

**WEST BENGAL UNIVERSITY OF TECHNOLOGY**  
**BACHELOR IN ARCHITECTURE (B. Arch.)**  
**SYLLABUS**  
**BACHELOR IN ARCHITECTURE (B. Arch.) -- 1<sup>st</sup>. SEMESTER**

<b>Code No.</b>	<b>Subject Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>TO</b>	<b>C</b>
ARCH 101	English Language & Communication	2	1	0	3	3
ARCH 102	Mathematics – I	3	1	0	4	4
ARCH 103	Engineering Mechanics	3	1	0	4	4
ARCH 104	History of Architecture-I	3	0	0	3	3
ARCH 105	Materials and construction-I	3	1	0	4	4
ARCH 106	Architectural Graphics -I	1	0	5	6	4
ARCH 181	Architectural Design –I	0	0	6	6	5
ARCH 182	Creative Expressions	0	0	3	3	2
ARCH 183	NSS/ ECA/NCC/ Sports	0	0	3	3	1
	<b>TOTAL</b>	<b>15</b>	<b>4</b>	<b>17</b>	<b>36</b>	<b>30</b>

**BACHELOR IN ARCHITECTURE (B. Arch.) – 2<sup>nd</sup>. SEMESTER**

<b>Code No.</b>	<b>Subject</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>TO</b>	<b>C</b>
ARCH 201	Mathematics – II	3	1	0	4	4
ARCH 202	Strength of Materials	3	1	0	4	4
ARCH 203	History of Architecture-II	3	0	0	3	3
ARCH 204	Materials and construction-II	3	0	0	3	3
ARCH 205	Architectural Graphics -II	1	0	6	7	5
ARCH 281	Architectural Design –II	0	0	6	6	5
ARCH 282	Methods of Construction - I	0	0	3	3	2
ARCH 283	Workshop Practice - I	0	0	4	4	3
ARCH 284	Educational Tour	0	0	2	2	1
	<b>TOTAL</b>	<b>13</b>	<b>2</b>	<b>21</b>	<b>36</b>	<b>30</b>

**BACHELOR IN ARCHITECTURE (B. Arch.) – 3<sup>rd</sup> SEMESTER**

<b>Code No.</b>	<b>Subject</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>TO</b>	<b>C</b>
ARCH 301	Computer Education-I	3	1	0	4	4
ARCH 302	Structure – I	3	1	0	4	4
ARCH 303	Climatology	3	1	0	4	4
ARCH 304	History of Architecture-III	3	0	0	3	3
ARCH 305	Materials and construction-III	3	0	0	3	3
ARCH 306	Art Appreciation	2	0	0	2	2
ARCH 381	Architectural Design –III	0	0	9	9	6
ARCH 382	Methods of Construction - II	0	0	3	3	2
ARCH 383	Rendering Techniques	0	0	3	3	2
	<b>TOTAL</b>	<b>17</b>	<b>3</b>	<b>15</b>	<b>35</b>	<b>30</b>

**BACHELOR IN ARCHITECTURE (B. Arch.) – 4<sup>th</sup> SEMESTER**

<b>Code No.</b>	<b>Subject</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>TO</b>	<b>C</b>
ARCH 401	Structure – II	3	1	0	4	4
ARCH 402	Acoustics	3	1	0	4	4
ARCH 403	History of Architecture-IV	3	0	0	3	3
ARCH 404	Materials and construction-IV	3	0	0	3	3
ARCH 481	Architectural Design –IV	0	0	9	9	6
ARCH 482	Methods of Construction - III	0	0	4	4	3
ARCH 483	Computer Graphics -I	0	1	3	4	3
ARCH 484	Workshop Prac II	0	0	4	4	3
ARCH 485	Educational Tour	0	0	1	1	1
	<b>TOTAL</b>	<b>12</b>	<b>3</b>	<b>21</b>	<b>36</b>	<b>30</b>

**BACHELOR IN ARCHITECTURE (B. Arch.) – 5th. SEMESTER**

<b>Code No.</b>	<b>Subject</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>TO</b>	<b>C</b>
ARCH 501	Sociology in Architecture	3	0	0	3	3
ARCH 502	Structure – III	3	1	0	4	4
ARCH 503	Building Services -I	2	1	0	3	3
ARCH 504	History of Architecture-V	3	0	0	3	3
ARCH 505	Materials & Construction - V	3	0	0	3	3
ARCH 506	Surveying	2	1	0	3	3
ARCH 581	Architectural Design – V	0	0	9	9	6
ARCH 582	Methods of Const -IV	0	0	3	3	2
ARCH 583	Comp Graphics –II	0	0	3	3	2
ARCH 584	Materials Testing wk shp	0	0	2	2	1
	<b>TOTAL</b>	<b>16</b>	<b>3</b>	<b>17</b>	<b>36</b>	<b>30</b>

**BACHELOR IN ARCHITECTURE (B. Arch.) – 6th. SEMESTER**

<b>Code No.</b>	<b>Subject</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>TO</b>	<b>C</b>
ARCH 601	Structure – IV	3	1	0	4	4
ARCH 602	Building Services - II	2	1	0	3	3
ARCH 603	History of Architecture - VI	3	0	0	3	3
ARCH 604	Advanced Materials	3	0	0	3	3
ARCH 605	Landscape Design	3	1	0	4	4
ARCH 681	Architectural Design – VI	0	0	9	9	6
ARCH 682	Working Drawings	0	0	5	5	4
ARCH 683	Survey Field work	0	0	3	3	2
ARCH 684	Educational Tour	0	0	2	2	1
	<b>TOTAL</b>	<b>14</b>	<b>3</b>	<b>19</b>	<b>36</b>	<b>30</b>

**BACHELOR IN ARCHITECTURE (B. Arch.) – 7<sup>th</sup> SEMESTER**

<b>Code No.</b>	<b>Subject</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>TO</b>	<b>C</b>
ARCH 701	Structure in Architecture	2	1	0	3	3
ARCH 702	Building Services - III	2	1	0	3	3
ARCH 703	Theory of Architecture	2	1	0	3	3
ARCH 704	Specifications , Estimation& Valuation	2	1	0	3	3
ARCH 705	Architectural Illumination	3	0	0	3	3
ARCH 706	Urban Planning & Human Settlements	3	0	0	3	3
ARCH 781	Architectural Design – VII	0	0	12	12	9
ARCH 782	Interior Design	0	0	4	4	3
	<b>TOTAL</b>	<b>14</b>	<b>4</b>	<b>16</b>	<b>34</b>	<b>30</b>

**BACHELOR IN ARCHITECTURE (B. Arch.) – 8<sup>th</sup> SEMESTER**

<b>Code No.</b>	<b>Subject</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>TO</b>	<b>C</b>
ARCH 801	Energy Eff. Architecture	3	0	0	3	3
ARCH 802	Professional Practice	3	0	0	3	3
ARCH 803	Bldg. Economics & Construction Management	3	0	0	3	3
ARCH 804	Housing & Comm. Planning	3	0	0	3	3
ARCH 805	Urban Design	3	0	0	3	3
ARCH 806	Disaster Resistant Architecture	3	0	0	3	3
ARCH 881	Architectural Design - VIII	0	0	12	12	9
ARCH 882	Thesis Programming	0	0	4	4	3
	<b>TOTAL</b>	<b>18</b>	<b>0</b>	<b>16</b>	<b>34</b>	<b>30</b>

### BACHELOR IN ARCHITECTURE (B. Arch.) – 9<sup>th</sup>. SEMESTER

Code No.	Subject	L	T	P	TO	C
ARCH 981	Professional Training ##	0	0	40	40	30
	<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>40</b>	<b>40</b>	<b>30</b>
##	Critical Appraisal					5
	Documentation of innovative details					5
	Field observation					5
	Office training					10
	Site supervision					5

### BACHELOR IN ARCHITECTURE (B. Arch.) – 10<sup>th</sup>. SEMESTER

Code No.	Subject	L	T	P	TO	C
ARCH 1001	<b>ELEC -I</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>3</b>
ARCH 1002	<b>ELEC-II</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>3</b>
ARCH 1003	<b>ELEC-III</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>3</b>
ARCH 1081	<b>Architectural Thesis**</b>	<b>0</b>	<b>0</b>	<b>25</b>	<b>25</b>	<b>21</b>
	<b>TOTAL</b>	<b>9</b>	<b>0</b>	<b>25</b>	<b>34</b>	<b>30</b>

ELEC –I      ADVANCED STRUCTURES  
 COST EFFECTIVE BLDG.TECH } any one subject from these  
 BUILDING MAINTENANCE  
 RETROFITTING

ELEC –II      ADVANCED LANDSCAPE  
 VERNACULAR ARCH } any one subject from these  
 ENV. PLANNING  
 ARCH CONSERVATION

ELEC –II      BARRIER FREE ARCHITECTURE  
 INDUSTRIAL ARCHITECTURE } any one subject from these  
 BUILDING AUTOMATION & MNGT. SYSTEM  
 GREEN BLDG AND SUST. ARCH

\*\* Includes four credit points for Viva Voce on Thesis.

## At the end of training for full five months, each student will produce a certificate from the trainer firm and a report signed by the latter for a viva voce, evaluation and crediting.

Note: There will be no examination for Subjects having no Lecture Classes.

## ENGLISH LANGUAGE & COMMUNICATION (ARCH 101)

**Credit**

**3**

**Contact Periods per week**

**2 lecture pds+ 1 tut pd**

**Semester Exam**

**3 hrs**

OBJECTIVE:

To develop a sense of language through texts drawn from contemporary writings in newspapers, newsmagazines, reports etc.

METHODOLOGY:

1. Lecture and post lecture discussions.
2. Practical assignments and student presentations.
3. Presentation by students on different themes.

Module-1

- 18 pds

Note Making, Paragraph writing, Commercial Correspondence, Precis writing, Preparing Instruction Manual, Preparing Proposal, Report Writing, Writing of Dissertation/Thesis, Elements of Grammar and Vocabulary

Module-2

- 24 pds

Group Discussion, Extempore Speaking, Presentation Strategies, Interview Preparation

REFERENCE:

1. Nitin & Mamta Bhatnagar Communicative English for Engineers and Professionals –
2. J.R. Spicer and E.C. Ames English in Business and Engineering -Stevenson, B.W.,

## MATHEMATICS – I (ARCH 102)

**Credit**

**4**

**Contact Periods per week**

**3 lecture + 1 tut pds**

**Semester Exam**

**3 hrs**

OBJECTIVE:

To revise the aspects of Mathematics learned earlier.

METHODOLOGY:

Lectures and exercises.

Module-1 Differential Calculus:

10PDS

Successive differentiation: Higher order derivatives of a function of single variable, Leibnitz's theorem (statement only and its application, problems of the type of recurrence relations in derivatives of different orders and also to find  $(y_n)_{x_0}$ )

Mean Value Theorems & Expansion of Functions: Rolle's theorem and its application, Mean Value theorems – Lagrange & Cauchy and their application, Taylor's theorem with Lagrange's and Cauchy's form of remainders and its application, Expansions of functions by Taylor's and Maclaurin's theorem, Maclaurin's infinite series expansion of the functions:  $\sin x$ ,  $\cos x$ ,  $e^x$ ,  $\log(1+x)$ ,  $(a+x)^n$  n being an integer or a fraction (assuming that the remainder  $R_n \rightarrow 0$  as  $n \rightarrow \infty$  in each case)

Module-2 Application of Differential Calculus:

10PDS

Angle of intersection of curves, Angle between Radius Vector and Tangents, Pedal equation of a curve.  
2PDS

Curvature of a Curve, Formulae for the Radius of Curvature, Evolute, Examples.

Asymptotes(Definition),Condition for a Straight Line to be an Asymptotes, Asymptotes for Algebraic Curves, Asymptotes in Polar Co-ordinate, Examples.

Equation of Envelopes, Envelope of two parameters family of Curves, Envelopes in case of Polar Curves, Examples.

Module-3 Convergence of Infinite Series: 10PDS

Simple ideas of sequence, Infinite series and their convergence/divergence, Infinite series of positive terms, Tests for convergence: Comparison test, Cauchy's Root test, D' Alembert's Ratio test and Raabe's test (statements and related problems on these tests), Alternating series(definition) & Leibnitz's Test (statements) illustrated by simple example, Absolute convergence and Conditional convergence.

.Module-4 Matrices and Determinants: 10PDS

Definition, Sum and product of matrices, Transpose, Symmetric and Skew symmetric matrix, Determinant of square matrices and their simple properties, Inverse of matrices, Rank of matrices, Solutions of system of linear equations: Cramer's Rule, Matrix method, Consistency and Inconsistency (only cases of  $m \times n$  matrix with  $m, n \geq 4$ ).

#### REFERENCE

- 1 Higher Engineering Mathematics - Grewal B S,, Khanna Publishers.
2. Advanced Engineering Mathematics - Kreyzig E.,John Wiley and Sons.
3. Application of Calculus - Bandyopadhyay S and Maity S K, Academic Publishers.
4. Calculus - Strauss M. J., Bradley G. L. and Smith K. L., Pearson Education
- 5 A Textbook of Engineering Mathematics-I - Samanta Guruprasad, New Age International Publishers
6. Engineering Mathematics - Sastry S. S., PHI

### ENGINEERING MECHANICS (ARCH 103)

**Credit**

**4**

**Contact Periods per week**

**3 lecture + 1 tut pds**

**Semester Exam**

**3 hrs**

#### OBJECTIVE:

To understand the basic principles of structural mechanics that would be pertinent to simple design elements.

To also understand the structural behavior of building elements.

#### METHODOLOGY:

Lectures and computation exercises.

Module-1

- 16 pds

Introduction: Concept of Engineering Mechanics – Statics & Dynamics – Scalar Quantity – Vector Quantity – Addition & Subtraction of Vectors – Basic units – Derived Units – SI units – Relationship: M.L.T.

System of Forces: Definition of a force with explanation – Linear representation of force – System of co-planar forces – Parallelogram Law of Forces – Composition and Resolution – Transmissibility of forces – Action and Reaction – Triangle Law & Polygon Law of forces – Determination of Resultant by Analytical and graphical method with equalitarian space diagram – Vector diagram – Bow's notation.

Moments & Couples: Definition of moment of a force about a point – Physical significance of moment – Moment of a system of parallel and inclined forces – Varignon's Theorem – Definition of moment of a couple – Physical significance of Couples Equivalent couples – Resultant of any number of coplanar couples – Replacement of a force about a point by an equal like parallel force together with a couple – Resultant of a couple and a force.

Condition of Equilibrium: Lami's Theorem – Triangle Law & Polygon Law of equilibrium – Conditions of equilibrium of co-planer system of concurrent forces – Conditions of equilibrium of co-planar system of non-concurrent parallel

forces (like & unlike) – Conditions of equilibrium of co-planar system of non-concurrent non-parallel forces (simple problems excluding statically indeterminate).

Module-2

-12 pds

FRICITION: Definition – Useful and harmful effects of friction – Laws of Static friction – Co-efficient of friction – Angle of friction – Angle of repose – Equilibrium of a body on a rough inclined surface with and without external force.

CENTRE OF GRAVITY: Concept & definition – Centre of mass – Centroid, Methods of finding out centroids of simple area, Finding the centroid of the following areas by integration: (i) uniform triangular lamina, (ii) uniform rectangular lamina, (iii) uniform circular lamina, (iv) uniform semi-circular lamina, and, (v) uniform lamina of quadrant of a circle, Finding the centroid of the following sections using the method of moment: (i) T-section, (ii) equal and unequal angle-sections, (iii) equal and unequal I-sections, (iv) Channel-sections, (v) Z-sections.

MOMENT OF INERTIA: Introduction – definition and unit, M I of a lamina, Theorems of finding out M I by: (i) Parallel axis theorem, and, (ii) Perpendicular axis theorem, Radius of Gyration, Finding out M I of the different sections about axes lying in the plane of the sections by integration, M I of irregular areas such as I-sections, T-sections, Angle-sections, Channel sections, Z-section, Composite sections (composite area method) – Related simple problems, Polar M I.

Module-3

- 12 pds

RECTILINEAR MOTION: Displacement - Time and Velocity-Time diagrams – Motion equations (with deduction) – Newton's Second Law of linear motion  $p = mf$  and momentum of a body – Conservation of momentum of a body – Numerical problems.

CURVILINEAR MOTION: Angular displacement – Angular speed – Angular velocity – Relation between angular speed & angular velocity – Angular acceleration – Relation between linear & angular velocity – Relation between linear & angular acceleration – Motion and path of a projectile (numerical problems) – Centripetal and centrifugal force (numerical problems).

#### REFERENCE

1. 'Strength of Materials -- S. Ramamurtham;
2. 'Strength of Materials and Theory of Structures -- B.C. Punmia

## HISTORY OF ARCHITECTURE-I (ARCH 104)

**Credit**

**3**

**Contact Periods per week**

**3 lecture pds**

**Semester Exam**

**3 hrs**

#### OBJECTIVE :

To develop an understanding of the physical experience of buildings in order to appreciate the complexity of the influences bearing on architecture, as reflected in the major historical periods beginning from early civilizations.

#### METHODOLOGY:

Visually intensive lectures using power point presentations to acquaint students with historic sites and buildings.

Module 1

-16 pds

Ancient Mesopotamia: Plentiful supply of soil in the alluvial plains of Tigris & Euphrates, knowledge of kiln-fire, scarcity of stone & timber, availability of bitumen from natural springs – leading to – ubiquity of mud brick laid in bitumen — Constraints imposed by the structural demands of brick vaulting, knowledge of true arch – leading to – Arcuated Architecture — Detail study of (a) the City of Ur, Mesopotamia (Iraq) as constructed by the Sumerians, and, (b) the City of Babylon, Mesopotamia (Iraq) as reconstructed by Nebuchadnezzar II.

Ancient Egypt: Belief in after-life, powerful priesthood, abundant labour – leading to – Tomb architecture of monumental scale: Mastabas, Royal Pyramids and Rock-hewn Tombs — Detail study of the Great Pyramid of Cheops, Gizeh — Temples: Great Temple of Amun, Karnak, Thebes — Idea about Pylons, Obelisks and Sphinx.



Mesoamerica: Pre-Columbian America: Settlements in North America, Mesoamerica and the Andes — The Maya: Schematics of typical Mayan temples — Detail study of the Temple I (the Temple of the Giant Jaguar), Tikal (Guatemala) of the Maya Late Classic Period.

Module 2

- 12 pds

Indus Valley Civilization: Relatively egalitarian society – prominent features of town planning – burnt-brick laid in mud-mortar in 'English bond' – no instance of true arch: openings spanned by wooden lintels — Study of the city of Mohen-Jo-Daro, Indus valley (Pakistan) with reference to its great bath and great granary.

Buddhist Architecture: Supreme sacred monument of Buddhism – Basic form: solid domical mound crowned by an chhatra (umbrella) – More monumental Stupas: surrounded by Vedika (railing) with Toranas (gateways) at cardinal points — Detailed study of the Great Stupa (Stupa 1), Sanchi

Module 3

- 12 pds

Rock-cut Architecture: Pillars Plain unornamented circular shaft – Campaniform capital – circular abacus with animal motif – Study of the Lion Capital, Sarnath, Uttar Pradesh, Early Rock-cut Architecture: Simple woodwork imitating forms – Study of the Lomash Rishi Caves, Barabar Hills, Bihar, Orissan Group (Jain): Monastic retreat only without any Chaitya or Stupa – semicircular arches with simple brackets – Study of the Rani Gumphs, Udayagiri, Orissa.

HINAYANA PHASE: Necessity of monasteries suitable for congregational worship, forbiddance of worship of Buddha's image - leading to - Chaityagriha & Vihara hewn out of rock, introduction of symbolic forms – translation of carpentry forms into stones, horseshoe-arch-gable – Study of the CHAITYA HALL, KARLI, MAHARASHTRA.

MAHAYANA PHASE: Influence of Hinduism – introduction of image – change in disposition of inner most cells of Vihara serving as monastery as well as sanctuary – Study of the AJANTA CAVE NO. 19, MAHARASHTRA.

FINAL PHASE (BRAHMINICAL): Gradual elaboration of interior from primitive singular cell to isolated cell with ambulatory – culmination in emulation of structural temple – Study of the KAILASA TEMPLES, ELLORA, MAHARASHTRA.

## REFERENCE

1. A History of Architecture (Century Edition) / Sir Banister Fletcher / Butterworth Heinemann (Hb), CBS (Pb)
2. Indian Architecture Vol. 1 (Buddhist & Hindu) / Percy Brown / D.B. Taraporevala
3. Buddhist and Hindu Architecture in India / Satish Grover / CBS
4. A World History of Architecture / Marian Moffett, Michael Fazio & Lawrence Wodehouse / McGraw-Hill
5. Encyclopaedia of Architectural Technology / Ed: Pedro Guedes / McGraw-Hill
6. The Story of Architecture FROM ANTIQUITY TO THE PRESENT / Jan Gympel / KÖNEMANN (Pb)
7. The Great Ages of World Architecture / G. H. Hiraskar / Dhanpat Rai.

## MATERIALS AND CONSTRUCTION-I (ARCH 105)

**Credit**

**4**

**Contact Periods per week**

**3 lecture + 1 tut pds**

**Semester Exam**

**3 hrs**

### OBJECTIVE:

To introduce students to various building materials and masonry construction practices

### METHODOLOGY:

1. Introduction to materials and construction through lectures and studio exercises.
2. Site visits to gain knowledge about construction details.
3. Introduction to some basic construction methods and elements

Module 1

- 16 pds

Stone - Classification, Technical Terms, Characteristics, General Principles of Stone Masonry, Types of Stone Masonry.

Timber -Classification, Processing, Defects, Products.

Module 2	- 12 pds
Bricks- Composition, Manufacturing, Classification, Technical Terms, General Principles of Brick Masonry, Bonds in Brick Work.	
Module 3	- 8 pds
Ferrous Metals ( Iron & Steel ) - Characteristics, Properties, Uses. Non ferrous Metals ( Aluminium & Copper )- Characteristics, Properties, Uses.	
Module 4	- 8 pds
Plastics- Characteristics, Properties, Uses, Types. Glass- Characteristics, Properties, Uses, Types.	

Tutorials :

Study Sheets and Drawing Works on –

- Stone Masonry
- Timber Joinery
- Brick Masonry

REFERENCE

1. Engineering Materials, Rangwala, Charotar Publishers.
2. Building Construction, W.B.Mckay, Orient Longman.
3. Building Construction, R.Barry, English Language Book Society.
4. Building Construction, Sushil Kumar, Standards Publishers.

## ARCHITECTURAL GRAPHICS -- I (ARCH 106)

<b>Credit</b>	<b>4</b>
<b>Contact Periods per week</b>	<b>1 lecture +5 prac pd</b>
<b>Semester Exam</b>	<b>3 hrs</b>

OBJECTIVE:

Introduction to the fundamental techniques of architectural drawing through graphical medium

METHODOLOGY:

Studio assignments and lectures. Demonstration of 3D Geometrical objects and their 2D representation on sheets

Module 1	- 6 pds
Introduction to Engineering Drawing and Descriptive Geometry – Language of Engineers and Architects. Introduction to the drawing instruments and their use. Various types of lines used in Engineering Drawing – Lettering techniques and types.	
Module 2	- 6 pds
Scale – Concept of representative fraction – Scale generally used for Architectural and Engineering Drawing – Concept of diagonal scale.	
Module 3	- 36 pds
Orthographic Projections – Planes of Projection – Concept of 1 <sup>st</sup> angle and 3 <sup>rd</sup> angle projection – ISI code of practice – projection of straight line, lamina and solid, Projection of point, lines, planes and solids: Prism, Pyramid, Cylinder, Cone etc.	
Module 4	- 24 pds
Sections of solids, true shape of sections of solids Development of Surfaces: Introduction to Development of Surfaces of Solids – Principal Developments – Parallel and Radial Developments. Interpenetration of Solids	

## REFERENCE

1. A Textbook of Engineering Drawing - B. Gupta;
- 2.; Engineering Drawing - N.D. Bhatt

## ARCHITECTURAL DESIGN I (ARCH 181)

**Credit** **5**  
**Contact Periods per week** **6 prac pd**

### OBJECTIVE :

To create various prototypes that bring together construction, design and anthropometric understanding while demonstrating an ability to learn basics of material handling.

### METHODOLOGY:

1. Orientation about the profession with the help of Audio/Video presentations.
2. Studio lectures.
3. Individual/ Group studio exercises.

Module 1 - 24 pds  
To develop methods to learn basics of designing using different materials, while addressing varied objectives.  
Module 2 - 48 pds  
Introduction to basic shapes & forms, geometry , its presence in nature and its application to basic design , 2D and 3D compositions and presentations.

## CREATIVE EXPRESSIONS (ARCH 182)

**Credit** **2**  
**Contact Periods per week** **3 prac pd**

### OBJECTIVE:

To develop an innovative mind for the students and portray how we could or should live in the world. .

### METHODOLOGY:

Critical engagements with materials and form and creative expressions of issues ;constituting the activity of discovering, inventing, and delivering arguments .

Module 1: Sketching  
Study built environment, light and shade pattern, surface texture, scale and proportion.  
Module 2: Photography exercises  
Module 3: Set designing exercises  
Module 4: Collage, sculpture ,and other creative exercises

## NSS/ ECA/NCC/ SPORTS (ARCH 183)

**Credit** **1**  
**Contact Periods per week** **3 prac pd**

### OBJECTIVE:

To ensure overall balanced physical and mental development of the students imbibing discipline and self confidence.

The students should emerge as a healthy and socially conscious citizens capable of doing hard work under pressure and respond to the requirements of the society.

**METHODOLOGY :**

Field work and report writing

Under NSS, the cadets should be introduced to socio-economic issues of urban and rural areas. Development related problems like rural sanitation and road, tree plantation in urban areas especially slums and squatter colonies may be undertaken by the cadets. Collection and distribution of clothes to the pavement dwellers and disaster affected people also may be undertaken. etc.

The NCC has its own programmes. The same shall be followed.

Sports include outdoor games football, cricket, badminton, athletics, yoga and others as provided by the Institute. No indoor game shall be considered.

## MATHEMATICS – II (ARCH 201)

**Credit**

**4**

**Contact Periods per week**

**3 lecture + 1 tut pds**

**Semester Exam**

**3 hrs**

OBJECTIVE:

To revise the aspects of Mathematics learned earlier.

METHODOLOGY:

Lectures and exercises

Module – 1 Co-ordinate Geometry:

6PDS

Two dimensions, Transformation of coordinates – Translation Rotation only,  
Reduction of general equation of second degree.

Module – 2 Three dimensions :

8PDS

Coordinates, Direction Cosines, Planes, Straight lines, Spheres, Standard equations of simple surface e.g. cylinders, cones, ellipsoinds, Hyperboloids etc.

Module – 3 Vector Algebra:

6PDS

Scalar and vector fields – definition and terminologies, dot and cross products, scalar and vector triple products and related problems, Equation of straight line, plane and sphere, Vector function of a scalar variable, Differentiation of a vector function, Scalar and vector point functions,

Module – 4 Linear Programming:

6PDS

Geometrical ideas of convex sets, feasible solutions and domains etc. Fundamental theorem of LPP (statement only), Graphical methods Applications of Simplex Algorithm.

Module – 5 Statistics:

8PDS

Analysis data (direct and grouped), Frequency Diagrams, Ogive, Histogram, Measures of central tendency : Mean, Median, Mode, Measures of dispersion, Skewness, Curtosis Fitting of curves (Least square method).

Module – 6 Differential Equations:

6PDS

Second order differential equations with constants co-efficient and with variable co-efficient reducible to case constant co-efficient, applications.

REFERENCE

1. Kreyzig E., Advanced Engineering Mathematics, John Wiley and Sons
2. Grewal B S, Higher Engineering Mathematics, Khanna Publishers
3. Dey S K and Sen S, Mathematical Statistics, U.N. Dhur & Sons Private Ltd
4. Samanta Guruprasad, A Textbook of Engineering Mathematics-II, New Age International Publishers
5. Das Jyoti, Analytical Geometry, Academic Publisher
6. Karak P M, Linear Programming, New Central Book Agency Pvt.Ltd

## STRENGTH OF MATERIALS (ARCH 202)

**Credit**

**4**

**Contact Periods per week**

**3 lecture + 1 tut pds**

**Semester Exam**

**3 hrs**

OBJECTIVE:

To understand the basic principles of strength of structural materials that would be pertinent to simple design elements To also understand the structural behavior of structural elements under stress.

#### METHODOLOGY:

Lectures and computation exercises

Module 1 - SIMPLE STRESSES & STRAINS - 14 pds.

Mechanical Properties of Materials Definitions with explanations only.

Different types of loads and their effects on materials – Tensile, Compressive, Shear and Impact Simple stresses and types of stresses, Simple strains and type of strains

Stress-strain diagram for M.S. in tensile test showing salient points such as Proportional Limit, Yield point, Elastic Limit, Ultimate points and Breaking Point. Study of stresses – Strain diagram for Cast Iron and Dead Steel.

Modulus of Elasticity. Ultimate stress, working stress and Factor of safety and their effect on simple designs. Stresses in members with stepped cross section and stress in composite members. Stress in nuts and bolts. Temperature stress and strain.

Simple problems.

Module 2 - SHEAR FORCE & BENDING MOMENT - 12 PDS.

Types of beams, types of supports and types of loads on beams

Definitions of Bending Moment and Shear Force and their sign conventions.

Bending Moment and Shear Force diagrams of simple cases such as:

(i) Cantilever beams with point loads, UDL and UVL.

(ii) Simply supported beams with point loads, UDL and UVL.

(iii) Simply supported overhanging beam – one side and both sides.

(iv) Introduce to external moment

(v) Simple Problems.

Module 3 - BENDING and Shear STRESSES IN BEAMS – 8 pds.

Introduction to bending and shear, pure bending, assumption and theory of simple bending, neutral axis, moment of resistance, section modulus and radius of gyration. Shear stress in Beam, Shear stress distribution in rectangular and circular section, related problems.

Module 4 - DEFLECTION OF BEAMS - 8 pds

Problems related to above two cases of cantilever and simply supported beams.

Fundamental concepts: Elastic curve, moment-curvature relationship, governing differential equation, boundary conditions. Relation among deflection, slope, shear force, bending moment and rate of loading, sign convention of slope and deflection. Deflection of beam by Direct Integration and Macaulay's Method- Problem related to cantilever, simply supported and overhanging beam.

#### REFERENCE

1. Elements of Strength of Material -S. P. Timoshenko & D. H. Young, EWP Pvt. Ltd
2. Engineering Mechanics of Solids -E. P. Popov, Pearson Education
3. Strength of Materials- R. Subramanian, OXFORD University Press
4. Strength of Material - Bansal
5. Strength of Materials -S S Bhavikatti, Vikas Publishing House Pvt. Ltd
6. Strength of Material -A. Pytel & F. L. Singer, AWL Inc
7. Strength of Material - Ramamrutham
8. Engineering Mechanics I by J. L. Mariam, John Willey
9. Engineering Mechanics- I. H. Shames, PHI
10. Fundamentals of Strength of Material -Nag & Chandra, WIE

## HISTORY OF ARCHITECTURE-II (ARCH 203)

**Credit**

**3**

**Contact Periods per week**

**3 lecture pds**

**Semester Exam**

**3 hrs**

### OBJECTIVE:

To provide an understanding of the evolution of the indigenous and influenced architecture of the Indian sub-continent, characterized by technology, ornamentation and planning practices,

### METHODOLOGY:

Visually intensive lectures using power point presentations to acquaint students with historic sites and buildings.

### Module 1 - Earliest Temples

- 6 pds

Roof suggesting timber & thatch origin – later addition of tower & pillared porch – square shaft with ‘cushion’ capital – lack of proportion – study of the LAD KHAN TEMPLE, AIHOLE — evolution of structured temple: VIMANA (SHRINE) WITH SIKHARA (TOWER), GARBHAGRIHA (SANCTUM), MANDAPA (ASSEMBLY HALL), ANTARALA (VESTIBULE), PRADAKSHINA PATHA (AMBULATORY) – two main styles: DRAVIDIAN & INDO-ARYAN

### Module 2 - Temple Architecture of Southern India: Dravidian Style

- 6 pds.

PALLAVA: Origin from rock-cut architecture – mandapa or pillared hall with a cell – Study of the monolithic RATHAS, MAMMALLAPURAM

Chola: Simplicity in treatment – lofty vimana – pillared mandapa aligned axially within walled enclosure – ‘kalasa’ capital replacing Pallava Lion capital

Pandya: Concentric walls enclosing prakarana (open courtyards) – introduction of gopuram (temple portal)

Vijaynagar: Elaboration in ceremony – addition of Amman shrine & ‘Kalyan’ mandapa

Madura: Two main temple formations: (a) inner flat-roofed courtyard with vimana thrusting above, and, (b) outer open courtyard – rectangular plan enclosed within high boundary wall with series of gopuram – interior pillars with foliated or gryphon brackets – Study of the MEENAKSHI TEMPLE, MADURA.

### Module 3 - Temple Architecture of Northern India: Indo-Aryan Style

-12 pds.

ORISSA GROUP: Separate nomenclature (Rekha Deul, Pida Deul, Jagamohan, Rahapaga, Pista etc.) – Wall enclosing axially aligned structures without pillars – interiors devoid of ornamentations – exteriors decorated with figure sculptures – Study of the LINGARAJA TEMPLE, BHUBANESWARA

KHAJURAHO GROUP: Elegantly proportioned detached temples without enclosing wall in ‘Latin cross’ plans – separate domical roofs gradually increasing in height grouped centripetally – rich surface ornamentation – Study of the KANDARYA MAHADEVA TEMPLE

WESTERN INDIAN GROUP: Exuberantly curved white marbles on vaulted ceilings surrounded by high enclosing walls of cells, enshrining statues of ‘Jina’ – open portico & vestibule leading to enclosed shrine with octagonal nave – obscured structural consideration – Study of the DILWARA TEMPLE, MOUNT ABU

### Module 4 - Beginning of Islamic Architecture in India

-6 pds.

Dominated by Persian style — Vocabulary of typical Islamic architecture: Arcuated architecture – Mortar-masonry – Pointed arches – Domes – Stalactite corbels – Arabesque – Stone grill & pierced screen —The Slave Dynasty: Study of parts of a typical mosque with reference to the Quwwat-ul-Islam Mosque, Old Delhi – Study of the Qutb Minar, Old Delhi.

The Sayyid & Lodhi Dynasties and The Buildings of Sher Shah Sur

Sayyid & Lodi Dynasties: Two forms of tombs – (a) single storied octagonal tomb surrounded by arched veranda, and, (b) two / three storied square tomb without veranda; both mounted by domes, range of pillared kiosk over

parapet — Study of the Tomb of Sher Shah: Grand fulfilment of the Lodi style – harmonious transition from square form of lower storeys to diminishing octagonal forms surmounted by circular base of crowning hemispherical dome with finial

Module 5 - The Mughal architecture

- 15 pds.

#### EARLIER PHASE

- AKBAR: Style executed in red sandstone with insertion of marble – trabeated construction system with frequent use of four-centred arch giving visual impression of arcuated style – hollow dome – many sided pillars with bracket capital – carving or bold inlay ornamentation with occasional painted design – Study of PLANNING FEATURES OF THE FATEHPUR SIKRI: The politics of Architecture – Visual Unity through sandstone – Symmetry around multiple axes – Study of (a) the DIWAN-I-KHAS, and, (b) the BULAND DARWAJA.
- Provincial Style of Bengal -BRIEF REFERENCE TO THE FIRST TWO PHASES: BRICK STRUCTURES NECESSITATING ARCUATED STYLE – SHORT PILLARS SUPPORTING POINTED ‘DROP’ ARCHES & VAULTS IN BRICK — TYPICAL FEATURES OF THIRD PHASE: CURVILINEAR FORM OF ROOF ORIGINATING FROM THATCHED BAMBOO HUT FACILITATING WATER DRAINAGE – STUDY OF (A) THE Eklakhi Tomb, Pandua, AND, (B) THE Qadam Rasul Masjid, Gaur.

#### LATER PHASE

- JAHANGIR: Keener interest towards nature than in buildings – Formal Mughal Gardens in Kashmir – Study of the SHALIMAR GARDEN, KASHMIR
- SHAHJAHAN: Age of marble – fine & restrained moulding – inlaid pattern of decoration in coloured stone – dome assuming Persian bulbous form constricted at neck – system of true double doming – voluted bracket capital & foliated base of pillions – Study of the (a) RED FORT emphasising planning & design of the DIWAN-I-AM; and, (b) the TAJ MAHAL emphasising on both TOMB and GARDEN.

#### REFERENCE

1. Indian Architecture Vol. 1 (Buddhist & Hindu) / Percy Brown / D.B. Taraporevala Sons & Co. Pvt. Ltd.
2. Indian Architecture Vol. 2 (Islamic Period) / Percy Brown / D.B. Taraporevala Sons & Co. Pvt. Ltd.
3. Islamic Architecture in India / Satish Grover / Galgotia Publishing Company, New Delhi
4. Buddhist and Hindu Architecture in India / Satish Grover / CBS
5. A History of Architecture / Sir Banister Fletcher / Butterworth Heinemann (Hb), CBS (Pb)
6. The Great Ages of World Architecture / G. H. Hiraskar / Dhanpat Rai
7. A World History of Architecture / Marian Moffett, Michael Fazio & Lawrence Wodehouse / McGraw-Hill

### **MATERIALS AND CONSTRUCTION-II (ARCH 204)**

**Credit**

**3**

**Contact Periods per week**

**3 lecture pds**

**Semester Exam**

**3 hrs**

#### OBJECTIVE :

Introduction to cement based building materials and basic finishing materials.

#### METHODOLOGY:

1. Lectures for understanding construction details.
2. Site visits and library studies regarding materials and construction methods.

Module 1

- 12 pds

Cement: Characteristics, Properties, Uses, Types.

Mortar -Characteristics, Properties, Uses, Types.

Module 2

- 15 pds

Conventional Concrete - Definition, Constituent Materials, Properties, Defects, Types.



Non - Conventional Concrete (Precast, Prestressed, FRC, Ferrocement) -Characteristics, Properties, Uses.

Module 3

- 6 pds

Adhesives- Characteristics, Properties, Uses, Types.

Module 4

- 12 pds

Finishes ( Internal & External – Floors, Walls, Ceiling )- Characteristics, Properties, Uses, Types.

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#### REFERENCE

1. Engineering Materials, Rangwala, Charotar Publishers.
2. Building Construction, W.B.Mckay, Orient Longman.
3. Building Construction, R.Barry, English Language Book Society.
4. Building Construction, Sushil Kumar, Standards Publishers.

### **ARCHITECTURAL GRAPHICS –II (ARCH 205)**

**Credit**

**5**

**Contact Periods per week**

**1 lecture + 5 prac pd**

**Semester Exam**

**3 hrs**

#### OBJECTIVE:

To train the students in the techniques of three- dimensional Architectural drawings & to enhance their visualization skills.

#### METHODOLOGY:

Studio assignments and lectures.

Drawing presentations related to the topics which would include the following:—

1. Isometric & Axonometric Projection - 12 pds
2. Sciography - 12 pds
3. Principle of Perspective Drawing - 24 pds
4. Modelling – Preparation of one model of a physical design under the subject Architectural Design & Drawing (AR-204). -24 pds

### **ARCHITECTURAL DESIGN II (ARCH 281)**

**Credit**

**5**

**Contact Periods per week**

**6 prac pd**

#### OBJECTIVE:

To develop an Architectural Design Language through spatial ordering mechanisms and programmatic interpretation. To introduce students to knowledge and application of basic structural forms.

#### METHODOLOGY :

Approach to studio work – Audio/Video presentations ,individual and group presentations on Graphical methods and model making.

Module 1	- 36 pds
Establish a relationship between Basic Design and Architectural Design , Study and design of single units like living, sleeping and cooking spaces and toilets.	
Module 2	- 36 pds
Design of a basic structure like kiosks, gate-house , obelisks, small living units,etc	

### **METHODS OF CONSTRUCTION I (ARCH 282)**

<b>Credit</b>	<b>2</b>
<b>Contact Periods per week</b>	<b>3 prac pd</b>

**OBJECTIVE:**

To be able to read , comprehend and develop a properly labeled and dimensioned construction drawing.

**METHODOLOGY :**

Study Sheets and Drawing Works .

Modules 1	- 12 pds
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Conventional Concrete Sections

Module 2	- 12 pds
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Non - Conventional Concrete Sections

Module 3	- 12 pds
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Finishing works and simple details of floors, roofs, walls,etc

### **WORKSHOP PRACTICE – I (ARCH 283)**

<b>Credit</b>	<b>3</b>
<b>Contact Periods per week</b>	<b>4 prac pd</b>

**OBJECTIVE:**

To equip students with the basic skills necessary to represent their ideas in a rudimentary model format using simple materials like hardwood, mud blocks

**METHODOLOGY:**

Exercises in cutting, finishing and joinery etc. with simple blocks, composition of basic geometrical forms etc.

Introduction to the various tools and equipment available for executing these exercises. The section on joinery details will be dealt with in an engineering lab.

Module 1-Carpentry	- 30 pds
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Specifications of wood and wood-products; Introduction to tools and equipment; Practice jobs and different wood-joineries like half-lap joint; tenon and mortise, tenon and dove-tailed bridle joint, right angled single mitred tenon and mortis joint and haunched tenon and mortise for windows frames etc.

Module 2 –Masonry	- 15 pds
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Practice of construction of brick masonry wall of English and Flemish Bond.

## **EDUCATIONAL TOUR (ARCH 284)**

**Credit**

**1**

**Contact Periods per week**

**2 prac pd**

A visit to a place / places of Minimum for a min of 10 days to a max of 12 days

Preparing a tour report highlighting the following:

1. Historical importance
2. Architectural style and building features
3. Documentation of building materials used

## COMPUTER EDUCATION – I (ARCH 301)

**Credit**

**4**

**Contact Periods per week**

**3 lecture + 1 tut pds**

**Semester Exam**

**3 hrs**

OBJECTIVE:

To familiarize the students with the basic computer languages

METHODOLOGY:

Intensive lectures and computations

Module-1

5 pds

Introduction: A brief history of the efforts in automated computing: ABACUS, PASCAL to Babbage's Difference Engine. Electronic era and early developments. Number system, codes: Positional number system, Binary, Hex etc., Conversion, Representation of negative numbers, Floating point representation. Addition, Subtraction, Character representation: ASCII, UNICODE

Module-2

6 pds

Logic operation and basic gates: AND, OR, NOT, XOR, NAND and NOR; operations, gates, Truth tables and use with respect to arithmetic ckts. (Half Adders and Full Adders etc.)

Module-3 --

6 pds

Computer Organisation: Introduction to Computer Systems Hardware, Functional units: CPU, MEMORY, I/O Devices – commonly used peripherals, cache, Bus etc. Organisation of a typical PC

Module-4 --

3 pds

Problem Solving Steps: Systematic decomposition, Flowchart & Algorithm. Simple constructs (assignment, loop and decisions) — Operating System and the programmer/user: What is OS, How it helps developing programs, Basic file manipulation, Editing, Compilation and linking loading steps, Debugging, I/O redirection. Source file, object file, compiler etc.

Module-5 --

22 pds

Introduction to Programming (in C): Introduction to Basic Computing, High level, assembly and machine level language. Writing simple programs, Basic data types and their use, Declaration and definition. Loop and Decision statements, Structured type: Array of basic types, Use of array in simple problems. Special control structures: Switch, break, continue. Philosophy of modular development, User defined and library functions, Parameters, return type, call by value and call by reference. Storage class. Bit manipulation. Definition and use. Array and pointers, Special use like memory allocation. Combined data types, use in real life problems. Running debugger, creating library, finding execution time, linking/loading concepts, Stack and heaps.

REFERENCE

1. Digital Principles and applications (5th Edition): Leach & Malvino
2. Digital Computer Electronics: Malvino
3. The Elements of Computing Systems: Building a Modern Computer: Noam Nisan and Shimon Schocken
4. C Programming Language: Kernighan & Ritchie

## STRUCTURE – I (ARCH 302)

<b>Credit</b>	<b>4</b>
<b>Contact Periods per week</b>	<b>3 lecture + 1 tut pds</b>
<b>Semester Exam</b>	<b>3 hrs</b>

### OBJECTIVE:

To understand the basic principles theories and calculations related to behavior of structural elements.

### METHODOLOGY:

Lectures and computation exercises

Module-1

-- 9 pds

Principal stress: shear stress, normal stress, conjugate stress. Mohr diagram.

Module-2

-- 18 pds

Deflection of beams using moment-area theorem and Conjugate beam method: Principle of superposition.

Module-3

-- 15 pds

Fundamentals, criteria for stability in equilibrium, column buckling theory, Euler's load for columns with different end conditions, limitations of Euler's theory – problems, . Empirical formulas for design of columns, Short columns and piers with eccentric loading (small eccentricity).

### REFERENCE

1. Dr.B.C.Punmia, et al , Strength of Materials and Theory of Structures - Vol.I, Lakshmi Publications,
2. Dr.Sadhu Singh, Strength of Materials, Khanna Publishers, 1988.
3. S.Ramamrutham, Strength of Materials, Dhanpat Rai son, 1992.
4. G.K.Hiraskar, Strength of Materials.

## CLIMATOLOGY (ARCH 303)

<b>Credit</b>	<b>4</b>
<b>Contact Periods per week</b>	<b>3 lecture + 1 tut pds</b>
<b>Semester Exam</b>	<b>3 hrs</b>

### OBJECTIVE:

To understand Climate and its impact on architectural design, fundamentals of climatology and environmental studies.

### METHODOLOGY:

The concepts shall be taught with the help of lectures, practical examples lab exercises.

Module-1 --

8 pds

Comfortable Built Environment: Orientation of Buildings Climate & weather;

Basic climatic zones: hot & arid, hot / warm & humid, cold

Climatic factors: solar radiation & temperature, clouds, relative humidity, prevailing wind; measuring instruments and si units

Features of dwellings in tropics: aspects of daylighting, plantation of trees

Module-2 --

8 PDS

Comfort: The Desirable Conditions Requirement of ventilation; Heat balance of body

Sun path diagram — comfort zone & bio-climatic chart — comfort range

Air change per hour — recommended values of air changes for different occupancies as per the NBC

Methods of ventilation

Module-3 --	8 PDS
Principles Of Thermal Design Thermal quantities – Heat flow, heat flow rate, density of heat flow rate — Sol-air temperature — Solar gain factor	
Heat Exchange Process: Conduction – Convection – Radiation through windows	
Evaporation — Calculation of heat loss & heat gain — Cooling & heating by air — Transmittance of Composite Walls, Thermal Gradient	
Module-4 --	4 PDS
Means Of Thermal Control: Natural Ventilation Principle of nature ventilation in buildings	
Cross-ventilation — position of openings – size of openings — control of openings: sashes, canopies, louvers wind shadow — humidity control: wind scoop	
Module-5 --	4 PDS
Means Of Thermal Control: Structural Controls Solar control: internal blinds & curtains – heat absorbing glasses Sun's position: effects of angle of incidence – stereographic projection – shadow angles Shading devices: vertical & horizontal – design of shading devices	
Module-6 --	8 PDS
Principles of Lighting Aims of good lighting and realization of the same	
Planning the brightness pattern considering the visual task, the immediate background of the task (central field & visual field) and the general Surroundings (peripheral field)	
Glare: direct, reflected & veiling	
Recommended values of illumination level for different occupancies as per the NBC.	
Module-7 –	8 PDS
Daylighting Sources of light of a point inside a building: skylight, externally reflected light, internally reflected light, direct sunlight — working plane	
Daylight factor — components of daylight factor: sc, erc, irc — daylight penetration	

REFERENCE

1. Manual of Tropical Housing and Building Part 1 Climatic Design / O. H. Koenigsberger, T. G. Ingersoll, A. Mayhew, S. V. Szokolay / Orient Longman

**HISTORY OF ARCHITECTURE --- III (ARCH 304)**

<b>Credit</b>	<b>3</b>
<b>Contact Periods per week</b>	<b>3 lecture pds</b>
<b>Semester Exam</b>	<b>3 hrs</b>

OBJECTIVE:

To provide an understanding of the evolution of Classical and various regional Architecture in the world in their various stylistic modes characterized by technology, ornamentation and planning practices.

METHODOLOGY:

Visually intensive lectures using power point presentations to acquaint students with historic sites and buildings.

Module 1- CLASSICAL GREECE -	9 pds.
Abundance of high quality limestone & marble, scarcity of hardwood, restriction on building spanning, expression of direct democracy, Mediterranean climate – leading to – COLUMNAR & TRABEATED architecture, HUMAN SCALE, EXTROVERT SPACE — ORDERS: DORIC, IONIC, CORINTHIAN — Elements of urban architecture: ACROPOLIS AT ATHENS with idea about AGORA, STOA, BOULEUTORION, THEATRE, ODEION, STADIUM, HIPPODROME AND GYMNASIA — Detail study	

of the PARTHENON, THE TEMPLE TO ATHENA with emphasis to its (a) Elevation: facade treatment, proportion (Golden section, optical correction); (b) Plan: PRONAOS, NAOS & STATUE AND OPISTHODOMOS OR EPINAOS.

#### Module 2- CLASSICAL ROME -

12 pds.

Introduction of FIRED BRICK, use of IMPROVED MORTAR analogous to modern concrete, judicious use of different quality of stone, STUCCO & MARBLE VENEERING; knowledge of TRUE ARCH, BARREL & CROSS VAULTS, CUPOLA & COFFER CEILING, expression of majesty of the Imperial Empire, financial resources from conquests – leading to – ARCUATED ARCHITECTURE, MONUMENTAL SCALE, GRANDEUR, INTROVERT SPACE — ORDERS added: TUSCAN and COMPOSITE or ROMAN — Comparative proportions of the Classical Orders — Idea about the TEMPLES, FORUM, BASILICAS, THERMAE & BALNEAE, THEATRE, AMPHITHEATRE, CIRCUSES, TRIUMPHAL ARCHES & COLUMNS, AQUEDUCTS & BRIDGES — Detail study of the PANTHEON, ROME with emphasis to section through its great dome.

#### Module 3- BYZANTINE ARCHITECTURE

6 pds.

Difference in the nature of Christ, knowledge of placing a dome over a regular polygonal plan with PENDENTIVES, TWO AXES – leading to – Orthodox Churches with square plan, enclosing nave & aisle in the shape of GREEK CROSS, use of large opening creating radiant interior — Detail study of the HAGIA SOPHIA, CONSTANTINOPLE.

#### Module 4- KHMER ARCHITECTURE

3 pds

Periodization; Materials -- Brick, Sandstone, Laterite; Structures -- Central sanctuary, Prang, Enclosure, Gallery, Gopura, Hall of Dancers, House of Fire, Library, Srah and baray, Temple mountain; Elements -- Bas-relief, Blind door and window, Colonette, Corbelling, Lintel, pediment, and tympanum, Stairs; Motifs -- Apsara and devata, Dvarapala, Gajasimha and Reachisey, Garuda, Indra, Kala, Krishna, Linga, Makara, Nāga, Nāga Bridge, Quincunx, Shiva, Vishnu; Ordinary housing.

#### Module 5- ARCHITECTURE OF INDONESIA

3 pds

Religious architecture; Traditional vernacular architecture -- Examples, Decline; Palace architecture; Colonial architecture; Post independence architecture.

#### Module 6- CHINESE ARCHITECTURE

3 pds

Features -- Architectural bilateral symmetry, Enclosure, Hierarchical, Horizontal emphasis, Cosmological concepts; Construction -- Materials and history, Structure; Classification by structure; Architectural types -- Commoner, Imperial, Religious; Urban planning; Miniature models.

#### Module 7- KOREAN ARCHITECTURE

3 pds

Introduction; Historical architecture -- Prehistoric architecture, Proto-Three Kingdoms Period (c. 1st-2nd century BCE to 3rd-4th century CE), Three Kingdoms Period (c. 3rd-4th century-668) -- Common architecture, Fortress architecture, Religious architecture, Royal architecture, Tomb architecture; Unified Silla Dynasty (668-935) architecture -- Religious architecture, Royal architecture; Koryŏ Dynasty (918-1392) architecture; Chosŏn (Joseon Dynasty) (1392-1897) architecture -- Fortress architecture, Religious architecture, Royal architecture, Urban architecture, Traditional architecture; Colonial period architecture.

#### Module 8- JAPANESE ARCHITECTURE

3 pds

General features of Japanese traditional architecture; Prehistoric period; Asuka and Nara architecture; Heian period; Kamakura and Muromachi periods; Azuchi-Momoyama period; Edo period; Meiji, Taisho, and early Showa periods -- Colonial architecture; Late Showa period; Early Heisei period; Japanese interior design -- Traditional Japanese aesthetic, Traditional materials of the interior, Western influence, Influence on the West.

#### REFERENCE

1. A History of Architecture (Century Edition) / Sir Banister Fletcher / Butterworth Heinemann (Hb), CBS Publishers & Distributors (Pb)
2. The Story of Architecture FROM ANTIQUITY TO THE PRESENT / Jan Gympel / KÖNEMANN (Pb)
3. A World History of Architecture / Marian Moffett, Michael Fazio & Lawrence Wodehouse / McGraw-Hill
4. The Great Ages of World Architecture / G. H. Hiraskar / Dhanpat Rai
5. Jessup, Helen Ibbitson. Art & Architecture of Cambodia. London: Thames & Hudson, 2004.
6. Roveda, Vittorio. Images of the Gods: Khmer Mythology in Cambodia, Laos & Thailand. Bangkok: River Books, 2005.
7. Sthapatyakam. The Architecture of Cambodia. Phnom Penh: Department of Media and Communication, Royal University of Phnom Penh, 2012.

8. Bussagli, Mario (1989). History of World Architecture – Oriental Architecture/2. Faber and Faber. ISBN 0-571-15378-X.
9. Coaldrake, William H. (1996) Architecture and Authority in Japan (Nissan Institute/Routledge Japanese Studies Series), Routledge, ISBN 978-0-415-10601-6
10. Frampton, Kenneth (1990). Modern Architecture a Critical History. Thames and Hudson.
11. Nishi, Kazuo; Hozumi, Kazuo (1996) [1983]. What is Japanese architecture? (illustrated ed.). Kodansha International. ISBN 4-7700-1992-0. Retrieved November 11, 2009.
12. Itoh, Teiji (1973). Kura – Design and Tradition of the Japanese Storehouse. Kodansha International. ISBN 0-914842-53-6.

## **MATERIALS AND CONSTRUCTION --- III (ARCH 305)**

### **Credit**

**3**

### **Contact Periods per week**

**3 lecture pds**

### **Semester Exam**

**3 hrs**

### OBJECTIVE

To acquaint the students with constructional systems and detailing of Doors, windows, and other components of a building .

### METHODOLOGY:

1. Lectures for understanding construction details.
2. Site visits and library studies regarding materials and construction.

Module-1 - Door 10 pds

Types of doors based on operation - Swing door, Revolving door, Sliding door, Sliding-folding door, Collapsible door, Rolling shutter door; Timber doors – Battened, Panelled & glazed door – Flush door; Steel doors – Collapsible door, Rolling shutter; Aluminium doors: Swing door – Sliding door; PVC/UPVC door; Fire door.

Module-2 - Window 10 pds

Types of windows based operation and Location – Fixed window, Casement window, Sliding window, Pivoted window, Louvered (or Venetian) window, Bay window, Clerestory window, Corner window – Gable and Dormer window. Timber windows – Panelled & glazed timber casement window; Steel windows – Glazed fixed & casement steel window; Aluminium windows – Casement and Sliding aluminium window; uPVC window

Module-3 - Hardware 5 pds

Fixing and fastening for doors and windows – Nails, Screws, Hinges, Bolts, Rivets, Handles etc.

Module-4 - Foundation 15 pds

Purpose; Essential requirements; Settlement; Classification – Shallow (Wall footings, Inverted arch foundation, Isolated footings, Combined footing, Strip footing, Cantilever footing, Mat or raft foundation) Deep: (Pile foundation, Pier foundation)

Module-5 - Damp Prevention and Water Proofing 15 pds

Causes and effects of dampness in buildings; Methods of damp prevention - Membrane damp proofing, Integral damp proofing, Surface treatment, Guniting; Damp Proofing of Basement, Foundation & Plinth, Cavity walls, Projections, Expansion/Seismic Joints; Water proofing treatment - Flat Roofs & Terraces, Parapet Wall (Details of Coping and Drip course), Window Sill & Chajja (Detail of Drip course)

### REFERENCE

1. McKay W.B., 2000 Building Construction, Orient Longman
2. Varghese P.C., 2005 Building Materials, Prentice' Hall of India Private Limited
3. Sharma S.K., 2000 A Text Book Of Building Construction, S.Chand & Company Limited
4. Kumar Sushil, 2000 Building Construction, Standard Publishers Distributors



## ART APPRECIATION (ARCH 306)

<b>Credit</b>	<b>2</b>
<b>Contact Periods per week</b>	<b>2 lecture pds</b>
<b>Semester Exam</b>	<b>3 hrs</b>

### OBJECTIVE:

To develop the ability of understanding various forms of art as expression.

### METHODOLOGY:

Intense lectures and presentations, involving guest lectures from visual art experts

Module 1 - 10 pds

Art through ages, architecture as art, milestones in art from the Prehistoric, Paleolithic, Neolithic, Classical, Medieval, Renaissance and modern periods. Indian art heritage, Indus valley to present day.

Module 2 - 15 pds

Art consciousness; Aesthetics, perception, symbolism, expression, style, fashion, appropriateness and values. Influence on Architectural design; development of aesthetic sensitivity as a prerequisite for all designers

Module 3 -15 pds

Critical appraisal of examples from the visual as well as performing arts. Effect of colour in architecture – Colour symbolism.

Module 4 -15 pds

Investigations in proportion, scale, balance, rhythm ,symmetry ,hierarchy, pattern and axis with examples from the built environment.

### REFERENCE

1. Vision and Invention – an introduction to Art Fundamentals – Calvin Harlan
2. Chaos and Creation – Sachidanand Sinha (Lalit Kala Akademi)

## ARCHITECTURAL DESIGN III(ARCH 381)

<b>Credit</b>	<b>6</b>
<b>Contact Periods per week</b>	<b>9 prac pd</b>

### OBJECTIVE:

To explore evolution of architectural language through principles of abstraction, space-form-structure-site correlations, and the disciplines of building and sensory qualities.

### METHODOLOGY :

Audio/video presentations, case studies and Studio work with viva voce at the end of semester

Module 1 - 24 pds

Studies of small institutions with key inputs on program-site analysis, area-volume diagrams, overlays, spatial structural system models and use of different media and representational techniques.

Module 2 - 70 pds

Design of small residences, neighborhood shopping centres, parks ,etc preferably not beyond two – storeys. Details of elements and Time sketch problems on similar topics

## METHODS OF CONSTRUCTION II(ARCH 382)

**Credit**

**2**

**Contact Periods per week**

**3 prac pd**

OBJECTIVE:

To be able to read , comprehend and develop a properly labeled and dimensioned construction drawing.

METHODOLOGY : Study Sheets and Drawing Works

1. Timber Panel Door
2. Timber Flush Door
3. Timber Casement Window
4. Metal (Aluminium) Glazed Door
5. Metal (Aluminium) Window
6. Metal (steel) Casement Window

## RENDERING TECHNIQUES (ARCH 383)

**Credit**

**2**

**Contact Periods per week**

**3 prac pd**

OBJECTIVE:

To allow students to develop feasible and visually appealing rendering abilities

METHODOLOGY :

Studio work and interactive sessions with experts.

Module 1

- 20 pds

Manual rendering techniques in black and white and colour,

Module 2

- 20 pds

Freehand drawing and representations in perspective.

## STRUCTURE – II (ARCH 401)

<b>Credit</b>	<b>4</b>
<b>Contact Periods per week</b>	<b>3 lecture + 1 tut pds</b>
<b>Semester Exam</b>	<b>3 hrs</b>

### OBJECTIVE:

To understand the basic principles theories and calculations related to behavior of steel and concrete structures.

### METHODOLOGY:

Lectures and computation exercises

Module 1 – 12 pds

Strain Energy: Castigliano's theorems; Identifying a situation (whether in axial loading, bending, or torsion)

Module 2 – 24 pds

Analysis of indeterminate structures and use of moment distribution method,(Analysis of indeterminate structures using of moment distribution method)

Module 3 - 12pds

Effect of wind and earthquake on structures.

### REFERENCE

1. Statically indeterminate structures - C. K. Wang McGraw-Hill
2. Elastic analysis of structures - Kennedy and Madugula Harper and Row
3. Structural Analysis (Vol I & Vol II) - S S Bhavikatti, Vikas Publishing House Pvt. Ltd
4. Structural Analysis- Ramamrutham

## ACOUSTICS (ARCH 402)

<b>Credit</b>	<b>4</b>
<b>Contact Periods per week</b>	<b>3 lecture + 1 tut pds</b>
<b>Semester Exam</b>	<b>3 hrs</b>

### OBJECTIVE:

To understand the behavior of sound in an enclosed space and remedial measures for controlling unwanted noise, towards creating the most favourable conditions for indoor and outdoor acoustic environment.

### METHODOLOGY:

The concepts shall be taught with the help of lectures, practical examples lab exercises.

Module 1-Nature of Sound: 6 pds.

Sound Waves, Sound Levels- Power, Intensity and Pressure, Auditory Range - thresholds of hearing & pain, Decibel scale, Sound Effects on Human; Incidence of Sound-reflection, absorption & transmission; Noise, Sound in Open Air-effects of wind flow & temperature gradients, acoustic shadow ; Sound in Enclosed Space-air-borne & structure-borne (impact) sound, direct & reverberant components, reverberation time using Sabine's formula (dead & live room), echo, resonance.

Module 2- Environmental Acoustics: Various Noise Sources, Planning Against Noise-zoning, distancing & screening, green belts & landscaping, noise barriers, Outdoor Noise Regulations in India, Open-air Auditorium.	4 pds.
Module 3- General Building Acoustics: Acceptable Indoor Noise Levels, Transmission Loss and insulation against air-borne sound, Various Sound Absorbents, Reduction of Noise, Noise isolators in Construction- hollow & composite wall, resilient surface materials, floating floor construction for concrete & wooden floors, suspended ceiling, Acoustic treatment of skirting, windows & ventilators.	8 pds.
Module 4- Residential Buildings: Sources of Noise and Recommendations- site planning, internal planning, sound insulation.	2 pds.
Module 5- Educational Buildings: Sources of Noise and Recommendations- site planning, internal planning, noise reduction within rooms, sound insulation.	2 pds.
Module 6- Auditoria and Theatres: Sources of Noise- outdoor and indoor, Recommendations- geometry & shape, seating arrangement, design criteria for different purposes; Electro-acoustic installations.	6 pds

#### REFERENCE

1. SP 7 (4): NATIONAL BUILDING CODE OF INDIA 2005 Group 4, Part 8 Building Services, Section 4:  
Acoustics, Sound Insulation & Noise Control / Bureau of Indian Standards
2. Architectural Acoustics- M. David Egan/ J. Ross Publishing (2007)

### HISTORY OF ARCHITECTURE-IV (ARCH 403)

<b>Credit</b>	<b>3</b>
<b>Contact Periods per week</b>	<b>3 lecture pds</b>
<b>Semester Exam</b>	<b>3 hrs</b>

#### OBJECTIVE:

To provide an understanding of Western Architecture during Medieval, Renaissance, Baroque, Neo Classical and Modern Periods upto the Nineteenth century.

#### METHODOLOGY:

Visually intensive lectures using power point presentations to acquaint students with historic sites and buildings.

Module 1	ROMANESQUE ARCHITECTURE	9 pds.
Pre-Romanesque Architecture -- Examples of Frankish buildings; Imperial styles -- Carolingian art, Ottonian art; Regional styles -- Croatia, England, France, Spain and Portugal, Italy;		
First-Romanesque Architecture -- Consolidation of Papal hierarchy, desire to articulate, to stress or underline every structural division in order to produce unified compositions, continuing development of STONE VAULTING into GROINED SYSTEMS – leading to – development of church plan as a LATIN CROSS with addition of TRANSEPTS, extension of aisles carried round APSIDAL SANCTUARY to form AMBULATORY, FIGURATIVE & NON-FIGURATIVE SCULPTURES designed and integrated with structure & construction — Detail study of the PISA CATHEDRAL WITH BAPTISTERY & CAMPANILE.		
Module 2	GOTHIC ARCHITECTURE	9 pds.
The term "Gothic" -- Definition and scope, Influences -- Political, Religious, Geographic; Architectural background -- Romanesque tradition, Islamic influence; Architectural development -- Abbot Suger, Transitional Period; Characteristics of Gothic churches and cathedrals -- Plan, Structure: the pointed arch -- _Origins, Functions, Height, Vertical emphasis, Light, Majesty, Basic shapes of Gothic arches and stylistic character, Lancet arch, Equilateral arch, Flamboyant arch, Depressed arch; Symbolism and ornamentation; Regional differences -- France, England,		

Germany and Central Europe, Spain and Portugal, Italy; — Detail study of the NOTRE DAME, PARIS with emphasis to its (a) Plan showing NAVE & CHOIR and, (b) transverse section showing POINTED ARCH, FLYING BUTTRESS, NAVE ARCADE & TRIFORIUM.

Module 3            RENAISSANCE ARCHITECTURE

9 pds.

Historiography; Principal phases; Characteristics of Renaissance architecture; Influences on the development of Renaissance architecture in Italy; Development of Renaissance architecture in Italy - Early Renaissance -- Brunelleschi, Michelozzo, Alberti; The Spread of the Renaissance in Italy; High Renaissance -- Bramante, Sangallo, Raphael; Mannerism -- Peruzzi, Giulio Romano, Michelangelo, Giacomo della Porta, Andrea Palladio; Progression from Early Renaissance through to Baroque; Spread of Renaissance architecture beyond Italy -- France, Netherlands, England, Scandinavia, Germany, Spain, Portugal, Poland, Hungary, Russia, Croatia; Legacy of Renaissance architecture; Detail study of the evolution of the plan of the CATHEDRAL OF ST. PETER, ROME — BAROQUE: movement, spatial invention, drama and freedom of detail – Detail study of PIAZZA OF ST. PETER, ROME.

Module 4            BAROQUE ARCHITECTURE

6 pds.

Precursors and features of Baroque architecture -- The Baroque and colonialism; Italy -- Rome and Southern Italy, Northern Italy; Malta; Spain; Spanish America and territories; Portugal and Portuguese Empire; Hungary; Transylvania; France; The Low Countries -- Southern Netherlands, Northern Netherlands; England; Holy Roman Empire; Polish–Lithuanian Commonwealth; Russia; Ukraine; Scandinavia; Turkey.

Module 5            RETURN TO CLASSICISM

9 pds.

Palladian Architecture -- Palladio's architecture; The Palladian window; Early Palladianism; Neo-Palladian -- English Palladian architecture, Irish Palladianism, North American Palladianism, Eastern European Palladianism; Decline of Palladianism.

Neoclassical Architecture -- Origins; Characteristics; Regional trends -- Spain, Polish-Lithuanian Commonwealth; Interior design; City Planning; Late phase -- United States; Neoclassical Architecture in Washington D.C and Virginia -- Key Concepts, History, Ancient Roman Influence -- Political, Aesthetic, Intellectual; Notable Examples; List of other architectural institutions (throughout the United States); Architecture in the former Union of Soviet Socialist Republics, China and other communist countries; Great Britain, The Third Reich; Canada; Neoclassicism today.

REFERENCE

1. A History of Architecture (Century Edition) / Sir Banister Fletcher / Butterworth Heinemann (Hb), CBS Publishers & Distributors (Pb)
2. The Story of Architecture FROM ANTIQUITY TO THE PRESENT / Jan Gympel / KÖNEMANN (Pb)
3. A World History of Architecture / Marian Moffett, Michael Fazio & Lawrence Wodehouse / McGraw-Hill
4. Encyclopedia of Architectural Technology / Ed: Pedro Guedes / McGraw-Hill
5. CRASH COURSE IN ARCHITECTURE / Eva Howarth / Caxton Editions
6. The Great Ages of World Architecture / G. H. Hiraskar / Dhanpat Rai
7. The Civilization of the Renaissance in Italy, 1860, English translation, by SGC Middlemore, in 2 vols., London, 1878)
8. Erwin Panofsky, Renaissance and Renaissance in Western Art, (New York: Harper and Row, 1960)
9. Arnold Hauser, Mannerism: The Crisis of the Renaissance and the Origins of Modern Art, Cambridge: Harvard University Press, 1965, ISBN 0-674-54815-9
10. Wölfflin, Heinrich (1971). Renaissance and Baroque. London: Collins.
11. Stefan Muthesius (1994). Art, architecture and design in Poland, 966-1990: an introduction. K.R. Langewiesche Nachfolger H. Köster Verlagsbuchhandlung. p. 34. ISBN 3-7845-7611-7.
12. Francis Ching, Mark Jarzombek, Vikram Prakash, A Global History of Architecture, Wiley Press, 2006.
13. Jean-Francois Gabriel, "Classical Architecture for the Twenty-first Century", Norton, 2004
14. Hugh Honour, Neoclassicism

**MATERIALS AND CONSTRUCTION -- IV (ARCH 404)**

**Credit**  
**Contact Periods per week**  
**Semester Exam**

**3**  
**3 lecture pds**  
**3 hrs**

**OBJECTIVE**

To acquaint the students with constructional practices pertaining to RCC floors and pitched roofs, staircases and various ways of spanning openings.

**METHODOLOGY:**

1. Lectures for understanding construction details.
2. Site visits and library studies regarding materials and construction methods.

Module-1 -- Spanning of Openings:

9 pds

Corbels, Lintels and Arches; Typical detail of a masonry window opening showing sill, lintel & chajja projection; Lintel types by construction methods: Brick lintel, RCC lintel (precast and cast-in-situ); Typical details of an arch opening with nomenclature; Types of Arches - Semi-circular, Segmental, Flat, Relieving arch etc

Module-2 -- Stairs:

12 pds

Components and requirements; Classification based on form, structural systems, materials; Typical construction details such as balustrade fixing, nosing, etc.

Module-3 -- Upper Floors:

12 pds

Timber Floor; Jack arch floor; RCC Floor - Slab (one-way, two-way & cantilever), Beam & slab, Flat Slab, Ribbed floor; Pre-cast concrete floors; Steel Floor with joist and deck-plate.

Module-4 -- Pitched Roofs:

9 pds

Nomenclature, Types - Lean-to-roof, Coupled roof, Closed couple roof, King Post Roof Truss, Queen Post Roof Truss, Steel trusses; Roofing materials with fixing details; Roof drainage systems and details.

**REFERENCE**

1. McKay W.B., 2000 Building Construction, Orient Longman
2. Varghese P.C., 2005 Building Materials, Prentice' Hall of India Private Limited
3. Sharma S.K., 2000 A Text Book Of Building Construction, S.Chand & Company Limited
4. Kumar Sushil, 2000 Building Construction, Standard Publishers Distributors
5. Arora S.P., Bindra S.P., 2000 A Text Book Of Building Construction (Planning Techniques And Methods Of Construction), Dhanpat Rai Publications
6. Duggal S.K., 2003, Building Materials, New Age International Publishers

**ARCHITECTURAL DESIGN IV (ARCH 481)**

**Credit**  
**Contact Periods per week**

**7**  
**9 prac pd**

**OBJECTIVE:**

To understand the effects of basic building services and their relationship to space, form and buildings

**METHODOLOGY :**

Audio/video presentations, case studies and work Studio with viva voce at the end of semester

Module 1

- 12 pds

Studies of the design of small institutions with key inputs on program-site analysis, area-volume diagrams, overlays, and spatial structural system.

Module 2 - 96 pds  
 Design of elementary school, doctors clinics , health centres, small libraries, clubs,etc.  
 Developing details of elements , time sketch on similar problems.

### METHODS OF CONSTRUCTION III(ARCH 482)

**Credit** 2  
**Contact Periods per week** 3 prac pd

**OBJECTIVE:**

To be able to read , comprehend and develop a properly labeled and dimensioned construction drawing.

**METHODOLOGY :**

Study Sheets and Drawing Works with end semester viva-voce

Module 1 - 12 pds

1. Foundation & Plinth
2. Damp Proofing Treatment

Module 2 - 12 pds

1. Spanning Of Openings
2. Stairs

Module 2 - 12 pds

Upper Floors & Roofing

### COMPUTER GRAPHICS – I (ARCH 483)

**Credit** 2  
**Contact Periods per week** 3 prac pds

**OBJECTIVE:**

To be able to read , comprehend and develop drawings using CADD

**METHODOLOGY :**

Lectures and Computer Drawings with end semester viva-voce.

Module –1 12pds

Introduction to Computer Graphics: Fundamentals of 2-dimentional Drawing in CAAD; Basic Drawing Features; Basic Editing Tools; Dimensioning and Text Formatting; Printing and Plotting Techniques.

Module –2 12 pds

Advanced 2-Dimentional Drawing and Editing: Use of Block and Attributes; Use of Block and W Block; Introduction to 3-Dimensional Drawing; Basic 3D Drawing and Editing Features; User Coordinate System; Introduction to Rendering Techniques

Module –3 12pds

Project Work

### WORKSHOP PRACTICE – II (ARCH 484)

**Credit** 3

**Contact Periods per week****4 prac pds****OBJECTIVE:**

To equip students with the basic skills necessary to represent their ideas in a rudimentary model format using Metals .

**METHODOLOGY:**

Exercises in cutting, finishing and joinery etc. with simple blocks, composition of basic geometrical forms etc. Introduction to the various tools and equipment available for executing these exercises. The section on joinery details will be dealt with in an engineering lab.

Module 1 - Introduction to fitter's tools: gauges, measuring instruments etc.; marking of jobs;	6pds
Module 2 - fitter's job: involving chipping, filing, sawing, drilling;	20pds
Module 3 - Use of taps and dies; pipe fittings and plumbing.	20pds

**EDUCATIONAL TOUR (ARCH 485)****Credit****1****Contact Periods per week****2 prac pds**

Duration of Tour: 10 days to 12 days

A detail tour programme should be prepared specifying the site of architectural interest to be visited. A detail measured drawing of one famous building should be prepared as a Group work. A teacher must accompany the students and assign specific jobs of the measure drawing to a specific Group in a balanced way. Performance of each student shall be evaluated by his actual participation in the site of measured drawing, preparation of the final drawings and presentation.



## **SOCIOLOGY IN ARCHITECTURE (ARCH 501)**

<b>Credit</b>	<b>3</b>
<b>Contact Periods per week</b>	<b>3 lecture pds</b>
<b>Semester Exam</b>	<b>3 hrs</b>

### OBJECTIVE:

To familiarize students with the basic concepts of Sociology and its influence on Architecture.

### METHODOLOGY:

Lectures and exercises.

Module 1	- 6 pds
Relevance of sociology, Definition and theories and their relevance to social set-up- Social structure – Organization – Social Institutions and Social Change.	
Module 2	- 6 pds
Social problems and programmes ; Urban Society – Social and economic problems – Rural society: Social and economic problems.	
Module 3	- 12 pds
Developmental programmes related to urban and rural society – Impact of programmes on social development. Man- Environment relationship: Positive and normative theories. Behavioral Science and modern movement. Substantive theory on Environment and human behavior, Social Stimulation and interaction, the affordances of the built Environment, Gestalt theory of Perception- Cognition and effect, Spatial behavior	
Module 4	-12 pds
Environmental Determinism, Environmental possibilism and Environmental probabilism. Behavioral concepts in Neighborhood and Urban Design. Speculative aesthetics and symbolic aesthetics. Semantic and Semiotic approaches. Contemporary Sociophysical issues in Environmental Design.	

### REFERENCE

1. Gopal Bhargava, Urban problems and policy perspectives, Abinav publication, New Delhi, 1981.
2. Prakasa Rao, VLS, Urbanisation in India, Concept Publishing Company, New Delhi, 1983.
3. A.R.Desai, Rural Sociology, Popular Prakashan, Bombay, 1984.
4. Neil J.Smelsa, Sociology, Prentice Hall, New Jersey, 1981.

## **STRUCTURES III (ARCH 502)**

<b>Credit</b>	<b>4</b>
<b>Contact Periods per week</b>	<b>3 lecture + 1 Tut pds</b>
<b>Semester Exam</b>	<b>3 hrs</b>

### OBJECTIVE:

To understand the basic principles theories and calculations related to behavior of steel and concrete structures.

### METHODOLOGY:

Lectures and computation exercises

1. Introduction: Principles of design of reinforced concrete members - Working stress and Limit State method of design
2. Limit state method of design: Basic concepts and IS code provisions (IS: 456 2000) for design against bending moment and shear forces; Balanced, under reinforced and over-reinforced beam/ slab sections; concepts of bond stress and development length; Use of 'design aids for reinforced concrete' (SP:16).
3. Analysis, design and detailing of singly reinforced rectangular, 'T', 'L', Cantilever beams, lintels and doubly reinforced beam sections by limit state method.
4. Distribution of base pressure; Middle third rules; earth pressure, Design of simple retaining wall; Cantilever retaining wall.
5. Design of one-way, chajjas and two-way slab panels as per IS code provisions
6. Staircases: Types; Design and detailing of reinforced concrete doglegged staircase
7. Design of reinforced concrete short columns of rectangular and circular cross-sections under axial load.
8. Shallow foundations: Types; Design and detailing of reinforced concrete isolated square and rectangular footing for columns as per IS code provisions by limit state method

#### REFERENCE

1. IS: 456- 2000 "Indian Standard for Plain and reinforced concrete – code of practice"
2. SP:16 Design Aid to IS 456
3. Limit state design of reinforced concrete- B C Punmia
4. Limit State Design of Reinforced Concrete- P. C. Varghese
5. Reinforced Concrete Design - Pillai and Menon
6. Reinforced concrete - S.N.Sinha
7. Fundamentals of reinforced concrete - N.C.Sinha and S.K. Roy

### **BUILDING SERVICES I (ARCH 503)**

<b>Credit</b>	<b>3</b>
<b>Contact Periods per week</b>	<b>2 lecture pds+1 tut pd</b>
<b>Semester Exam</b>	<b>3 hrs</b>

#### OBJECTIVE:

To impart knowledge required for understanding the building services of water supply, sanitation and their integration with architectural design.

#### METHODOLOGY:

Exercises in layout of simple drainage systems for small buildings. Planning of bathrooms and lavatory blocks in domestic and multi-storied buildings. Exercises can also be clubbed with design studio project.

Module 1 -6pds

Elements of public water supply system: Sources of water, water quality, pumping and transportation of water. Conventional water treatment sedimentation, coagulation, filtration and disinfection.

Module 2 -6pds

Distribution system, building service connections: cold and hot water distribution systems in buildings and their design, direct and indirect systems, special installation in multistoried buildings. Types of fixtures and materials- wash basins, water closets, urinals, bidets, sinks etc. storage reservoirs. Conditions of flow in building supply & drainage pipes.

Module 3 -12pds

Traps and vents; Design of drainage and vent pipes, system for low-rise and high-rise buildings, storm water drainage, design of storm drains, building drains, sewers, gully traps, inspection chambers, manholes, connection to public sewer. Waste-water disposal systems, septic tank, soak pits and anaerobic filters, on-site processing and disposal methods. Solid wastes collection and removal from buildings. Reciprocating, Centrifugal, Deep well, Submersible, Automatic pumps, Sewerage pumps, Compressors,

Module 4 -12 pds

Vacuum pump – their selection, installation and maintenance – Hot water boilers –

Social features required for physically handicapped and elderly –Laboratory Service – Gas, water, Air and Electricity.

#### REFERENCE

1. Water Supply and Sanitary Engineering – S.K.Hussain
2. Water Supply and Sanitary Engineering – S.C. Rangwala

### **HISTORY OF ARCHITECTURE - V (ARCH 504)**

**Credit**

**3**

**Contact Periods per week**

**3 lecture pds**

**Semester Exam**

**3 hrs**

#### OBJECTIVE:

To provide an understanding and appreciation of Contemporary trends in Indian and Western Architecture in terms of Ideas and directions through the works of outstanding architects.

#### METHODOLOGY:

Lectures and presentations

Module 1 - 12 pds

Reasons for the evolution of Modern Architecture, origins-Neo Classicism-Enlightenment, Social revolutions, Historiography, Revivalism-Works of Soane, Ledoux, Boulee Durrand & Schinkel. Industrial revolution and its impact – Emergence of new building typologies-New Materials and Technologies : history of steel ,glass and concrete

Module 2 - 16 pds

Arts & Crafts movement in Europe and America; Art nouveau, and the works of Horta, Guimard, Gaudi and Macintosh; Organic Architecture -Early works of F.L.Wright. Chicago school; Art deco Architecture in Europe and America.

Module 3 - 20 pds

Viennese secession, Adolph Loos and debates on ornamentation ; Futurism, Expressionism works of Mendelssohn & Taut, Cubism, Constructivism, De stijl and their influence on Architecture. Bauhaus school & Walter Gropius, Modernism and the International style.

#### REFERENCE

1. Space, time and Architecture- Sigfried Giedion

2. Modern Architecture- Vincent Scully Jr
3. After the masters (Contemporary Architecture of India)- Vikram Bhatt and Peter Sciver
4. Modern Architecture- Kenneth Frampton
5. Library of Contemporary Architects.

### **MATERIALS AND CONSTRUCTION -- V (ARCH 505)**

<b>Credit</b>	<b>3</b>
<b>Contact Periods per week</b>	<b>3 lecture pds</b>
<b>Semester Exam</b>	<b>3 hrs</b>

#### OBJECTIVE

To acquaint the students with constructional practices pertaining to partitions, wall panelling and roofing materials including false ceilings, etc., modern and advanced construction materials and practices.

#### METHODOLOGY:

1. Lectures for understanding construction details.
2. Site visits and library studies regarding materials and construction methods.

Module-1 - Partitions and wall panelling 12 pds

Partitions: Construction of partition in masonry, timber and timber products, gypsum boards etc. for use in offices and restaurants. Construction and details of glazed, lightweight and soundproof partitions and soft paneling.

Module-2 - Roofing 12 pds

Roofing materials: Burnt clay tiles, slates, AC sheets, GI and Aluminium sheets. Materials for Terracing: Mud- phaska and Brick Tiles and other new systems for terracing. Suspended ceilings- purpose and construction techniques with various materials

Module-3 – Prefab systems 16 pds

Introduction of pre-stressing, prefabrication and systems building. Jointing, tolerances and modular coordination. production, transportation, storage and handling of materials. Characteristics, performances and application of mechanized construction equipments. Advanced construction techniques.

#### REFERENCE

1. McKay W.B., 2000 Building Construction, Orient Longman
2. Varghese P.C., 2005 Building Materials, Prentice' Hall of India Private Limited
3. Sharma S.K., 2000 A Text Book Of Building Construction, S.Chand & Company Limited
4. Kumar Sushil, 2000 Building Construction, Standard Publishers Distributors
5. Arora S.P., Bindra S.P., 2000 A Text Book Of Building Construction (Planning Techniques And Methods Of Construction), Dhanpat Rai Publications
6. Duggal S.K., 2003, Building Materials, New Age International Publishers

### **SURVEYING (ARCH 506)**

<b>Credit</b>	<b>3</b>
<b>Contact Periods per week</b>	<b>2 lecture pds+1 tut pd</b>
<b>Semester Exam</b>	<b>3 hrs</b>

#### OBJECTIVE:

To illustrate the the various methods of Surveying and Leveling .

**METHODOLOGY :**

Lectures and presentations

Module 1

- 6 pds

Linear measurement and chain survey: use of various types of tape measurement etc of correct length of line, direction and indirect ranging, changing along sloping ground. Obstacles in changing, errors, and their elimination

Module 2

-15 pds

Compass surveying: Use of prismatic compass, temporary adjustment, bearing of a line, local attractions, correction of bearing.

Plane table surveying : Methods of plane table, radiations. Intersections , traversing and resection. 2-point and 3-point problem, adjustment and common error in plane table survey.

Module 3

-15 pds

Levelling: Use of dumpy level and leveling staff. Temporary and Permanent adjustments of dumpy level. Reduction of levels by H.I and rise and fall method. Curvature and refraction error, sensitiveness of level tube, reciprocal leveling, leveling difficulties and common errors.

Contouring: Contour interval and horizontal equivalent . Characteristics of contours, methods of contouring - direct and indirect method, contour gradient.

Theodolite Survey: Use of theodilite, temporary adjustment, measuring horizontal and vertical angles, theodilite traversing or measurement of included angles

**REFERENCE:**

1. Surveying and levelling Vol - 1, T. P. Kanetkar and S. V. Kulkarni
2. Surveying - Vol - I, B. C. Punmia

## **ARCHITECTURAL DESIGN V(ARCH 581)**

**Credit**

**7**

**Contact Periods per week**

**9 prac pd**

**OBJECTIVE:**

To focus on the integration of land and building and environmental characteristics and develop an architectural form in the process.

**METHODOLOGY :**

Audio/video presentations, case studies and work Studio with viva voce at the end of semester

Module 1

- 24 pds

Studies will deal with the dwelling environments of a small community . Analysis of space- requirement matrix, evolution and use of bubble diagrams and Interpretation of climatic data to formulate design approaches.

Module 2

- 72 pds

Design of neighborhood centres, clubs, banks, post offices, hostels, lodge, small shopping complex, high schools, etc Design problem using modular approach on similar topics.

## **METHODS OF CONSTRUCTION IV(ARCH 582)**

**Credit**

**2**

**Contact Periods per week**

**3 prac pd**

OBJECTIVE:

To be able to read , comprehend and develop a properly labeled and dimensioned construction drawing.

METHODOLOGY :

Study Sheets and Drawing Works

Module 1

12 pds

Masonry Wall partitions & Timber partitions and panelling

Module 2

12 pds

Glazed partitions and panelling

Module 3

12 pds

Roof and suspended ceilings

## **COMPUTER GRAPHICS II(ARCH 583)**

**Credit**

**2**

**Contact Periods per week**

**3 prac pd**

OBJECTIVE:

To be able to read , comprehend and develop drawings using 3-D software and rendering software

METHODOLOGY :

Lectures and Computer Drawings with end semester viva-voce.

Module 1

6 pds

Modelling in 3D based software like 3D Max, Sketch-up

Module 2

6 pds

Rendering techniques in 3D mode. Photoshop rendering.

Module 2

24pds

Project work including interior spaces .

## **MATERIAL TESTING WORK SHOP(ARCH 584)**

**Credit**

**1**

**Contact Periods per week**

**2 prac pd**

OBJECTIVE:

To be able to conduct tests through laboratory equipment and gain further knowledge of materials.

## METHODOLOGY :

Lectures and lab works with end semester viva-voce.

### Module 1

14 pds

1. Tests on Bricks- density and crushing strength
2. Tests on cement – specific gravity, fineness, soundness, normal consistency, setting time, compressive strength on cement mortar cubes
3. Tests on fine aggregate – specific gravity, bulking, sieve analysis, fineness modulus, moisture content , bulk density and deleterious materials.
4. Tests on coarse aggregate - specific gravity, sieve analysis, fineness modulus, bulk density.

### Module 2

22 pds.

1. Tests on reinforcements – elasticity and tensile ability
2. Tests on Fresh Concrete: Workability : Slump, Vee-Bee, Compaction factor tests
3. Hardened Concrete: Compressive strength on Cubes, Split tensile strength, Static modulus of elasticity, Flexure tests , Non destructive testing (Rebound hammer & Ultrasonic pulse velocity)
4. Mix Design of Concrete.

## STRUCTURES IV(ARCH 601)

<b>Credit</b>	<b>3</b>
<b>Contact Periods per week</b>	<b>3 lecture + 1 Tut pds</b>
<b>Semester Exam</b>	<b>3 hrs</b>

### OBJECTIVE:

To understand the basic principles theories and calculations related to behavior of concrete structures.

### METHODOLOGY:

Lectures and computation exercises

Module 1	9 pds
Steel structures: Permissible stresses; Design of truss members; Simple riveted and welded connections including beam-end connections	
Module 2	12 pds
Built-up beams and columns: Design of base-plate, gusset plate and concrete footings for steel columns, Grillage foundation.	
Module 3	16 pds
Design of M.S. plate girders and compound columns.	

### REFERENCE

1. N.Subramanian, 2008, Design of Steel Structures, Oxford University Press
2. Limit state design of steel structures by S. K. Duggal
3. Dowling P.J., P.Knowles and G.W.Owens, 1988, Structural steel Design, The Steel Construction Institute and Butterworths, London.
4. Vinnakota. S, 2006, Steel Structures: Behaviour of LRFD, McGraw– Hill Higher Education, New York
5. Narayanan.R, Plate girders, steel Designer's Manual [Fifth Edition] The Steel construction Institute, UK (1992 2)
6. IS 800 – 2007, General construction in steel – code of practice 3)
7. IS 813 – 1986, Scheme of symbols for welding 4)

## BUILDING SERVICES II(ARCH 602)

<b>Credit</b>	<b>3</b>
<b>Contact Periods per week</b>	<b>2 lecture pds+1 tut pd</b>
<b>Semester Exam</b>	<b>3 hrs</b>

### OBJECTIVE:

To impart knowledge and skills related to electrical services and fire-protection systems and its integration



into Architectural design

**METHODOLOGY:**

Lectures & Exercises in layout of house wiring, fire prevention installations and fixture layout systems for small buildings and multi-storied buildings. Exercises can also be clubbed with design studio project.

Module 1	-6 pds
Sources of energy; General structure of electrical power systems, Fundamentals of electricity, current, voltage, Power transmission and distribution via overhead lines and underground cables, Steam, Hydel, Gas and Nuclear power generation ,cities and house hold connections;	
Module 2	-9 pds
Elements of building wiring system – feeders, panel board, circuit breakers' fuses, switches etc.; Electrical symbols; Installations from meter board to individual point; Electrical wiring system; Distribution boards and layout of points; Different materials and specification; Earthing agreements; Lightning conductors;	
Module 3	- 6 pds
Fixtures and accessories used in electrical installation; Schematic layout of installations and points for different building types	
Module 4 (Fire fighting)	-15 pds
Causes and spread of fire. Combustibility of materials and safety norms. Study of fire regulations, Fire detection and fire fighting equipment- smoke detectors, monitoring devices, alarm systems. Etc. Design of Fire escapes for high-rise buildings, case studies of building from fire protection requirements	

**REFERENCE**

1. Electrical Technology - H. Cotton
2. Electrical wiring, Estimating & Costing) - L. Uppal

**HISTORY OF ARCHITECTURE – VI (ARCH 603)**

<b>Credit</b>	<b>3</b>
<b>Contact Periods per week</b>	<b>3 lecture pds</b>
<b>Semester Exam</b>	<b>3 hrs</b>

**OBJECTIVE:**

To inculcate in students ,a critical and analytical approach, in understanding contemporary works of Architecture.

**METHODOLOGY:**

Lectures and presentations, seminar presentation by students

Module 1	- 16 pds
Criticisms of Modern Architecture; Post Modernism, Collage, Technology and new science., Pop art Deconstruction, Critical Regionalism with examples from works of 2nd & 3rd generation architects.	
Module 2	-16 pds
Corbusier' works in India – Chandigargh and the Ahamedabad buildings - their influence on the modern rationalists; Louis Kahn's works in India - their influence on the empiricists; Post-Nehruvian modernist architecture – modernism, utilitarian modernism and neo-modernism, brutalism.	
Module 3	- 16 pds
Criticisms on the modern movement in India; countering the stigma of colonialism; Critical regionalism	

and the neo-vernacular; the community architectural movement; integrating the new and the old; revivalism in religious and secular buildings; revivalism and post-modernism.

#### REFERENCE BOOKS

1. Kenneth Frampton, Modern Architecture: A Critical History, Thames and Hudson, London.
2. Sigfried Giedion, Space time and Architecture: The Growth of a New tradition, Harvard University Press.
3. Manfredo Taferi / Francesco Dal Co, Modern Architecture, Faber and Faber/ Electa, 1980.
4. Lang, Desai, Desai – Architecture & Independence, Oxford University Press, New Delhi.
5. Sarbjit Bahga et al, Modern Architecture in India, Galgotia Publishing Company, New Delhi.
6. Vikram Bhatt and Peter Scriver, Contemporary Indian Architecture: After the Masters, Mapin, Ahmedabad.
7. W.J.Curtis , Modern architecture Since 1900, Paidon Press Ltd, Oxford, 1982.

### **ADVANCED MATERIALS(ARCH 604)**

**Credit**

**3**

**Contact Periods per week**

**3 lecture pds**

**Semester Exam**

**3 hrs**

#### OBJECTIVE:

To acquaint students with use of appropriate material and methodologies to be adopted for advanced construction practises.

#### METHODOLOGY:

Lectures and presentations

#### Module 1

- 6 pds

Contextual relevance- what are buildings made of  
Natural and artificial materials- where they are used.

#### Module 2

- 6 pds

Introduction to cost effective and environmentally friendly building materials such as Stabilized mud blocks, course on vernacular approach

#### Module 3

- 12 pds

PVC & FRP, frameless glass doors and windows and partitions. Wooden/Steel/Aluminium sliding and folding doors and partitions. Steel doors for garages and workshops. Collapsible gate and rolling shutters, remote control systems of doors and gates. Structural glazing, aluminium composite panel cladding.

#### Module 4

-12 pds

Insulation materials – Thermal and sound insulation materials. Glass – its manufacture in its various types like plate, tinted, decorative, reinforced, laminated glass block, fibre glass, glass murals, partially coloured glass, etching of glass and its applications in building industry for both exteriors and interiors. Glass fabrication techniques, fibre reinforced composite materials and products.

#### REFERENCE

- 1) "Construction Technology" by Chudley
- 2) "Construction of Buildings" by Barry

## LANDSCAPE DESIGN (ARCH 605)

<b>Credit</b>	<b>4</b>
<b>Contact Periods per week</b>	<b>3 lecture pds+1 tut pd</b>
<b>Semester Exam</b>	<b>3 hrs</b>

### OBJECTIVE:

Introduction to the role of landscape elements in architectural design. Impacts of landscape elements on environment.

### METHODOLOGY:

Lectures and presentations, creative exercises on landscape design, field study on vegetation types

Module 1 - 6 pds

Introduction to landscape architecture; role of landscape design in architecture; ecology , concept of ecosystem , ecological balance, environmental degradation and deterioration of natural resources,

Module 2 - 15 pds

Landscape and garden design in history - French, English, Japanese, Renaissance and Moghul . Study of notable examples.

Hard and soft landscape elements, Plant materials, classification, characteristics, use and application in landscape design; Water and Landform. Introduction to Landscaping materials

Module 3 - 15 pds

Significance of landscape in urban areas; road landscaping; waterfront development, landscaping of residential areas , Industrial landscaping .

Basic principles of planting design; Spatial development in landscape design; Study of landscape design of any small project including paving and street furniture design

### REFERENCE

1. An Introduction to Landscape Architecture - Michael Laurie, Elsevier, 1986.
2. The Landscape of Man - Geoffrey And Susan Jellicoe, Thames And Hudson, 1987.

## ARCHITECTURAL DESIGN VI (ARCH 681)

<b>Credit</b>	<b>6</b>
<b>Contact Periods per week</b>	<b>9 prac pd</b>

### OBJECTIVE:

To emphasise the role of construction in evolving expression.To focus on design detail as vital part of architectural expression. To integrate building systems , clarity and effective communication in the production of legible drawings.

### METHODOLOGY :

Intense interactive sessions and Studio work and viva voce at the end of semester.

Module 1 - 24 pds  
Case studies on design project, development of design methodology for Design of high rise residential and institutional buildings, integrating architecture, structural form and systems and building services along with site services.

Module 2 - 72 pds  
Design of multiple tenement structures, art and crafts centres, orphanages & old age homes in urban areas, etc.  
Critical analysis and presentation of existing community / public building

### **WORKING DRAWING (ARCH 682)**

**Credit** 4  
**Contact Periods per week** 5 prac pds

**OBJECTIVE :**

Reading and execution of working drawing, their co-relation and cross-referencing in various technical projections like plans, elevations, sections, detailing etc.

**METHODOGY :**

Lectures and studio work

Module 1 15 pds  
Producing drawings for approval of local authorities such as CMDA, Municipality etc, for a Load Bearing Residential unit with ground and upper floors.

Module 2 25 pds  
Complete set of working drawings for the regular class design project or any institute / public building of R.C.C. framed structure with part/full basement, ground floor and first floor with lift/elevator including interior detail drawings like cabin / Board room, Toilet details etc..

### **SURVEY FIELD WORK (ARCH 683)**

**Credit** 2  
**Contact Periods per week** 3 prac pds

**OBJECTIVE :**

To familiarize students with survey purpose and equipments

**METHODOGY :**

Field work and report writing

Module 1 -15 pds  
Use of dumpy level and fly leveling.  
Longitudinal Section and Cross Section.

Contouring.

Module 2 -21 pds  
Measurement of horizontal and vertical angle of theodolite.  
Traversing by theodolite by measurement of included angles.

### **EDUCATIONAL TOUR (ARCH 684)**

**Credit** 1  
**Contact Periods per week** 2 prac pd

A visit to a place / places of Minimum for a min of 10 days to a max of 12 days

A detail tour programme should be prepared specifying the site of architectural interest to be visited. A detail measured drawing of one famous building should be prepared as a Group work. A teacher must accompany the students and assign specific jobs of the measure drawing to a specific Group in a balanced way. Performance of each student shall be evaluated by his actual participation in the site of measured drawing, preparation of the final drawings and presentation.

### **STRUCTURE IN ARCHITECTURE(ARCH 701)**

**Credit**

**3**

**Contact Periods per week**

**2 lecture pds+1 tut pd**

**Semester Exam**

**3 hrs**

**OBJECTIVE:**

To understand the modern trends and challenges in building structural systems.

**METHODOLOGY:**

Lectures by the experts in the field will be arranged to make the students to understand advance structure techniques available for construction of complex structures.

Module1

- 12 pds

Theory of Domes, Shells ,Vaults , Space Frame, Flat Slabs, Hollow Floor. & Folded Plates.

(Following systems and techniques are to be understood conceptually. Calculations /

Design for these techniques and systems are not expected.)

Synthesis of force systems to create Structural system.

Module 2

- 12 pds

Vector Active, Surface Active and Bulk Active systems.

Portal Frame, Cables and Suspension Structures.

Module 3

- 12 pds

Structure System for Seismic Zone

Inflatable Structures

**REFERENCE**

1. Wolfgang Schuller- High Rise Building Structures, John Wiley & Sons; New York1976.
2. Frei Otto; Tensile Structures ; Vol-II, Pneumatic Structures, Cable Structures: The MIT Press London.
3. N.Subramaniam; Principles of Space Structures: Wheeler& Co.; Allahabad 1983.

### **BUILDING SERVICES III (ARCH 702)**

**Credit**

**3**

**Contact Periods per week**

**2 lecture pds+1 tut pd**

**Semester Exam**

**3 hrs**

**OBJECTIVES:**

To understand the schematic layout of simple air conditioning system for domestic and office buildings.

Understanding of operations and use of lifts and escalators.

**METHODOLOGY:**

Lectures & Exercises in principles and layout of Air-conditioning systems and mechanical transportation systems in multi-storied buildings. Exercises can also be clubbed with design studio project

Module 1(Principles of air conditioning)	-9 pds
Thermodynamics, Fluid flow, Heat Transfer Psychrometric chart, comfort zone. Selection of indoor and outdoor design conditions Cooling and heating load calculations; Air conditioning systems, evaporative, winter and all-year air conditioning systems,	
Module 2	-6 pds
Refrigeration cycle and air cycle. Standards and prescribed locations for various parts. Descriptive details of plants and duct layout. Air distribution system- fans, filters, ductwork, outlets, dampers.	
Module 3	- 9 pds
Natural and artificial ventilation. Cooling load for AC. Application to a selected project, and case analysis of selected project	
Module 4(Lifts)	- 12 pds
Types of lifts, their control and operation. Definition of average lift carrying capacity, rated load, rated speed, RTT etc. Details of lift section, machine room, equipment, lift well and lift pit. Design standards for lifts lobby, lift cars size etc from building codes. Escalators and conveyors	

#### REFERENCE

1. Principles of Refrigeration' - Roy J Dosat
2. 'Air Conditioning and Refrigeration Data Hand book' - Manohar Prasad
3. 'Refrigeration and Air Conditioning' - Don Kundwar

### **THEORY OF ARCHITECTURE (ARCH 703)**

<b>Credit</b>	<b>3</b>
<b>Contact Periods per week</b>	<b>2 lecture pds+1 tut pd</b>
<b>Semester Exam</b>	<b>3 hrs</b>

#### OBJECTIVE:

To acquaint the students with the basic aesthetic principles involved in architectural design.

#### METHODOLOGY:

Lectures & Exercises in principles of design and theories from various ages. Extensive reading, discussions and Seminar presentations .

Module 1	-9 pds
Definition of architecture- elements of architecture - Space defining elements , openings in space defining elements, spatial relationship, spatial organization Primary forms, properties of form, transformation of forms - dimensional transformation, subtractive, additive forms, organization of additive forms - Articulation of forms	
Module 2	- 9 pds
Components of building circulation - The building approach, The building entrance, Configuration of path, Path space relationship, Form of circulation space -Circulation diagram for residence and restaurant	
Module 3	- 18 pds

Design process –integration of aesthetics and function - Understanding of formative ideas, organization concepts, spatial characteristics, - Massing and circulation in design analysis of the following buildings: Falling water house, & Guggenheim museum by F . L.Wright -Villa Savoye & Chapel of Notredame Du Haut by le Corbusier.

## REFERENCE

1. Francis D. K. Ching, Architecture - Form, Space and Order, Van Nostrand Reinhold Company , 1979
2. Roger H. Clark, Michael Pause, Precedents In Architecture, Van Nostrand Reinhold Company , 1996
3. K.W.Smithies, Principles of Design in Architecture, Van Nostrand Reinhold Company , 1981
4. Sam F. Miller, Design Process - A Primer For Architectural & Interior Design, Van Nostrand Reinhold Company , 1995
1. Ernest Burden, Elements of Architectural Design – A Visual Resource, Van Nostrand Reinhold Company , 1994

## **SPECIFICATION, ESTIMATION & VALUATION (ARCH 704)**

**Credit**

**3**

**Contact Periods per week**

**2 lecture pds+1 tut pd**

**Semester Exam**

**3 hrs**

### OBJECTIVE:

To equip students with the necessary technical knowledge for calculating estimates and detailed costing for small to medium scale projects.

### METHODOLOGY:

Lectures and computation exercises

#### Module 1

- 6 pds

Specification - Definition, purpose, procedure for writing specifications for the purpose of calling tenders, types of specification. General specifications for all types of buildings.

#### Module 2

-9 pds

Specifications for the following items – Bricks; sand; cement; coarse aggregate; water; reinforcement; storing and handling of materials; Earth work in foundation; PCC; RCC; First class brick work in cement mortar; half brick thick partition in cement mortar; reinforced brick work; DPC; glazed tiles in skirting and dadoo; cement plaster; joinery in wood, steel & aluminum; painting to walls – cement paint, oil bound distemper, acrylic emulsion, enamel paint ; painting to joinery ; varnishing ; French polishing ;

#### Module 3

- 12 pds

Estimation – definition; purpose; types of estimate; various methods of approximate estimate of buildings.

Rate analysis – definition; method of preparation; quantity and labour estimate for unit work; task or outturn work; rate analysis for: earth work, concrete works, first class brick work, reinforced brick work, cement plastering, DPC with cement mortar/ concrete, finishing (cement paint, distemper, acrylic emulsion, enamel paint) to walls & ceiling.

Detailed estimate – data required, factors to be considered, methodology of preparation, abstract of estimate, contingencies, work-charged establishment, bill of quantities, different methods for estimating building works, methods of measurement of works.

Module 4 - 9 pds  
 Valuation – purpose of valuation, types of valuation- book value – salvage value- scrap value- depreciation- obsolescence- sinking fund- land valuation- mortgage and lease- problems on valuation- Annuity- definition, Fixation of rent- out going- gross and net income – year's purchase- capital cost-standard rent- market rent- Economical rent  
 Easements & Arbitration -Definition, types of Easements, acquisition, protection and extinction of easements – Need for Arbitration, arbitration agreement, role of arbitrators, umpire etc, excepted matters, arbitral award.

REFERENCE

1. M. Chakraborti, . Estimation, Costing, Specification and Valuation in Civil engineering

**ARCHITECTURAL ILLUMINATION (ARCH 705)**

**Credit** 3  
**Contact Periods per week** 2 lecture pds+1 tut pd  
**Semester Exam** 3 hrs

OBJECTIVE:

To introduce students to illumination studies and to sensitize them with respect to their integration into Architectural Design.

METHODOLOGY:

Extensive presentations and site visits and incorporating ideas in design projects.

Module 1 - 6 pds

Light and its propagation, reflection, radiation, transmission and absorption. Definitions and units of flux, solid angles, luminous intensity, brightness

Module 2 - 6 pds

Visual tasks - factors affecting visual tasks - Modern theory of light and colour - Synthesis of light - Additive and subtractive synthesis of colour.

The laws of illumination, different type of lamps and their properties,

Module 3 - 12 pds

Criteria and Standards of illumination for different activity areas. Design calculation of interior lighting, Illumination for sports and recreational facilities, choice of luminaire.

Tests before commissioning of electrical services

Module 4 - 12 pds

Study of interior lighting - Different types of lighting their effects types of lighting fixtures.

REFERENCE

1. Derek Philips; Lighting in Architectural Design.
2. G.K.Lal, Elements of Lighting, 3-D Publishers.
3. R.G. Hopkinson and J.D.Kay, The lighting of buildings, Faber and Faber, London, 1969.

**URBAN PLANNING & HUMAN SETTLEMENTS (ARCH 706)**

**Credit** 3



**Contact Periods per week**  
**Semester Exam**

**2 lecture pds + 1 tut pd**  
**3 hrs**

**OBJECTIVE:**

To give an introduction to Human Settlements Planning and to develop skills for carrying out surveys, analysis, presentation with respect to problems faced in order to improve them.

**METHODOLOGY:**

Lectures and seminar presentations.

Module 1 - 12 pds

Man and Environment, Biological and behavioral responses to human settlements.

History of human settlements. , Role of River Banks in growth of human settlement.

Western world: River valley settlements, Greek, Roman, Medieval, Renaissance and modern.

Module 2 - 12 pds

Indus valley civilization - Mohenjodaro, Harappa, Extracts from Chanakya's Arthashastra, Manasara's

Vastushastra, planning thought behind Fatehpur sikhri, Shahjahanabad, Jaipur and Delhi

Studies of selected examples to include concentric city, radiant city, CIAM, linear industrial city and

Contemporary India Cities

Module 3 - 12 pds

Definitions of town planning, levels of planning and steps for preparation of a town plan, survey techniques in Planning, concepts, functions, components and preparation of a development plan.

Planning concepts related to garden city, Geddesian triad, neighbourhood planning, Radburn layout, ekistics, Satellite towns and ribbon development.

Concepts in Regional and Metropolitan planning, land subdivision regulations and zoning, nature of Regulations and control, the comprehensive role of urban design in town planning process.

**REFERENCE BOOKS**

1. Text book of Town Planning, A.Bandopadhyay, Books and Allied, Calcutta 2000
2. John Ratcliffe, An Introduction to Town and Country Planning, Hutchinson 1981
3. Arthur B. Gallion and Simon Eisner, The Urban Pattern – City planning and Design, Van Nostrand Reinhold company
4. Rangwala, Town Planning, Charotar publishing house
5. G.K.Hiraskar, Town Planning
6. Rame Gowda, Urban and Regional planning

**ARCHITECTURAL DESIGN VII (ARCH 781)**

**Credit**  
**Contact Periods per week**

**9**  
**12 prac pd**

**OBJECTIVE:**

To familiarize students to interpretations of climatic data to formulate design approaches and consider social aspects along with structural considerations and building services. Application and use of relevant building bye-laws and provisions of National Building Code .Estimation of areas and approximate cost

**METHODOLOGY:**

Studio work and viva voce at the end of semester

- Module 1 - 30 pds  
Case studies to focus on developing an understanding of complex issues related to urban settings through projects varying from urban inserts, urban housing and institutional design. Students are exposed to multiple design methods and are expected to propose innovative yet contextual response to the given conditions.
- Module 2 - 108 pds  
Design of regional hubs like shopping malls, sub divisional hospitals, auditoria, community housing, etc

**INTERIOR DESIGN (ARCH 782)**

**Credit**

**3**

**Contact Periods per week**

**6 prac pds**

**OBJECTIVE:**

To introduce the students to the discipline of Interior Design and to develop basic skills required for handling simple interior design projects

**METHODOGY :**

Studio exercises supplemented with workshops and site-visits.

- Module 1 - 15 pds  
Design exercises with simple spatial layouts of furniture and utilities in buildings.
- Module 2 - 30 pds  
Study of furniture and ergonomics. Design exercises related to graphical compositions in wall, flooring, furniture and ceiling details, etc Incorporating ideas through drawings and workshop modelling
- Module 3 - 45 pds  
Design project incorporating all details including illumination , wall paneling and air conditioning feature

## **ENERGY EFFICIENT ARCHITECTURE(ARCH 801)**

<b>Credit</b>	<b>3</b>
<b>Contact Periods per week</b>	<b>2 lecture pds + 1 tut pd</b>
<b>Semester Exam</b>	<b>3 hrs</b>

### OBJECTIVE:

To Introduce students to how energy conscious architecture can be adopted as an alternative in today's perspective.

### METHODOGY:

Intensive lecture-presentations, special lectures by experts from various professions

Module 1 - 12 pds

Solar System and Earth - Renewable Sources of Energy - Global Climates and Architecture in Historic Perspective

Heating & cooling loads – Energy estimates - Energy conservation – Efficient day lighting – Solar Water heating system. Exercises on heating and cooling load calculations in buildings.

Module 2 - 12 pds

Land form & orientation – Vegetation & Pattern – Water Bodies – Open Space & Built form - Plan form & Elements – Roof form – Fenestration pattern & Configuration – Building envelope & finishes.

Module 3 - 12 pds

Contemporary Trends - Sustainability and Architecture, green buildings and its features, ratings and Success stories

### REFERENCE

1. Mili Majunder, Teri – Energy – Efficient Bldg in India – Thomson Press , New Delhi – 2001
2. J.K Nayak & Others , Energy Systems Energy Group,- Isa Annal Of Passive Solar Architecture.
3. Arvind Krishnan & Others – Climate Responsive Architecture, Tata Mcgraw –Hill New Delhi 2001.
4. James D. Ritchie – Successful Alternate Energy Methods – Structures Publishing Co . Michigan 1980.

## **PROFESSIONAL PRACTICE (ARCH 802)**

<b>Credit</b>	<b>3</b>
<b>Contact Periods per week</b>	<b>2 lecture pds + 1 tut pd</b>
<b>Semester Exam</b>	<b>3 hrs</b>

**OBJECTIVE:**

To understand the professional responsibilities and liabilities of an Architect within the ambit of laws of the land, building codes, contract documents and ethics.

**METHODOGY :**

Intensive lecture-presentations, interactive sessions with professional Architects

Module 1 - 12 pds

Architect's role in society, IIA code of conduct, salient features of architect's act 1972, the council of architecture – Management of an architects office, elementary accountancy required for the same etc. Architectural services- conditions of agreement- scope of work, comprehensive architectural services and architectural competitions, conditions of engagement, remuneration, professional fees and charges as per IIA norms. Regulations governing the conduct of competitions, open & closed competitions, appointment & duties of Assessors, instructions to participants, award of premium.

Module 2 - 12 pds

Role of development authorities & urban arts commissions, Environmental acts & laws, special rules governing hill area development & coastal area management, heritage act of India etc.

Module 3 - 12 pds

Calling for Tenders, tender documents, open & closed tenders, various types such as item rate, lump sum, labour & demolition tenders, conditions of tender, submission, scrutiny, recommendations & award of contract. Conditions of contract, IIA form of contract, articles of agreement, certification of contractors bills, defects liability .

**BLDG. ECONOMICS & CONST. MANAGEMENT (ARCH 803)**

<b>Credit</b>	<b>3</b>
<b>Contact Periods per week</b>	<b>2 lecture pds + 1 tut pd</b>
<b>Semester Exam</b>	<b>3 hr</b>

**OBJECTIVE:**

To provide an insight into Economics and it's influence on the business of Architecture and management of Construction Projects involving management of money, manpower, machinery and time.

**METHODOGY:**

Intensive lecture-presentations, interactive sessions with professional Managers.

Module 1 - 9 pds

Elements of Economics: An idea of fundamental concepts of economics Science and their application in Construction industry. Micro Economics: Factor of production-Characteristics and importance, demand supply analysis, competitive market and determination. Macro Economics: National income and its distribution, inequalities of income distribution, its causes and measures,

Module 2 - 9 pds

Project planning and project scheduling and project controlling, Role of Decision in project management, Method of planning and programming, Human aspects of project management, work breakdown structure, Life cycle of a project, disadvantages of traditional management system

Module 3 - 18 pds

Event, activity, dummy, network rules, graphical guidelines for network, numbering of events. CPM network analysis & PERT time estimates, time computation & network analysis  
 Project cost, Indirect project cost, direct project cost, slope of the direct cost curve, Total project cost and optimum duration, contracting the network for cost optimization, steps in cost-time optimization

#### REFERENCE

1. Project planning and control with PERT and CPM - Dr. B.C.Punmia et al. Laxmi Publications, New Delhi
2. Project Management for Architect's and Civil Engineers- , S.P.Mukhopadyay, IIT, Kharagpur, 1974
3. A Management Guide to PERT, CPM, - Jerome D.Wiest and Ferdinand K.Levy, Prentice Hall of India Pub,

### **HOUSING & COMMUNITY PLANNING (ARCH 804)**

<b>Credit</b>	<b>3</b>
<b>Contact Periods per week</b>	<b>2 lecture pds + 1 tut pd</b>
<b>Semester Exam</b>	<b>3 hrs</b>

#### OBJECTIVE:

To understand the fundamentals of housing design

#### METHODOGY:

Lecture-presentations, interactive sessions, site survey and data assimilation

Module 1 - 6 pds

Review of different forms of housing globally – particularly with reference to third world countries.  
 Housing need & Demand – Calculation of future need. Housing resources and options available in housing  
 Housing Agencies and their contributions to housing development – HUDCO, State Housing Boards, Housing  
 Co-operatives and Banks. Housing Policies in India and other countries like UK & USA.

Module 2 - 12 pds

Social factors influencing Housing Design, affordability, economic factors and housing concepts – Slum  
 upgrading and sites and services schemes. Different types of Housing standards – Methodology of formulating  
 standards – Relevance of standards in Housing Development.

Module 3 - 18 pds

Different stages in project development – Layout design including utilities and common facilities – Housing  
 design as a result of environmental aspects, development of technology and community interests.  
 Case studies of Public Sector housing, Government housing, Private and Co-operative housing – their  
 Advantages and disadvantages.

#### REFERENCE

1. Babur Mumtaz and Patweikly, Urban Housing Strategies, Pitman Publishing, London, 1976.
2. Geoffrey K.Payne, Low Income Housing in the Development World, John Wiley and Sons, Chichester, 1984.
3. John F.C.Turner, Housing by people, Marison Boyars, London, 1976.
4. Martin Evans, Housing, Climate and Comfort, Architectural Press, London, 1980.
5. Forbes Davidson and Geoff Payne, Urban Projects Manual, Liverpool University

### **URBAN DESIGN (ARCH 805)**

**Credit** **3**  
**Contact Periods per week** **2 lecture pds + 1 tut pd**  
**Semester Exam** **3 hrs**

**OBJECTIVE :**

To familiarize students with the aspects of urban design and to provide introductory knowledge of urban design.

**METHODOGY :**

Lecture-presentations, interactive sessions , site survey and data assimilation

Module 1 -12 pds

Emergence of urban design as a discipline – Concepts and parameters of urban design  
Urban scale, Mass and Space; Understanding components of urban fabric ; Making a Visual survey;  
Understanding the various urban spaces in the city and their hierarchy- Spaces for residential, commercial,  
recreational and industrial use: Special focus on streets ;Expressive quality of built forms, spaces in public  
domain

Module 2 - 15 pds

A brief analysis of urban spaces in history – in the West ( Greek, Roman, Medieval and Renaissance towns)  
and the East ( Vedic, temple towns, medieval and Islamic towns ) ; Relevance of the historical concepts in the  
present context ; Critical analysis of some Indian cities

Module 3 - 9 pds

Understanding urban renewal and the need for it, Scope, challenge and Implementation methods; Public  
participation; Townscape policies and urban design guidelines for new developments- Case studies

**REFERENCE**

- 1.Town and Square - Paul Zucker
2. The Urban Pattern - Arthur B Gallion, CBS publishers
3. Indian mega city and economic reforms - A.K.Jain , Management publishing Company
4. Design of Cities – Edmund Bacon
5. Architecvture of Towns and Cities – P.D.Sprieregen

## **DISASTER RESISTANT ARCITECTURE(ARCH 806)**

**Credit** **3**  
**Contact Periods per week** **2 lecture pds + 1 tut pd**  
**Semester Exam** **3 hrs**

**OBJECTIVE:**

To provide awareness and introduction to earthquake resistant design of buildings.

**METHODOGY :**

Lecture-presentations, case studies and seminars.

Module 1 -6 pds

Introduction to disaster management: Different types of Environmental hazards  
& Disasters, Introduction to various different mitigation methods.Types of Disasters and its effect on  
architecture: Building Safety from natural Hazards: an introduction :Earthquake ,Floods,Landslides  
Cyclone effects: High winds, storm surge, cyclone safety aspects in buildings

Module 2 - 15 pds

Design aspects and considerations for various types of buildings, especially the residential, congregational and institutional buildings.

Elementary Seismology: Earthquake occurrence in the world, plate tectonics, faults, earthquake hazard maps of India and the states

Causes of earthquake, seismic waves, magnitude, intensity, epicenter and energy release, characteristics of strong earthquake, ground motions

Seismological instruments: Seismograph, Accelerograph, Seismoscope/Multi SAR

Module 3

-15 pds

Site planning, Building Forms and Architectural Design Concepts for Earthquake resistance and resistance against other natural disasters.

Emerging approaches in Disaster Management: Pre- disaster stage (preparedness), Emergency Stage, Post Disaster stage-Rehabilitation, Natural Disaster Reduction & Management, Disaster Management- An integrated approach for disaster preparedness -mitigation & awareness, Integrated Planning- Contingency management

Preparedness,

Monitoring Management,

REFERENCE:

1. Charles Janes (2002), Inviting Disaster: Lessons from the Edge of Technology, Harper Business

2. Levinson Jaye & Granot Helim(2002), Transportation Disaster Response handbook, Academy Press

3. Macdonald Roxana (2003), Introduction to Natural and Manmade Disasters and their Effects on Buildings, Architectural Book Publication Co

4. Manual of EQR, Non engineered construction, Indian Society of Earth Quake Technology, Roorkee.

## **ARCH. DESIGN VIII (ARCH 881)**

**Credit**

**9**

**Contact Periods per week**

**12 prac pd**

OBJECTIVE:

To allow students to formulate a individual and innovative approach to design. The focus of the course is on individual development and maturity, ability to bring together various determinants into an integral whole, within defined design positions.

METHODOLOGY :

Studio work and viva voce at the end of semester

Module 1

Case studies to focus on understanding the interrelated issues, influencing the plan of a complex of buildings, as well as, individual plan of each constituent building.

**Module 2**

- 140 pds

Design of office building complex, museum complex, resorts, convention centres, etc and detail drawings and estimate of the project

## THESIS PROGRAMMING (ARCH 882)

**Credit**

**3**

**Contact Periods per week**

**6 prac pd**

Module 1

24 pds

The work involves students to discuss with the faculty to identify an area of interest or specific types of buildings. This stage should end with a project proposal giving routine information on site, location, need, broad requirements and scale, analysis and synthesis of case studies. In addition, the proposal should clearly indicate the "project question" or an area (or areas) of interest.

Module 2

48 pds

Student shall present a seminar on the project topic which would include the following;

- a. Precedents of similar projects, either actual visit to such projects or through literature reviews
- b. Cultural, contextual, historical, technological, programmatic concerns of the project
- c. Prevalent or historical models of architectural approach to such projects and a critique of such models
- d. Site data analysis
- e. Aims and Objectives
- f. Project questions



## **PROFESSIONAL TRAINING(ARCH 981)**

**Credit**

**30**

**Contact Periods per week**

**40 prac pd**

Students are required to undergo compulsory internship training in the office of a competent practicing architect registered with the Council of Architecture or in the architectural wing/ department of a governmental, private or non-governmental voluntary organization; evaluation shall be through a report presentation using hard copy of the endorsed works undertaken in the office.

Students are required to choose any interesting completed project and trace its development from the early design concepts till the occupancy stage. The building should be assessed with respect to the building type, compliance to building regulations, indoor and outdoor spatial quality, functional, visual, structural, material, maintenance, eco friendliness, environmental, circulation, and service aspects for the performance and efficiency as part of post occupancy evaluation. Evaluation shall be through a report presentation .

Students are expected to gather from observation on site, activities involved in different stages of construction of a building project. They are required to record the methods used, sequence of activities, construction details, time involved at different stages etc., as observed from the site; evaluation shall be through a seminar presentation.

The student is expected to document at least twenty details that may include historical or contemporary details of any kind used in buildings, interiors, landscaping, services etc. The innovative details and observations should be documented and evaluated for the purpose intended and performance achieved; evaluation shall be through a report presentation.

On the assessment of the report of works rendered by the student during the training. The external Jury will award the marks for the practical training on the basis of Viva-voce examination of the student on the work rendered by the student during training.

## **ELECTIVES I,II,III**

### **OBJECTIVE:**

To expose students to related areas of architecture

### **METHODOGY :**

Lecture-presentations, case studies and seminars.

## **ADVANCED STRUCTURES (ELEC I ) (ARCH 1001)**

**Credit**

**3**

**Contact Periods per week**

**3 lecture pds**

**Semester Exam**

**3 hrs**

### **PRE STRESSED CONCRETE**

Introduction to pre stressed concrete – Pre stressed concrete materials – Methods of pre stressing - Analysis and approximate design of determinate beams - losses of prestressing - Comparison between RCC and pre stressed concrete.

### **TALL BUILDINGS**

Tall buildings structural systems – Rigid frames – Braced frames – Shear wall – Buildings – Wall frame buildings – Tubular buildings – Tube-in tube buildings – Outrigger braced system – Brief outline of their behaviour and their applicability for various heights of buildings.

### **SPECIAL STRUCTURES**

Definitions, Types – single, double & multilayered grids – two way & three way space grids, connectors, Grids – Domes - various forms - Geodesic domes.

### **SHELLS AND FOLDED PLATES**

Shells – Types – Classification as per BIS – Stress resultants – Relative merits and applicability. Folded plates – Types – Comparison with shells – Applicability. Arches – Basic concepts – Analysis of three hinged arches.

### **TENSILE STRUCTURES**

Suspended cable structures – types of cable network systems, shapes of cable suspended systems, examples of tensile membrane structures – types of pneumatic structures.

## **COST EFFECTIVE BUILDING TECHNOLOGY ( ELEC I) (ARCH 1001)**

<b>Credit</b>	<b>3</b>
<b>Contact Periods per week</b>	<b>3 lecture pds</b>
<b>Semester Exam</b>	<b>3 hrs</b>

Sustainable design strategies and approaches, Sustainable design innovation, Introduction to various cost effective materials and processes.

### **ENVIRONMENTAL & SOCIAL CONSIDERATIONS**

Eco-design. Socially responsible design, User-centered design, Design education and sustainability, Design ethics and sustainability.

Understanding water use/ demand, water conservation,

### **CASE STUDIES OF SUSTAINABLE BUILDINGS**

Introduction to the role of green building rating systems- Eg: LEED.. Study the architectural design of the following buildings in order to explore the use of green building materials, energy and water conservation, and creating safe, healthy indoor environments indian: Gurgaon Development Centre-Wipro Ltd. Gurgaon; Technopolis, Kolkata; Grundfos Pumps India Pvt Ltd, Chennai; Olympia Technology Park, Chennai; World Bank Chennai Building Chennai; Bpo Park At Chennai. others: the Chicago Center for Green Technology Chicago, USA; Green Operations Building White Rock, Canada. U.S. Courthouse, Orlando, USA.

### **REFERENCE**

1. Charles. J. Kibert, 'Sustainable Construction' John Wiley and sons Inc, USA.
2. N.D. Kaushika, Energy, Ecology and Environment, Capital Publishing Company, New Delhi

## **BUILDING MAINTENANCE ( ELEC I) (ARCH 1001)**

<b>Credit</b>	<b>3</b>
<b>Contact Periods per week</b>	<b>3 lecture pds</b>
<b>Semester Exam</b>	<b>3 hrs</b>

Sequence of construction of building. Name of different parts of building. Brick masonry – principles bonds construction . Tools & Equipments used.

Stone masonry , terms used, principles of construction & classification. Reinforcement Concrete work. Bonding and placing of reinforcement. Mixing, laying and consolidation of concrete. Finishing of RCC surface.

Types of ground floor and upper floor. Method of constructing granolithic, mosaic, brick tiles etc. floors. Application of lime and cement mortar. Plastering, stucco, lath etc. Special types of finishing.

Defects in plaster work & types of pointing.

Preparation of surface. Application of whitewash and colour washing. Types of paints. Process of painting on different surfaces. Dampness in building and damp proof course method of prevention of dampness in building.

RCC materials, form work, bars & constructive materials used; basic concepts of building maintenance management. Classification of maintenance types, Work order types, Planning and scheduling of maintenance works, Maintenance contract types, Organizing preventive maintenance activities, Maintenance contract documents

### **RETROFITTING ( ELEC I ) (ARCH 1001)**

<b>Credit</b>	<b>3</b>
<b>Contact Periods per week</b>	<b>3 lecture pds</b>
<b>Semester Exam</b>	<b>3 hrs</b>

Case studies related to various situations of retrofitting; preparing reconnaissance reports and evolving strategic planning for works; studies of as-built drawings to decide on modes of retrofitting, Work order types  
Study of repair materials and processes  
Shotcrete ,Epoxy resins ,Epoxy mortar, Gypsum cement mortar ,Micro-concrete  
Fibre-reinforced concrete ,techniques for strengthening; strengthening roof, walls, foundations

#### REFERENCES

1. A.G Mudhura Rao and D.S.Ramchandra Murthy "Appropriate Technology for Low cost housing." Oxford and IBH publishing Co-Private. Ltd. New Delhi 1999.
2. Technologies for Retrofitting of Existing Building and Structures to make them Earthquake Resistance. Sponsored by TIFAC - Department of Earthquake Engineering, ITT Roorkee 2003.
3. M.S. Mathews "Conservations Engineering" i n (Madras)-Universitat Karlsruhe (TH) 1998.

### **ADVANCED LANDSCAPE ( ELEC II)(ARCH 1002)**

<b>Credit</b>	<b>3</b>
<b>Contact Periods per week</b>	<b>4 prac pd</b>
<b>Semester Exam</b>	<b>end viva-voce</b>

Contemporary landscape design work/projects in India.  
Case studies of varied urban situations with typical different landscape characters in Chandigarh, Delhi and other urban regions, to analyze and assess their present landscape status by applying knowledge and techniques acquired as above.  
Landscape design proposal based on above mentioned analysis as class exercise.  
Expert lectures/workshops to be organized.

### **VERNACULAR ARCHITECTURE ( ELEC II ) (ARCH 1002)**

<b>Credit</b>	<b>3</b>
<b>Contact Periods per week</b>	<b>3 lecture pds</b>
<b>Semester Exam</b>	<b>3 hrs</b>

Approaches and concepts to the study of Vernacular architecture – Introduction to Kutcha architecture and Pucca architecture

Planning aspects, materials of construction, Constructional details & Settlement Planning of various regions  
Religious practices, beliefs, culture & climatic factors influencing the planning of the above.

#### REFERENCES

1. Traditional buildings of India, Ilay Cooper, Thames and Hudson Ltd., London
2. Architecture of the Indian desert, Kulbushan Jain & Meenakshi Jain, Aadi Centre, Ahmedabad

## ENVIRONMENTAL PLANNING ( ELEC II ) (ARCH 1002)

**Credit**

**3**

**Contact Periods per week**

**3 lecture pds**

**Semester Exam**

**3 hrs**

Man, biosphere, ecosystems, resource identification and its implications for development -soil, water, land, plants, animals, renewable energy and non renewable energy. Preparation and analysis of resource inventories.

#### ENVIRONMENTAL IMPACT ASSESSMENT

Methodologies and techniques

#### ENVIRONMENTAL LEGISLATION

Significance of law and its relationship to development, evolution of planning legislation. National environmental policy.

#### ENVIRONMENTAL & SOCIAL CONSIDERATIONS

Design for environment, Land use planning; smart growth and urban design; transportation policy and design; environmental site design; site assessment and selection; Brownfield redevelopment strategies and infill development, Eco-design. Socially responsible design, User-centered design, Design education and sustainability, Design ethics and sustainability.

#### ENERGY & WATER USAGE OPTIMIZATION

Optimizing Energy performance & Designing with renewable and alternative energy systems including solar power, wind, geothermal, low-impact hydroelectric, photovoltaic, biomass & biogas with a view to achieving energy efficiency. Understanding water use/ demand, water conservation, water quality and biological methods of wastewater treatment, use of recycled water and storm water drainage as they relate to the planning and design of urban communities and project sites. Planning and design for natural and impacted on-site water features. Fundamental water resources policy issues and hydrologic processes, as they apply to community planning and design situations.

#### REFERENCE

- 1.Sustainable design manual, Vols 1& 2, The energy and resource institute, New Delhi.
- 2.Charles. J. Kibert, 'Sustainable Construction' John Wiley and sons Inc, USA.
- 3.N.D. Kaushika, Energy, Ecology and Environment, Capital Publishing Company, New Delhi.
- 4.John Fernandez, Material Architecture, Architectural Press, UK.
- 5.Rodney Howes, Infrastructure for the built environment, Butterworth Heineman.
- 6.G.Tyler Miller JR, Living in the Environment, Ward

## **ARCHITECTURAL CONSERVATION ( ELEC II ) (ARCH 1002)**

<b>Credit</b>	<b>3</b>
<b>Contact Periods per week</b>	<b>3 lecture pds</b>
<b>Semester Exam</b>	<b>3 hr</b>

Definition of conservation, Need for conservational activities, brief study in India and abroad, Role of architect in conservation program.

Origin and evolution of conservational programs, survey and studies required - methodology and implementation.

Social, cultural, historical and economical values of Conservational projects, involvement of community.

Conflict and compatibility between conservation and development - the need to strike a balance

Case studies of conservation programs which are successful by government and non-governmental agencies.

Rules and regulation, administrative aspects, new concepts in conservation.

Documentation of a conservation project as class work

### **REFERENCE**

1. Bernard Fielden (INTACH), Guide to Conservation

2. Conservation of European Towns

3. Peter Marston – The book of the Conservation – Orion House, London

## **INTELLIGENT BUILDINGS ( ELEC III ) (ARCH 1003)**

<b>Credit</b>	<b>3</b>
<b>Contact Periods per week</b>	<b>3 lecture pds</b>
<b>Semester Exam</b>	<b>3 hr</b>

Introduction to Intelligent Buildings - definitions – building elements -

descriptions, definitions and components - historical overview - Energy and Intelligent Buildings - Energy consumption in buildings – micro climate – human comfort in buildings - energy conservation in buildings – active and passive systems - advanced building energy

management systems - Building Automation - Intelligent control of building components – automating building services

– system integration and optimization with building envelope

– communication systems and safety and security systems

- Performance Evaluation and Standards - Building performance evaluation and intelligent building standard

## **INDUSTRIAL ARCHITECTURE ( ELEC III ) (ARCH 1003)**

<b>Credit</b>	<b>3</b>
<b>Contact Periods per week</b>	<b>3 lecture pds</b>
<b>Semester Exam</b>	<b>3 hr</b>

Industrial Estates - requirements of factory act and codes – classification of industrial occupancy – patterns of industrial estates – integrated aspects of design – general requirements of different types of industries - history of factory buildings – functional planning of spaces - plant layout - flexibility of design and future expansion - Industrial Structures - steel structures and concrete structures – requirements of various finishing works - Environmental Design for Industries - aspects of external environments such as noise control regulations, pollution levels, sewage disposal and hygiene - factory and landscape – layout and organisation of industrial townships.

### **BARRIER FREE ENVIRONMENT AND DESIGN ( ELEC III ) ( ARCH 1003 )**

<b>Credit</b>	<b>3</b>
<b>Contact Periods per week</b>	<b>3 lecture pds</b>
<b>Semester Exam</b>	<b>3 hr</b>

Types of disabilities and its implications in Architecture, barrier free environment, access- provisions to facilities and amenities.

Special design considerations in residential buildings, congregational buildings like auditoriums, theatres, studios, transport terminals etc, Institutional buildings, outdoor appurtenances, garden – parks etc.

Study of norms set by Central Government.

### **GREEN BUILDINGS & SUSTAINABLE ARCHITECTURE ( ELEC III ) ( ARCH 1003 )**

<b>Credit</b>	<b>3</b>
<b>Contact Periods per week</b>	<b>3 lecture pds</b>
<b>Semester Exam</b>	<b>3 hrs</b>

#### **Module 1**

An understanding of sustainable site design analysis and assessment, importance of transportation planning, Interaction between a building, its occupants and the local climate, building operational systems and its impact on the microclimatic systems .

#### **Module 2**

Resources to assist in determining materials appropriateness, analytical process to evaluate materials for a project including understanding Life Cycle Analysis and Embodied Energy and considerations for structural materials selection, including advanced framing. Developing innovative ventilation system design strategies

Barriers and solutions to achieving good indoor air and acoustical comfort

Physical, psychological and financial benefits of daylight and view. Construction waste management including opportunities for deconstruction and reuse; Benefits of Building Information Modeling (BIM)

Studies on Building Operations and Maintenance Building Commission (Cx) and its critical importance to the performance of a building , Effective operations, maintenance and procurement

#### **Module 3**

To outline a project showcasing all of the above

## ARCHITETURAL THESIS (ARCH 1081)\*\*

**Credit**

**21**

**Contact Periods per week**

**25 prac pd**

### OBJECTIVE:

1. To demonstrate an ability to comprehend the nature of architectural problem and create a brief which sets the frame work for design
2. To demonstrate an advanced level design ability to convert the brief set forth earlier into a speculative proposition of design
3. To articulate and delineate the propositions of design into an architectural solution addressing all the dimensions

### METHODOGY :

Architectural Thesis can be of any scale and size (in terms of built areas) as long as the required rigour and depth is demonstrated by the student to merit consideration as a final project. It is expected that all genre of projects (study or design) would end in a design solution.

#### Module 1

100 pds

Documentation, which is part of this presentation, shall be taken as completion of "Case Study" part of the final requirement.

#### Module 2

100 pds

There shall be reviews to clarify the conceptual statements and assumptions of the students.

Students shall present a clearly articulated response to context, programme and users. Preliminary / Conceptual and development of architectural scheme shall be the end product of this stage.

#### Module 3

12 pds

This stage should consist of all the works which would be presented at the Viva-voce. Mode of presentation shall be tentative.

#### Module 4

100 pds

The final output shall include a Report, All Drawings, Study Models and Presentation Model.

The Report shall discuss the Programme, Site Analysis, Literature Review, Case Studies, Design Criteria, Concept and Detailed Design. Three copies of the report shall be submitted along with drawings and models.