CURRICULUM AND SYLLABUS(R2015)

CHOICE BASED CREDIT SYSTEM

(Applicable to the batches admitted from July 2015)

B. Arch – BACHELOR OF ARCHITECTURE

(FULL TIME)

I-X SEMESTERS

SEMESTER – I

SUBJECT CODE	SUBJECT TITLE	L	T	P/S	CREDITS
	STUDIO				
BAR 1LI	Architectural Basic Design I	0	0	14	6
	THEORY				
BAR 101	Theory of Architecture I	3	0	0	3
BAR 102	History of Architecture I	3	0	0	3
BAR 103	Mechanics of structures I	3	0	0	3
BMA 102	Mathematics	3	0	0	3
BEN 102	English	2	0	1	3
	THEORY / STUDIO				
BAR 106	Architectural Graphics & Art studio	0	0	6	3
	TOTAL	**35**			**24**

SEMESTER – II

SUBJECT CODE	SUBJECT TITLE	L	T	P/S	CREDITS
	STUDIO				
BAR 2LI	Architectural Design - II	0	0	11	6
	THEORY				
BAR 201	Theory of Architecture II	3	0	0	3
BAR 202	History of Architecture II	1	0	2	3
BAR 203	Mechanics of structures II	3	0	0	3
BAR 204	Personality development, soft skills enhancement	3	0	0	3
	THEORY / STUDIO				
BAR 205	Architectural Graphics II	0	0	6	3
BAR 206	Materials & construction I	2	0	4	4
	TOTAL	**35**			**25**

SEMESTER – III

SUBJECT CODE	SUBJECT TITLE	L	T	P/S	CREDITS
	STUDIO				
BAR 3LI	Architectural Design - III	0	0	13	6
	THEORY				
BAR 301	Building services I	3	0	0	3
BAR 302	History of Architecture III	3	0	0	3
BAR 303	Design of structures I	3	0	0	3
BAR 304	Climate & Environmental studies	3	0	0	3
	THEORY / STUDIO				
BAR 305	Computer studio I	0	0	4	3
BAR 306	Materials & construction II	2	0	4	4
	TOTAL	**35**			**25**

SEMESTER – IV

SUBJECT CODE	SUBJECT TITLE	L	T	P/S	CREDITS
	STUDIO				
BAR 4LI	Architectural Design - IV	0	0	13	6
	THEORY				
BAR 401	Building services II	3	0	0	3
BAR 402	History of Architecture IV	3	0	0	3
BAR 403	Design of structures II	3	0	0	3
BAR 404	Site planning & Landscape Architecture	0	0	4	3
BAR 405	Climate & Built Environment	3	0	0	3
	THEORY / STUDIO				
BAR 406	Materials & construction III	2	0	4	4
	TOTAL	**35**			**25**

SEMESTER – V

SUBJECT CODE	SUBJECT TITLE	L	T	P/S	CREDITS
	STUDIO				
BAR 5LI	Architectural Design - V	0	0	13	6
	THEORY				
BAR 501	Building services III	3	0	0	3
BAR 502	History of Architecture V	3	0	0	3
BAR 503	Design of structures III	3	0	0	3
BAR 5E1	**ELECTIVE I**	3	0	0	3
	THEORY / STUDIO				
BAR 5L2	Computer studio - II	0	0	4	3
BAR 504	Materials & construction IV	2	0	4	4
	TOTAL	**35**			**25**

SEMESTER – VI

SUBJECT CODE	SUBJECT TITLE	L	T	P/S	CREDITS
	STUDIO				
BAR 6LI	Architectural Design - VI	0	0	16	8
	THEORY				
BAR 601	Building services IV	3	0	0	3
BAR 602	History of Architecture VI	3	0	0	3
BAR 603	Cost estimation	3	0	0	3
BAR 604	Human settlements & Planning	2	0	2	4
BAR 6E2	**ELECTIVES II**	3	0	0	3
	TOTAL	**35**			**24**

SEMESTER – VII

SUBJECT CODE	SUBJECT TITLE	L	T	P/S	CREDITS
	STUDIO				
BAR 7LI	Architectural Design - VII	0	0	18	8
	THEORY				
BAR 701	Urban design	2	0	2	4
BAR 702	Research Methodology & Pre thesis work	2	0	2	4
BAR 703	Professional Ethics & Practice	3	0	0	3
BAR 704	Project Management	3	0	0	3
BAR 7E3	**ELECTIVE III**	3	0	0	3
	TOTAL	**35**			**25**

SEMESTER – VIII

SUBJECT CODE	SUBJECT TITLE	L	T	P/S	CREDITS
	THEORY				
BAR 801	Urban Housing	2	0	2	4
BAR 802	Vernacular Architecture	2	0	2	3
BAR 8E4	**ELECTIVES IV**	3	0	0	3
BAR 8E5	**ELECTIVES V**	3	0	0	3
	STUDIO				
BAR 8L1	Architectural Design - VIII	0	0	18	8
	TOTAL				**21**

SEMESTER – IX

SUBJECT CODE	SUBJECT TITLE	L	T	P/S	CREDITS
BAR 9PT	Practical Training - I				14
	TOTAL				**14**

SEMESTER – X

SUBJECT CODE	SUBJECT TITLE	L	T	P/S	CREDITS
	STUDIO				
BAR XTH	Thesis	**0**	**0**	32	18
	THEORY				
BAR XE6	**ELECTIVES VI**	3	0	0	3
	TOTAL	**35**			**21**

TOTAL CREDITS FOR THE PROGRAMME – 222

PROFESSIONAL ELECTIVE I

SUBJECT CODE	SUBJECT TITLE	L	T	P/S	CREDITS
BAR 5E1	ENERGY EFFICIENT ARCHITECTURE	3	0	0	3
BAR 5E1	THEORY OF DESIGN	3	0	0	3

PROFESSIONAL ELECTIVE II

SUBJECT CODE	SUBJECT TITLE	L	T	P/S	CREDITS
BAR 6E2	SUSTAINABLE ARCHITECTURE	3	0	0	3

PROFESSIONAL ELECTIVE III

SUBJECT CODE	SUBJECT TITLE	L	T	P/S	CREDITS
BAR 7E3	INTERIOR DESIGN	3	0	0	3
BAR 7E3	LANDSCAPE AND ECOLOGY	3	0	0	3

PROFESSIONAL ELECTIVE IV

SUBJECT CODE	SUBJECT TITLE	L	T	P/S	CREDITS
BAR 8E4	EARTHQUAKE RESISTANT BUILDINGS	3	0	0	3
BAR 8E4	CONTEMPORARY PROCESS IN ARCHITECTURE	3	0	0	3

PROFESSIONAL ELECTIVE V

SUBJECT CODE	SUBJECT TITLE	L	T	P/S	CREDITS
BAR 8E5	ADVANCED STRUCTURES	3	0	0	3
BAR 8E5	STEEL ARCHITECTURE AND DESIGN	3	0	0	3

PROFESSIONAL ELECTIVE VI

SUBJECT CODE	SUBJECT TITLE	L	T	P/S	CREDITS
BAR XE6	ARCHITECTURAL CONSERVATION	3	0	0	3
	ARCHITECTURAL JOURNALISM AND PHOTOGRAPHY				

PROFESSIONAL CORE COURSES (PC)

Sl.No	Code No	Course Title	Contact Periods	L	T	P	C
1	BAR102	HISTORY OF ARCHITECTURE I	3	3	0	0	3
2	BAR101	THEORY OF ARCHITECTURE I	3	3	0	0	3
3	BAR1L1	ARCHITECTURAL BASIC DESIGN	12	0	0	12	6
4	BAR106	ARCHITECTURAL GRAPHICS AND ART STUDIO	5	1	0	4	3
5	BAR205	ARCHITECTURAL GRAPHICS – II	5	1	0	4	3
6	BAR2L1	ARCHITECTURAL DESIGN I	12	0	0	12	6
8	BAR202	HISTORY OF ARCHITECTURE II	3	3	0	0	3
9	BAR3L1	ARCHITECTURAL DESIGN II	14	0	0	14	8
10	BAR302	HISTORY OF ARCHITECTURE III	3	3	0	0	3
11	BAR404	SITE PLANNING & LANDSCAPE ARCHITECTURE	3	2	0	2	3
12	BAR4L1	ARCHITECTURAL DESIGN IV	14	0	0	14	8
13	BAR402	HISTORY OF ARCHITECTURE IV	3	3	0	0	3
14	BAR5L1	ARCHITECTURAL DESIGN V	14	0	0	14	8
15	BAR502	HISTORY OF ARCHITECTURE V	3	3	0	0	3
16	BAR604	HUMAN SETTLEMENT AND PLANNING	3	3	0	0	3
17	BAR603	COST ESTIMATION	3	0	0	0	3
18	BAR6L1	ARCHITECTURAL DESIGN VI	16	0	0	16	8
19	BAR602	HISTORY OF ARCHITECTURE V	3	3	0	0	3
20	BAR701	URBAN DESIGN	3	3	0	0	3
21	BAR 702	RESEARCH METHODOLOGY & PRE THESIS WORK	2	0	0	2	4
22	BAR202	THEORY OF ARCHITECTURE II	3	3	0	0	3
23	BAR801	URBAN HOUSING	3	3	0	0	3
24	BAR 802	VERNACULAR ARCHITECTURE					
25	BAR7L1	ARCHITECTURAL DESIGN VII	16	0	0	16	8
26	BAR8L1	ARCHITECTURAL DESIGN VIII					
27	BARX	THESIS	**32**	**0**	**0**	**32**	**18**
Total Credits	**120**						

BUILDING SCIENCESAND APPLIED ENGINEERING (BS & AE)

SL.NO.	COURSE CODE	COURSE TITLE	CONTACT PERIODS	L	T	P	C
1	BAR103	MECHANICS OF STRUCTURES I	4	2	2	0	3
2	BAR102	MATHEMATICS	4	2	2	0	3
3	BAR203	MECHANICS OF STRUCTURES II	4	2	2	0	3
4	BAR206	MATERIALS AND CONSTRUCTION I	5	1	0	4	3
5	BAR303	DESIGN OF STRUCTURES I	3	2	2	0	3
6	BAR301	BUILDING SERVICES I	3	2	0	2	3
7	BAR306	MATERIALS AND CONSTRUCTION II	4	1	0	4	3
8	BAR403	DESIGN OF STRUCTURES II	4	2	2	0	3
9	BAR401	BUILDING SERVICES II	3	2	0	2	3
10	BAR405	CLIMATE & BUILT ENVIRONMENT	3	3	0	0	3
11	BAR406	MATERIALS AND CONSTRUCTION III	5	1	0	4	3
12	BAR503	DESIGN OF STRUCTURES III	4	2	2	0	3
13	BAR501	BUILDING SERVICES III	4	2	0	2	3
14	BAR504	MATERIALS AND CONSTRUCTION IV	5	1	0	4	3
Total Credits							**54**

PROFESSIONAL ABILITY ENHANCEMENT COURSES (PAEC)

SL.NO.	COURSE CODE	COURSE TITLE	CONTACT PERIODS	L	T	P	C
1	BEN102	ENGLISH	3	2	0	2	3
2	BAR204	PERSONALITY DEVELOPMENT & SOFT SKILLS ENCHANCEMENT	4	2	0	2	3
3	BAR305	COMPUTER STUDIO I	4	1	0	4	3
4	BAR5L2	COMPUTER STUDIO II	4	1	0	4	3
5	BAR704	PROJECT MANAGEMENT	3	3	0	0	3
6	BAR703	PROFESSIONAL ETHICS AND PRACTICE	3	3	0	0	3
7							
8	BAR9PT	PRACTICAL TRAINING	FULL DURATION OF SEMESTER	–	–	–	**12**
Total Credits							**36**

SUMMARY OF CURRICULUM STRUCTURE AND CREDIT & CONTACT HOUR DISTRIBUTION

S.No	Sub Area	Credit As per Semester										No. of Credit	% of credit
		I	II	III	IV	V	VI	VII	VIII	IX	X		
1	Professional Core (PC)	15	12	11	14	11	14	14	11	-	18	120	52.63%
2	Building Sciences and Applied Engineering (BS & AE)	6	6	12	12	9	6	3	-	-	-	54	23.68%
3	Professional Ability Enhancement Courses (PAEC)	3	3	3	-	3	-	3	9	12	-	36	15.78%
4	Professional Elective	-	-	-	-	3	3	3	6	-	3	18	8%
	Total Credit	24	21	26	26	26	23	23	26	12	21	228	-
	Total Contact Hour	34	34	34	35	37	34	33	36	FULL SEMESTER	35		-

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR 1LI	ARCHITECTURAL BASIC DESIGN	0	0	14	6

OBJECTIVES:

- To understand the elements and principles of Basic Design as the building blocks of Creative design through exercises that will develop originality, expression, skill and creative thinking.
- To involve students in a number of exercises to understand the grammar of Design and Visual composition.
- To enable the understanding of 3D Composition by involving students in a number of exercises which will help generation of a form from a two dimensional / abstract idea.
- To understand architecture as a craft, of making and of putting together.
- To sensitize students to materials both planar and plastics and Processes involved in working with them.
- To draw inspiration and clues from nature.
- To introduce Drawing as an analytical tool.
- To introduce students to History of Design and craft.

UNIT I INTRODUCTION TO BASIC DESIGN 1 9

Introduction to architectural design –

- Line
- Direction
- Shape
- Size
- Texture
- Value colour.

UNIT II WORKSHOP

Using of carpentry, masonry model making, space frame models, such as match sticks, straw, steel wire etc.

TOTAL: 75 PERIODS

Text Book:

1. Francis DK Ching – "Form space and order"

2. VS. Prammar – "Design fundamentals in architecture"

References:

1. Edward D. Mills – "Planning the Architects handbook, London 1985"

2. Paul Laseau , Graphic thinking for Architects and Designers, John Wiley & Sons, New York , 2

COURSE OUTCOMES (COs)	
The student will be able	
CO1	Identify the basic design elements and principles and applying the same in designing
CO2	Develop the skills of art appreciation and sense of aesthetics by studying, correlating the basic design principles and works of master architects.
CO3	Developing the skills of expressing the ideas visually through sketching, renderings using different media.
CO4	An ability to engage and combine the elements of design in spontaneous as well as intentional ways in order to create desired qualities and effects.
CO5	An understanding of the qualities of different elements as well as their composite fusions.
C06	An ability to engage and combine the elements of design in spontaneous as well as intentional ways in order to create desired qualities and effects

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1				L		M		L			L	
	CO2	H											M
	CO3		M		L			H		H			
	CO4					L	M		L		M		
	CO5		M									L	
	C06							H					L
3	Category	Professional Core (PC)											
4	Approval	26th Meeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR 101	THEORY OF ARCHITECTURE – I	3	0	0	3

OBJECTIVES:

- To understand that architecture is a dynamic interface between man and his environment: through its constituent aspects and elements.
- To understand the various principles of architectural design, with which the above objective is attained.
- To understand that architecture is communicative medium involving aspects of expression and experience.
- To understand the various possibilities of approaching architectural design, through examples from historical and contemporary examples.

UNIT I INTRODUCTION **9**

APPLICATION OF COLOUR IN ARCHITECTURE

Effect of Colour in architecture – Colour symbolism.

UNIT II

ORGANISATION OF FORMS AND SPACES

a) Spatial Relationship

i) Space within space

ii) Interlocking Spaces

iii) Adjacent spaces

iv) Space linked by a common space.

b) Spatial Organization – influencing factors and their types

i) Centralized

ii) Linear

iii) Radial

iv) Clustered

v) Grid

c) Articulation of forms and spaces types

i) Edges and Corners

ii) Surface.

UNIT III

Factors influencing the character and style of buildings. Study of examples from Buddhist, Hindu and Islamic Architecture in India – Greek, Roman, Gothic, Renaissance, Modem and Post Modern Movement.

UNIT IV

PRINCIPLES OF COMPOSITION

Unity, Harmony and specific qualities of design to include Dominance, Punctuating Effect, Dramatic Effect, Fluidity, Climax, Accentuation and Contrast with building examples.

UNIT V

CIRCULATION

Function of building circulation components of building circulation – The building approach, the building entrance, Configuration of the Path, path space relationship, from of circulation space with examples.

Simple circulation diagram for buildings.

TOTAL: 45 PERIODS

Text Book:

1. Sir-Bannister Fletcher – "A History of Architecture", Butterworths, London, 1987.

2. Francis D.K. Ching, Architecture – "Forms, Space and Order", Van Nostrand Publications, New York, 1979.

3. Paul Alan Johnson - The Theory of Architecture - Concepts and Themes - Van Vostrand Reinhold Co – 1994

4. V.S. Pramar, Design Fundamental in Architecture - Somaiya Publications Pvt. Ltd. New Delhi,1973

References:

1. Ernest Burden – "Elements of Architectural Design" – A Visual resource, Van Nostrand Reinhold, 1994.

COURSE OUTCOMES (COs)	
The student will be able	
CO1	To know the difference between architecture and engineering.
CO2	Understand the primary elements and forms in architecture, their role and impact on architecture and the development of new forms by applying the same techniques.
CO3	Understand about the elements and fundamentals Techniques of space making of space making.
CO4	An exposure to the principles of architecture and applications of the same in buildings.
CO5	A thorough understanding on the definition of architecture; elements of architectures of form.
C06	An understanding the meaning of character and style of buildings with examples.

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H		M	H					H	H		H
	CO2		H		M	H			M		L	H	
	CO3	H				L				M			H
	CO4		L							M		M	
	CO5	H	M	M	M				M		H		H
	C06			M			L						
3	Category	Professional Core (PC)											
4	Approval	32nd Meeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR 102	HISTORY OF ARCHITECTURE – I	3	0	0	3

OBJECTIVES:

- To inform about the development of architecture in the Ancient Western World and the cultural and contextual determinants that produced that
- To understand architecture as evolving within specific cultural contexts including aspects of politics, society, religion and climate.
- To gain knowledge of the development of architectural form with reference to Technology, Style and Character in the prehistoric world, Ancient Egypt, West Asia, Greece , Rome, Medieval times and Renaissance period.

UNIT I

PREHIST AND EGYPT 9

Old stone age – the agricultural revolution – the new stone age – development of shelter – nature of art and architecture – out line of architectural character pyramid of Cheops – temple of Ammoon etc.,

UNIT II

WEST ASIA 8

Sumerian, Babylonian and Persian cultures – architectural characters – Ziggurats – Palace of Sargoan – Palace at Persepolis

UNIT III

GREECE 10

Evolution of city states – arts culture development – classical periods – architectural characters – orders in architecture examples Parthenon of Athens, Erecthion, Theatre etc.,

UNIT IV

ROME 6

Republican States – factors influencing architecture – out line of architectural character – examples.

UNIT V

EARLY CHRISTIAN AND BYZANTINE 12

British and spread of Christianity – church forms – out line of architectural character and various examples.

TOTAL: 45 PERIODS

Text Book:

1. Sir Banister Fletcher "A History of Architecture"

References:

1. Spiro Kostof – "A History of Architecture"
2. Pier Liugi Nervi – "History of World Architecture New York 1972"

COURSE OUTCOMES (COs)	
The student will be able	
CO 1	***Understand*** the origin of architecture in prehistoric age in western world.
CO 2	***Understand*** the origin of architecture in prehistoric age in western world.
CO 3	Know the importance of the history, relate to design thinking, cultural aspiration, social needs, and the evolution of the built environment
CO 4	Interpret the characteristics of designing of temples and tombs by Egyptian, Babylonian, and Mesopotamian, Greek, Rome and Byzantine builders.
CO 5	Compare spatial and stylistic qualities associated with church architecture
C06	An Understanding of architecture as an outcome of various social, political and economic upheavals, and as a response to the cultural and context.

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H	H	M		M			M	H	H		H
	CO2	L		M	M						L	H	L
	CO3		L			L			M				H
	CO4									M		M	H
	CO5		M	M	M				M		H	W	
	C06				M				L				
3	Category	Professional Core(PC)											
4	Approval	32nd Meeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR 103	MECHANICS OF STRUCTURES I	3	0	0	3

OBJECTIVES:

- To enable a student to understand the effect of action of forces on a body and the concept of equilibrium of the body through exercises.
- To determine the internal forces induced in truss members due to external loads by working out
- problems.
- To calculate the sectional properties (centroid, moment of inertia, section modulus and radius of gyration) for various sections by working out problems.
- To study the stress – strain behaviours of steel and concrete due to axial loads and to determine the stresses and strains developed in solids due to external action through select problems.
- To derive the relationship between elastic constants and solving problems.

UNIT I **9**

FORCES AND STRUCTURAL SYSTEMS

Types of force systems – Resultant of parallel forces – principle of moments –principle of equilibrium – simple problems.

UNIT II **8**

ANALYSIS OF PLANE TRUSSES

Introduction to determinate and indeterminate Plane trusses – Analysis of simple supported and cantilevered trusses by method of joints and method of sections.

UNIT III **10**

PROPERTIES OF SECTION

Centroid – Moment of Inertia – Section modulus – Radius of gyration – Theorem of perpendicular axis – Theorem of parallel axis.

UNIT IV **6**

ELASTIC PROPERTIES OF SOLIDS

Stress strain diagram for mild steel, High tensile steel and concrete – concept of axial and volumetric stresses and strains.

UNIT V **12**

ELASTIC CONSTANTS

Elastic constants – Relation between elastic constants – Application to problem

Text Book:

1. P.C. Punmia, "Strength of Materials and Theory of Structures", Vol 1, Laxmi Publications, Delhi 1994.

2. S. Ramamurtham, "Strength of Materials", Dhanpatrai & Sons, Delhi 1990.

References:

1. W.a. Nash, "Strength of Materials" – Schaums Series – McGraw Hill Book Company, 1989.

2. R.K. Bansal – "Engineering Mechanics and Strength of Materials" – Lakshmi Publications, Delhi 1990.

3. R.K. Rajput – "Strength of Materials', S. Chand & Company Ltd., New Delhi 1996.

TOTAL: 45 PERIODS

OUTCOMES:

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

- Apply the concepts of action of forces on a body and should be able to apply the equilibrium concepts.
- Analyze any type of determinate trusses with different end conditions.
- To solve the sectional properties for any geometrical shapes.
- The concepts of elastic constants and its applications for various types of problems with a thorough understanding of stresses and strain.

TEXTBOOKS:

1. R.K.Bansal – A text book on Engineering Mechanics, Laxmi Publications, Delhi, 2005.

2. R.K.Bansal – A textbook on Strength of Materials, Lakshmi Publications, Delhi 2007.

REFERENCES:

1. P.C.Punmia, Strength of Materials and Theory of Structures; Vol. I, Lakmi Publications, Delhi 1994.

2. S. Ramamrutham, Strength of Materials – Dhanpatrai & Sons, Delhi, 1990.

3. W.A.Nash, Strength of Materials – Schaums Series – McGraw Hill Book Company, 1989.

4. R.K. Rajput – Strength of Materials, S. Chand & Company Ltd. New Delhi 1996.

COURSE OUTCOMES (COs)	
The student will be able	
CO1	***Relate*** with basic engineering mechanics concepts required for analyzing static structures. To calculate resultant of parallel forces
CO2	***Solve*** the problems of Free body Diagram & principle of equilibrium
CO3	***Identify*** and model various types of loading and support conditions that act on structural
CO4	***Analyze*** any type of determinate trusses with different end conditions.
CO5	***Demonstrate*** the relations for centroid and Center of Gravity and ***Analyze*** the moment of
C06	***Apply*** the knowledge of stress and strain in the design of structural elements.

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H	H	M		M			M	H	H		H
	CO2	L	H		M		M		M		L	H	L
	CO3					L						M	
	CO4	H	L			L		L		M		M	H
	CO5	H	M	M	M				M		H		H
	C06			h								l	
3	Category	Building sciences and Applied Engineering (BS & AE)											
4	Approval	30th Meeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BMA 102	MATHEMATICS	3	0	0	3

OBJECTIVES:

- Identifying practical problems to obtain solutions involving trigonometric and exponential functions.
- Studying the properties of lines and planes in space, along with sphere and providing a tool too.
- Understand 3D material.
- Understand functions of more than one variable, along with differentiation under integral sign.
- Solving differential equation of certain type and analyzing data collection and interpretation of results using statistical tools.

UNIT I **9**

PLANE AND LINES

Direction rations and cosines of a line – equations of a plane and intersecting planes – symmetric form of a straight line – angle between lines and planes – coplanar lines – skew lines – shortest distance.

UNIT II **8**

CURVED SURFACES 8

Equations of Sphere – section by a plane – tangent plane – standard equations of cone, cylinder and conoid – Properties.

UNIT III **10**

MATRICES

Characteristic equation, values and eigen vectors of a real matrix cayley – Trigonom Theorem without proof, reduction of a real symmetric matrix to diagonal from.

UNIT IV **6**

INTEGRATION

Integration of rational, trigonometric and irrational functions, properties of definite integrals, reduction formulae for trigonometric functions.

UNIT V **12**

ORDINARY DIFFERENTIAL EQUATIONS AND FUNCTIONS OF TWO VARIABLES

Linear second order and higher order different equations with constant co effienients. Differential equations with variable coefficients of Euler type. Partial differentiation, total derivative, approximations, Taylor's theorem with remainder Maxima and Minima envelope.

TOTAL: 45 PERIODS

Text Book:

1. B.S. Grewal, "Higher Engineering Mathematics", Khanna Publications, Delhi

2. P. Kandhaswamy, K. Thilagavathi, "Engineering Mathematics" Vol – I & II, S. Chandhan Publishers – 1998.

2. Narayan S. Manickavachagam Pillai T.K. Ramanaiah G – "Advanced Mathematics for Engineering Students" – Vol I & II S. Viswanathan Printers – 1993.

References :

1. V.Ramamurthy – Engineering Mathametics – Vol I & II, Amudha publications

COURSE OUTCOMES (COs)	
The student will be able	
CO1	***Find*** area and volumes of simple, complex and irregular geometries using various rules.
CO2	***Apply*** Trignometry on architectural elements
CO3	***Demonstrate*** the appropriate role of the mathematical concepts learnt.
CO4	***Analyze*** Tally charts, Tables and graphs and statistical diagrams using for various types of data.
CO5	***Explain*** about various architectural proportioning systems and calculating the same.
C06	Understanding of the appropriate role of the mathematical concepts learnt

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H	H	M	H	M			M	H	H		H
	CO2			M				M			L	H	L
	CO3		L			L						M	
	CO4	H				L	H			M			
	CO5			M	M				M		H	W	H
	C06		l					h					
3	Category	Basic Sciences (BS)											
4	Approval	31St Meeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BEN 102	ENGLISH	3	0	0	3

OBJECTIVES: The English Language Course for students of architecture would,

- Enhance their communication skills in English by developing their listening, speaking, reading and writing skills.
- Develop their speaking skills with specific reference to prospective/actual clients, suppliers, business partners and colleagues.
- Enhance their reading particularly, rules and regulations, catalogues, architecture journals and textbooks.
- Develop their writing skills especially writing emails, proposals and reports.

UNIT I **9**

LISTENING

Importance of listening, how listening plays a vital role listening comprehension - listening to audio cassettes – listening to interviews & group discussion and debate.

UNIT II **8**

SPEAKING

Defining things – Describing objects using adjectives – comparing – pronunciation practice –world stress – discourse markets – intonation – role play.

UNIT III **10**

READING

Detailed reading – interpreting tables, flow charts, tree diagram, pie diagram – understanding discourse coherence – guessing the meaning and training sentences (technical as well as general meaning) – vocabulary analysis.

UNIT IV **6**

WRITING

Sentence Patterns – SVO, SVOC, SVOCA…., recommendations and suggestions – preparing checklists, preparing an agenda to organize any program – formal and informal letters – preparing resume paragraph writing – note making and precise writing.

UNIT V **12**

LANGUAGES FOCUS

Parts of speech, prefixes & suffixes, degrees of comparison, prepositions, types of verbs, punctuation, error detection & correction synonyms and antonyms.

TOTAL: 45 PERIODS

Text Book:

1. "English for Engineers and technologist" Vil. I Orient Longman Ltd.

References:

1. Narayanasami, "Strength your writing"-Orient Longman revised edition.
2. Picket and laster, "Technical Writing" – New York Haper and Row publication.
3. Swan, Michel, "Basic English" – OUP
4. Technical communication – Principles – Meenakshi Raman & Sangeetha Sharma, Oxford University

COURSE OUTCOMES (COs)	
The student will be able	
CO1	*Identify* different strategies of reading and writing skills.
CO2	*Revise* the library skills in their learning process.
CO3	*Apply* different techniques to various types of material such as a novel, newspaper, poem, drama and other reading papers.
CO4	*Use* visual aids to support verbal matters into language discourse.
CO5	*Prepares* to face the written exam with confidence and without any fear or tension.
C06	Speak convincingly, express their opinions clearly, initiate a discussion, negotiate, and argue using appropriate communicative strategies.

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	M	H			M			M		H		H
	CO2			M	M	H					L	H	L
	CO3		L			L	L			M			
	CO4		L			L		H		M		M	
	CO5		M	M	M				M		H	W	H
	C06	L					M						
3	Category	Professional Ability Enhancement Courses (PAEC)											
4	Approval	30th Meeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR 1L2	ARCHITECTURAL GRAPHICS & ART STUDIO	0	0	6	3

OBJECTIVES:

- To understand drawing as a medium to visualize and communicate design ideas.
- To understand the concepts of Architectural Drawing with the introduction of drafting fundamentals.
- To understand the language of Architectural representations through Architectural Drawing systems and to introduce the basics of measured drawing.

UNIT I **9**

GEOMETRICAL DRAWING: INTRODUCTION

Introduction to fundamentals of drawing/ drafting: Construction of lines, line value, line types, lettering, dimensioning, representation, format for presentation, etc.; Construction of angles, use of scales; Construction of circles, tangents, curves and conic sections.

Fundamentals of art – Elements and principles of drawing – Types of drawing – Visual effects of drawing – Scale drawing – Composition – Approach to sketching – Study of light, shade and shadow.

Exercise involving Indoor and outdoor sketching – Spot sketching - Drawing from imagination – Study of 3 D effects through light and shade from nature – Tools and materials – Illustration – Study of human being and mobiles.

UNIT II **8**

GEOMETRICAL DRAWING: PLANE & SOLID GEOMETRY

Construction and development of planar surface – square, rectangle, polygon etc Introduction of multi-view projection – projection of points, lines and planes.

Multi- view projection of solids – cube, prism, pyramids, cones, cylinders etc.; Sections of solids, true shape of solids.

UNIT III **10**

GEOMETRICAL DRAWING: AXONOMETRICPROJECTION & MEASURED DRAWING

Isometric, plan oblique and elevation oblique projection of planes, solids and combination of solid etc.

Introduction to fundamentals of measured drawing, line value, lettering, drawing representation, format for presentation methods and technique of measuring buildings and their details. Measured drawing of simple objects like furniture, detailing in terms of construction, ornamentation, measured drawing of building

components like column, door, window, cornice, etc

UNIT IV **6**

PAINTING I & II

Introduction of painting – Colour – Properties of colour – Colour schemes – Types of colours - Application and visual effects of colour. Exercise involving Study of colour – Properties of paper, brush and other tools – Basic washes – 3D effects from still-life, nature and built environment using mono chromatic and multi colour.

Indoor and outdoor painting – Rendering techniques Exercise involving Water colour – Water soluble colour pencil – Tempra – Acarali – Water soluble oil colour – Oil colour – Pen and ink –

Brush – Air brush – Mixed mediums – Study of multi colour and 3D effects from nature and built environment.

UNIT V SCULPTURE **6**

Introduction of sculpture –Sculpture using various materials such as clay, plaster of Paris, paper mache, and wire.

UNIT VI APPLIED ART **6**

Graphic representations – Visual composition and Abstraction- Exercises involving Logo design, collage, calligraphy and printing.

OUTCOMES

- An understanding on the concepts of architectural drawing as well as representation skills are imparted.
- An understanding on the building representation in 2D and 3D among students in addition to preparation of measured drawing.
- The students are exposed to various mediums and techniques.
- Bold enough to handle to the colours for the presentation sheets.
- The students are mastery in sketching and expression through forms.
- The skill and knowledge gained through the subject is most useful to their profession

TOTAL: 45 PERIODS

TEXTBOOKS:

1. IH. Morris, Geometrical Drawing for Art Students - Orient Longman, Madras, 2004.

2. Francis D. K. Ching, Architectural Graphics, John – Wiley and Sons, 2009.

3. Fraser Reekie, Reekie's Architectural Drawing, Edward Arnold, 1995

4. Webb, Frank, "The Artist guide to Composition", David & Charles, U.K., 1994.

5. Drawing a Creative Process", Ching Francis, Van Nostrand Reinhold, New York, 1990.

6. Alan Swann, Graphic Design School, Harper Collins,1991.

REFERENCES:

1. C.Leslie Martin, Architectural Graphics, The Macmillan Company, New York, 1978.

2. Moivahuntly, "The artist drawing book", David & Charles, U.K., 1994.

3. Arundell (Jan) Exploring sculpture, Mills and Boon, London/Charles, T. Brand Ford Company, U.S.A.

4. The art of drawing trees, heads, colours, mixing, drawing, landscape and painting,water colour, oil colour, etc. – The Grumbacher Library Books, New York –1996.

5. Caldwell Peter, "Pen and Ink Sketching", B.T. Bats ford Ltd., London, 1995.

COURSE OUTCOMES (COs)	
The student will be able	
CO1	***Demonstrate*** the usage of various drafting tools in the process of preparing drawings.
CO2	***Assess*** 3D objects and represent them in drawings.
CO3	***Construct*** lines, Planar and solid geometry of simple and complex objects in reduced scales.
CO4	***Compare*** the various types of projections
CO5	***Construct*** Orthographic projections, Axonometric and Isometric views of three dimensional objects in reduced scales.
C06	An understanding on the concepts of architectural drawing as well as representation skills are imparted

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1			L									
	CO2	H			H			M			L		
	CO3					M							L
	CO4		M	L	H		L					L	
	CO5									M			
	C06		M										
3	Category	Professional Core (PC)											
4	Approval	22nd Meeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR 2 LI	ARCHITECTURAL DESIGN – II	0	0	11	6

UNIT I

DESIGN STUDIO

The problems involve simple space organization starting with single space single use – small span Horizontal movement – single bay – passive energy type spaces. The study of space standards and an anthropometrics related to each problem is stressed upon. Anthropometry as related to physically handicapped and elderly persons is required to be studies.

Examples and exercises include

a) Toilet for a physically handicapped person, Hostel Room, Bedroom, Kitchen.

b) Shop, Workshop, Pavilions, Snack bar.

c) Residence, Petrol bunk, fire station, police station, cottage for an elderly couple.

UNIT II WORKSHOP

Elementary models including wall surfaces floral designs, ceilings, glass areas; law water, bodies etc., Block models of small campuses using wood, the ramacol mount broad, soap, soap, corkboard, etc., Detailed model of a small building like branch bank, small residence, bus shelter, snack bar, including landscape details.

TOTAL: 180 PERIODS

References:

Design Studio

1. "E and O.E Planning", L life Book Ltd., London, 1973

2. De. Chiara and Callender, "Timer – saver standards for building types" McGrawHill Co., New York, 1973.

3. Sid Delk Mar Leach, "Techniques of Interior Design Rendering and Presentation", McGraw Hill Co., New York, 1973.

Workshop II

1. Wenninger (Magrus. J) "Sperical Models", Cambridge University Press, 1979.

2. Arundell (Jan), "Exploring Sculpture", Mills and Boom, London/Charles T. Brandford Company, USSA, 1972.

3. John W. Mills, "The Technique of Sculpture", B.T. Batsford Ltd., New York Reinhold Publishing Corpn., London, 1966.

4. Jannsen Constructional Drawing and Architectural models, KariKramer Verlag, Stuttgart

COURSE OUTCOMES (COs)	
The student will be able	
CO1	Demonstrate the knowledge on arriving spatial requirements for various human activities
CO2	Demonstrate the knowledge on anthropometry and ergonomics in architectural design.
CO3	Interpret the case study examples to develop knowledge on architectural design.
CO4	Design of single spaces with the understanding of structural, utility, aesthetics and material considerations.
CO5	Develop a neat presentation drawings scale models using various media
C06	Learn to reciprocate and sensitize the design/concept to the environment and the design skill of the project

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H			H	M			M	H	H		H
	CO2	L		M		H			M		L	H	L
	CO3					L				M		M	
	CO4		L			L				M			
	CO5	H	M	M	M				M		H		H
	C06					L						M	
3	Category	Professional Core(PC)											
4	Approval	32nd Meeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR 201	THEORY OF ARCHITECTURE – II	3	0	0	3

OBJECTIVES:

- To introduce the large scale changes from 1960s as context for new thought in architecture.
- To give exposure to the critiques of modern architecture.
- To study in detail the different post modern directions in architecture.
- To give an outline of architectural approaches across the world from late 20^{th} century.
- To give an understanding of the trajectory of post independence architecture of India till the present.

UNIT I **9**

INTRODUCTION

Developments during the industrial area, the great inventions and the reason for the birth of modern architecture.

UNIT II **8**

USE OF NEW MATERIALS

Extensive use of steel, glass and concrete – the great or the international exhibitions and their influence on architecture. The characteristic feature of modern architecture.

UNIT III **10**

CONTEMPORARY ARCHITECTS

The various moments, thoughts and philosophies of the 19th and 20th centuries to include Art Nouveau, Brutalism, Chicago school, constructivism, expressionism, Bauhaus, Functionalism, futurism, Neoclassicism, Organic architecture, Modular Co-ordination.

UNIT IV **12**

CONTEMPORARY ARCHITECTS

The three generations of architects : first generation to include L. Sullivan, F.L. Wright, Le Corbusier, Mies Van Der Rohe, Eric Mendelson. Walter Gropius, Richard Neutra. Second generation to include, Erro Sarrinen, Kenzo Tange, Louis Kahn, Minoru Yamasaki, Hugh Stubbins, Paul Rudolph, Skidmore Owings and Merrill.

UNIT V **6**

LATER TREND

Developments of prefabrication techniques, futuristic thoughts of Buck Minister Fuller.

TOTAL: 45 PERIODS

References:

1. Peter Collins, “Changing ideals in Modern Architecture”, Faber and Faber, London, 1985.
2. Bill Rise Bero, “Modern Architecture and Design”.
3. Kenneth Frampton, “Modern Architecture – A critical history” – Oxford University Press, 1980.
4. William J. Christ “Modern architecture since 1900”, Paidon Press Ltd., Oxford, 1982.

COURSE OUTCOMES (COs)	
The student will be able	
CO	Understand the impact of literature in architecture on philosophical development of
CO	Understand concepts, material and construct the alternative architectural methods
CO	Exposed to the master architects works and trace the development of evolution of their
CO 4	Understand the spatial organization and spatial qualities of different typologies of buildings
CO	Knowledge of the contemporary design process and apply the same in the architectural
C0	Understanding the conceptualization of architectural design with respect to program,

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/PO	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1				H	L	M		M		H	L	
	CO2				H	L	M		M		H		
	CO3				H	L	M		M		H		
	CO4				H		M						
	CO5				H		M						
	C06				H		M					L	
3	Categor	Professional Core(PC)											
4	Approva	37TH Meeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/ S	C
BAR 202	HISTORY OF ARCHITECTURE – II	3	0	0	3

OBJECTIVES:

- To give an overall understanding of the architecture in India up to the colonial period as parallel and sequential productions rising from the cumulative effect of forces operating and intersecting in the Indian subcontinent.
- To inform about specific and prominent modes of architecture in terms of evolution,
- Togive exposure to works that are architecturally exemplary and/or representative.
- To appreciate architecture as a giver of particular or universal meaning.

UNIT I **9**

ANCINET INDIA

Indus valley civilization – Culture and pattern of settlement. Impact of Aryan Culture – Vedic Village and the rudimentary forms of bamboo and wood wooden construction under the Mauryan Rule.

UNIT II **8**

BUDDHIST ARCHITECTURE

Hinayana and Mahayana Buddhism – Interaction of Hellenic & Indian ideas in Northern India – Architectural Production During Ashoka's Rule – Ashokan Pillar, Sarnath, Rock cut caves at Barabar, Sanchi Stupa, Salient features of a Chaitya hall and Vihara, Rock cut architecture in the Western and Eastern Ghats – Karli, Viharas at Nasik, Rani Gumpha, Udaigiri, Takti Bhai, Gandhara.

UNIT III **10**

HINDU ARCHITECTURE

Evolution of Hindu Temple – Early shrines of the Gupta and Chalukya periods – Tigawa Temple, Ladh Khan and Durga Temple, Aihole, Papanatha and Virupaksha Temples, Pattadakal.

UNIT IV **12**

DRAVIDIAN ARCHITECTURE

Dravidian culture – Rock cut products under Pallavas – Shore Temple, Mahabalipuram – Dravidian Order – Brihadeeswara Temple, Tanjore – Evolution and Form of Gopuram – Complexity in temple plan due to complexity in Ritual – Minakshi Temple, Madurai.

UNIT V **6**

INDO ARYAN STYLE

Salient Features of an Indo Aryan Temple – Lingaraja Temple, Bhuvaneswar – Sun Temple, Konarak, Kunds and Vavs – Sabali Kund – Adalaj – Surya Kund, Modhera.

TOTAL: 45 PERIODS

Test Book:

1. Percy Brown, "Indian Architecture (Buddhist and Hindu period)", Taraporevalla and sons, Bombay, 1983.

2. Satish Grover, "The Architecture of India (Buddhist and Hindu period)", Vikas Publishing Housing.

References:

1. Christoper Tadgelli, The History of Architecture in India From the Dawn of civilization to the end of Raj, Longman Group, U.K. Ltd., London, 1990.

COURSE OUTCOMES (COs)	
The student will be able	
CO1	***Understand*** the origin of various civilization and Architecture in India at different points of time
CO2	***Understanding*** the architectural responses with respect to materials, technology, style and character in the Buddhist, Hindu and Dravidian Architecture
CO3	***Understand*** the emergence of Islamic Architecture, form and function of different structures and the underlying geometry and concepts of decoration and colour.
CO4	***Gain Knowledge*** on the history related to design thinking, cultural aspiration, social needs, and the evolution of the built environment
CO5	An understanding of the diversity of architecture in India and sensitivity towards its syncretic aspects
C06	Ability to appreciate particular cultural, symbolic, spatial and material qualities in architecture and cities as givers of meaning and continuity.

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H	H	M	H	M			M	H	H		H
	CO2				M						L	H	
	CO3									M		M	
	CO4		L			L						M	
	CO5	H	M		M				M		H	W	H
	C06												
3	Category	Professional Core (PC)											
4	Approval	31St Meeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR 203	MECHANICS OF STRUCTURES II	3	0	0	3

OBJECTIVES:

To enable understanding of the basic concepts of shear force and bending moment acting on beams subjected to different loading conditions.

- To give knowledge about how to determine stresses in beams and strength ofsections.
- To give knowledge about how to calculate deflection of beams.
- To enable study of theory of columns.
- To give an understanding of the concept of indeterminate structure and its analysis.

UNIT I **9**

SHEAR FORCE AND BENDING MOMENT

Concept of sharing forces and Bending Moments – shear force and bending Moment diagrams for cantilver and simply supported beams subjected to point load, uniformly distributed loads and their combinations.

UNIT II **8**

STRESSES IN BEAMS

Theory of simple blending stresses in beams, share stresses in beams – examples on simple sections. Stress distribution diagrams.

UNIT III **10**

DEFLECTION OF BEAMS

Slope and deflection at a section – Double Integration and Macaulay's method for simply supported and cantilever beams.

UNIT IV **12**

THEORY OF COLUMNS

Short and long columns – Euler's method and its limitation. Derivations of Euler's formula (for different end conditions) – Rankine's formula for columns, examples, effect of eccentric loading.

UNIT V **6**

INTRODUCTION INDETERMINATE STRUCTURES

Concept in Analysis of continuous beams, fixed, beams, cantilevers, and partial frames (No problems)

TOTAL: 45 PERIODS

Text Books:

1. M.M. Ratwani, & V.N. Vazirani, "Analysis of Structures, Vol. I" Khanna Publishers – Delhi, 1987.

2. A.R. Jain and B.K. Jain, "Theory and Analysis of Structures, Vol I" Nemchand and Bros, Roorkeee, 1987.

3. B.C. Punmia, 'Strength of Materials and Theory of Structures" Vol I Laxmi publications New Delhi, 1994.

4. R.K. Rajput "Strength of Materials", S. Chand & Company Ltd., New Delhi 1996.

References:

1. Timoshenko, S.P. and D.H. Young, "Elements of Strength of Materials" Fifth Editions, East West Press, 1983.

COURSE OUTCOMES (COs)	
The student will be able	
CO1	***Identify*** various types of loading and support conditions that act on structural systems and Understand the basic principles used in the analysis of structural members.
CO2	***Apply*** the concepts for finding the shear forces and moments for various structural members.
CO3	***Apply*** the concepts for finding the shear forces and moments for various structural members.
CO4	***Analyze*** the long and short columns and determine the design loads.
CO5	***Analyze*** indeterminate beams like continuous beams and fixed beams
C06	***Analyze*** and solve the problems in practical installations of the structural members

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1			M	H	M			M	H	H		H
	CO2			M							L		L
	CO3		L							M			
	CO4	H								M			
	CO5	H		M	M						H		
	C06					l		H					
3	Category	Building Sciences and Applied Engineering (BS &AE)											
4	Approval	32nd Meeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BMA 204	PERSONALITY DEVELOPMENT, SOFT SKILLS ENHANCEMENT	3	0	0	3

OBJECTIVES

The objective of the training programme is bring about personality development with regard to the different behavioral dimensions that have far reaching significance in the direction of organizational effectiveness.

Unit 1 **9**

Leadership Introduction to Leadership, Leadership Power, Leadership Styles, Leadership in Administration.

Unit 2 **8**

Interpersonal skills – Conversation, Feedback, Feed forward

Interpersonal skills – Delegation, Humor, Trust, Expectations, Values, Status,

Unit 3 **5**

Communication Introduction to Communication, Flow of Communication, Listening, Barriers of Communication, How to overcome barriers of communication.

Unit 4 **6**

Stress Introduction to Stress, Causes of Stress, Impact Management Stress, Managing Stress

Unit 5 **6**

Group Dynamics Importance of groups in organization, and Team Interactions in group, Group Building Decision Taking, Team Building, Interaction with the Team, How to build a good team?

Unit 6 5

Time Time as a Resource, Identify Important Time Management Wasters, Individual Time Management Styles, Techniques for better Time Management.

Unit 7 **5**

Motivation Introduction to Motivation, Relevance and types of Motivation, Motivating the subordinates, Analysis of Motivation

TOTAL: 45 PERIODS

COURSE OUTCOMES (COs)	
The student will be able	
CO1	Students gets the ability to apply visual and verbal communication skills at various stages of architectural design and project delivery process.
CO2	Students gains self-confidence to get into the global world.
CO3	*Apply* different techniques to various types of material such as a novel, newspaper, poem, drama and other reading papers.
CO4	*Use* visual aids to support verbal matters into language discourse.
CO5	*Prepares* to face the written exam with confidence and without any fear or tension.
C06	Speak convincingly, express their opinions clearly, initiate a discussion, negotiate, and argue using appropriate communicative strategies.

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H	H	M	H	M			M	H	H		H
	CO2			M	M						L	H	L
	CO3									M			
	CO4	H	L							M		M	H
	CO5								M		H		H
	C06												
3	Category	Professional Ability Enhancement Courses (PAEC)											
4	Approval	22nd Meeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR 205	ARCHITECTURAL GRAPHICS – II	3	0	0	3

UNIT I **15**

PERSPECTIVE

Characteristic of Perspective Drawings, Perspective Systems and methods. Two point perspective of simple objects, outdoor and indoor view of building etc.

UNIT II **15**

ONE POINT AND TWO POINT PERSPECTIVE

One and two point perspective of interiors, Perspective theory and practice.

UNIT III **15**

SCIOGRAPHY

Principles of shade and shadows – of lines and Circles, shadows of Architectural elements, etc., Shadows of circular solids, shadows on buildings.

TOTAL:45 PERIODS

Text Book:

I Perspective:

1. Robert W. Gill, “Basic Perspective”, Thames and Hudson, London, 1974.
2. Interiors: “Perspective in Architectural Design Graphic” – SMA Publishing Co., Ltd., Japan, 1967.

II Sciography :

1. C. Leslie Martin, “Architectural Graphics”, The Macmillan Company, New York, 1964.
2. Francis Ching, “Architectural Graphics”, Van Nostrand and Reinhold Company, New York, 1975.
3. Ernest Norling, “Perspective Drawing”, Walter Foster Art Books, California, 1986.
4. Bernard Alkins – 147, “Architectural Rendering”, Walter Foster Art Books, 1986.

COURSE OUTCOMES (COs)	
The student will be able	
CO1	***Demonstrate*** the usage of various drafting tools in the process of preparing drawings.
CO2	***Assess*** 3D objects and represent them in drawings.
CO3	***Measure*** and prepare scaled measured drawings of various objects and existing buildings/
CO4	***Create*** One-point and Two-point perspective views of objects, interior and exterior of buildings from given plans and elevations.
CO5	***Analyze*** and ***draft*** the formation of shade and shadows of basic geometric shapes, forms and
C06	Ability to construct the 3d views and perspective drawings of the buildings.

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H	H		H	M			M	H	H		H
	CO2	L	H	M	M	H					L	H	L
	CO3		L			L				M		M	H
	CO4		L			L			M	M			H
	CO5	H	M	M	M				M		H	W	H
	C06					L		H					
3	Category	Professional Core(PC)											
4	Approval	32nd Meeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR 206	MATERIALS AND CONSTRUCTION I	0	0	6	3

1 INTRODUCTION **15**

Functional requirements of a building and its components - Drawings of foundations, plinth superstructure, roofings. Soils - Formation - grainsize distribution - soil classification systems. Lime - fat/hydraulic limes - Their uses and properties - Manufacturing process -Mortar, functions - requirements - mix proportions.

2 RURAL - MATERIAL AND CONSTRUCTION **20**

Mud as a building material - Soil stabilisation, soil blocks-Drawings of foundations - types, S.S. Block - S.S.Castinsitu walls - flooring - roofing - plastering. Bamboo, casuarina coconut, palam, hay coir,jute-properties-uses-fire retardent treatment insection proofing. Types of foundations - walls - simple rooftrusses, floors for rural structures.

3 STONE **25**

Classification of rocks - Building stones - their uses - physical properties - brief study of tests for stone - deterioration - preservation of stone - various stone finishes - cutting and polishing of granites. Drawings of foundations - types of masonry - random rubble/Ashlar, etc.-cavity walls - flooring copings, sills, lintels,corbels, arches.

4 BRICKS AND CLAY PRODUCTS **15**

Bricks - brief study on manufacture of bricks - properties - uses - suitability - types of bricks - uses in buildings, structural titles, ceramics, terracotta - uses.

TOTAL: 45 PERIODS

TEXTBOOKS:

1. R.J.S.Spencke and D.J.Cook, Building Materials in Developing Countries, John Wiley and Sons,1983.
2. HUDCO -All you want to know about soil stabilized mud blocks, HUDCO Pub., New Delhi, 1989.
3. UNO - Use of bamboo and reeds in construction - UNO Publications.
4. Rural Construction - NBO,New Delhi.

WEBSITES :

http://www.baboo-Flooring.com

http:// ag.avizona.edu/SWES

http://www/angelfite.com/in

http://www.idrc.ca/libary/documents/104800/chapz-e.html

http://www/angelfite.com/inz/granite

	COURSE OUTCOMES (COs)	
	The student will be able	
		Understand the basics of structures and differentiate their types. Know the formation of
		Get sensitized about the various ecological materials and their properties, treatment
		Draw the various types of building components for rural and modern structures using
		.Classify the various types of lime and compare their properties and application in building construction. Identify the mix
		Able to identify the good and clay products
		Identify the various water proofing materials, thermal insulation and their

Mapping of Course Outcomes with Program Outcomes (POs)

	C												
	C												
	C												
	C												
	C												
	C												
	C0												
	Ca	Building Sciences and Applied Engineering (BS &AE)											
	Ap	32nd Meeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR 3LI	ARCHITECTURAL DESIGN – III	0	0	13	6

UNIT I

DESIGN STUDIO **120**

Single level planning in small scale, small span, horizontal movement and simple vertical movement, data collection, case studies, analysis and presentation of studies – Data collection with respect to design and detailing for physically handicapped persons – Concepts and presentation of design with scales models – Examples : Residential buildings, Institutional buildings, banks, Nursery or Primary schools, Primary Health Centre, School for children with learning disabilities, neighbourhood market, etc.

UNIT II

COMPUTER LAB STUDIO

Introduction to computer aided drafting system, concepts of real dimension, colours, symbols repeatability modification, layers, exercises related to design projects above.

TOTAL:210 PERIODS

References:

1. De Chiara and Callender, “Time Saver Standards Building Types”, McGraw Hill Co., 2nd Editions, 1980.

2. Edward D. Mills, Planning-“the Architects Handbook” – 10th Edition, British Library C Taloguing in Publishing Data, 1985.

3. Wakita / Linde, “The Professional practice of Architectural working, drawing” Jonh Wiley & Sons, 1984.

4. Andrew Alpern, “Handbook of specialty Elements in Architecture”, McGraw Hill Book Co., 1982.

5. Julius Panero & Martin Zelnik, “Human Dimension and Interior Space”, Whitney Library of Design Publication, 1979.

6. “Neufert Architect’s Data”, Rudolf Hefg, Crosby Lockwood and Sons Ltd., 1970.

COURSE OUTCOMES (COs)	
The student will be able	
CO1	To understand the characteristics of site and the importance of site planning which includes built form and open space.
CO2	Determine spatial arrangements, circulation of buildings and the response of user group through case studies.
CO3	Learn the process of design
CO4	Design of spaces with functional, aesthetics and material considerations by applying the knowledge gained in case studies.
CO5	Producing neat presentation drawings using various media and making scale models .
C06	Ability to perceive, understand and represent fundamental attributes of form-spacewith respect to human experience and use.

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1		H	M	H	M			M	H	H		H
	CO2			M								H	L
	CO3											M	
	CO4	H	L			L			M	M		M	
	CO5		M		M				M		H		H
	C06					M				L			
3	Category	Professional Core (PC)											
4	Approval	32nd Meeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR 301	BUILDING SERVICES I	3	0	0	3

OBJECTIVES:

- To Study Water supply, treatments, distribution and plumbing system for all type of buildings.
- To Study Waste water treatments, Sewer lines for all types of buildings.
- To Study Drainage system for a Small Campus and a Residential neighbourhood.
- To understand Refuse collections, disposal, composting, Landfill, Bio gas for a Town and City.
- Applications of all the above systems to a Buildings, Small Campus and a Residential neighbourhood.

CONTENT:

UNIT I WATER QUALITY, TREATMENTS AND DISTRIBUTION 9

Sources of water supply – Water Quality - Water requirements for all type of residential, commercial, Industrial buildings and for town – Water treatment methods – Screening, aeration, Sedimentation, Filtration, Disinfection, Softening, conveyance of water – Distribution of water – Choice of pipe materials - Types of fixtures and fittings – System of plumbing in all type of buildings.

UNIT II WASTE WATER, TREATMENTS AND DISPOSAL 8

Waste water – Sewage disposal, primary treatment. Secondary treatment, Biological treatment and Modern types of Sewage Treatment Plants - Sewer line fixtures and traps, Manholes, Septic tank.

UNIT III STORM WATER DRAINAGE AND RAIN WATER HARVESTING 10

Basic principles of storm water drainage – drain pipes and type of pipe – storm water gutter –rain water harvesting principles – storage sumps

UNIT IV SOLID WASTE, COLLECTIONS, TREATMENTS, DISPOSAL, MODERN DRAINAGE SYSTEMS 12

Refuse collection, disposal, Incinerator, Composting, Vermicomposting, Sanitary Land filling, Bio gas system and Modern renewable energy system. Modern plumbing system, drainage collection system, disposal for a housing colony, small towns – Selection of pumps and Construction of pump rooms.

UNIT V APPLICATION OF THE ABOVE UNITS 6

Layout design and details of water supply distribution system in a Campus or Small residential neighbourhood - Layout design and details of sewage and drainage system for different types of buildings –

water supply pipe lines, storm water drainage pipe lines and Rain water Harvesting for small residential neighbourhood.

TOTAL: 45 PERIODS

OUTCOMES

1. Students have through understanding of how water and waste water are managed, in residential unit, small campus and for a large city.
2. Students are aware of the principles and best practices for Solid waste management in residential unit, small campus and for a large city.

TEXTBOOK:

1. Manual of water supply and treatment, Second edition, CPHEEO, Ministry of works and housing, New Delhi 1977
2. AFEWise, JASwaffiedWater, Sanitary &Waste Services in buildings –Mitchell Publishing Co. Ltd. – 2002, V Edition
3. Punmia B.C., Waste Water Engineering, Laxmi Publications, 2009.
4. Arceivala S.J., Waste Water Treatment for Pollution Control, Tata McGraw Hill, 2008.

REFERENCES:

1. G.M. Fair, J.C. Geyer and D.Okin, Water and Waste water engineering Volume II, John Wiley & Sons, Inc. New York, 1968
2. Manual on sewerage and sewerage treatment, CPHEEO – Ministry of works and housing, New Delhi, 1980
3. Renewable energy, basics and technology, supplement volume on integrated energy systems) Auroville, 1998 Sri Aurobindo Ashram, Pondicherry 605002 India

COURSE OUTCOMES (COs)	
The student will be able	
CO1	***Outline*** the sources and treatment of ground water
CO2	***Explain*** the various water supply and drainage systems
CO3	***Assess*** the water supply requirements and sewerage generated.
CO4	***Select*** the pumps, water supply and drainage pipes.
CO5	***Design*** the water supply and drainage layout of residential buildings.
C06	***Illustrate*** the solid waste management concepts and systems.

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H	H		H	M			M	H	H		H
	CO2			M	M						L	H	
	CO3									M			
	CO4					L				M			
	CO5	H	M	M	M				M		H		H
	C06												
3	Category	Building Sciences and Applied Engineering (BS &AE)											
4	Approval	34th Meeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR 302	HISTORY OF ARCHITECTURE – III	3	0	0	3

UNIT I **9**

ROMANESQUE

The medieval ages – learning in the monasteries, evolution of the guilds – Factors influencing architecture – outline of architectural character in Italy, France and England – Examples: Pisa group, Italy; Abbey Aux Hommes, Caen; Tower of London.

UNIT II **8**

FRENCH GOTHIC

Religious and social influence – evolution of vaulting and development of structural systems – outline of Architectural character – Examples: Notre Dame, Paris.

UNIT III **10**

ENGLISH AND ITALIAN GOTHIC

Development of English gothic vaulting – outline of architectural character in England and Italy – Examples: West Minister Abbey, Hampton Court Place, London: Doges Palace, Venice: Milan Cathedral.

UNIT IV **12**

ITALIAN RENAISSANCE

The Idea of rebirth and revival of art – sociological influences in art architecture – Development of thought, emergence of merchant communities and their patronage. Outline of the Architecture during the Early Renaissance. High Renaissance and Baroque Periods – Features of a typical Renaissance Place, example: Palazzo Ricardi, Study of life History, Philosophy, contribution of the following architects: Brunelleschi, Michael Angelo, and Andrea Palladio.

UNIT V **6**

FRENCH & ENGLISH RENAISSANCE

Outline of the architectural character of French and English Renaissance – Domestic Architecture in England – Study of the life, Philosophy and works of the following architecture: Sir Christopher Wren. Indigo Jones.

TOTAL: 45 PERIODS

Text Books:

1. Sir Bannister Fletcher, "A History of Architecture", University of London, The Antholone Press. 1986.

2. G.K.Hiraskar, Great Ages of World Architecture ,Dhanpat Rai and Sons,Delhi

References:

1. Pier Luigi Nervi, "History of World Architecture Series". Harry N. Abrame Inc. Publication, New York, 1972.

2. S. Lloyd/H.W. Muller, "History of World Architecture" – Series Faber Ltd., London, 1986.

3. Spiro Kostof, "A History of Architecture" – Settings and Rituals, Oxford University Press, London, 1985.

COURSE OUTCOMES (COs)	
The student will be able	
CO1	Explain the architectural characters of Medieval Europe through selected examples.
CO2	Analyze the continuity between each style – the factors that connect each style
CO3	Analyze the trend or the pattern of development of architectural styles.
CO4	Interpret the contemporary architectural style and its development leading to new styles.
CO5	Understanding Characteristics and styles of colonial architecture
C06	Understanding the ideas and styles over revolution.

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H	H	M		M			M	H	H		H
	CO2			M							L	H	
	CO3									M			
	CO4		L			L				M			H
	CO5	H	M	M	M				M		H		H
	C06							M					
3	Category	Engineering Sciences (ES)											
4	Approval	32nd Meeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR 303	DESIGN OF STRUCTURES I	3	0	0	3

OBJECTIVES: To introduce the design of various timber components in a building. • To enable the understanding of the types, efficiency and strength, advantages and
Disadvantages of Rivet and welded joints in steel. • To enable the design of Tension (beams) and compression (columns) steel members in a
building under various conditions.
• Case studies and models wherever applicable.

UNIT I

TIMBER STRUCTURES - DESIGN OF BEAMS AND COLUMNS 9

Grading of Timber – Permissible Stresses – Design of timber beams – Madras terrace roof – Design of timber columns.

UNIT II

STEEL STRUCTURES - BOLTED AND WELDED JOINTS 12

Assumptions – failure of Bolted joints – Strength and Efficiency of Bolted Joints – Types – Design of Bolted Joints for Axially Loaded Members (Excluding eccentric connections)Types of
welded joints – Advantages and disadvantages – Design of Fillet welds (Excluding eccentric connections).

UNIT III

TENSION MEMBERS 8

Introduction – Net sectional area – permissible stresses. Design of Axially loaded Tension member – Lug angle – code provision – tension splice.

UNIT IV

COMPRESSION MEMBERS 10

Introduction – various sections – built up section – Design of columns (excluding Lacing, Battening and other connections.)

UNIT V

STEEL BEAMS 6

Introduction – laterally supported and unsupported beams – Design of laterally supported beams.

TOTAL: 45 PERIODS

OUTCOMES:

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

Design the timber beams and columns by applying the codal provisions. Able to design the steel joints for maximum efficiency and strength.

Tension members and compression members are designed for various conditions by applying the codal provisions.

Différent types of laterally unsupported & supported beams to be designed for various conditions.

TEXTBOOK:

1. L.S. Negi, Design of Streel Structures – Tata McGraw Hill Publishing Company Ltd., New Delhi, 1997.

2. S. Ramachandra, Design of Steel Structures - Standard Book House, Delhi, 1984.

3. Ramamurutham .S, Narayanan .R, Design of Steel Structures, Dhanpat Rai – Sons, 2006.

4. Punmia B.C., Design of Steel Structures, Laxmi Publications, 2005.

REFERENCES:

1. A.S.Arya, Structural Design in Steel, Masonry and Timber, Nemchand and Bros, Roorkee, 1971.

2. National Building Code of India, 1983, Part VI, Structural Design.

3. Gurucharan Singh, Design of Steel Structures, Standard Publishers, New Delhi, 1982.

4. Dayaratnam.P, Design of Steel Structures, Oxford and IBH Publishing Co.

5. IS 883 – Code of Practice for Design of Structural Timber in Buildings

6. IS 800 - 2007 – Code of Practice for use of Structural Steel in General Building Construction

COURSE OUTCOMES (COs)	
The student will be able	
CO1	***Illustrate*** masonry walls for axial loads and RCC walls.
CO2	***Apply*** relevant IS Code provisions to ensure safety and serviceability of structural elements
CO3	***Identify*** and compute the main mechanical properties of concrete and steel and structural
CO4	**Design** different types of foundations for axially short and long columns
CO5	***Design*** reinforced concrete slabs and beams by WSM and LSM for flexure
C06	Ability to Differentiate types of laterally unsupported & supported beams to be designed for various conditions

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H	H	M		M			M	H	H		H
	CO2				M	H	L				L	H	L
	CO3		L			L		M		M			
	CO4		L			L				M			
	CO5	H	M	M	M				M		H	W	H
	C06					H		L					

COURSE CODE	COURSE TITLE	L	T	P/S	C
BMA 304	CLIMATE AND ENVIRONMENTAL STUDIES	3	0	0	3

OBJECTIVES:

- To study human heat balance and comfort.
- To familiarize students with the design and settings for buildings for daylight and factors that influence temperature
- To inform about the air pattern around buildings and the effect of wind on design and siting of buildings
- To expose the students to the various design strategies for building in different types of climatic zones.

UNIT I CLIMATE AND HUMAN COMFORT 9

Factors that determine climate of a place – Components of Climate – Climate classifications for building designers in tropics – Climate characteristics. Human body heat balance – Human body heat loss – Effects of climatic factors on human body heat loss – Effective temperature – Human thermal comfort – Use of C.Mahony's tables.

UNIT II DESIGN OF SOLAR SHADING DEVICES 8

Movement of sun – Locating the position of sun – Sun path diagram – Overhead period–Solar shading– Shadow angles – Design of appropriate shading devices

UNIT III HEAT FLOW THROUGH BUILDING ENVELOPE CONCEPTS 10

The transfer of heat through solids – Definitions – Conductivity, Resistivity, Specific heat, Conductance, Resistance and Thermal capacity – Surface resistance and air cavities – Air to air transmittance (U value) – Time lag and decrement – Types of envelops with focus on glass.

UNIT IV AIR MOVEMENT DUE TO NATURAL AND BUILT FORMS 12

The wind – The effects of topography on wind patterns – Air currents around the building – Air movement through the buildings – The use of fans – Thermally induced air currents – Stack effect, Venturi effect – Use of court yard.

UNIT V CLIMATE AND DESIGN OF BUILDINGS 6

Design strategies in warm humid climates, hot humid climates, hot and dry climates and cold climates – Climate responsive design exercises.

TOTAL: 45 PERIODS

OUTCOMES

- Understanding of Thermal balance in Human beings
- Designing Climate responsive structure
- Conceptual understanding of Air flow in Buildings

TEXTBOOKS:

1. O.H. Koenigsberger and Others, Manual of Tropical Housing and Building – Part I - Climate design, Orient Longman, Madras, India, 2010.

2. Bureau of Indian Standards IS 3792 (1987), Hand book on Functional requirements of buildings other than industrial buildings, (Part I – IV), Manakbhavan, 9, Bahadur Shah Zafar Marg, New Delhi – 110 002.

REFERENCES:

1. Martin Evans (1980), Housing Climate and Comfort – Architectural Press, London.

2. B. Givoni (1981), Man, Climate and Architecture, Architectural Sciences Series – Applied Science Publishers Ltd., London

3. B. Givoni (1994) Passive and Low Energy Cooling of building, Van Nortrand Reinhold New York, USA.

4. Galloe, Salam and Sayigh A.M.M. (1998) "Architecture, Comfort and Energy", Elsivier Science Ltd., Oxford, U.K.

COURSE OUTCOMES (COs)	
The student will be able	
CO1	***Understand*** climatic types and design approaches
CO2	***Analyze*** design types of shading devices
CO3	***Understand*** thermal performance of various building materials
CO4	Able to ***design*** of buildings with good ventilation
CO5	Able to ***design*** of climatic conscious buildings
C06	Designing Climate responsive structure

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H	H		H	M			L	H	H		H
	CO2			M	L		L				L	H	
	CO3							L		M			
	CO4					L				M			
	CO5	H	M	M	M				M		H		H
	C06												
3	Category	Building Sciences and Applied Engineering (BS &AE)											
4	Approval	34th Meeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR 305	COMPUTER STUDIO – I	0	0	4	3

UNIT I

INTRODUCTION TO COMPUTER **15**

Technology of small computer system, computer terminology operation principles of P.C. introduction to application software, and graphic system, and use of printers, scanner, plotter, file management etc.,

UNIT II

INTRODUCTION TO COMPUTER AIDED 2D DRAFTING **15**

Understanding the use of drawing tools, object editing, drawing objects, filling and setting drawing units, scales, limits that size and dimensioning, text, Setting up of drawings of various simple architecture objects with complete text and dimensioning.

UNIT III

ADVANCE COMPUTER AIDED 2D DRAFTING **15**

Advance command programming – transparent overlays hatching utilities, assigned colour and line type, use of multiline, style, block, symbol library manipulation for accurate drawings, incorporating the above said utilities.

UNIT IV

INTRODUCTION TO 3D DRAFTING **15**

Introduction to 3D modeling technique and construction planes, drawing object 3D surface setting up elevation and thickness, and use of dynamic projections.

UNIT V

3D MODELLING **15**

Solid modeling with primitive commands and Boolean Operation. Use of region modeling in solid modification in solid modification.

TOTAL: 75 PERIODS

Text Book:

1. V. Rajaraman, "Principles of Computer Programming" – Prentice Hall of India.

References:

1. "Auto CAD reference manual" – Auto Desk Inc.

2. "Auto CAD Architectural users' guide" – Auto Desk Inc.

CO1	To **apply** softwares in the field of Architecture to represent design ideas.
CO2	***Produce*** 2D technical drawings using AutoCAD
CO3	***Develop*** the 3D model of buildings & objects using AutoCAD and Sketch Up
CO4	***Recreate*** realistic image of objects and buildings by using presentation software.
CO5	Sheet set ***organization*** and plot/print drawing to the scale.
C06	Ability to develop knowledge.

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1			M	H	M			M	H	H		H
	CO2			M	M	H					L	H	L
	CO3					L		M					
	CO4	H	L			L		M					
	CO5	H	M	M	M				M		H		H
	C06					L							
3	Category	ProfessinalAbilityEnhancement Courses (PAEC)											
4	Approval	32nd Meeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR 306	MATERIALS AND CONSTRUCTION II	2	0	4	4

UNIT I

BRICKS AND CLAY PRODUCTS **15**

Drawings of brick foundations - buildings in brickwork, bonds columns,corners - structrual members in brickwork. Reinforced brick masonry - Arches - Lintels - Corbels - copings. Hollow clay blocks - for walls - patritions -roofs. Roofings - Flats Roofs - or Terrace roofs - Sloping roofs. Detailing includes for physically handicapped.

UNIT II

TIMBER AND ALLIED PRODUCTS **15**

Softwood and Hardwood - Secondary Timber - Physical properties and uses - Defects, Conversion, Seasoning, Decay and preservation of timber - Fire retardent treatment, anti-termite treatment. Industrial timbers - plywood,blockboard,particle board, fibre boards. Manufacture and uses - current developments.

UNIT III

TIMBER **15**

Drawings of timber joinery for Windows, doors, ventilators. Timber partitions, panelling, false ceiling,fixed ceiling - wall panelling. Timber staircases - Designed staircase - timber trusses - Lean to - close couple - Kingpost - Queen pot - Trusses. Timber floors - timber built-in-furniture - Detailing and fittings for physically handicapped.

UNIT III

LOW COST BUILDING TECHNOLOGY **15**

Drawings of foundations - walling - Roofs - Partitions - Ceiling panel - Doors and Windows. Miscellaneous - Drawing of Brick Jails, Screen Walls - Pavement blocks - Ferrocement water tanks. Detailing and specifications for physically handicapped.

GLASS **15**

Composition of glass - brief study on manufacture, treatment, properties and uses of glass - special types of glass, sheet glass, plate glass, safety glass, tinte coated glass - Glass blocks - properties and applications in the building Industry -current developments.

TOTAL: 45 PERIODS

TEXTBOOKS:

1. Don A.Watson, Construction Materials and Processes, McGraw Hill Co.,1972.

2. Alanwerth, Materials, The Mitchell Pub.Co.Ltd., London,1986.

3.R.Chudleu,'Building Construction Handbook',British Library Cataloguing in Publication Data,London,1990.

WEBSITES

http://www.ibex-ibex-intl.com

http://www.inika.com/chitra

http://www.routbdge.com

http://www.ventura india.com

COURSE OUTCOMES (COs)	
The student will be able	
CO1	Understand the basics of structures and differentiate their types. Know the formation of soil, their classification and understand the importance of soil in building construction.
CO2	Classify the various types of timber and compare their properties and application in building construction.
CO3	Draw the various types of building components for rural and modern structures using various materials like timber
CO4	Classify the various types of stones and bricks and compare their properties and application in building construction.
CO5	Draw the various types of building components for rural and modern structures using various materials like brick, stone.
C06	Able to identify the good and clay products

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H	H		H	M			M	H	H		H
	CO2			M	M						L	H	
	CO3									M			
	CO4					L				M			
	CO5	H	M	M	M				M		H		H
	C06												
3	Category	Building Sciences and Applied Engineering (BS &AE)											
4	Approval	32nd Meeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR 4LI	ARCHITECTURAL DESIGN – IV	0	0	13	6

UNIT I

DESIGN STUDIO

Problem related to multi room, single use, small span – Multiple story, Horizontal and vertical movement, Active cum passive energy, Masonry and frame type buildings.

Ex: Department store, Library, higher secondary school, campus students' center, etc. The projects will consciously provide for movement and use by the physically handicapped and elderly.

UNIT II

DESIGN STUDIO – RURAL PROJECT

Problems related to Rural Housing – Visits to selected village – Surveys on socio – economic, physical, housing and surveys, etc. to study existing conditions – analysis of survey data – preparation of report and presentation in a seminar – preparation of design brief solutions for housing and community facilities.

UNIT III

COMPUTER LAB STUDIO

Documentation of rural project of Housing typology using computer – Introduction to 3D modeling and rendering 3D images. **TOTAL: 180 PERIODS**

References:

1. De Chiara and Callender, "Time Saver Standard for building Types". McGraw Hill Co., 2nd Edition 1980.

2. Edward. Mills, Planning – "The Architects handbook – 10th Edition", British Library Cataloguing in Publication Data, 1985.

3. Wakita Linde, "The Professional Practice of Architectural Working", Drawing John Wiley & Sons 1984.

4. Andrew Alphern "Handbook of Specialty Elements in Architecture", McGraw Hill Book Co.,

5. Julius Panero & Martin Zelnik, "Human Dimension and Interior Space", Whitney Library of Design Publication, 1979.

6. "Neufert Architect's Data", Rudolf Herg, Crosby Lockwood and Sons Ltd., 1970.

COURSE OUTCOMES (COs)	
The student will be able	
CO1	***Understand*** the space and furniture's required for various human activities.
CO2	***Interpretation*** of buildings for spatial arrangements and circulation.
CO3	***Design*** of medium scale public buildings with structural, utility, aesthetics and material considerations by applying the knowledge gained in case studies. Analyse a site with respect to various aspects
CO4	Learn the procedure of studying and **analysis** of rural housing and settlements and preparing design solutions.
CO5	***Involve*** in producing neat presentation drawings using various media like pencil color, water and poster colors, crayons etc.
C06	***Prepare*** scale models of studio exercises using sheets, boards, wood etc.

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H	H			M			M	H	H		H
	CO2			M	M	H					L	H	L
	CO3	H				L		H		M		M	H
	CO4		L			L	L			M			
	CO5		M	M	M				M		H		
	C06							H					L
3	Category	Professional Core (PC)											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR 401	BUILDING SERVICES II	3	0	0	3

UNIT I **9**

PUMPS AND MACHINERIES

Reciprocating, centrifugal, deep well, submersible automatic pumps, sewerage pump, compressors vacuum pump – their selection installation and maintenance – Hot Water Boiler –Lifts and Escalators – special features required for physically handicapped and elderly – Conveyors – Vibrators – Concrete mixers – DC / AC motors – generators – Laboratory services – gas, water, air and Electricity.

UNIT II **8**

ELECTRICAL SYSTEMS

Basics of electricity – single / three phase supply – Protective devices in electrical installations – Earthing for safety – Types of earthing – ISI Specification.

UNIT III **10**

ELECTRICAL INSTALLATIONS IN BUILDINGS Type of wiring systems and their choice – Planning electrical wiring for building – Main and distribution boards – transformers and switch gears – Layout of substations.

UNIT IV **12**

PRINCIPLES OF ILLUMINATION

Visual Tasks – factors affecting visual tasks – Modern theory of light and colour – Synthesis of light – additive and subtractive synthesis of colour – luminous flux – Candela – Solid angle illumination – Utilisation factor – depreciation factor – MSCP – MHCP – Lans of illumination.

UNIT V **6**

LIGHT DESIGN

Classification of lighting – Artificial light sources – spectral energy distribution – luminous efficiency – colour temperature – colour rendering. Design of modern lighting for stores, offices, schools, hospitals and house lighting. Elementary idea of special features required and minimum level of illumination requited for physically handicapped and elderly in building types.

TOTAL: 45 PERIODS

Text Books:

1. “Handbook for Building Engineering in Metric systems”, NBC, New Delhi, 1968.

References:

1. E.R. Ambrose, "Hear Pumps and electric heating", John and Wiley and Sons, Inc., New York, 1968.
2. "Philips Lighting in Architectural Design", McGraw Hill, New York, 1964.
3. R.G. Hopkinson and J.D. Kay, "The Lighting of buildings", Faber and Faber, London, 1969.

COURSE OUTCOMES (COs)	
The student will be able	
CO1	***Illustrate*** the basics of electricity, components and installations and ***prepare*** electrical layout
CO2	***Illustrate*** the fundamentals of lighting and ***prepare*** lighting design
CO3	***Outline*** energy efficient lighting design solutions
CO4	***Understand*** the fire safety requirements of buildings
CO5	***Identify*** fire detection and fire fighting systems for buildings and ***prepare*** fire safety
C06	

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	M	H	L	H	M			M	H	H		H
	CO2	L		M	M						L	H	
	CO3						M	L		M		M	
	CO4					L				M			
	CO5	M			M				M		H		H
	C06												
3	Category	Building Sciences and Applied Engineering (BS &AE)											
4	Approval	32nd Meeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR 402	HISTORY OF ARCHITECTURE – IV	3	0	0	3

UNIT I **9**

INTRODUCTION TO ISLAMIC ARCHITECTURE

Brief History of Islam in terms of birth, spread across countries and principles – Influences on Islamic Architecture – Evolution of building types in terms of forms and functions – the mosque, the tomb, and minaret, the madarasa, the palace, the caravanserai, vernacular architecture, the market – important principles, elements and character of Islamic architecture in terms of structure materials and methods of construction, elements of decoration, colour, geometry, light – important examples to illustrate development of Islamic architecture.

UNIT II **8**

ISLAMIC ARCHITECTURE IN INDIA

Advent of Islam into the Indian subcontinent and its impact – source of Islamic Architecture in India and influences on them – Brief history of development and classification urban different styles and regions.

UNIT III **10**

DELHI OR IMPERIAL STYLE

Development of architectural styles during the rule of the slave, Khilji, Tulip Spayed and Lodi Dynasties – important examples for each period.

UNIT IV **12**

PROVINCIAL STYLE

Development of the provincial styles in different regions – Punjab, Jaunpur, Bengal, Gujarat, Malwa, the Deccan (Bijapur, Golconda, Bidar and Gulbarga) – Important examples for each style.

UNIT V **6**

MUGHAL STYLE

Development of the Mughal style under the different rulers – Babur, Shershah, Humayun, Akbar, Jahangir, Shahjahan, Aurangzeb – important examples – development of the Mughal garden – important examples.

TOTAL: 45 PERIODS

Text Books:

1. Brown Percy, “Indian Architecture (Islamic Period)” Taraporevalla and Sons, Bombay, 1983.

2. Satish Grover .The Architecture of India(Islamic) Vikas Publishing House Pvt Ltd. New Delhi

References:

1. "Architecture of the Islamic World" – George Michell – its history and social meaning, Thames and Hudson, London, 1978.

2. "Islamic Architecture, Form, Function and Meaning", Robert Hillenbrand, Edinburgh University Press, 1994.

3. Christopher Tadgell – "The History of Architecture in India" – Penguin Books (India) Ltd., New Delhi, 1990.

4. Satish Grover, "The Architecture of India (Islamic)" Vikas Publishing House Pvt. Ltd., elk New Delhi, 1981.

5. R. Nath – "History of Mughal Architecture" – Abhinav Publications – New Delhi – 1985.

COURSE OUTCOMES (COs)	
The student will be able	
CO1	***Understand*** the origin of various civilization and Architecture in India at different points of time
CO2	***Understanding*** the architectural responses with respect to materials, technology, style and character in the Buddhist, Hindu and Dravidian Architecture
CO3	***Understand*** the emergence of Islamic Architecture, form and function of different structures and the underlying geometry and concepts of decoration and colour.
CO4	***Gain Knowledge*** on the history related to design thinking, cultural aspiration, social needs, and the evolution of the built environment
CO5	An understanding of the diversity of architecture in India and sensitivity towards its syncretic aspects
C06	Ability to appreciate particular cultural, symbolic, spatial and material qualities in architecture and cities as givers of meaning and continuity.

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H	H	M	H	M			M	H	H		H
	CO2				M						L	H	
	CO3									M		M	
	CO4		L			L						M	
	CO5	H	M		M				M		H	W	H
	C06												
3	Category	Professional Core (PC)											
4	Approval	31st Meeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR 403	DESIGN OF STRUCTURES II	3	0	0	3

OBJECTIVES:

- To inform about the methods of design through working stress and limit state methods.
- To use the above two methods for the design of Concrete beams and slabs under various conditions.
- To use the limit state method for design of a concrete staircase.
- Case studies and models wherever applicable.

UNITI **9**

DESIGN OF CONCRETE MEMBERS AND WORKING STRESS

DESIGN OF BEAMS

Concept of Elastic method, Ultimate Load Method and Limit State Method – Advantages of Limit State Method over other methods. Analysis and Design of Singly and Doubly reinforced rectangular and flanged beams for bending.

UNITII **8**

LIMIT STATE DESIGN OF BEAMS

Analysis and design of singly and doubly reinforced rectangular and flanged beams for Bending – Design of Continuous beams using IS code co-efficient.

UNIT III **10**

LIMIT STATE DESIGN OF SLABS

Behavior of one way and two way slabs – Design of one way and two way slabs for various edge conditions - Corner effects.

UNIT IV **12**

DESIGN OF CIRCULAR SLABS

Design of Simply supported and fixed Circular slabs subjected to uniformly distributed loads.

UNIT V **6**

DESIGN OF STAIRCASE BY LIMIT STATE METHOD

Types of Staircases – Design of Dog Legged Staircase.

TOTAL: 45 PERIODS

OUTCOMES:

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

- Understand the different concepts of WSM and LSD methods using the codal provisions.
- RC beams and slabs to be designed by applying the above concepts.
- Dog legged staircase design using LSD.

TEXTBOOK:

1. S.N. Sinha, Reinforced Concrete Design – Tata McGraw Hill Publishing Co. Ltd.,New Delhi,1998.

2. Shah, Reinforced Concrete, Vol. 1 and 2 – Charotar Publishing House, Anand, 1998.

REFERENCES:

1. P.Dayaratnam, Design of Reinforced Concrete Structures, Oxford and IBH Publishing Co., 1983.

2. C. Sinha and S.K. Roy, Fundamentals of Reinforced Concrete, S.Chand & Co., New Delhi, 1983.

3. Dr. B.C. Punmia, Reinforced Concrete Structures, Vol, 1 & 2 Laxmi publication, Delhi, 2004.

4. IS 456:2000, Indian Standard, Plain and Reinforced Concrete – Code of Practice, Bureau of Indian Standards.

5. S. Unnikrishnan Pillai and Devados Menon, Reinforced Concrete Design – Tata McGraw Hill Publishing Co. Ltd., New Delhi, 1999.

COURSE OUTCOMES (COs)	
The student will be able	
CO1	***Design*** the Pre stressed members
CO2	***Explain*** the design concepts of Shells and folded plates
CO3	***Analyze*** the behavior of steel and R.C.C structural members
CO4	***Design*** the steel connections.
CO5	***Design*** the R.C.C structural members
C06	Understand the different concepts of WSM and LSD methods using the codal provisions

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	M	H	M	H	M			M	H	H		H
	CO2					H					L	H	
	CO3					L	H					M	
	CO4	L	L			L							
	CO5	L	M	M	M				M		H		H
	C06				L		M						
3	Category	Building Sciences and Applied Engineering (BS &AE)											
4	Approval	32nd Meeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR 404	SITE PLANNING & LANDSCAPE ARCHITECTURE	0	0	4	3

OBJECTIVES:

- To teach the importance of site and its content in architectural creations
- To orient the students towards several influencing factors which govern the siting of a building or group of buildings in a given site.
- To teach various techniques of site analysis through exercises and case studies.
- To teach the students the methodology of preparing a site analysis diagram. This will serve as a prelude to any architectural creation through exercises.

UNIT I **9**

INTRODUCTION

Definition of plot, site, land and region, units of measurements. Introduction to survey, methods of surveying, where they are used, Surveying Instruments and their application. Need for surveying. Measuring and drawing out a site plan from the measurements

UNIT II **8**

SITE DRAWINGS

Computation of area by geometrical figures and other methods. Drawing marking out plan, layout plan and centerline plan – Importance, procedure for making these drawings and dimensioning. Setting out the building plan on site – Procedure and Precautions. Exercises on the above.

UNITIII **12**

SITE ANALYSIS

Importance of site analysis; On site and off site factors; Analysis of natural, cultural and aesthetic factors – topography, hydrology, soils, vegetation, climate, surface drainage, accessibility, size and shape, infrastructures available - sources of water supply and means of disposal system, visual aspects; Preparation of site analysis diagram. Study of microclimate:- vegetation, landforms and water as modifiers of microclimate. Study of land form;- contours, slope analysis, grading process, grading criteria, functional and aesthetic considerations – Case studies and exercises on the above.

UNITIV **10**

SITE CONTEXT

Context of the site. Introduction to existing master plans land use for cities, development control Rules. Preparation of maps of matrix analysis & composite analysis. Site selection criteria for housing development, commercial and institutional projects - Case studies.

UNIT V **6**

SITE PLANNING AND SITE LAYOUT PRINCIPLES

Organization of vehicular and pedestrian circulation, types of roads, hierarchy of roads, networks, road widths and parking, regulations. Turning radii & street intersections

TOTAL: 45 PERIODS

OUTCOMES

- The contextual importance on site analysis can be understood based on the various site factor with respect to the study area.
- A first hand understanding of site drawings for Landscape Architecture and Urban design is
- studied.
- Various scientific and analytic site analysis techniques is understood.
- A methodological approach for preparation of master plans for small scale and large scale projects can be understood.

TEXTBOOK:

1. Kevin Lynch - Site planning - MIT Press, Cambridge, MA - 1984.

2. Edward. T. Q. Site Analysis – Architectural Media, 1983

REFERENCES:

1. B.C.Punmia - Surveying Vol.I - Standard Book House, New Delhi - 1983.

2. P.B.Shahani - Text of surveying Vol.I, Oxford and IBH Publishing Co – 1980

3. Joseph De.Chiarra and Lee Coppleman - Urban Planning Design Criteria – Van Nostrand Reinhold Co., 1982

4. Storm Steven, Site engineering for landscape Architects, John wiley & Sons Ine, 2004.

5. Development Control Rules – CMDA, 2008.

COURSE OUTCOMES (COs)	
The student will be able	
CO1	Illustrate the application of various types of surveys in buildings
CO2	Survey a site or building
CO3	Analyse a site with respect to various aspects
CO4	Design and Develop a site plan
CO5	Outline the Environmental factors related to site planning
C06	Understand the Sensitivity towards aspects of site at macro and micro contexts.

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H	H	M	H	M			M	H	H		H
	CO2	L		M		H					L	H	L
	CO3									M			
	CO4		L							M			
	CO5	H	M		M				M		H		H
	C06						L					M	
3	Category	Professional Core (PC)											
4	Approval	32nd Meeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR 405	CLIMATE & BUILT ENVIRONMENT	3	0	0	3

OBJECTIVES:

At the end of this course the student is expected to understand what constitutes the environment, what are precious resources in the environment, how to conserve these resources, what is the role of a human being in maintaining a clean environment and useful environment for the future generations and how to maintain ecological balance and preserve bio-diversity. The role of government and non-government organization in environment managements.

UNIT I **9**

INTRODUCTION TO ENVIRONMENTAL STUDIES AND NATURAL RESOURCES

Definition, scope and importance of environment – need for public awareness - Forest resources: Use and over-exploitation, deforestation, case studies- timber extraction, mining, dams and their effects on forests and tribal people – Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies – Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. case studies – Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification – role of an individual in conservation of natural resources – Equitable use of resources for sustainable lifestyles.

Field study of local area to document environmental assets – river / forest / grassland / hill /mountain.

UNIT II **8**

ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY

Concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers – energy flow in the ecosystem – ecological succession – food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the

(a) forest ecosystem (b) grassland ecosystem (c) desert ecosystem (d) aquatic ecosystems

(ponds, streams, lakes, rivers, oceans, estuaries) – Introduction to biodiversity definition: genetic, species and ecosystem diversity – biogeographically classification of India

– value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option

values – Biodiversity at global, national and local levels – India as a mega-diversity nation – hotspots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation of biodiversity.

Field study of common plants, insects, birds; Field study of simple ecosystems – pond, river, hill slopes, etc.

UNITIII **10**

ENVIRONMENTAL POLLUTION

Definition – causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards – soil waste management: causes, effects and control measures of municipal solid wastes – role of an individual in prevention of pollution – pollution case studies – disaster management: floods, earthquake, cyclone and landslides.Field study of local polluted site – Urban / Rural / Industrial / Agricultural.

UNIT IV **12**

SOCIAL ISSUES AND THE ENVIRONMENT

From unsustainable to sustainable development – urban problems related to energy – water conservation, rain water harvesting, watershed management – resettlement and rehabilitation of people; its problems and concerns, case studies – role of non-governmental organization- environmental ethics: Issues and possible solutions – climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies.

– wasteland reclamation – consumerism and waste products – environment production act – Air (Prevention and Control of Pollution) act – Water (Prevention and control of Pollution) act – Wildlife protection act – Forest conservation act – enforcement machinery involved in environmental legislation- central and state pollution control boards- Public awareness.

UNIT V **6**

HUMAN POPULATION AND THE ENVIRONMENT

Population growth, variation among nations – population explosion – family welfare programme – environment and human health – human rights – value education – HIV / AIDS – women and child welfare – role of information technology in environment and human health – Case studies.

TOTAL: 45 PERIODS

OUTCOMES:

1. Students are sensitized on the need for natural resource management, and sustainable lifestyles
2. Students appreciate the value of ecosystem and the need and methods for conserving the same.
3. Students understand the how pollution and hazards can be mitigated.

TEXT BOOKS:

1. Gilbert M.Masters, "Introduction to Environmental Engineering and Science", 2nd edition, Pearson Education, 2004.
2. Erach Bharucha, "Text book of Environmental Studies", University Press, Hyderabad, 2006.
3. Anubha Kaushik and Kaushik C.P., " Perspectives in Environmental Studies" New age International (P) Ltd., New Delhi, 2005
4. Venugopala Rao.P, " Principles of Environmental Science and Engineering" Prentice Hall of India Pvt. Ltd., New Delhi, 2006.

REFERENCES:

1. Cunningham, W.P. Cooper, T.H. Gorhani, "Environmental Encyclopedia", Jaico Publ., House, Mumbai, 2001.
2. Dharmendra S. Sengar, "Environmental law", Prentice hall of India PVT LTD, New Delhi,2007
3. Rajagopalan, R, "Environmental Studies-From Crisis to Cure", Oxford University Press,2005
4. Richard T. Wright, "Environmental Science" Prentice Hall of India Pvt. Ltd., New Delhi,

COURSE OUTCOMES (COs)	
The student will be able	
CO1	To understand what constitutes the environment and how to conserve it.
CO2	To analyse the need for natural resource management, and sustainable lifestyles
CO3	To evaluate the value of ecosystem and the need and methods for conserving the same.
CO4	To understand the how pollution and hazards can be mitigated.
CO5	To analyse with case studies on various social causes and understand the need to spread and learn more about the causes and the ways to prevent them.
C06	An overview of important regulations and bylaws

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1			M	H	M				H	H		H
	CO2			M					M		L	H	L
	CO3					L		H		M		M	
	CO4					L	L			M		M	
	CO5	H	M		M				M		H		H
	C06						M						
3	Category	Building Sciences and Applied Engineering (BS &AE)											
4	Approval	32nd Meeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR 406	MATERIALS AND CONSTRUCTION III	2	0	4	4

OBJECTIVES:

- To give an introduction to cement and concrete as materials for building construction.
- To help understand the principles, types, methods of construction and applications of concrete for structural and non-structural building components.
- To enable design and detail using concrete in buildings

1 CEMENT **10**

Varities of cement,compostion,properties and uses - brief study on manufacture of portland cement - tests for cement - mortar for various works.

2 CONCRETE,ITS INGREDIENTS MANUFACTURE & PROPERTIES **15**

Ingredients - suitability requirementsd for aggregates, grading of aggregates - role of water in concrete - reinforcement - admixtures - properties of concrete. Manufacture of concrete and concreting - mix proportioning - batching, mixing, transporting, placing, compaction, curing formwork - quality control - outline of tests for concrete - joints in concrete - concrete finishes.

3 SPECIAL CONCRETE AND CONCRETING METHODS **15**

Lightweight, high density, fibre reinforced, polymer concrete - outline of manufacture, properties and uses of the above - ready mixed concrete - grunting - cold weather and underwater concreting - current developments in concrete products and methods of concreting.

4 CONCRETE CONSTRUCTION **15**

Introduction to frames structures.

Concrete in foundations - types of footings - isolated, combines, continious,strip. Concrete floors, walls and partitions. Concrete Lintels, arches, sunshades Concrete slabs - types - concrete beams and columns.

5 CONCRETE STAIRCASES **20**

Factors involving staircase design - types of staircases like straightflight, doglegged, quarterturn, bifurcated,spiral,helical, etc. - different support conditions like inclined slab,cranked slab,continuous,cantilever - foundations, finishes for staircases- detailing out of handrails and balusters. Designing and detailing for physically handicapped.

TOTAL: 45 PERIODS

TEXTBOOKS:

1. M.S.Shetty, Concrete Technology, S.Chand & Co.ltd,New Delhi,1986.
2. S.C.Rangwala, Engineering Materials, Charotar Publishing House, India, 1997.
3. Dr.B.C.Punmia, Building Construction, Laxmi Publications Pvt.Ltd., New Delhi, 1993.
4. Arthur Lyons - Meterials for Architects and Builders - An introduction Arnold, London,1997.
5. Don A.Watson, Construction Materials and Process, McGraw Hill Co.,1972.
6. Jack M.Launders, Construction Materials and Methods Careers, South Holland, Illinois, Wilcox Co.Ltd.,1986.
7. Francis D.K.Ching, Building Construction Illustrated VNR.1975.
8. Alan Banc, Stairs, Steps and Ramps, Butterworth Heinemann Ltd.,1996.

WEBSITES:

http://dir.yahoo.com/Business-and -
Economy/companies/construction/concrete/materials

http://www.easyads.co.2a/yellow/india/construct

COURSE OUTCOMES (COs)	
The student will be able	
CO1	***Explain*** the composition, properties, and tests for cement
CO2	***Summarize*** the ingredients, properties ,quality control of concrete and its construction process
CO3	***Create*** detailed drawings of footing, lintels, beams and slabs
CO4	Ability to use concrete as a versatile material in different contexts and to use it innovatively in simple projects.
CO5	An understanding of the concepts of concrete as a building construction material
C06	Ability to design and detail specific components in concrete where there is scope for architectural design.

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H	H	M	H	M			M	H	H		H
	CO2			M	M						L		L
	CO3									M			H
	CO4		L			L	H			M		M	H
	CO5		M	M	M				M		H	W	H
	C06	H				M		L					
3	Category	Building Sciences and Applied Engineering (BS &AE)											
4	Approval	32nd Meeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR 5LI	ARCHITECTURAL DESIGN – V	0	0	13	6

UNIT I

DESIGN STUDIO

Small complexes – multi planning circulation analysis – massing problems involving building technology – Design and detailing for movement of physically handicapped and elderly persons within and around buildings, examples, shopping center (Commercial) apartments (Residential) Nursing home (Institutional) home for aged. Introduction to three dimensional modeling of spaces using computer. Construction and manipulation of three dimensional building data bases, Rendering 3D images, Presentation techniques.

TOTAL:180 PERIODS

References:

1. Edward D. Mills, "Planning, 4 volumes", Newnes, Butterworths, London, 1976.
2. E and O.E. "Planning", Liffee Books Ltd., London, 1973.
3. "National Building Code" IST
4. De Chiara Callender, "Time Saver Standard for Building Types", McGraw Hills Co., 1973.

COURSE OUTCOMES (COs)	
The student will be able	
CO1	***Demonstrate*** the concept of passive design in built environment
CO2	Ability to critically understand and address issue of resources.
CO3	***Analyze*** the impact of spatial configuration at building level and at site level on passive design.
CO4	***Analyze*** and interpret different case buildings.
CO5	***Design*** and development energy efficient buildings.
C06	***Develop*** working drawings and model displaying energy efficient and green building technologies.

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H	H			M			M	H	H		H
	CO2			M	M						L		
	CO3									M			H
	CO4		L			L	H			M		M	
	CO5		M	M	M						H		H
	C06	H				M		L					
3	Category	Building Sciences and Applied Engineering (BS &AE)											
4	Approval	25th Meeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR 501	BUILDING SERVICES III	3	0	0	3

UNIT I **9**

BASIC REFRIGERATION PRINCIPLES

Thermodynamics – Heat – Temperature, measurement transfer – Change of state – Sensible heat – Latent of fusion, evaporation, sublimation – Saturation temperature – Super heated vapor – sub cooled liquid pressure temperature relationship for liquids – Refrigerants.

UNIT II **8**

REFRIGERATION CYCLE AND SYSTEM COMPONETNS

Vapor compression cycle – compressors – evaporators – Refrigerant control devices – electric motors – starters – Air handling units – Cooling towers.

UNIT III **10**

AIR-CONDIONING SYSTEM AND APPLICATIONS

Window type and package air-conditioners – chilled water plant – fan coil systems – water piping – cooling load – Air-conditioning systems for different types of buildings –Protection against fire to be caused by A.C. systems.

UNIT IV **12**

FIRE SAFETY – GENERAL PROVISIONS

Causes of fire in buildings – safety regulations – NBC – Planning considerations in buildings like Non-combustible materials, construction, staircase and life lobbies, fire escapes and A.C. systems. Special features required for physically handicapped and elderly in building types.

UNIT V **6**

FIRE DETECTION AND FIGHTING INSTALLATIONS

Heat and smoke detectors – Fire Alarm system, snorkel ladder – Fire lighting pump and water storage – Dry and Wet risers – Automatic sprinklers.

TOTAL: 45 PERIODS

Text Books:

1. William H. Severns and Julian R. Fellows, "Air conditioning and Refrigeration", John Wiley and Sons, London, 1988.

References:

1. A.F.C. Sherratt. "Air conditioning and Energy Conservation", The Architectural Press, London.

2. "National Building Code".

COURSE OUTCOMES (COs)	
The student will be able	
CO1	***Illustrate*** the basics of building management systems, scope and its importance.
CO2	***Outline*** the basics of BIM and Controllers.
CO3	***Categorize*** all the aspects of BMS and its role in advanced building services.
CO4	***Assess*** the components of BMS and its application in buildings
CO5	***Summarize*** the various technological advancements, current trends in BMS
C06	Ability to integrate services in buildings.

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H	H	M	H	M			M	H	H		H
	CO2			M	M	H					L		L
	CO3					L				M			H
	CO4		L			L	H			M		M	H
	CO5		M	M	M				M		H	W	H
	C06	H				M		L					
3	Category	Building Sciences and Applied Engineering (BS &AE)											
4	Approval	32nd Meeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/ S	C
BAR 402	HISTORY OF ARCHITECTURE – V	3	0	0	3

UNIT I **9**

LEADING TO A NEW ARCHITECTURE

Historical overview – Origins if Neo-Classicisms – Enlightenment Architects: Boulle and Ledoux. Beginning of New Extra – Industrial Revolution & its impart – Materials & Technology's History of Steel concrete glass.

UNIT II **8**

REVIEWING INDUSTRIALIZATION

Architecture Industrial Exhibition Arts and Crafts Movement in Europe and America – Art Nouveau and the works of Gaudi, Horta, Guimard, Macintosh – Early works of F.L. Wright.

UNIT III **10**

ISSUES OF ORNAMENTATION AND AESTHETICS

Adolf loos and the Arguments on Ornamentation – Futurists Movement Manifestos and the works of Sant Elia – Expressionism and the works of Mendelssohn, Taut, Polzeig – Cubism and Constructivism and its influence on Architecture – De stijl : Ideas and works.

UNIT IV **12**

INSTITUTIONS

Werkbund and Bahaus/Works of Behrens and Gropius – Cannonising Modernism – International Style – CIAM Congresses and Declarations.

Works and Ideas – Le Corbusier – Mies – Later Works of Wright – Alvar Alto.

UNIT V **6**

ARCHITECTURE IN COLONIAL INDIA

Colonialism and its impact – Early British Neo – classical Architecture – Indo – Sarcenic Architecture and the works of Chisholm – P.W.D. and the Institutionalisation of Architecture – Building New Delhi.

TOTAL: 45 PERIODS

Text Books:

2. Mechy Design – "Architecture after Independence".

References:

1. Leonardo Benevolo, “History of Modern Architecture”, 2 Vols. Routledge & Kegan Paul, London, 1971.

2. Manfredo Taferi/Franceso dal co., “Modern Architecture”, Faber and Faber / Electra, 1980.

3. Sigfried Giedion, “Space Time and Architecture”. The Growth of a New Tradition, Harvard University Press, 1978.

4. Thomas Metcalf, “An Imperial Vision”, Faber and Faber, London. 1989.

5. Tzonis Alexander – Santiago Calatrava International Publication

6. Kenneth Frampton, “Modern Architecture”. A Critical History, Thames and Hudson, London 1994.

COURSE OUTCOMES (COs)	
The student will be able	
CO1	***Differentiate*** the chronological development of architectural style in relation with the material development and cultural change.
CO2	***Interpret*** the spatial configuration and three dimensional articulation of master architects
CO3	***Examine*** the contextual design solution, Spatial organization and spatial qualities of different typologies of buildings.
CO4	***Develop*** the knowledge towards logical design development.
CO5	An understanding of modernity as a fundamental transformation in Western society that spread across the world and the resultant architectural production.
C06	An insight into the development of modern architecture.

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H	H	M	H	M			M	H	H		H
	CO2	L	H	l	M	H					L	H	L
	CO3	H	L			L		L	L	M		M	l
	CO4	H	L			L	M		M	M		M	H
	CO5	H	M	M	M				M		H	W	H
	C06					L							

3	Category	Professional Core (PC)
4	Approval	29th Meeting of Academic Council

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR 503	DESIGN OF STRUCTURES III	3	0	0	3

OBJECTIVES:

- To inform about structural design through working stress and limit state methods.
- To enable use of the above two methods for the design of concrete beams and slabs under different conditions.
- To enable use of limit state method for design of a concrete staircase.

UNIT I **9**

LIMIT STATE DESIGN OF RCC COLUMS

Code provisions – design of axially loaded short and long columns of rectangular and circular sections – ties and spiral reinforcements.

UNIT II **8**

LIMIT STATE DESING OF BEAMS, SLABS AND STAIRCASE

Limit state design of continuous beams and slabs using code coefficients. Types of staircases – design of doglegged staircase.

UNIT III **10**

SEISMIC STUDY AND STRUCTURAL APPLICATION IN BUILDING DESIGN

Introduction of seismic study – identification of seismic zones – effects of earthquake in environment and in built forms – types of structural damages due to seismic effects – precautions in structural design – form and shapes of built forms and structures. Materials related to structural forms – related building codes – safety factors.

UNIT IV **12**

WORKING STRESS DESIGN OF FOUNDATION

Types of foundation – isolated pad footings – combined footings – design principles for rafts, pile foundations. (No design calculations)

UNIT V **6**

WORKING STRESS DESIGN OF RETAINING WALLS

Design of RCC Cantilever retaining walls

TOTAL: 45 PERIODS

Text Books :

1. P. Dayaratnam, “Design of Reinforced Concrete Structure”, Oxford and IBH Publishing Co., 1983.

2. N.C. Sinha and S.K. Roy, Fundamentals of Reinforced Concrete’, S. Chand and Co., New Delhi, 1983.

References:

1. Vazirani and Ratwani, 'Concrete Structures', Khanna Publishers, New Delhi 1969.

2. S.N. Sinha 'Reinforced Concrete Design' Tata McGraw Hill, New Delhi 1998.

3. Ashok K. Jain 'Reinforced Concrete Limit State Design" Nemchand, Bros Roorkeee 1983.

COURSE OUTCOMES (COs)	
The student will be able	
CO1	Ability to understand the different concepts of WSM methods using the code provisions
CO2	Ability to understand the different concepts of LSD methods using the code provisions
CO3	Ability to design RCC beams and slabs by applying the aboveconcepts.
CO4	Ability to design RCC slabs by applying the aboveconcepts.
CO5	Ability to design RCC dog legged staircase design usingLSD.
C06	Ability to design RCC foundation.

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H	H	M		M				H	H		H
	CO2			M		H					L		
	CO3					L				M			
	CO4					L				M		M	
	CO5	H		M	M				M		H	W	H
	C06						H	H					
3	Category	Building Sciences and Applied Engineering (BS &AE)											
4	Approval	32nd Meeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR 5E1	ELECTIVE I- ENERGY EFFICIENT ARCHITECTURE	3	0	0	3

OBJECTIVES:

- To inform the need to use alternative sources of energy in view of the depleting resources and climate change.
- To familiarise the students with simple and passive design considerations
- To inform about the importance of day lighting and natural ventilation in building design
- To make the students aware of the future trends in creating sustainable built environment.

UNIT I **9**

PASSIVE DESIGN

Significance of Energy Efficiency in the contemporary context, Simple passive design considerations involving Site Conditions, Building Orientation, Plan form and Building Envelope - Heat transfer and Thermal Performance of Walls and Roofs

UNIT II **8**

ADVANCED PASSIVE ARCHITECTURE- PASSIVE HEATING

Direct Gain Thermal Storage ofWall and Roof - Roof Radiation Trap - Solarium - Isolated Gain

UNIT III **10**

PASSIVE COOLING 8

Evaporative Cooling - Nocturnal Radiation cooling - Passive Desiccant Cooling - Induced Ventilation - Earth Sheltering - Wind Tower - Earth Air Tunnels

UNIT IV **6**

DAY LIGHTING AND NATURAL VENTILATION

Daylight Factor - Daylight Analysis - Daylight and Shading Devices - Types of Ventilation - Ventilation and Building Design.

UNIT V **12**

CONTEMPORARY AND FUTURE TRENDS 12

Areas for innovation in improving energy efficiency such as Photo Voltaic Cells, Battery Technology, Thermal Energy Storage, Recycled and Reusable Building materials, Nanotechnology, smart materials and the future of built environment, Energy Conservation Building code.

TOTAL: 45 PERIODS

OUTCOMES:

- The students are exposed to alternative sources of energy and are exposed to passive design considerations
- An understanding on day lighting and natural ventilation in design in addition to the future trends in creating sustainable built environment

TEXTBOOK:

1. Manual on Solar Passive Architecture, IIT Mumbai and Mines New Delhi - 1999
2. Arvind Krishnan & Others, Climate Responsive Architecture, A Design Handbook for Energy Efficient Buildings, TATA McGraw Hill Publishing Company Limited, New Delhi, 2001
3. Majumdar M, Energy Efficient Building in India, TERI, 2000.

REFERENCES:

1. Fuller Moore, Environmental Control Systems, McGraw Hill INC, New Delhi - 1993
2. Sophia and Stefan Behling, Solpower, the Evolution of Solar Architecture, Prestel, New York, 1996
3. Givoni .B, Passive and Low Energy Cooling of Buildings, Van Nostrand Reinhold, New York, 1994
4. The energy efficient home: a complete guide by PatrickWaterfield, Crowood press ltd.
5. Dean Hawkes, Energy Efficient Buildings:Architecture, Engineering and Environment, W.W. Norton & Company
6. David Johnson, Scott Gibson, Green from the Ground Up: Sustainable, Healthy and Energy efficient home construction, Published April 2008 by Tauton.

COURSE OUTCOMES (COs)	
The student will be able	
CO1	***Demonstrate*** the concept of passive design in built environment
CO2	Ability to critically understand and address issue of resources.
CO3	***Analyze*** the impact of spatial configuration at building level and at site level on passive design.
CO4	***Analyze*** and interpret different case buildings.
CO5	***Design*** and development energy efficient buildings.
C06	***Develop*** working drawings and model displaying energy efficient and green building technologies.

Mapping of Course Outcomes with Program Outcomes (POs)

(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H	H			M			M	H	H		H
	CO2			M	M						L		
	CO3									M			H
	CO4		L			L	H			M		M	
	CO5		M	M	M						H		H
	C06	H				M		L					
3	Category	Building Sciences and Applied Engineering (BS &AE)											
4	Approval	25th Meeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR 5E1	ELECTIVE I- THEORY OF DESIGN	3	0	0	3

OBJECTIVES:

- To understand design and the role of the designer in changing society.
- To familiarize the students with methodologies, theories and models of the design process.
- To inform students about the term creativity and introduce techniques which will enable creative thinking.
- To inform the approaches that generate ideas for architectural design and the importance of the participatory approach to design.

UNIT I **9**

INTRODUCTION TO DESIGN

Definition and understanding of design- design in history -changing role of designer on society different classifications of design according to scale, process, mode of production, etc.,

UNIT II **8**

DESIGN METHODOLOGY MOVEMENT

Context for the rise of the design methodology movement- theories of the first generation and the second generation design methodologists- various models of the design process- focus on the design problem: ideas of escalation/regression and wicked problem.

UNIT III **10**

CREATIVE THINKING

Understanding the term creativity- theories on thinking: left brain/ right brain, convergent and divergent thinking, lateral and vertical thinking- design spectrum from the logical to chance - blocks in creative thinking- various techniques to generate creativity

UNIT IV **12**

ARCHITECTURAL CREATIVITY

Design puzzles and traps - approaches to generate ideas for architectural design - types of concepts- personal philosophies and strategies of individual designers - channels to creativity in architecture

UNIT V **6**

DESIGN AND PEOPLE

Concept of pattern language- participatory approach to design - design as process

TOTAL: 45 PERIODS

OUTCOMES:

An ability to think about architecture as one of the many fields under the broader ambit of design as a fundamental human activity.

TEXTBOOK:

1. Geoffrey Broadbent - Design in Architecture - Architecture and the human sciences - John Wiley & Sons, New York, 1981.

2. Bryan Lawson - How Designers Think, Architectural Press Ltd., London, 1980.

3. Anthony Antoniades, Poetics of architecture- Theory of design

4. Paul Alan Johnson, Theory of Architecture- Concepts, Themes,Wiley 2008 VNR, 1994

5. Christopher Alexander, Pattern Language, Oxford University Press,1977

6. James C. Snyder, Anthony J. Catanese, Timothy L. McGinty- Introduction to Architecture, McGraw Hill 1979.

REFERENCES:

1. Victor Papanek, Design for the real world

2. Edward De Bono, Lateral Thinking, Penguin, 1990.

3. Design methods- Christopher Jones, Wiley, 1980.

4. Tom Heath - Method in Architecture, John Wiley & Sons, New York, 1984.

5. Nigel Cross - Developments in Design Methodology, John Wiley & Sons, 1984.

6. Evans, Helen Marie; Dumesnil, Carla Davis- An Invitation to Design, Macmillan Publishing Co., New York, 1982

COURSE OUTCOMES (COs)	
The student will be able	
CO1	An ability to think about architecture as one of the many fields under the broader ambit of design as a fundamental human activity.
CO2	Focuses on the aesthetic and **function** of the structure.
CO3	It's **design** works to create a space that flows with its surroundings.
CO4	The infinite variety of these spaces can be as varied as life itself
CO5	**design theory** is a system of ideas that explains how and why **design** works.
CO6	To know how everything they put on a page communicates, influences, directs, invites, entices and excites an audience

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	a	b	c	d	e	f	g	h	i	j	k	l
	CO2	H					M			M			
	CO3		L			L					H		
	CO4	M		M				L					
	CO5		L				M						M
3	Category	PE											
4	Approval	27THMeeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR 5L2	COMPUTER STUDIO II	0	0	4	3

OBJECTIVES:

- To introduce Computer operation principles and explore image editing through a visual composition using graphics.
- To impart training in Computer aided 2D drafting and 3D Modeling through projects
- To enable the rendering of a building so as to create a photo realistic image.

UNIT I **10**

INTRODUCTION TO COMPUTER AND IMAGE EDITING

Technology of small computer system, computer terminology operation principles of P.C., introduction to application software, and graphic system, and use of printers, scanner, plotter, File management, etc. Understanding Bitmap images and Vector Graphics, Image size and Resolution. Basic Tools for Editing and Creating Graphics.

UNIT II **15**

THE BASICS OF BUILDING MODELLING

Creating a basic floor plan, About Temporary Dimensions, Adding and Modifying Walls, Working with Compound Walls, Using Editing Tools, Adding and Modifying Doors, Adding and Modifying Windows

UNIT III **20**

VIEWING THE BUILDING MODEL

Understanding the drawing unit's settings, scales, limits, drawing tools, drawing objects, object editing, and text, dimensioning. Transparent overlays, hatching utilities, line type, line weight and colour. Multiline, Polyline, etc. Styles, blocks and symbol library.

UNIT IV **15**

INTRODUCTION TO 3D MODELLING

Project: Create 3D sculpture using 3D primitives (cubes, spheres etc.)

Tools: Slide facilities script attributes, V-port, editing session. Introduction to 3D-modelling technique and construction planes, drawing objects, 3D surfaces setting up elevation thickness and use of dynamic projections.Solidmodelingwith primitive command andBoolean operation.

UNIT V **15**

3D RENDERING AND SETTING

Project: Visualize a building. Explore the potential of lights and camera and use the same in the model created for the final submission. Tools: Rendering and scene setting to create a photo realistic picture,

understanding material mapping, environment setting and image filling. Exercise to identify and visualize a building using the above said utilities.

TOTAL: 75 PERIODS

OUTCOMES:

- The students benefit by learning software which helps them to better visualize complicated forms and also helps in producing photo realistic images of those 3D forms.

TEXTBOOK:

1. Photoshop 7Bible ProfessionalEdition,Wiley John&Son INC,NewYork,Deke McClelland, 2000.

2. AutoCAD architectural user guide – Autodesk Inc., 1998.

3. A. Watt, Fundamentals of Three-Dimensional Computer Graphics, Addis Wesley, Massachusetts, 1989.

REFERENCES:

1. The Illustrated AutoCAD 2002 Quick Reference, Ralph Grabowski,

2. Autocad 2000: A Problem-Solving Approach, Sham tikoo. Pub: Thomson Learning, 1999.

3. 3D MAX - 6 Bible, Wiley, 2004.

CO1	To ***apply*** softwares in the field of Architecture to represent design ideas.
CO2	***Produce*** 2D technical drawings using AutoCAD
CO3	***Develop*** the 3D model of buildings & objects using AutoCAD and Sketch Up
CO4	***Recreate*** realistic image of objects and buildings by using presentation software.
CO5	Sheet set ***organization*** and plot/print drawing to the scale. In photoshop
C06	Ability to develop knowledge.

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1			M	H	M			M	H	H		H
	CO2			M	M	H					L	H	L
	CO3					L		M					
	CO4	H	L			L		M					
	CO5	H	M	M	M				M		H		H
	C06					L							
3	Category	ProfessinalAbilityEnhancement Courses (PAEC)											
4	Approval	32nd Meeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR 504	MATERIALS AND CONSTRUCTION – IV	2	0	4	4

UNIT I

FERROUS METALS **5**

Brief study on manufacture,properties and uses of cast iron,wrought iron,pig iron and steel - anticorrosive measures for steel - mechanical and heat treatment of steel - market forms of steel - structural steel, stainless steel, steel alloys - properties and uses - current developments.

UNIT II

STEEL CONSTRUCTION **10**

Structural steel sections - types of connections in steel - steel in foundations, columns and beams - different types of steel roof trusses including northlight truss - space frames - materials for roofcovering. Steel staircases and handrails,balusters. Steel doors and windows - openable, sliding - collapsible gates - rolling shutters. Steel in furniture and other interior uses. Detailing and specification for physically handicapped.

UNIT III

NON FERROUS METALS **15**

Aluminium and Aluminium Alloys - brief study on manufacture,properties and uses - Aluminium products - extrusions,foils,castings,sheets,etc.-tin and lead,properties and uses - current developments.

UNIT III

CONSTRUCTION USING NON-FERROUS METALS **20**

Aluminium doors - openable, sliding, pivoted.

Aluminium windows -

openable,sliding,fixed,pivoted.

Aluminium ventilators - top hung,bottom

hung,pivoted,louvred,fixed. Aluminium partitions,false

ceiling,shopfront handrails,curtainwalling. Aluminium roofing -

northlight glazing bar ,Aluminium roofing sheets.

Use of other nonferrous metals like copper,bronze,brass,etc.,in architectural construction. Detailing and specification for physically handicapped.

UNIT III

PLASTICS 10

Thermoplastics and thermosets - properties and architectural uses of plastics - structural plastics - reinforced plastics and decorative laminates - plastic coatings,adhesives and seatants - modifiers and plasticzers - fillers and stablizers - fabrications of plastics. Primary plastic building products for walls,roof and partitions -

secondary building products for rooms,windows,roof lights, domes,gullers handrails.

TOTAL:60 PERIODS

TEXTBOOKS:

1. .C.Rangwala,Engineering Materials, Charotar Publishing House,India,1997.
2. B.C.Punmia,Building Construction,laxmi Publications Pvt.Ltd.,New Delhi,1993.
3. Arthur Lyons - Materials for Architects and Builders - An Introduction - Arnold,London,1997.
4. Don A.Watson,Construction Materials and processes,McGraw Hill Co.,1972.
5. Harold B.Olin,Construction Principles materials and Method, The Institute of Financial Education, Chicago,1980.
6. Time Saver Standards for Architectural Design Data,Callendar JH,McGraw Hill,1974.

WEBSITES

http://www.britmetfed.org.uk/medu.html

http://www.indiabussinesSonline.com

http://www.nrwas.com

http://www.arcadiaproducts.com

COURSE OUTCOMES (COs)	
The student will be able	
CO1	***Identify*** the appropriate Ferrous and Non-Ferrous materials in construction.
CO2	***Identify*** appropriate construction techniques using Ferrous and Non-Ferrous materials in construction
CO3	***Assess*** the suitable steel roof truss for different spans of industrial buildings.
CO 4	***Detailed drawings of Ferrous and Non Ferrous, Glass based building components***
CO5	***Apply the property of glass towards "Energy conservation***
C06	***Knowledge of properties of ferrous and non-ferrous metals as materials for buildings***

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1			M	H				M		H		H
	CO2	L	H		M						L	H	L
	CO3	H				L				M			
	CO4	M	L							M			
	CO5		M	M					M		H		M
	C06					H	M						
3	Category	Building Sciences and Applied Engineering (BS &AE)											
4	Approval	32nd Meeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR6L1	ARCHITECTURAL DESIGN VI	0	0	16	8

OBJECTIVE:

- To introduce buildings as consumers of resources for human needs and to enable responsible, creative addressing of this fact through design choices.
- To enable an understanding of architectural design as integrating diverse functional concerns in a building through analysis and innovation.
- To impart training in the resolving of spatial considerations with other physical aspects such as structures, services and climate.

TOTAL: 240 PERIODS

CONTENT:

Design of large structures – Multiuse multispan – non masonry building types involving buildings – Design and detailing for movement and use by physically handicapped people within and around building technology and services.

Examples: College (Institutional) Office Buildings Resorts – etc., Working drawings for any one design using computers.

OUTCOME:

- Understand issues in buildings with respect to density, services and energy consumption as well as make the right choices in design situations involving these issues.fabric. Ability to bring inclusivity into the architectural design process.

REFERENCES

1. Edward D Mills, “Planning, 4 volumes”, Newnas Butterworths, London 1976.
2. E and OE “planning” 11ffee Books Ltd., London 1973.
3. National Building Code 151
4. Da Chara and Callandar, “Time saver standards for building type McGraw Hall Col. 1983.
5. Henry J Cowan,foerresr Wilson Structural Systems -Van Nostrand Reinhold Company, London / New York
6. Mario Salvadori Robert Heller Structures in Architecture- Prentice International series in Architecture

COURSE OUTCOMES (COs)	
The student will be able	
CO1	Understand issues in buildings with respect to density, services and energy consumption as well as make the right choices in design situations involving these issues.
CO2	Understand Green Building concepts and basic principles of sustainable built environment.
CO3	Integrating the services in the design
CO4	Design and Produce computer aided presentation drawings and making scale models
CO5	Understanding the impact of design on site and various aspects
C06	Understanding the design and form of building typologies that are the result of
	pressure on urban lands with a thrust on issues like urban land economics, technology

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H	H	M	H		H				L		
	CO2	H	M	L	H		M				L		M
	CO3	M	H	M	H		M						
	CO4	M	M	L									M
	CO5										L		
	C06												
3	Category	Professional Core (PC)											
4	Approval	34th Meeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR601	BUILDING SERVICES IV	3	0	0	3

OBJECTIVE:

- To introduce the condition of modernity and outline its impact on society, cities and architecture.
- To give a detailed understanding of modern architecture as new expression with different strands rising from various aspects and effects of modernity.
- To create an overall understanding of the architectural developments in India rising out of colonial modernity and nationalism.

UNIT I	FUNDAMENTALS	6

Sound waves, frequency, intensity, wave length, measure of sound, decibel scale, speech and music frequencies, human ear characteristics – Tone structure.

UNIT II	SOUND TRANSMISSION AND ABSORPTION	9

Outdoor noise levels, acceptable indoor noise levels, sonometer, determinate of density of a given building material, absorption co-efficients and measurements, choice of absorption material, resonance, reverberation, echo, exercises involving reverberation time and absorption co-efficient.

UNIT III	NOISE CONTROL AND SOUND ABSORPTION	9

Types of noise, transmission of noise, transmission loss, noise control and sound insulation, remedial measures and legislation.

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UNIT IV	CONSTRUCTIONAL MEASURES	12

Walls/partitions, floors/ceilings, window/doors, insulating fittings and gadgets, machine mounting and insulation of machinery.

UNIT V	ACOUSTICS AND BUILDING DESIGN	9

Site selection, shape, volume, treatment for interior surface, basic principles in designing open air theatres, cinemas, broadcasting studios, concert halls, class rooms, lecture halls and theatres.

TOTAL: 45 PERIODS

OUTCOMES:

- Identify the sound insulation materials in design
- Collection of sound proof materials

REFERENCES:

1. Dr. V. Narasimhan – "An Introduction to Building Physics" – Kabeer printing Works, Chennai – 5. 1974.

2. D.J. Groomet – "Noise, Building and People" – Pergumon Press – 1997.

3. Thomas D. Northwood – "Architectural Acoustics" – Dowden, Hutchinson and Ross Inc. 1997.

4. Peter Templeton and Saunders- Detailing for Architectural acoustics – Architectural press Acoustical design for Auditoriums – IS 2526 ISI 1963

5.S.L .Suri Acoustics Design and Practice Asia Publishing house

COURSE OUTCOMES (COs)	
The student will be able	
CO1	Identify the sound insulation materials in design
CO2	Collection of sound proof materials
CO3	Analyse the materials with respect to various aspects
CO4	Design and Develop in a building
CO5	To understand the usage of materials in sound proof building for auditorium and lab
CO6	Understand the design methodology

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1			H		M							
	CO2			H									L
	CO3		H	L					M			L	
	CO4		H	L									
	CO5		H	L									L
3	C06												
4	Approval	34THMeeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR602	HISTORY OF ARCHITECTURE – VI	3	0	0	3

OBJECTIVE:

- To introduce the condition of modernity and outline its impact on society, cities and architecture.
- To give a detailed understanding of modern architecture as new expression with different strands rising from various aspects and effects of modernity.
- To create an overall understanding of the architectural developments in India rising out of colonial modernity and nationalism.

UNIT I	CRITIQUING MODERNISM	6

Challenging CIAM declaration: Team X and Brutalism – Writing of Venturi – Jane Jacobus – Aldo Rosi – Christopher Alexander.

UNIT II	AFTER MODERNISM	9

Conditions of POST – Modernity – Tools of New Architecture: Collage, Technology and New Science – Canonization of Post – Modernist Architecture – Historic Revivalism – Pop Architecture – Critical Regionalism – Deconstructivist Theory and Practice.

UNIT III	ALTERNATIVE PRACTICE	9

Ideas and Works of Fathy – Baker – Ando – Soleri – Bawa.

.

UNIT IV	POST – INDEPENDENT ARCHITECTURE IN INDIA	12

Chandigarh and Bhuvaneswar experiments – Influence of Corbusier, Louis Kahn, Koenigsberger – The formation of Institutions – Debates on Tradition as source and burden – works and ideas : Nari Gandhi – Doshi – Kanvinde – Correa – Raje – Jain – Stein Housing and the issues of Appropriate Technology – Architecture in the Horizon.

UNIT V	CONTEMPORARY ARCHITECTURE	9

Overview of larger changes in society from late 20th century and their influence on architecture. Outline of architecture related to parametric design and digital processes, sustainability, globalisation, phenomenology, complexity. Ideas and works of ZHA, contemporary Dutch architecture, Bjarke Engels and BIG, OMA and Rem Koolhaas, Steven Holl, Mcdonough, Yeong, Zumthor, Pallasma, Murcutt. Outline of contemporary architecture in the non Western world. Large scale changes in India from the 90s. Outline of post 1990s architecture of India.

TOTAL: 45 PERIODS

OUTCOMES:

- Differentiate the chronological development of architectural style in relation with the material development and cultural change.

REFERENCES:

1. Aldo Rossi, 'The Architecture of the City", MiT Press, Massachusett 1982.

2. Charles Jencks, "The Language of Post – Modem Architecture", 1984.

3. Christopher Alexander, "Pattern Language", Oxford University Press Oxford.

4. D. Ghirardo, "Architecture After Modernism", Thames and Hudsoi London, 1980.

Robert Venturi, "Complexity and Contradiction in Architecture", The Architectural Press, London,

COURSE OUTCOMES (COs)	
The student will be able	
CO1	***Differentiate*** the chronological development of architectural style in relation with the material development and cultural change.
CO2	***Interpret*** the spatial configuration and three dimensional articulation of master architects works.
CO3	***Examine*** the contextual design solution, Spatial organization and spatial qualities of different typologies of buildings.
CO4	***Develop*** the knowledge towards logical design development.
CO5	An understanding of modernity as a fundamental transformation in Western society that spread across the world and the resultant architectural production.
CO6	An insight into the development of modern architecture.

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H	H	M	H	M			M	H	H		H
	CO2	L	H	l	M	H					L	H	L
	CO3	H	L			L		L	L	M		M	l
	CO4	H	L			L	M		M	M		M	H
	CO5	H	M	M	M				M		H	W	H
4	Approval	34THMeeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR 603	COST ESTIMATION	3	0	0	3

UNIT I	INTRODUCTION TO ESTIMATION	6

Quantity survey – Principle of measurement and billing, elementary billing and measurement of basic materials like brick wood, concrete, etc., Advance billing and measurement of basic materials like brick wood, concrete, etc., Advance billing and measurement of structural and service item of work.

UNIT II	COST ESTIMATING	9

Calling Function of cost planner, liaisons with consultant construction planning techniques for efficient cost control or cost budgeting of a project.

Exercise in variation, cost adjustment and cost analysis norms and standard for building project. Relationship between specification with B.O.Q. on ground of cost economics.

UNIT III	COST BUILDING	9

The business environment, and its structure in practice details and information on taxation, depreciation, operation cost, economics of buildings plant and materials handling.

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UNIT IV	FINANCE AND BUDGETING	12

Financial control and management for building construction and maintenance investment role of various financial agencies for building and land development.

UNIT V	PROJECT EVALUATION	9

Financial of projects, economic feasibility report, valuating depreciation and its implication, and assessment of completed project.

: 45 PERIODS

OUTCOMES:

- To enable understanding with respect to quality and quantity of materials, quantity and classes of skilled and unskilled labours, and tools and plants required for projects.
- To give an understanding of how to draw up specifications for the different items of a building project and also to prepare the schedule of programming of the project.
- To give knowledge on how to prepare approximate as well as detailed estimates and to have a clear picture of the project expenditure.
- To help calculate the exact quantities of items of work done for effecting payment especially when direct measurements are difficult and also to determine the quantities of different materials required for various items of work.
- To give understanding of how to prepare valuation report of real and landed property.
- To give exposure to budgeting in projects.

REFERENCES:

1. Dutta, "Estimating and Costing", S. Dutta and Co., Lucknow
2. S.C. Rangwala, "Elements of Estimating and Costing", Charoter Publishing House, India.
3. W.H. King and D.M.R. Esson, "Specification and Quantities for Civil Engineering", The English University Press Ltd.
4. "T.N. Building Practice", Vol. 1. Civil, Govt. Publication
5. "P.W.D. Standard specification", Govt. Publication.
6. CPWD Specifications- Government of India

COURSE OUTCOMES (COs)	
The student will be able	
CO 1	Understand the unit measurement of materials.
CO2	Understand the techniques of estimating and costing related to building construction.
CO3	Apply and understand the various methods of quantity surveying, rate analysis of building and valuation for different materials used. Calculate material cost of given component/product.
CO4	Know about Specification for basic building material and apply the same for another example
CO5	Understand and apply the concepts of project planning and basics of financial management
CO6	Analysingthe cost of the projects

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H							M				
	CO2		L								M		H
	CO3			M			M			L			
	CO4	H			H			L					H
	CO5		M			H			L				
3	Category	PC											
4	Approval	27THMeeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR 604	HUMAN SETTLEMENTS & PLANNING	2	0	2	4

OBJECTIVE:

- To introduce the vocabulary, elements and classification of human settlements.
- To give exposure to planning concepts at different scales of settlements.
- To give an understanding of planning addressing current issues.

UNIT I	INTRODUCTION	6

Elements of Human Settlements – Role of Man and Society in the growth and decay of human settlements

UNIT II	PLANNING CONCEPTS	9

Contribution to planning through – Patric Geddes, Ebenezer Howard – CA Perry – Le Corbusier – Doxiadis – Mumford – Relevance to Indian Planning Practice

UNIT III	URBAN PLANNING	9

Various types of plans, Master plan, Structure plan, Comprehensive plan, subject plan, Zonal Development plan, their scope and content, planning process

UNIT IV	URBAN DEVELOPMENT PROGRAMMING	12

IUDP, IDSMT, Megacity, IFRE, Sustainable City Programme – their context, concept, scope, content and funding mechanism.

UNIT V	RURAL PLANNING	9

Rural settlement structure – Demographic dynamic – micro level planning: Scope and content.

TOTAL: 45 PERIODS

OUTCOMES:

- Understand the origin, evolution and growth of settlements.
- Learn about planning theories by prominent planners.
- Study the planning concepts in planned cities

REFERENCES:

1. C.L. Doxiadis, Ekistios, "An Introduction to the Science of Human Settlements", Hutchinson, London 1968.

2. Madras Metropolitan Development Authority, "Master Plan for Madras Metropolitan Area, Second Master Plan – 1995".

3. Government of India, "Report of the National Commission on Urbanisation" 1988.

4. Ministry of Urban affairs and Employment, Government of India, New Delhi "Urban Development plans: Formulation & implementation" – Guidelines - 1996.

5. Hansen N. "Regional Policy and Regional Integration" Edward Elgar, UK, 1996.

6. Centre for Human Settlements, Anna University, Chennai "Development Plan for Uthokottai Taluk, Cheyyur Taluk", 1999.

7. Andro D Thomas Housing and Urban renewal george Allen and Unwin Sydney

COURSE OUTCOMES (COs)	
The student will be able	
CO1	***Understand*** the origin, evolution and growth of settlements.
CO2	***Learn*** about planning theories by prominent planners.
CO3	***Understand*** about the dynamics of Urban Form and various Human Settlements pattern
CO4	***Understand*** Planning process and techniques adopted at various levels.
CO5	***Study*** the planning concepts in planned cities
C06	Arrangement of city pattern

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	M				H							
	CO2		M										
	CO3			L									
	CO4				H	M							
	CO5	M											
	C06												M

3	Category	Professional Core(PC)
4	Approval	35th Meeting of Academic Council

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR 6E2	SUSTAINABLE ARCHITECTURE I	3	0	0	3

OBJECTIVE:

- To make student aware about the concepts, of environment, ecology, role of institutions in the country.
- To provide basic knowledge on Sustainable Technologies involved – tracing the growth of settlements – their response to climate – other technical options.
- To provide an orientation to students from Macro Level to Micro Level Design aspects, and
- To expose to students International and National Level agenda on concepts of conservation of Environment and its implications on sustainable concepts of Architecture and planning.

UNIT I	INTRODUCTION	7

Planning Concept – Environment Impact Analysis – Ecological Footprints – Essential ingredients of Sustainable Development apart from Social and Economical – Environment, Stakeholders Participation, and Institutional Mechanism.

UNIT II	DEVELOPMENT IN HISTORICAL CONTEXT	9

Early settlement pattern – Climate Responsive Planned Layouts – orientation of Streets and Buildings, Creation of Habitable Environment, Early Planning Methods – Land Generation, Soil and Water Conservation, Bioregional Approach.

UNIT III	RESOURCE EFFICIENCY	9

Land, Water, Energy, Human Resource, Biodiversity – Suitable practices at settlement, Campus and Building Level

UNIT IV	SUSTAINABLE ARCHITECTURE	12

Appropriate materials and construction – review of their properties workability, Eco Friendly construction practices – Need for Legislation – sustainable campuses, neighborhoods, programs and case studies.

UNIT V	SUSTAINABLE PLANNING AND POLICIES	9

Awareness program at National, International levels Rio de Jenero agenda – Earth summits – agenda involved – their realization.

TOTAL: 45 PERIODS

OUTCOMES:

- The students are oriented about the concepts of ecosystem carrying capacity, erlolqkn I footprint sustainability and sustainable development. Knowledge of vernacular architectural forms i different regions.

REFERENCES:

1. Bioclimatic Architecture – ENEA and IN/ARCH Publication Edition – 1989.
2. Brotoc, Sustainable architecture high-tech housing.
3. Roofs, Eco-house a design guide

COURSE OUTCOMES (COs)	
The student will be able	
CO1	An understanding of Indian vernacular architecture as a process and to also provide an overview of various approaches and concepts towards its study.
CO2	Knowledge of vernacular architectural forms in different regions.
CO3	An understanding of the impact of colonial rule on vernacular architecture in India.
CO4	To understand how the contexts of a region have an impact on **vernacular** architectural forms.
CO5	The impact of context of a region over architectural forms
CO6	Expressions will lead to sensible and context specific and sensitive design solutions.

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H				L						M	
	CO2		L				M				H		
	CO3	L			L					M			
	CO4		M				M						
	CO5			L					M				H
3	Category	PE											
4	Approval	34THMeeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR7L1	ARCHITECTURAL DESIGN VII	0	0	18	8

OBJECTIVE:

- To enable an understanding of architecture as having the capacity to critically interpret and transform status quo in the built environment and society through the act of design.
- To guide in the taking of critical/ philosophical/ ideological positions relating to specific design situations in the current world and to explore architectural morphology as an expression of those positions.

TOTAL: 180 PERIODS

DESIGN OF ADVANCED AND COMPLEX PROBLEMS 180

Design of advanced and complex problems – comprising group multi storied structures and infrastructure – with regard to climatic conditions, orientation, services, circulation problems relating to large developments Design and detailing for movement and use by handicapped persons within and around building and campuses to be addressed – examples: campus design, urban centers, Housing Senior citizens neighbourhood and Time problem using computer aided design

OUTCOME:

- Understand the concept of energy efficient design & green building technologies.
- Ability to bring inclusivity into the architectural design process.

REFERENCES

1. Edward D Mills, ‘Planning 4 volumes”, newness Butterworths, London 1976.
2. E and 05 “Planning London” 11ffe Books Ltd 1973.
3. “National Building” Code ISI
4. De Chiara and Callendar – “Time savers standards for Building Types”- McGraw Hill Co. 1973.

COURSE OUTCOMES (COs)	
The student will be able	
CO1	Understand the concept of energy efficient design & green building technologies.
CO2	Understand the impact of spatial configuration at building level and at site level on energy consumption
CO3	Analyze and interpret different case buildings.
CO4	Design and development energy efficient buildings.
CO5	Develop working drawings and model displaying energy efficient and green building technologies.
CO6	Demonstrate an understanding of the design philosophy, or vision of the architectural office and its implementation in the project/s

Mapping of Course Outcomes with Program Outcomes (POs)

(H/M/L indicates strength of correlation) H-High, M-Medium, L- Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H						M				L	
	CO2		H			M							
	CO3			L			M				M		
	CO4	H			M								L
	CO5		H				H				L		
3	Category	PC											
4	Approval	32NDMeeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR 701	URBAN DESIGN	2	0	2	4

OBJECTIVE:

- To create an understanding of urbanism and urban morphology as rising from various forces through history.
- To introduce the components of the modern city and their interdependencies.
- To introduce the scope and nature of urban design as a discipline
- To introduce key theories associated with urbanism and cities.
- To create awareness of contemporary urban issues and how they are addressed.
- To give exposure to ways of perceiving, documenting and analysing cities

UNIT I	INTRODUCTION	6

Relationship between Architecture, Urban Design and Town Planning – Perception of city from and pattern – Townscape elements.

UNIT II	ROLE OF SPACE IN HISTORICAL TOWNS	9

Comparative analysis of public spaces, their organization and articulation in pre-history, early, mediaeval and renaissance periods in west and east.

UNIT III	ORGANISATION OF SPACE	9

Understanding, organizing and articulation of spaces for residential, commercial industrial and recreational areas.

UNIT IV	RENEWAL AND RE-DEVELOPMENT	12

Objectives, surveys program of urban renewal and public involvement and participation.

UNIT V	CONTEMPORARY PRACTICE	9

Townscape policies, need for new bye-laws, regulations and emerging areas of development

TOTAL: 45 PERIODS

OUTCOMES:

- Plan / Undertake a study to identify existing issues related urban design in built environment.
- Identify various factors that are responsible urban conditions
- Gather, correlate and interpret the data that are required for
- design proposal at historic cities.

REFERENCES:

1. Lawrence Hatprin – "Cities" Reinhold Publishing Corporation N.Y. 1964.

2. Gosling and Maitland – "Urban Design" – St. Martin's Press, 1984.

3. Jonathan Barnett – "An Introduction to Urban Design" – Harper & Row, Publishers, N.Y. 1982.

4. Image of the city –Kevin Lynch

5. Architecture of Town and cities – Paul D Speriregon The MIT press

6. Urban Design – Ornamentation & Decoration – Cliff Monghtin

7. Urban Design – Street and square – Cliff Monghtin

8. Town and square – Paul Zucker – Bath prss

9. Urban Pattern - Arthur B Gallion CBS Publication

10. Architecture and Urban Experience – Raymond J Curran

11. Indian city in the Arid west – Kulbhushan Jain – Aadi centre

COURSE OUTCOMES (COs)	
The student will be able	
CO1	Plan / Undertake a study to identify existing issues related urban design in built environment.
CO2	Identify various factors that are responsible urban conditions.
CO3	Gather, correlate and interpret the data that are required for design proposal at historic cities.
CO4	Develop an urban renewal proposal for a city.
CO5	Develop a design proposal for the urban issues relating to the built environment
CO6	To provide a framework for exploring the meaning and **scope of urban design**

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	L						M					
	CO2		H								M		
	CO3			M			M						
	CO4	M						M					H
	CO5		L				L				H		
3	Category	PC											
4	Approval	30THMeeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR702	RESEARCH METHODOLOGY AND PRE THESIS WORK	2	0	2	4

OBJECTIVE:

- To enable an understanding of urbanism as a continuous experience involving the interrelated disciplines of architecture, urban design and town planning.
- To understand architecture as influenced by and influencing the dynamics of cities.
- To facilitate the taking of architectural design decisions in the context of the urban

TOTAL: 240 PERIODS

CONTENT:

Design studio emphasize on explaining and understanding Architecture primarily through the mode of making. Dissertation offers an opportunity to look at architecture, history and design primarily through textual. However, like design, dissertation involves process of observation, reflection and abstraction. Students are encouraged to choose any topic of their interest during the Practical Training -I undertaken by the student in IX semester and obtain approval from the Department before commencement of the Practical Training-II at the X semester.
The dissertation proposal in about 1500 words stating the topic, issues to be explored and the scope must be submitted before the commencement of Practical Training II for the approval of the department. The topic chosen may range from analyzing the works of an architect, history, typological changes, writing, design process and many more. After approval the work would be reviewed atleast twice during the semester by the department. Students are advised to seek the guidance of the architects under whom they go through the Practical Training II.
The final dissertation report shall contain objectives, followed by exhaustive documentation and arguments. The emphasis however, could vary according to the topic. A well written report of a minimum 15,000 words must be submitted in the prescribed format, if any provided by the University. The student would subsequently make a presentation of his/her work and appear for the Viva voce examination to be conducted at the end of Practical Training II.

OUTCOMES:

- Undertake the research systematically in a chosen topic.
- Illustrate the various methods available for the collection of information.

REFERENCES

1. Ian Border, Kurt Rueideu, The Dissertation, An Architectural Students Hand Book, Architectural Press, 2000

2. Linda Grant and David Wang, Architectural Research Methods, John Wiley Sons, 2002

COURSE OUTCOMES (COs)	
The student will be able	
CO1	*Undertake* the research systematically in a chosen topic.
CO2	Illustrate the various methods available for the collection of information.
CO3	analyses and interpret the information obtained from the study.
CO4	Organize the collected information graphically
CO5	*Develop* a report of the analyzed information with the logical reasoning and conclusion.
CO6	Builds his his/her capacity to work independently and methodically in a variety of intellectually demanding contexts.

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	L					M				H		
	CO2		M		M					H			
	CO3	L				M						L	
	CO4		H				H						M
	CO5	L						L			M		
3	Category	PAEC											
4	Approval	26THMeeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR 703	PROFESSIONAL ETHICS & PRACTICE	3	0	0	3

UNIT I	EASEMENTS	6

EASEMENTS Definition – types of easement – acquisition extinction and protection of easements.

UNIT II	TENDER	9

Calling for tenders – tender documents – open and closed tenders – item rate, lump sum, labour and demolition tender – conditions offender – submission of tender – scrutiny and recommendations.

UNIT III	CONTRACT	9

Conditions of contract – Form of contract articles of agreement – Contractor's bill certification.

UNIT IV	ARBITRATION	12

Arbitration in disputes – arbitration agreement – sole arbitration – umpire – excepted matters award.

UNIT V	LEGISLATION	9

Environmental Acts and Laws – Special Rules governing Hill Area Development – coastal area development and management – Heritage Act of India – Consumer protection act and their relevant provisions.

: 45 PERIODS

OUTCOMES:

- Relate the responsibility of architect towards the society.
  Know the office procedure, work with allied
  professionals as a team in accordance with the architect's act 1972

REFERENCES:

1. Publications of COA IIA “Hand book on Professional Practice”, The Architects publishing Corporate of India, Bombay 1987.
2. D.C. Rules for Chennai Metropolitan Area 1990.
3. T.N.D.M. Building Rules, 1972.
4. T.N.P. Building Rules, 1942.
5. Chennai City Corporation Building Rules 1972.
6. Denk Sharp, The Business of Architectural Practice William Coliins Sons & Co. Ltd., 8 Erafton St. London W1 1986.
7. Roshan Namavathi, Professional Practice, Lakshmi Book Depot, Mumbai 1984.
8. Publication of IIA.
9. Environmental Laws of India – by Kishore Vanguri, C.P.R. Environmental Education Centre Chennai.
10. The Tamil Nadu Hill Areas Special Building Rules – 19.
11. Heritage Act
12. Consumer Protection Act.
13. Indian Easements Act.

COURSE OUTCOMES (CO:)

The student will be able	
CO1	Relate the responsibility of architect towards the society.
CO2	Illustrate the building rules and regulations essentials for practice.
CO3	Know the ethics to be followed while practicing the profession
CO4	Prepare tenders
CO4	Know the office procedure, work with allied professionals as a team in accordance with the architect's act 1972
CO 6	Prepare contract documents

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H							M				
	CO2		L				M						M
	CO3	L		H									
	CO4		M					M			L		
	CO5	M				M							M
3	Category	PAEC											
4	Approval	33RDMeeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR 704	PROJECT MANAGEMENT	3	0	0	3

OBJECTIVE:

- To introduce housing in the Indian context and the various agencies involved in the production of housing.
- To outline factors, aspects and standards related to housing.
- To inform about the various housing design typologies and the processes involves in housing project development.
- To inform about current issues and aspects in housing.

UNIT I	INTRODUCTION TO PROJECT MANAGEMENT	6

Introduction to project Management concepts of background of management, purpose, goal and objectives, characteristics of projects and different aspects of management.
Traditional management system, Gantt's approach load chart, progress chart, bar-chart merits and limitation. Schedule, time estimates units.

UNIT II	PROJECTS PROGRAMMING	9

Project programming, resources balancing, phasing of activities, program, scheduling, project control, reviewing, updating and monitoring.
Introduction to modem management, concepts, uni dimensional management techniques – Introduction to PERT and CPM introduction to network concepts, network elements and inter-relationships.

UNIT III	NETWORK – TECHNIQUES	9

Network techniques, network logic o inter relationships, activity information, data sheets, development of network. CPM for management, CPM network analysis, identification of critical path float computation result sheets.

UNIT IV	PERT NETWORK	12

PERT Network, introduction to the theory of probability and statistics, probabilistic time estimation for activities of PERT network. Different types of tender.

UNIT V	PROJECT COST	9

Introduction to two dimensional network analysis, activity cost information. Cost time relationship, crashed estimates for the activities, compression potential, cost slope, utility, data sheet, project direct cost and indirect cost.

Crashed program, network compression least cost solution least time solution, optimum time solution. Network techniques, PERT/CPM, generating alternative strategies using computersTOTAL

: 45 PERIODS

OUTCOMES:

- Knowledge of various issues concerning housing & housing development in Indian & global context covering a cross section of income groups.
- Ability to appreciate socio-economic aspects in housing.
- An understanding of housing standards, site planning principles, housing concepts and types.
- An understanding of key issues in housing today.

REFERENCES:

1. S.P. Mukhopadyay, “Project Management for Architects and Civil Engineers”, IIT, Kharagpur, 1974.

2. Jerome D. Wiest and Fenfinand K. Levy, “A Management Guide to PERT / CPM”. Prentice Hall of Indian Pub. Ltd. New Delhi 1982.

3. R.A. Burges and G. White, “Building production and Project Management”, The Construction Press, London 1979.

COURSE OUTCOMES (COs)	
The student will be able	
CO1	Initiate projects with clearly identified scope, requirements, and stakeholders
CO2	Plan complex projects using appropriate **planning** tools
CO3	Develop plans to implement quality and resource management processes.
CO4	Manage project risk.
CO 5	Manage project costs including procurement process for project resources.
CO 6	Benefits that are observable within the targeted environment

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	M				L					L		
	CO2		H				M					L	
	CO3	L			M			H					
	CO4		H			H					M		
	CO5			L			L			M			
3	Category	PAEC											
4	Approval	25THMeeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR 7E3	INTERIOR DESIGN	3	0	0	3

OBJECTIVE:

- To introduce the vocabulary of interior design.
- To familiarize the students with an overview of interior and furniture design and design Movements through history.
- To inform the various components of interior space and treatment and finishes for the same.
- To familiarize the students with the various components of interior design like lighting, landscaping and furniture.

UNIT I	INTRODUCTION TO INTERIOR DESIGN	7

Definition and process of interior design - vocabulary of interior design in terms of principles and elements - introduction to the design of interior spaces as related to typology and function, themes and concepts

UNIT II	HISTORY OF INTERIOR AND FURNITURE DESIGN	9

Overview of interior and furniture design in the Western context through the ages relating to historical context, design movements and ideas -overview of folk arts and crafts of India with reference to their role in interior decoration.

UNIT III	COMPONENTS OF INTERIOR SPACE- INTERIOR TREATMENT AND FINISHES	9

Treatment of components such as floors, ceilings, walls, partitions, window treatments, accessories, etc., in terms of their choice and design related to materials, methods of construction, colour, texture, etc., based on functional, aesthetic and psychological criteria

UNIT IV	COMPONENTS OF INTERIOR SPACE- LIGHTING AND LANDSCAPING	12

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Interior lighting - different types of lighting - types of lighting fixtures- their effects and suitability in different contexts Interior landscaping elements: rocks, plants, water, flowers, fountains, paving,artifacts, etc., their physical properties and effects on spaces

UNIT V	COMPONENTS OF INTERIOR SPACE- - FURNITURE	9

Furniture design as related to human comfort and function, materials and methods of construction, changing trends and lifestyles, innovations and design ideas - furniture for specific types of interiors: office furniture, children's furniture, residential furniture, display systems, etc.

TOTAL: 45 PERIODS

OUTCOMES:

- An understanding of interior design as an interdisciplinary as well as allied field related to architecture.

REFERENCES:

1. 1. Helen Marie Evans, An Invitation to design, Macmillan Pub Co 1982
2. 2. Julius Penero and Martin Zelnik, Human Dimensions and Interior space, Whitney
3. Library of Design NY 1979
4. 3. Inca-Interior Design Register, Inca Publications, Chennai 1989
5. 4. Kathryn B.Hiesinger and George H.Marcus, Landmarks of twentieth Century Design; Abbey Ville Press 1993
6. Susanne Slesin and Stafford Cliff, Indian Style, Clarkson N.Potter, Newyork 1990

COURSE OUTCOMES (COs)	
The student will be able	
CO1	To become aware of the planning principle for **designing** various **interior** spaces.
CO2	To gain better understanding as regard the History of furniture, Anthropometric data in space **designing** for various activities.
CO3	To apply Ergonomics in **interior designing**.
CO4	Create a full set of design documents for an interior design project
CO5	Compose written justification of project designs and verbally communicate design
CO6	collaboration, creating a positive impact on the classroom

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H				L						M	
	CO2		L				M				H		
	CO3	L			L					M			
	CO4		M				M						
	CO5			L					M				H
3	Category	PE											
4	Approval	34THMeeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR 801	URBAN HOUSING	2	0	4	4

OBJECTIVE:

- To introduce housing in the Indian context and the various agencies involved in the production of housing.
- To outline factors, aspects and standards related to housing.
- To inform about the various housing design typologies and the processes involves in housing project development.
- To inform about current issues and aspects in housing.

UNIT I	INTRODUCTION TO HOUSING AND HOUSING ISSUES IN INDIA	6

Housing and its importance in architecture, its relationship with neighborhood and city planning. Housing demand and supply. National Housing Policy. Housing agencies and their role in housing development. Impact of life style. Rural Housing. Public and private sector housing.

UNIT II	SOCIO-ECONOMIC ASPECTS	9

Economics of housing. Social economic factors influencing housing affordability. Formal and informal sector. Equity in housing development. Sites and services. Slum housing, upgradation and redevelopment. Low Cost Housing. Health principles in housing. Legislation for housing development. Cost-effective materials and technologies for housing. Case studies in India and developing countries.

UNIT III	HOUSING STANDARDS	9

UDPFI guide lines, standard and regulations.DCR. Performance standards for housing.

UNIT IV	SITE PLANNING AND HOUSING DESIGN	12

Site Planning for housing. Selection of site for housing, consideration of physical characteristics of site, location factors, orientation, climate, topography, landscaping. Integration of services and parking. Housing design relating to Indian situations – traditional housing, row housing, cluster housing, apartments, high-rise housing. Case studies in India of the various types.

UNIT V	CURRENT ASPECTS AND ISSUES IN HOUSING	9

Green building and sustainable practices. Disaster resistance and mitigation. Prefabrication Community participation.

TOTAL: 45 PERIODS

OUTCOMES:

- Knowledge of various issues concerning housing & housing development in Indian & global context covering a cross section of income groups.
- Ability to appreciate socio-economic aspects in housing.
- An understanding of housing standards, site planning principles, housing concepts and types.
- An understanding of key issues in housing today.

REFERENCES:

1. Christopher Alexander, 'A Pattern Language', Oxford University press, New York 1977.

2. Leuris S, 'Front to back: A Design Agenda for Urban Housing', Architectural Press, 2006.

3. S.K.Sharma, 'Mane A New Initiative in Public Housing', Housing & Urban Development Corporation, 1991.

COURSE OUTCOMES (COs)	
The student will be able	
CO1	student must be aware of the significance of housing
CO2	The context of both global scenario.
CO3	critical social and economic issues related to housing
CO4	They should familiarize to the various housing schemes
CO5	Housing Finance, Sources of Housing Finance
CO6	Concept of Aided Self Help- Housing the poor through the NGO s

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H					L						
	CO2	H						M				M	
	CO3		M				M						L
	CO4	M			L					M			
	CO5			M					M				
3	Category	PC											
4	Approval	31STMeeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR 802	VERNACULAR ARCHITECTURE	2	0	2	3

OBJECTIVE:

- To introduce the study of vernacular architecture as a process and not a product.
- To provide an overview of the different approaches and concepts to the study of vernacular architecture.
- To study the various vernacular architecture forms in the different regions of the country.
- To look at the impact of colonial rule on the vernacular architecture of India.

UNIT I	INTRODUCTION	7

Definition and classification of vernacular architecture. Vernacular architecture as a process. Methodology for survey and study of vernacular architecture. Overview of cultural and contextual responsiveness of vernacular architecture.

UNIT II	APPROACHES AND CONCEPTS	9

Overview of different approaches and concepts to the study of vernacular architecture. Aesthetic, architectural and anthropological studies in detail.

UNIT III	VERNACULAR ARCHITECTURE OF THE WESTERN AND NORTHERN REGIONS OF INDIA	9

Forms, spatial planning, cultural aspects, symbolism, colour, art, materials of construction and construction technique of the vernacular architecture of the deserts of Kutch and Rajasthan (including havelis of Rajasthan), rural and urban Gujarat (including wooden mansions/ havelis in general and that of the Bohra Muslims) and geographical regions of Kashmir (including house boats).

UNIT IV	VERNACULAR ARCHITECTURE OF SOUTH INDIA	12

Forms, spatial planning, cultural aspects, symbolism, art, colour, materials of construction and construction technique, proportioning systems, religious beliefs and practices in the vernacular architecture of Kerala (including houses of the Nair & Namboothri community, Koothambalam and Padmanabhapuram palace) and Tamil Nadu (including houses and palaces of the Chettinad region, agraharams).

UNIT V	WESTERN INFLUENCES ON VERNACULAR ARCHITECTURE OF INDIA	9

Colonial influences on the traditional Goan house. Evolution of the bungalow from the traditional bangla, Victorian villas. Planning principles and materials and methods of construction of the bungalow. Settlement pattern and house typologies of Pondicherry and Cochin.

TOTAL: 45 PERIODS

OUTCOMES:

- An understanding of Indian vernacular architecture as a process and to also provide an overview of various approaches and concepts towards its study.
- Knowledge of vernacular architectural forms in different regions.
- An understanding of the impact of colonial rule on vernacular architecture in India.

REFERENCES:

1. Paul Oliver, 'Encyclopedia of Vernacular Architecture of the World', Cambridge University Press, 1997.

2. Amos Rapoport, 'House, Form & Culture', Prentice Hall Inc. 1969.

COURSE OUTCOMES (COs)	
The student will be able	
CO1	An understanding of Indian vernacular architecture as a process and to also provide an overview of various approaches and concepts towards its study.
CO2	Knowledge of vernacular architectural forms in different regions.
CO3	An understanding of the impact of colonial rule on vernacular architecture in India.
CO4	To understand how the contexts of a region have an impact on **vernacular** architectural forms.
CO5	The impact of context of a region over architectural forms
CO6	Expressions will lead to sensible and context specific and sensitive design solutions.

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H				L						M	
	CO2		L				M				H		
	CO3	L			L					M			
	CO4		M				M						
	CO5			L					M				H
3	Category	PE											
4	Approval	34THMeeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR 8E4	EARTHQUAKE RESISTANT ARCHITECTURE	3	0	0	3

OBJECTIVE:

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- To enable an understanding of the fundamentals of earthquake and the basic terminologies.
- To give basic knowledge of earthquake resistant design concepts.
- To provide familiarity with design codes and building configuration
- To enable understanding of the different types of construction details to be adopted in a seismic prone area.
- To give knowledge for applying earthquake resistant principles in an architectural design project.

UNIT I	FUNDAMENTALS OF EARTHQUAKES	7

Earth's structure, seismic waves, plate tectonics theory, origin of continents, seismic zones in India. Predictability, intensity and measurement of earthquake. Basic terms- fault line, focus, epicentre, focal depth etc.

UNIT II	SITE PLANNING, PERFORMANCE OF GROUND AND BUILDINGS	9

Historical experience, site selection and development. Earthquake effects on ground, soil rupture, liquefaction, landslides. Behaviour of different types of building structures, equipments, lifelines, collapse patterns. Behaviour of non-structural elements like services, fixtures in earthquake-prone zones

UNIT III	SEISMIC DESIGN CODES AND BUILDING CONFIGURATION	9

Seismic design code provisions. Introduction to Indian codes. Building configuration - scale of building, size, horizontal and vertical plane, building proportions, symmetry of building - torsion, re-entrant corners, irregularities in buildings like short storeys, short columns, etc.

UNIT IV	DIFFERENT TYPES OF CONSTRUCTION DETAILS	12

. Seismic design and detailing of masonry structures, wood structures, earthen structures. Seismic design and detailing of RC and steel buildings. Design of non-structural elements - architectural elements, water supply, drainage, electrical and mechanical components.

UNIT V	URBAN PLANNING AND ARCHITECTURAL DESIGN	9

Vulnerability of existing buildings, facilities planning, fires after earthquake, socio-economic impact after earthquakes. Conceptual design for earthquake resistance involving institutional masonry building with horizontal spread and height restriction, multi-storeyed RC framed apartment/commercial building.

TOTAL: 45 PERIODS

OUTCOMES:

- Ability to understand the formation and causes of earthquakes
- An understanding of the factors to be considered in the design of buildings and services to resist earthquakes.

REFERENCES:

1. Ian Davis, 'Safe Shelter within Unsafe Cities: Disaster Vulnerability and Rapid Urbanization'
2. Open House International, UK, 1987
3. 'Socio-economic developmental record'- Vol.12, No.1, 2005.
4. Mary C. Comerio, Luigia Binda, 'Learning from Practice- A Review of Architectural Design and Construction Experience after Recent Earthquakes', Joint USA-Italy workshop, Oct.18-23, 1992, Orvieto, Italy.

COURSE OUTCOMES (COs)	
The student will be able	
CO1	Introduction to Disaster and disaster management
CO2	Basic knowledge of dynamics and methods of dynamic analysis
CO3	Blast and fire resistant design of structures
CO4	Earthquake resistant design of structures
CO5	Design of shear wall
CO6	Retrofitting, rehabilitation and strengthening of structures

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H				L						M	
	CO2		L				M				H		
	CO3	L			L					M			
	CO4		M				M						
	CO5			L					M				H
3	Category	PE											
4	Approval	34THMeeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR 8E5	CONTEMPORARY PROCESS IN ARCHITECTURAL DESIGN	3	0	0	3

OBJECTIVE:

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- To introduce theories of media and its influence on the perception of space.
- To enable study of the various aspects of digital architecture and its exploration through emerging phenomena that relies on abstraction of ideas.
- To give understanding of the works of contemporary architects who have illustrated the influence of the digital media in architecture.

UNIT I	INTRODUCTION	7

Investigation of contemporary theories of media and their influence on the perception of space and architecture. Technology and art. Technology and architecture. Digital technology and architecture.

UNIT II	ASPECT OF DIGITAL ARCHITECTURE	9

Aspects of digital architecture. Design and computation. Difference between digital process and non-digital process. Architecture and cyberspace. Qualities of the new space. Issues of aesthetics and authorship of design. Increased Automatism and its influence.

UNIT III	CONTEMPORARY PROCESS	9

Emerging phenomena such as increasing formal and functional abstractions. Diagrams, diagrammatic reasoning, diagrams and design process. Animation and design. Digital hybrid.

UNIT IV	GEOMETRIES AND SURFACES	12

Fractal geometry. Shape grammar. Hyper surface. Liquid architecture. Responsive architecture.

UNIT V	CONTEMPORARY PROCESS AND ARCHITECTURAL WORKS	9

Ideas and works of architects related to contemporary processes. The architects to include Greg Lynn, Reiser + Umemotto, Lars Spuybroek / NOX Architects, UN studio, Diller Scofidio, Dominique Perrault, Decoi, Marcos Novak, Foreign Office Architects, Asymptote, Herzog and de Meuron, Neil Denari, Serie Architects, BIG Architects. Study to be undertaken in the form of assignments/discussions/seminars/presentations.

TOTAL: 45 PERIODS

OUTCOMES:

- An understanding of the effect of contemporary theories of media on contemporary architectural design.
- Insight into contemporary design process/theories and their relation to computation.
- Ability to understand specific aspects of contemporary processes appropriate to a design situation.
- Familiarity with architectural works derived from contemporary processes.

REFERENCES:

1. Gillian Hunt, 'Architecture in the Cyberspace II', John Wiley & Sons, 2001.
2. L. Convey et al, 'Virtual Architecture', Batsford, 1995.
3. Rob Shields (ed.), 'Cultures of the internet: Virtual Spaces, Real Histories, Living bodies', Sage, London, 1996.
4. John Beckman, 'The Virtual Dimension, Architecture, Representation and Crash Culture', Princeton Architecture Press, 1998.
5. William J Mitchell, City of Bits: Space, Place and the Infobahn',MIT Press, Cambridge, 1995.
6. Marcos Novak, 'Invisible Architecture: An Installation for the Greek Pavilion', Venice Biennale, 2000.

COURSE OUTCOMES (COs)	
The student will be able	
CO1	***Understand*** the impact of literature in architecture on philosophical development of design.
CO2	***Understand*** the alternative architectural methods available.
CO3	***Exposed*** to the master architects works and trace the development of evolution of their style.
CO4	Understand the spatial organization and spatial qualities of different typologies of buildings.
CO5	Knowledge of the contemporary design process and apply the same in the architectural design.
CO6	To gain knowledge of the spatial organization and articulation in the works of master

Mapping of Course Outcomes with Program Outcomes (POs)

(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H						H					M
	CO2		H				M				H		
	CO3	M			M				M				
	CO4		H			H						M	
	CO5	M		M							L		
3	Category	PE											
4	Approval	34THMeeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR8L1	ARCHITECTURAL DESIGN VIII	0	0	18	8

OBJECTIVE:

- To enable an understanding of urbanism as a continuous experience involving the interrelated disciplines of architecture, urban design and town planning.
- To understand architecture as influenced by and influencing the dynamics of cities.
- To facilitate the taking of architectural design decisions in the context of the urban

TOTAL: 240 PERIODS

CONTENT:

Urbanism is a dynamic phenomenon involving many aspects - urban growth, landuse distribution and change, urban form, demographics including gender and class, cultural aspects such as place and heritage, physical infrastructure such as roads and transportation nodes, public spaces, etc., Architecture is an integral and large part of urbanism, shaping and being shaped by it. It can serve to include/ gather society and enrich the urban environment in a seamless manner.

Understanding of this aspect of architecture will be achieved by architectural projects involving interdependencies between architecture and the city. Some of the issues and areas that could be addressed are- transportation nodes, heritage areas, adaptive reuse, suburban sprawl, place making, identity, collective memory, mixed use programming, large scale urban interventions, revitalisation and renewal of urban fragments, urban waterfront development, urban nodes, multi-use urban complexes.

The tools and techniques can include contemporary ways/ tools of perceiving, gathering and analysing data, inclusive, collaborative and participatory approaches, etc.,
It is preferable to have one major project with small exercises under it if required.

OUTCOME:

- Ability to perceive and design buildings as contributing to/ transforming the urban
- fabric. Ability to bring inclusivity into the architectural design process.

REFERENCES

1.Jonathan Barnett, 'An Introduction to Urban Design', Harper and Row; 1982 Cavallo, R. et al, 'New Urban Configurations', IOS Press, 2014.

2.Henriette Steiner & Maximilian Sternberg, 'Phenomenologies of the City: Studies in the History and Philosophy of Architecture', Routledge 2015.

3.Jan Gehl, 'Life between Buildings- Using Public Space', Arkitektens Forleg 1987. 'Time Savers

4.Standard for Urban Design', Donald Watson, McGraw Hill, 2005.

5.Malcolm Moore & Jon Rowland Eds, 'Urban Design Futures', Routledge, 2006.

6.Michelle Provoost et al., 'Dutchtown', NAI Publishers, Rotterdam, 1999. Lawrence Halprin,

'Cities', 7.Reinhold Publishing Corporation, New York, 1964. Gosling and Maitland, 'Urban Design', St. Martin‟s Press, 1984.

8.Kevin Lynch, 'Site Planning', MIT Press, Cambridge 1967.

9.Jeremy Till et al, 'Spatial Agency: Other Ways of Doing Architecture', Routledge, 2011.

COURSE OUTCOMES (COs)	
The student will be able	
CO1	Demonstrate knowledge of the spatial planning system and basic tools of spatial policy in Poland and the EU.
CO2	Demonstrate knowledge of contemporary ideas of shaping space in cities.
CO3	Identify principles of formulating local zoning plans for advanced urban complexes using the applicable notation.
CO4	Demonstrate broad knowledge which takes into consideration the interdisciplinary character of circumstances of urban planning
CO5	Demonstrate advanced knowledge of parameters of traffic engineering and the principles of designing roads, streets, cycle lanes, pedestrian precincts and parking lots and equipment of technical infrastructure
CO6	Identify the regulations and procedures of formulating local land-use plans. zoning and their impact on the investment.

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	M		L					M				
	CO2		H				L				M		
	CO3	M			L					M			
	CO4		L			L						M	
	CO5	M					M						L
3	Category	PC											
4	Approval	34THMeeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR9PT	PRACTICAL TRAINING	0	0	0	14

OBJECTIVE:

- To introduce the challenges of architectural practice.
- To enable overall understanding of different stages in real life architectural projects in practice.
- To create involvement in these stages as much as possible within the scope of a specific architectural practice - initiation of project, development of concepts into schematic drawings, approval process, presentations and working drawings, involvement in office discussions and client meetings, integrating structural and service concerns, estimation and tendering processes, site supervision and coordination in the construction process.

TOPICS OF THE STUDY	6

CONTENT:

Practical Training will be done in offices/ firms in India, empanelled by the institution, in which the principal architect is registered with the Council of Architecture. The student will attempt to learn as much of aspects outlined in the objectives, either first hand or indirectly.
The progress of practical training will be assessed periodically internally through submission of log books along with work done by the students in terms of drawings, reports, etc., along with the regular progress report from the employers.

The students will be evaluated based on the criteria related to their contribution in the office some of which are given below.

- Understanding and involvement in the process of architectural practice as mentioned in the objectives within the scope of the specific office in which training is undertaken.
- Adherence to time schedule, overall responsibility and professional conduct.
- Ability to carry out the instructions on preparation of schematic drawings, presentation drawings, working drawings and skill in this regard.
- Ability to work as part of a team in an office and contribute to related activities.
- Ability to participate in client meetings and discussions.
- Involvement in supervision at project site.
- Involvement/ initiative/ participation in any other aspects during the course of the training.
- At the end of the Practical Training, a portfolio of work done during the period of internship along with certification from the office should be submitted for evaluation through a viva voce examination.

OUTCOMES:

- An overall idea of the nuances of architectural practice.
- An understanding about the total process that goes into the making of a building.
- Maturity in using the experience gained from internship in the thesis project.

CO1	Demonstrate an understanding of the design philosophy, or vision of the architectural office and its implementation in the project/s
CO2	Interpret the architectural design process evolves when structural and service issues are integrated to create the final product.
CO3	Demonstrate the Knowledge on how the Drawings are used at site and an insight into the relationship between the site and drawing.
CO4	Develop a office and run the office successfully
CO5	offices / firms in India empanelled by the Institution in which the principal architect
CO6	progress of practical training shall be assessed internally through submission

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	M					L				M		
	CO2		L		M								
	CO3	M								H			L
	CO4		H				M				L		
	CO5	M		L									
3	Category	PAEC											
4	Approval	26THMeeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BARXTH	THESIS	0	0	32	18

OBJECTIVE:

- All the architectural design courses offered since semester II culminate in the thesis Project to motivate students to involve in individual research and methodology. This is to train them in handling projects independently.

TOPICS OF THE STUDY	6

The main areas of study and research can include advanced architectural design, including contemporary design processes, urban design including urban-infill, environmental design, conservation and heritage precincts, housing etc. However, the specific thrust should be architectural design of built environment. Preparation of presentation drawings, working drawings, detailed drawings and study model are part of the requirements for submission.

- The Thesis Project shall be submitted in the form of drawings, project report, models, slides, CDs and reports.

TOTAL: 510 PERIODS

OUTCOMES:

- A comprehensive understanding in handling a major Architectural independently

REFERENCES:

1. Donald Appleyard, The Conservation of European Cities, M.I.T. Press, Massachusetts, 1979.
2. Michelle Provoost et al., Dutchtown, NAI Publishers, Rotterdam, 1999
3. Richard Kintermann and Robert small site planning for cluster Housing van nastrand reinhold company, Jondon/New York 1977.
4 Miller T.G. Jr., Environmental Sciences, Wadsworth Publishing Co. (TB)
5. Kevin Lynch - Site planning - MIT Press, Cambridge, MA - 1967.
6. Geoffrey And Susan Jellico, The Landscape of Man, Thames And Hudson, 1987.
7. Arvind Krishnan & Others, Climate Responsive Architecture, A Design Handbook for Energy

8.Efficient Buildings, TATA McGraw Hill Publishing Company Limited, New Delhi, 2007

COURSE OUTCOMES (COs)	
The student will be able	
CO1	To use all the skills acquired in the duration of preceding academic courses.
CO2	Methodically self-direct effort by choosing the project of choice, builds capacity to work independently and methodically in a variety of intellectually and professionally demanding contexts.
CO3	Learn to make an original and individual, creative contribution to the academic discipline and/or the professional field in some cases.
CO4	Be able to interpret the urban forms of the past and present.
CO5	Articulate their stance and position as a designer within discourses of urbanism.
C06	Research and analyse information relevant to developing the proposal

Mapping of Course Outcomes with Program Outcomes (POs)

(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	L				M				M			
	CO2		H				H				M		
	CO3	M			M			L					
	CO4		M						M				M
	CO5	L										M	
3	Category	PC											
4	Approval	28THMeeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR XE6	ARCHITECTURAL JOURNALISM AND PHOTOGRAPHY	3	0	0	3

OBJECTIVE:

- To introduce general skills necessary for the practice of professional journalism.
- To introduce the fundamentals of writing, explain different strategies and their criticism.
- To give particular exposure to architectural journalism.
- To introduce photojournalism, bring out importance/ contributions of photography in the
- Architectural profession and to help develop proficiency in modern photography techniques.

UNIT I	INTRODUCTION	7

Introduction to journalism, key concepts and objectives of journalism. Specialised journalism with emphasis on architectural journalism. Journalism skills: research, reporting, writing, editing, photography, columnists, public relationships, criticism. Issues such as copyright, public art policy, the arts and urban redevelopment. Introduction to local culture scene.

UNIT II	TECHNOLOGIES IN JOURNALS	9

Environment, social change, persuasion. Interviewing techniques, argument and debate as a technique in the investigation of social problems. Evidence, proof, refutation, persuasion. Training in argumentative speaking. Introduction to software needed in journalism and photography, video coverage, walk-through of buildings, production of contemporary architectural journalism. Understanding the individual demands in the context of newspapers, radio, film, and television.

UNIT III	CONTEMPORARY ARCHITECTURAL JOURNALISM	9

Role of the editor. Editing of articles, features and other stories. Editing for online newspaper and magazines. Text preparation, mode of presentation, standards and guidelines for documentation. Code of ethics. Basic knowledge on press laws, Press Council of India. Multimedia/ online journalism and digital developments.

UNIT IV	DISCUSSIONS AND ISSUES	12

Regional, national and international discussion forums. Changes in contemporary and historical design practices. Discussions on topics needed in an architectural journal and current issues. Types of journals. Works of key architectural journalists. Public discourse on the internet. Mass media and public opinion. Critique on selected pieces of journalism.

UNIT V	ARCHITECTURAL PHOTOGRAPHY	9

Introduction to architectural photography and role of the photographic image in the global world. Equipment - cameras and lenses. Techniques- film speed, exposure measurement, gray scale, photo-finishing and editing digital images. Perspectives- single point, two- point, three- point and methods of correcting distortions. Lighting - external and interior

TOTAL: 45 PERIODS

OUTCOMES:

- An An ability to critically think and analyse about the effects of architecture on society as well as the tools to enable recording of the same

REFERENCES:

1. Martin Huckerby, 'The Net for Journalists: A Practical Guide to the Internet for Journalists in Developing Countries'. UNESCO/Thomson Foundation/ Common wealth Broadcasting Association, 2005.
2. S. J. A.Ward, 'Philosophical Foundations of Global Journalism Ethics', Journal of Mass Media Ethics, Vol. 20, No. 1, 3-21, 2005.
3. M. Heinrich, 'Basics Architectural Photography', Bikhauser Verlag AG, 2008.
4. Gerry Kopelow, 'Architectural Photography: The Professional Way', Princeton Architectural Press, 2007.

COURSE OUTCOMES (COs)	
The student will be able	
CO1	Discuss the history of Photography, moving images and Photo Journalism
CO2	Demonstrate a brief understanding of news values, photo journalism and sources.
CO3	Explain various types of cameras, its components and accessories
CO4	Discuss the legal and ethical aspects of photography and photojournalism.
CO5	Assess the importance of digital technology in photography
CO6	Critically analyse and appreciate photographs

Mapping of Course Outcomes with Program Outcomes (POs)
(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	M			M			L					
	CO2		H				H				L		
	CO3	L		L		M							
	CO4		M		M							L	
	CO5	M					M						H
3	Category	PE											
4	Approval	34THMeeting of Academic Council											

COURSE CODE	COURSE TITLE	L	T	P/S	C
BAR XE6	ARCHITECTURAL CONSERVATION	3	0	0	3

OBJECTIVE:

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- To introduce theories of media and its influence on the perception of space.
- To enable study of the various aspects of digital architecture and its exploration through emerging phenomena that relies on abstraction of ideas.
- To give understanding of the works of contemporary architects who have illustrated the influence of the digital media in architecture.

UNIT I	INTRODUCTION TO CONSERVATION	7

Understanding heritage. Defining conservation, preservation and adaptive reuse. Heritage conservation- need, debate and purpose. History of conservation movement. International agencies like ICCROM, ICOMOS, UNESCO and their role in conservation. Charters.
Principles and ethics of conservation.

UNIT II	CONSERVATION IN INDIA	9

Museum conservation. Monument conservation and the role of ASI, SDA, INTACH. Central and state government policies and legislations. Inventories and projects. Selected case studies of sites such as Hampi, Golconda, Mahabalipuram. Craft Issues of conservation.

UNIT III	CONSERVATION METHODS AND MATERIALS	9

Investigation techniques and tools. Behaviour of historic materials and structures. Problems with masonry, foundation. Repair methods, traditional and modern methods. Seismic retrofit, services additions and disabled access to historic buildings. Moisture and pollution problems.

UNIT IV	CONSERVATION PRACTICE	12

Listing of monuments. Documentation of historic structures. Assessing architectural character. Historic structure report. Guidelines for preservation, rehabilitation and adaptive re-use of historic structures. Case studies of palaces in Rajasthan, dwellings in Chettinad and Swamimalai. Heritage site management

UNIT V	URBAN CONSERVATION AND CONSERVATION PLANNING	9

Understanding the character and issues of historic towns. Selected case studies. Historic districts and heritage precincts. Conservation as a planning tool. Financial incentives and planning tools such as TDR. Urban conservation and heritage tourism. Case studies of sites like Cochin, Pondicherry French town. Conservation project management.

TOTAL: 45 PERIODS

OUTCOMES:

- An understanding of the importance of heritage, issues and practices of conservation through case studies.
- Familiarity with historic materials and their properties, different technologies for investigating masonry, foundation and also traditional and modern repair methods.

REFERENCES:

5. James M. Fitch, Historic Preservation: Curatorial Management of the Built World by University Press of Virginia; Reprint Edition,1990.

6. Robert E. Stipe, 'A Richer Heritage: Historic Preservation in the Twenty-First Century, University of North Carolina Press, 2003.

7. B.P. Singh, 'India's Culture- The State, The Arts and Beyond', Oxford University Press, 2000

8. A.G. K. Menon (Ed), 'Conservation of Immovable Sites', INTACH Publication, N. Delhi. John H. Stubbs and Emily G Makas; Architectural Conservation in Europe and the Americas, John Wiley & Sons, 2011.

COURSE OUTCOMES (COs)	
The student will be able	
CO1	The recognition and protection of the historic environment to gain awareness
CO2	Understands the techniques and the theoretical frame which are essential for preparing the documentation work besides the restoration projects of the cultural heritage.
CO3	Understands the techniques and the theoretical frame which are essential for preparing the documentation work besides the restoration projects of the cultural heritage.
CO4	Improves the critical point of view using the examples.
CO5	Realizes the responsibilities of legaslation aspects.
CO6	Realizes the necessity of sustainable design: sustainability in architecture and urban design decisions and areas of natural

Mapping of Course Outcomes with Program Outcomes (POs)

(H/M/L indicates strength of correlation) H-High, M-Medium, L-Low

1	COs/POs	a	b	c	d	e	f	g	h	i	j	k	l
2	CO1	H					M					M	
	CO2		M					L					M
	CO3	M			H						L		
	CO4		M				L						M
	CO5	M				L					M		
3	Category	PE											
4	Approval	34THMeeting of Academic Council											