

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

**Semester-I**

**LANGUAGE LAB. /TECHNICAL ENGLISH (ARCH 101)**

<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 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**

1. **Communication-** Def, Barriers to communication; verbal and non verbal, importance of body language.
2. **Reading Skills-** Skimming and scanning, Comprehension, Note Making, Summarization.
3. **Writing Skills-** a) Formal correspondence ( Letters to clients, C.V. writing, Job Application , email writing)  
b) Report Writing- Types & Style; Format.  
c) Thesis Writing
4. **Grammar & Vocabulary**

**MODULE -2      Speaking Skills**

**12 pds**

1. Group Discussions
2. Presentation Skills- Oral & Power Point
3. Extempore Speaking

**REFERENCE:**

1. Communicative English for Engineers and Professionals – Nitin & Mamta Bhatnagar
2. English in Business and Engineering -Stevenson, B.W., J. R. Spicer and E.C. Ames
3. Effective Business Communications, Kulbhushan Kumar, Khanna Publishing House
4. Technical Communication, Meenakshi Raman & Sangeeta Sharma, Oxford University Press

**OUTCOME:**

Improvement of communicative and presentation skills and prepare the students.

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

**MATHEMATICS – I (ARCH 102)**

<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 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  $(y_n)_0$ )

**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  $m, n \leq 4$ ).

**REFERENCE**

1. Higher Engineering Mathematics - Grewal B S., Khanna Publishers.
2. Advanced Engineering Mathematics (as per AICTE) – Chandrika Prasad, Khanna Publishing House
3. Engineering Mathematics for first year, Veerarajan T., TataMcGraw-Hill
4. Advanced Engineering Mathematics- Kreyzig E., John Wiley and Sons.
5. Application of Calculus - Bandyopadhyay S and Maity S K, Academic Publishers
6. Calculus - Strauss M. J., Bradley G. L. and Smith K. L., Pearson Education
7. A Textbook of Engineering Mathematics-I – Samanta Guruprasad, New Age International
8. Engineering Mathematics- Sastry S. S., PHI

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

**OUTCOME:**

Development of basic skill needed for studying related and analytical advanced subjects.

**ENGINEERING MECHANICS (ARCH 103)**

**Credit**

**3**

**Contact Periods per week**

**3 lecture 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 Quality – Vector Quality – 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 in determinant).

**Module-2**

**-12 pds**

**FRICTION:** 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**

**Maulana Abul Kalam Azad University of Technology, West Bengal**

*(Formerly West Bengal University of Technology)*

**Syllabus for Bachelor in Architecture (B. Arch)**

(Applicable from the academic session 2019-2020)

**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 – D.S. Bedi
2. Engineering Mechanics, D.S. Bedi & M.P. Poonia
3. 'Strength of Materials -- S. Ramamurtham;
4. 'Strength of Materials and Theory of Structures -- B.C. Punmia
5. Engineering Mechanics, R.S. Khurmi, S. Chand Publishing

OUTCOME:

The students will be able to apply the basic principles of mechanics and structural behavior to design and analyze structural elements in future projects.

**HISTORY OF ART & ARCHITECTURE (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**

**- 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, Art consciousness; Aesthetics, perception, Symbolism, expression, style, fashion, appropriateness and values.

**Module 2**

**-18 pds**

Ancient Mesopotamia, Egypt and Central America: Detail study of art and architecture in (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. 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. Detail study of the Temple I (the Temple of the Giant Jaguar), Tikal (Guatemala) of the Maya Late Classic Period.

**Module 3**

**- 12 pds**

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

**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.

**Module 4**

Investigations in proportion, scale, balance, rhythm, symmetry, hierarchy, pattern and axis with examples from the built environment. Influence on Architectural design; development of aesthetic sensitivity as a prerequisite for all designers

**Reference Books**

1. A History of Architecture (Century Edition) / Sir Banister Fletcher / Butterworth Heinemann (Hb), CBS (Pb)
2. Vision and Invention – an introduction to Art Fundamentals – Calvin Harlan
3. Chaos and Creation – Sachidanand Sinha (Lalit Kala Akademi)
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 Gypel / KÖNEMANN (Pb)
7. The Great Ages of World Architecture / G. H. Hiraskar / DhanpatRai.
8. Architecture and Building, Ashok Kumar Jain, Khanna Publishing House (as per AICTE)

**OUTCOME:**

The students shall gain knowledge about the chronological development of Art & Architecture, the basic design elements, forms, materials, construction techniques and design principles developed under the socio-economic cultural and political influence during various time periods.

The students can analyze the contributing factors for the design development of different styles during these time periods.

**ARCHITECTURAL DESIGN I (ARCH 181)**

**Credit**

**6**

**Contact Periods per week**

**6 sess pds**

**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.

**OUTCOME:**

The students will have a basic idea of generating design concepts and represent the same in Architectural drawings using composition of different design elements, forms and basic design principles.

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

Application of anthropometric data and standards in designing of space.

**ARCHITECTURAL GRAPHICS -- I (ARCH 182)**

**Credit**

**5**

**Contact Periods per week**

**6 sessional pds**

**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**

Practice of sketching and still life, Lines and curves, Lettering techniques and types.

**Module 2**

**- 12 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 –Scale – Concept of representative fraction – Scale generally used for Architectural and Engineering Drawing – Concept of diagonal scale.

**Module 3**

**- 24 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**

**- 18 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. Engineering Graphics & Design, Pradeep Jain & A.P. Gautam
2. A Textbook of Engineering Drawing - B. Gupta;
3. Engineering Drawing - N.D. Bhatt

**OUTCOME:**

Develop knowledge of drawing as a medium to visualize and communicate ideas.

Application of various drawing tools and accessories used in drafting and lettering techniques

Imparting knowledge of representation of three-dimensional forms in design projects using graphical presentation skills.

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

**MODEL MAKING (ARCH 183)**

**Credit**

**2**

**Contact Periods per week**

**2 prac pds**

**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:** Study built environment, light and shade pattern, surface texture, scale and proportion, create models using everyday material

**Module 2:** Preparing models of geometric shapes and solids with mount boards

**Module 3:** Using levels and texture in working with composite material

**Module 4:** Collage, sculpture , and other modes of modeling exercises

**OUTCOME:**

Students will develop ability to understand and represent space by three-dimensional geometric/ abstract forms in scale. Develop skills of cutting and joining simple materials for model making.

**NSS/ ECA / NCC/ SPORTS (ARCH 184)**

**Credit**

**2**

**Contact Periods per week**

**2 prac pds**

**OBJECTIVE:**

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

**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.

**OUTCOME:**

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

This would also help in imparting a sense of responsibility and team work.

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

**Semester-II**

**MATHEMATICS – II (ARCH 201)**

<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 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 :** **-6pds**

Coordinates, Direction Cosines, Planes, Straight lines, Spheres, Standard equations of simple surface e.g. cylinders, cones, ellipsoids, 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:** **-6pds**

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. Advanced Engineering Mathematics (as per AICTE) – Chandrika Prasad, Khanna Publishing House
3. Grewal B S, Higher Engineering Mathematics, Khanna Publishers
4. Dey S K and Sen S, Mathematical Statistics, U.N.Dhur & Sons Private Ltd
5. Samanta Guruprasad, A Textbook of Engineering Mathematics-II, New Age International Publishers
6. Das Jyoti, Analytical Geometry, Academic Publisher
7. Karak P M, Linear Programming, New Central Book Agency Pvt. Ltd

**OUTCOME:**

Students will be capable to understand advanced analytic subjects in the curriculum.

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

**STRENGTH OF MATERIALS (ARCH 202)**

<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 understand the basic principles of strength of structural materials that would be pertinent to simple design elements.

**METHODOLOGY:**

Lectures and computation exercises

**Module 1 - SIMPLE STRESSES & STRAINS** **- 12pds.**

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** **- 9pds.**

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 and UDL.
- (ii) Simply supported beams with point loads and UDL.
- (iii) Simply supported overhanging beam – one side and both sides.
- (iv) Simple Problems.

**Module 3 - BENDING STRESSES IN BEAMS** **-9pds.**

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** **-6pds**

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 beams.

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

REFERENCE

1. Strength of Materials – D.S. Bedi, Khanna Publishing House (Ed. 2018)
2. Elements of Strength of Material -S. P. Timoshenko & D. H. Young, EWP Pvt. Ltd
3. Engineering Mechanics of Solids -E. P. Popov, Pearson Education
4. Strength of Materials- R. Subramanian, OXFORD University Press
5. Strength of Material - Bansal
6. Strength of Materials -S S Bhavikatti, Vikas Publishing House Pvt. Ltd
7. Strength of Material -A. Pytel & F. L. Singer, AWL Inc
8. Strength of Material - Ramamrutham
9. Engineering Mechanics I by J. L. Mariam, John Willey
10. Engineering Mechanics- I. H. Shames, PHI
11. Fundamentals of Strength of Material -Nag & Chandra, WIE

OUTCOME:

Students will understand the structural behavior of beams under different conditions.

**HISTORY OF ARCHITECTURE-I (ARCH 203)**

**Credit**

**3**

**Contact Periods per week**

**3 lecture pds**

**Semester Exam**

**3 hrs**

OBJECTIVE:

To provide an understanding of the evolution of Buddhist and Hindu 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**

**- 12pds**

**Buddhist Art and 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

**Rock-cut Architecture and Cave paintings:** 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 – semi-circular arches with simple brackets – Study of the Rani Gumph, 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.

**Maulana Abul Kalam Azad University of Technology, West Bengal**

(Formerly West Bengal University of Technology)

**Syllabus for Bachelor in Architecture (B. Arch)**

(Applicable from the academic session 2019-2020)

**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.

**Module 2 -Earliest Temples**

**- 6pds**

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), *pradakshinapatha* (ambulatory) – two main styles: dravidian&indo-aryan

**Module 3-Temple Architecture of Southern India: Dravidian Style**

**- 9pds.**

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 4- Temple Architecture of Northern India: Indo-Aryan Style**

**-9pds.**

Orissa Group: Separate nomenclature (*RekhaDeul, PidaDeul, 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.

**REFERENCE**

1. Architecture & Buildings, Ashok Kumar Jain/ Khanna Publishing House
2. Indian Architecture Vol. 1 (Buddhist & Hindu) / Percy Brown / D.B. Taraporevala Sons & Co. Pvt. Ltd.
3. Buddhist and Hindu Architecture in India / Satish Grover / CBS
4. A History of Architecture / Sir Banister Fletcher / Butterworth Heinemann (Hb), CBS (Pb)
5. The Great Ages of World Architecture / G. H. Hiraskar / DhanpatRai
6. A World History of Architecture / Marian Moffett, Michael Fazio & Lawrence Wodehouse / McGraw-HillIndian
7. Architecture Vol. 1 (Buddhist & Hindu) / Percy Brown / D.B. Taraporevala
8. Buddhist and Hindu Architecture in India / Satish Grover / CBS

**OUTCOME:**

Students will understand the diversity of architecture in India and will gain knowledge about the design variables, construction techniques, materials and craftsmanship used in the historical buildings of Indian Subcontinent.

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

**MATERIALS AND CONSTRUCTION-I (ARCH 204)**

<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 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** **- 12 pds**

**Conventional construction materials like mud, bricks, stone and timber-**

raw material manufacturing processes, composition, classifications, properties, uses and finishes.

**Module 2** **- 6 pds**

**Ferrous Metals( Iron& Steel )** - Characteristics, Properties, Uses.

**Non ferrous Metals ( Aluminium& Copper )**- Characteristics, Properties, Uses.

**Plastics** - Characteristics, Properties, Uses, Types.

**Glass**- Characteristics, Properties, Uses, Types

**Module 3** **- 18 pds**

**Cement:** Characteristics, Properties, Uses, Types.

**Mortar**- Characteristics, Properties, Uses, Types.

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

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

**REFERENCE**

1. Civil Engineering Construction Materials, S.K. Sharma, Khanna Publishing House (AICTE Recommended)
2. Engineering Materials, Rangwala, Charotar Publishers.
3. Building Construction, W.B.Mckay, Orient Longman.
4. Building Construction, R.Barry, English Language Book Society.
5. Building Construction, Sushil Kumar, Standards Publishers.

**OUTCOME:**

Students will learn the uses, properties and applications of various constructional materials.

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

**ARCHITECTURAL DESIGN II (ARCH 281)**

**Credit** **6**  
**Contact Periods per week** **6 sessional pds**

**OBJECTIVE:**

To introduce students to knowledge of design and its application in basic building 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.

**OUTCOME:**

Students will gain basic skills for designing basic spaces and forms.

**ARCHITECTURAL GRAPHICS –II (ARCH 282)**

**Credit** **6**  
**Contact Periods per week** **-6 sessional pds**

**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 including rendering techniques  | - 24 pds |
| 4. Model making – Preparation of one model of a physical design under the subject Architectural Design II (AR-204). | -24 pds  |

**OUTCOME:**

Students will be able to develop Architectural Design through spatial ordering mechanisms and programmatic interpretation.

**Maulana Abul Kalam Azad University of Technology, West Bengal**

*(Formerly West Bengal University of Technology)*

**Syllabus for Bachelor in Architecture (B. Arch)**

(Applicable from the academic session 2019-2020)

**WORKSHOP PRACTICE - (ARCH 283)**

**Credit**

**2**

**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 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**

**-30pds**

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**

**-18pds**

Practice of construction of brick masonry wall of English and Flemish Bond.

OUTCOME:

Students will acquire skills to generate different architectural elements through prototype building.

**EDUCATIONAL TOUR (ARCH 284)**

**Credit**

**1**

**Contact Periods per week**

**-2 prac pds**

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

OUTCOME:

Students will get exposure to various types of historical as well as modern structures.

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

**Semester-III**

**STRUCTURE – I (ARCH 301)**

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

**METHODOLOGY:**

Lectures and computation exercises

<b>Module-1</b>	<b>-9pds</b>
Principal stress: Shear stresses, normal stress, conjugate stress. Mohr diagram.	
<b>Module-2</b>	<b>-12pds</b>
Deflection of beams using moment-area theorem and Conjugate beam method: Principle of superposition.	
<b>Module-3</b>	<b>-15pds</b>
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. D.S. Bedi, *Strength of Materials*, Khanna Publishing House
2. Dr.B.C.Punmia, et al , *Strength of Materials and Theory of Structures - Vol.I*, Lakshmi Publications,
3. Dr.Sadhu Singh, *Strength of Materials*, Khanna Book Publishing Company Private Limited, Delhi.
4. S.Ramamrutham, *Strength of Materials*, DhanpatRai son, 1992.
5. G.K.Hiraskar, *Strength of Materials*.

**OUTCOME:**

Shall equip the students with knowledge of basic structure, helping them to design simple building components.

**CLIMATOLOGY (ARCH 302)**

<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 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.

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

**Module-1 -- -9pds**

**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

**Module-2 -- -9pds**

**Comfort 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

Climatic factors affecting building design and orientation.

**Module-3 -- -6pds**

**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-4 -- -6pds**

**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-5-- -6pds**

**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

OUTCOME:

Will be able to design climate responsive buildings considering the impact of climatic factors, comfort conditions, natural ventilation and day lighting.

**History of Architecture-II (Islamic) (ARCH 303)**

**Credit**

**3**

**Contact Periods per week**

**3 lecture pds**

**Semester Exam**

**3 hrs**

OBJECTIVE:

To provide an understanding of the evolution of Islamic Architecture in India 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.

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

**Module 1 – 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 QutbMinar, Old Delhi.

**Module 2 – The Sayyid & Lodhi Dynasties -6 pds.**

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 17olute17ment 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 3 – The Early Mughal architecture -12pds.**

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 FatehpurSikri: 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.

**Module 4-Later Phase -12pds.**

- 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 – 17 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. 2 (Islamic Period) / Percy Brown / D.B. Taraporevala Sons & Co. Pvt. Ltd.
2. Islamic Architecture in India / Satish Grover / Galgotia Publishing Company, New Delhi

OUTCOME:

Students will be aware of the impact of Islamic influence on the development of architectural style for future application in appropriate context.

**MATERIALS AND CONSTRUCTION-II (ARCH 304)**

**Credit**

**3**

**Contact Periods per week**

**3 lecture pds**

**Semester Exam**

**3 hrs**

OBJECTIVE:

Introduction to constructional practices pertaining to foundations, DPC and waterproofing types of upper floors and

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

various ways of spanning openings.

**METHODOLOGY:**

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

**Module-1 – Foundation**

**-9pds**

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-2 - Damp Prevention and Water Proofing**

**-9pds**

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)

**Module-3 -- Spanning of Openings:**

**-9pds**

**9pds** 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-4 -- Upper Floors:**

**-9pds**

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.

**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), DhanpatRai Publications
6. Duggal S.K., 2003, Building Materials, New Age International Publishers

**OUTCOME:**

The students will understand the basic components of a building with its construction details and develop the ability to integrate knowledge of properties and construction methods of these components in the design of simple projects.

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

**ARCHITECTURAL DESIGN III (ARCH 381)**

**Credit** **6**  
**Contact Periods per week** **6 sessional pds**

**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** **- 48pds**

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

**OUTCOME:**

Students will understand the relation of space, form and site considerations to develop designs for medium sized public buildings.

**METHODS OF CONSTRUCTION I (ARCH 382)**

**Credit** **4**  
**Contact Periods per week** **4 sessional pds**

**OBJECTIVE:**

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

**METHODOLOGY :**

Study Sheets and Drawing Works .

**Modules 1**

Standard woodwork and joinery, brick bondings, stone masonry.etc. **- 12 pds**

**Module 2**

Various types of foundations-, Shallow :( Wall footings, Inverted arch foundation, Isolated footings, Combined footing, Strip footing, Cantilever footing, Mat or raft foundation; Deep: (Pile foundation, Pier foundation), plinth, skin sections from foundation to parapet including damp proofing and Water proofing, spanning of openings, lintels and arches. **- 20pds**

**Module 3**

Upper floors roofs of buildings; roof finishes and construction methodologies; parapets and stair roof **-16pds**

**OUTCOME:**

Students will gain knowledge of constructional details of different building components which can be applied in future projects.

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

**COMPUTER EDUCATION (ARCH 383)**

**Credit**

**2**

**Contact Periods per week**

**4 prac pds**

OBJECTIVE:

To familiarize the students with the basic computer languages

METHODOLOGY:

Intensive lectures and computations

**Module-1**

-6pds

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 Systematic decomposition, Flowchart & Algorithm. Simple constructs (assignment, loop and decisions)

**Module- 2**

-6pds

Introduction to Basic Computing, High level, assembly and machine level language. Writing simple program ms, Basic data types and their use.

**Module-3**

-12pds

Declaration and definition. Loop and Decision statements, Special control structures: Switch, break, continue User defined and library functions, Parameters, return type, call by value and call by reference. Storage class

**Module-4**

-12 pds

Structured type: Array of basic types, Use of array in simple problems.. Definition and use .Array and pointers

**Module-5**

-6pds

Strings- definition, basic operations & functions

**Module-6**

-6pds

Structures Union and Files: Basic of structures, structures and functions, arrays of structures, bit fields, formatted and unformatted files.

REFERENCE

1. C Programming Language: Kernighan & Ritchie
2. Computer Fundamentals, R.S. Salaria, Khanna Publishing House
3. Let Us C: Yashavant P. Kanetkar
4. Problem Solving and Programming in C, R.S. Salaria, Khanna Publishing House
5. Introduction To Computing (TMH WBUT Series), E. Balagurusamy, TMH
6. Computer Fundamentals and Programming in C: Reema Thareja

OUTCOME:

Getting idea about the history and basics of computer, its programming and architecture.

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

**Materials Testing Lab (ARCH 384)**

**Credit**

**2**

**Contact Periods per week**

**- 4 prac pds**

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**

**-24 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**

**-24pds.**

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.

OUTCOME:

Gain hands on experience about properties of basic building materials.

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

**Semester-IV**

**STRUCTURE – II (ARCH 401)**

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

**METHODOLOGY:**

Lectures and computation exercises

**Module 1** -6 pds

Strain energy: Due to axial load, bending and shear, Torsion; Castigliano's theorems, theorem of minimum potential energy, principle of virtual work, Maxwell's theorem of reciprocal deflection

**Module 2** -12 pds

Deflection determinate structures: Energy methods, Unit load method for beams, Deflection of trusses and simple portal frames, three hinged arch, cables

**Module 3** -12 pds

Analysis of statically Indeterminate structures: Moment distribution method - solution of continuous beam, effect of settlement and rotation of support, frames with or without side sway. Slope Deflection Method – Method and application in continuous beams and Frames. Analysis of two-hinged arch.

**Module 4**

Effect of wind and earthquake analysis on structure. - 6pds

**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- Ramamrurtham
5. Structural Analysis, R. Agor, Khanna Publishing House

**OUTCOME:**

Will equip students with knowledge of different theories for analysis of structural behaviour of structures.

**ACOUSTICS (ARCH 402)**

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

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

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

**Module 1-Nature of Sound:**

**-9pds**

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:**

**- 6pds**

Various Noise Sources, Planning Against Noise-zoning, distancing & screening, green belts & landscaping, noise barriers, Outdoor Noise Regulations in India, Open-air Auditorium.

**Module 3- General Building Acoustics:**

**- 9pds**

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.

**Module 4- Residential Buildings:**

**-3pds**

Sources of Noise and Recommendations- site planning, internal planning sound insulation.

**Module 5- Educational Buildings:**

**-3pds**

Sources of Noise and Recommendations- site planning, internal planning, noise reduction within rooms, sound insulation.

**Module 6- Auditoria and Theatres:**

**- 6 pds**

Sources of Noise- outdoor and indoor, Recommendations- geometry & shape, seating arrangement, design criteria for different purposes; Electro-acoustic installations.

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)

OUTCOME:

Students will gain knowledge of basics architectural acoustic systems in buildings and acoustic principles and treatments and be equipped to design acoustic interiors and buildings.

**HISTORY OF ARCHITECTURE-III (ARCH 403)**

**Credit**

**3**

**Contact Periods per week**

**3 lecture pds**

**Semester Exam**

**3 hrs**

OBJECTIVE:

To provide an understanding of architecture during Classical, Romanesque, Gothic and Renaissance.

METHODOLOGY:

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

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

**Module 1- CLASSICAL GREECE -**

**- 6pds**

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.

**CLASSICAL ROME -**

**- 6pds**

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.

**BYZANTINE ARCHITECTURE**

**- 3pds**

Difference in the nature of Christ, knowledge of placing a dome over a regular polygonal plan with pendentive, 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 2-ROMANESQUE ARCHITECTURE**

**-6pds**

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 Baptistry & Campanile.

**Module 3-GOTHIC ARCHITECTURE**

**-6pds**

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 4- RENAISSANCE ARCHITECTURE**

**-6pds**

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, Giacomodella 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.

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

**Module 5- BAROQUE ARCHITECTURE**

**-3pds**

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.

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. Architecture & Buildings, Ashok Kumar Jain, Khanna Publishing House (Ed. 2018) (Pb)
4. A World History of Architecture / Marian Moffett, Michael Fazio & Lawrence Wodehouse / McGraw-Hill
5. The Great Ages of World Architecture / G. H. Hiraskar / DhanpatRai
6. Jessup, Helen Ibbitson. *Art & Architecture of Cambodia*. London: Thames & Hudson, 2004.
7. Roveda, Vittorio. *Images of the Gods: Khmer Mythology in Cambodia, Laos & Thailand*. Bangkok: River Books, 2005.
8. *Sthapatyakam. The Architecture of Cambodia*. Phnom Penh: Department of Media and Communication, Royal University of Phnom Penh, 2012.
9. Bussagli, Mario (1989). *History of World Architecture – Oriental Architecture/2*. Faber and Faber. ISBN 0-571-15378-X.
10. Coaldrake, William H. (1996) *Architecture and Authority in Japan (Nissan Institute/Routledge Japanese Studies Series)*, Routledge, ISBN 978-0-415-10601-6
11. Frampton, Kenneth (1990). *Modern Architecture a Critical History*. Thames and Hudson.
12. The Civilization of the Renaissance in Italy, 1860, English translation, by SGC Middlemore, in 2 vols., London, 1878)
13. Erwin Panofsky, *Renaissance and Renascences in Western Art*, (New York: Harper and Row, 1960)

OUTCOME:

Students will gain knowledge about the spatial and stylistic qualities, use of materials & technology and principles of composition associated with architecture during Classical to Renaissance period.

An understanding of architecture as an outcome of various social, political and economic upheavals, and as a response to the culture and context.

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

**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 methods.

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

**Module 1**

**- 9pds**

**Door** – 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.

**Window** –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 2**

**- 6 pds**

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

**Adhesives**- Characteristics, Properties, Uses, Types.

**Module 3**

**- 6 pds**

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

**Module 4**

**- 9 pds**

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

-Mud flooring, Stone flooring, other flooring in mosaic, terrazzo, ceramic tiles, vitrified tiles, wooden and polished concrete flooring. Paints, Plastering (Internal and External) Glazes and Varnishes, different finishes for building components with stone, bamboo, lime and mud different types, composition, characteristics and uses of paints enamels, distemper, plastic emulsion, polyurethane, special paints such as fire retardant, luminous and bituminous paints, Gypsum and POP ,Plastering materials.

**Module-5**

**Stairs**

**-6pds**

Components and requirements; Classification based on form, structural systems, calculations, escape route, travel distance, materials including metal Staircase, typical construction details such as balustrade fixing, nosing, etc, Railing details.

**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.

**OUTCOME:**

The students will gain knowledge of cost effective and environmentally friendly materials, types and constructional details of building components like doors, windows and stairs and finishes for application in practical field.

**ARCHITECTURAL DESIGN IV (ARCH 481)**

**Credit**

**6**

**Contact Periods per week**

**6 sessional pds**

**OBJECTIVE:**

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

**METHODOLOGY:**

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

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

**Module 1** - 12pds  
Studies of the design of small institutions with key inputs on program-site analysis, area-volume diagrams, overlays, and spatial structural system.

**Module 2** - 60pds  
Design of elementary school, doctors clinics , health centres, small libraries, clubs, etc.  
Developing details of elements ,time sketch on similar problems.

OUTCOME:  
Students will learn to analyze different parameters and design Institutional buildings.

**METHODS OF CONSTRUCTION II (ARCH 482)**

**Credit** 4  
**Contact Periods per week** 4 sessional pds

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** - 16 pds  
All door and window sections (timber, steel, rolled steel, aluminium, PVC, glazed, etc.)

**Module 2** - 16 pds  
Staircase Sections for different types of Staircases & Details

**Module 3** - 16 pds  
Finishing drawings and details of  
1. Flooring  
2. Special materials like Stone, bamboo & cladding using different finishing materials.

OUTCOME:  
The students will learn to do detail drawings of the above mentioned basic components of a building.

**COMPUTER GRAPHICS – I (ARCH 483)**

**Credit** 3  
**Contact Periods per week** 6 prac pds

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

METHODOLOGY:  
Lectures and Computer Drawings with end semester viva-voce.

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

**Module –1** **-24pds**  
Introduction to Computer Graphics: Fundamentals of 2-dimensional Drawing in CAAD; Basic Drawing Features; Basic Editing Tools; Dimensioning and Text Formatting; Printing and Plotting Techniques.

**Module –2** **-24pds**  
Advanced 2-Dimensional 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** **-24pds**  
Project Work

REFERENCE

1. Engineering Graphics & Design, Pradeep Jain, Khanna Publishing House – AICTE Recommended

OUTCOME:

The students will learn to express the representation of visual composition in 2D using digital tools, drafting, 3D visualisation and rendering.

**EDUCATIONAL TOUR (ARCH 484)**

<b>Credit</b>	<b>1</b>
<b>Contact Periods per week</b>	<b>2 prac pds</b>

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.

OUTCOME:

Students will learn and experience the architectural characteristics of various historical as well as contemporary buildings.

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

**Semester-V**

**STRUCTURES III (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 understand the basic principles theories and calculations related to behavior of concrete structures.

**METHODOLOGY:**

Lectures and computation exercises

**Module 1** **- 12 pds**

Introduction: Principles of design of reinforced concrete members- Working stress and Limit State method of design.

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)

**Module 2** **- 12 pds**

Analysis, design and detailing of singly reinforced rectangular, 'T', 'L', Cantilever beams, lintels and doubly reinforced beam sections by limit state method.

Distribution of base pressure; Middle third rules; earth pressure, Design of simple retaining wall; Cantilever retaining wall.

Design of one-way and two-way slab panels and chajjas as per IS code provisions.

**Module 3** **- 12pds**

Staircases: Types; Design and detailing of reinforced concrete doglegged staircase.

Design of reinforced concrete short columns of rectangular and circular cross-sections under axial load.

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

**OUTCOME:**

Students will gain knowledge about design and detailing of concrete structural components.

**Maulana Abul Kalam Azad University of Technology, West Bengal**

*(Formerly West Bengal University of Technology)*

**Syllabus for Bachelor in Architecture (B. Arch)**

(Applicable from the academic session 2019-2020)

**BUILDING SERVICES I (ARCH 502)**

**Credit**

**3**

**Contact Periods per week**

**3 lecture pds**

**Semester Exam**

**3 hrs**

**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

**OUTCOME:**

Students will gain knowledge about water supply, sewerage, and waste disposal systems in buildings and develop the ability to conceptually plan/ design.

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

**HISTORY OF ARCHITECTURE – IV (ARCH 503)**

<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 and appreciation of Modern trends in Indian and Western Architecture in terms of Ideas and directions

**METHODOLOGY:**

Lectures and presentations

**Module 1**

**- 18pds**

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.

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

**Module 2**

**- 9pds**

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**

**- 9pds**

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.
6. Architecture & Buildings, Ashok Kumar Jain, Khanna Publishing House

**OUTCOME:**

The students will have an insight into the development of Modern architecture and Arts & Crafts movement in Europe and America.

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

**MATERIALS AND CONSTRUCTION -- V (ARCH 504)**

<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 paneling 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, wall panelling and special doors - 15pds**

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 partitions, partially colored glass, etching of glass and its applications in building industry for both exteriors and interiors. Glass fabrication techniques, fiber reinforced composite materials and products.

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, aluminum composite panel cladding.

**Module-2 - Roofs & Roofing: -9pds**

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.

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 -9pds**

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.

**Module 4 - Insulation -6pds**

Insulation materials - Thermal and sound insulation materials; Plastics and PVC; acoustic partitions and soft paneling

**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
7. S.K. Sharma, Civil Engineering Construction Materials, Khanna Publishing House, 2018

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

**OUTCOME:**

The students will acquire knowledge of roofing, partitions and panelling in building construction and become familiar with advanced materials and construction techniques.

**ARCHITECTURAL DESIGN V (ARCH 581)**

**Credit**

**8**

**Contact Periods per week**

**8 sessional pds**

**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**

**- 72pds**

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

**OUTCOME:**

The students will develop sensitivity in design approach in community oriented projects analyzing context, collective values and needs.

**METHODS OF CONSTRUCTION III (ARCH 582)**

**Credit**

**4**

**Contact Periods per week**

**4 sessional pds**

**OBJECTIVE:**

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

**METHODOLOGY:**

Study Sheets and Drawing Works

**Module 1**

**-12pds**

Masonry Wall partitions & Timber partitions and paneling, sections through special doors

**Module 2**

**-12pds**

Glazed partitions and paneling, internal partitions & external skins, curtain walls & structural glazing

**Module 3**

**-18pds**

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

Roofing – construction of various types, including waterproofing and drainage; suspended ceilings - design of ceilings including all services.

**Module 4** **-6pds**  
Prefab sections, all types of insulated sections.

OUTCOME:

The students will learn detail drawings of the above mentioned building components for future practical applications.

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

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

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** **-8 pds**

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

**Module 2** **-8 pds**

Rendering techniques in 3D mode. Photoshop rendering.

**Module 3** **-8 pds**

Project work including interior spaces .

REFERENCE

1. Engineering Graphics & Design, Pradeep Jain, Khanna Publishing House – AICTE Recommended

OUTCOME:

Exposure to softwares like 3D Max, Sketch-up and Photoshop will help students to prepare presentation drawings in 2D and 3D.

### **SURVEY FIELD WORK (ARCH 584)**

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

OBJECTIVE :

To familiarize students with survey purpose and equipments

METHODOLOGY :

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
*(Formerly West Bengal University of Technology)*  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

Field work and report writing

**Module 1**

**-12 pds**

Use of dumpy level and fly leveling.  
Longitudinal Section and Cross Section.  
Contouring.

**Module 2**

**-12 pds**

Measurement of horizontal and vertical angle of theodolite.  
Traversing by theodolite by measurement of included angles.

**OUTCOME:**

Students will develop the ability to measure, draw, and represent all the physical parameters of a site.

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

**Semester-VI**

**STRUCTURES IV (ARCH 601)**

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

**METHODOLOGY:**

Lectures and computation exercises

<b>Module 1</b>	<b>-12 pds</b>
Steel structures: Permissible stresses; Design of truss members; Simple welded connections including beam-end connections.	
<b>Module 2</b>	<b>-12 pds</b>
Built-up beams and columns: Design of base-plate, gusset plate and concrete footings for steel Columns, Grillage foundation.	
<b>Module 3</b>	<b>-12 pds</b>
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, 1998, *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)

**OUTCOME:**

Students will gain knowledge of analyzing and designing steel structures.

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

**BUILDING SERVICES II (ARCH 602)**

<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 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**

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**

Light and its propagation, reflection, radiation, transmission and absorption. Definitions and units of flux, solid angles, luminous intensity, brightness, different type of lamps and their properties, Fixtures and accessories used in electrical installation; Schematic layout of installations and points for different building types. Visual tasks - factors affecting visual tasks - Modern theory of light and colour.

**Module 4** **-15 pds**

Causes and spread of fire. Combustibility of materials and safety norms.

Study of fire regulations, fire detection and firefighting 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
3. Handbook of Fire Protection Engineering – K. Ehteshami
4. Elements of Fuels and Combustion Technology, O.P. Gupta

**OUTCOME:**

The student will understand the importance and working of lighting installation in buildings, and gain the ability to design basic electrical lighting and firefighting systems .

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

**HISTORY OF ARCHITECTURE – V (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 through the works of outstanding architects.

**METHODOLOGY:**

Lectures and presentations, seminar presentation by students

**Module 1** **- 12pds**

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** **-12 pds**

Corbusier' works in India – Chandigarh and the Ahmedabad 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** **- 12 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.
8. Ashok Kumar Jain, Architecture and Buildings, Khanna Publishing House, 2018.

**OUTCOME:**

The students will gain knowledge of neo-vernacular and contemporary architecture.

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

**LANDSCAPE DESIGN (ARCH 604)**

<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:**

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 Mughal. Study of notable examples.

Hard and soft landscape elements, Types of 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.

Basic principles of planting 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.

**OUTCOME:**

The student will understand the scope of landscape architecture the elements used in landscape design and the impact of human activities on the environment and also the role of architect in mitigating it.

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

**ARCHITECTURAL DESIGN VI (ARCH 681)**

**Credit** **8**  
**Contact Periods per week** **8 sessional pds**

**OBJECTIVE:**

To emphasize 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** **- 24pds**

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 alongwith site services.

**Module 2** **- 72pds**

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

**OUTCOME:**

The students will learn design methods for site planning and give appropriate/ innovative design solutions for community buildings in urban environment.

**WORKING DRAWING (ARCH 682)**

**Credit** **4**  
**Contact Periods per week** **4 sessional pds**

**OBJECTIVE :**

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

**METHODOLOGY :**

Lectures and studio work

**Module 1** **-24 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** **-24 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 upper floors with lift/elevator including interior detail drawings floor and finishes, Toilet details etc. Site layout, landscaping and external services details to be included.

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

**OUTCOME:**

The students will learn to use architectural terms and symbols; apply construction materials and methods; identify the relationship between specifications and drawings; identify governing codes; and produce a set of sanction drawings and commercial construction drawings.

**ESTIMATION & VALUATION (ARCH 683)**

**Credit**

**1**

**Contact Periods per week**

**2 prac pd**

**OBJECTIVE:**

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

**METHODOLOGY:**

practical work and computation exercises

**Module 1**

**- 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 2**

**- 12 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
2. Premvir Kapoor, Sociology & Economics for Engineers, Khanna Publishing House

**OUTCOME:**

The students will be able to forecast the estimated value of a project and determine basic specifications of material and workmanship.

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
*(Formerly West Bengal University of Technology)*  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

**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.

**OUTCOME:**

Students will learn and experience the architectural characteristics of various historical as well as contemporary buildings.

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

**Semester-VII**

**STRUCTURE IN ARCHITECTURE (ARCH 701)**

<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 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 York 1976.
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.

**OUTCOME:**

Students will learn the behavioral pattern of different structural systems so as to incorporate those in their design.

**BUILDING SERVICES III (ARCH 702)**

<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>

**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:**

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

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

<b>Module 1</b>	<b>-9 pds</b>
Thermodynamics, Fluid flow, Heat Transfer Psychometric 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,	
<b>Module 2</b>	<b>-6 pds</b>
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.	
<b>Module 3</b>	<b>- 9 pds</b>
Natural and artificial ventilation. Cooling load for AC. Application to a selected project, and case analysis of selected project	
<b>Module 4</b>	<b>- 12 pds</b>
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
4. Refrigeration and Air Conditioning – Sadhu Singh

**OUTCOME:**

Students will learn different air conditioning systems and types of lifts.

**BLDG. ECONOMICS & CONST. MANAGEMENT (ARCH 703)**

<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>

**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.

**METHODOLOGY :**

Intensive lecture-presentations, interactive sessions with professional Managers.

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

**Module 1**

**- 9 pds**

Elements of Economics: An idea of fundamental concepts of economics Science and their application in Construction industry.

Micro Economics: Utility analysis, demand & supply Factor of production Characteristics and importance, short run and long run production function , law of variable proportions , law of returns to scale , Cost – upto long run marginal cost , Market overview –Perfect competition, monopoly & Monopolistic

Macro Economics: National income and its distribution, inequalities of income distribution, its causes and measures ,

**Module 2**

**- 9 pds**

Cost sheet, Capital Budgeting –Payback period, discounted payback period, payback profitability, Net present value Ratio Analysis – Idea of trading A/C, Profit & loss A/C and Balance sheet, Basic ratios

**Module 3**

**- 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 4**

**- 9pds**

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
4. Sociology & Economics for Engineers, Premvir Kapoor, Khanna Publishing House

**OUTCOME:**

Students will learn to manage the economic aspect of construction.

**URBAN PLANNING & HUMAN SETTLEMENTS (ARCH 704)**

**Credit**

**3**

**Contact Periods per week**

**3 lecture pds**

**Semester Exam**

**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.

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

**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 Fatehpursikhri, 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
7. Ashok Kumar Jain, Town Planning, Khanna Publishing House (AICTE)

**OUTCOME:**

The student will gain knowledge about the nature, characteristics and evolution of human settlements and also the planning concepts of historical and contemporary towns. They will be aware of the current issues in urban planning and will be acquainted with land-use, zoning, types of development plan ,etc.

**ARCHITECTURAL DESIGN VII (ARCH 781)**

**Credit**

**Contact Periods per week**

**9**

**9 sessional pds**

**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

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

**Module 1** - 36 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** - 72pds

Design of regional hubs like shopping malls, sub divisional hospitals, auditoria, community housing, etc

**OUTCOME:**

The students will learn innovative design solutions for Institutional buildings/Housing in urban environment.

**INTERIOR DESIGN (ARCH 782)**

**Credit**

4

**Contact Periods per week**

4 sessional pds

**OBJECTIVE:**

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

**METHODOLOGY :**

Studio exercises supplemented with workshops and site-visits.

**Module 1** - 8pds

Design exercises with simple spatial layouts of furniture and utilities in buildings.

**Module 2** - 16pds

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** - 24 pds

Design project incorporating all details including illumination, wall paneling and air conditioning feature

**OUTCOME:**

The students will gain knowledge about Ergonomics and furniture design and get an overall exposure to the ways in which interior spaces can be enriched through the design of specific components.

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

**ARCHITECTURAL ILLUMINATION (ARCH 783)**

<b>Credit</b>	<b>1</b>
<b>Contact Periods per week</b>	<b>2 prac pd</b>
<b>Semester Exam</b>	<b>3 hrs</b>

**OBJECTIVE:**

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

**METHODOLOGY:**

Lab work, material sourcing and design presentations.

**Module 1**

Experiments on photometric laws.

**- 8 pds**

Principles of Lighting -Aims of good lighting and realization of the same

Synthesis of light – Additive and subtractive synthesis of colour.

The laws of illumination, 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

**Module 2**

Experiments on Illuminance.

**-8pds**

Criteria and Standards of illumination for different activity areas. Recommended values of illumination level for different occupancies as per the NBC, Design calculation of interior lighting, Illumination for sports and recreational facilities, choice of luminaire.

Tests before commissioning of electrical services

**Module 3**

Prototype situation building & stimulation.

**- 8 pds**

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

**OUTCOME:**

The student understand the principles, laws, and recommended values of illumination in buildings with experiments for application in design projects.

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

**Semester-VIII**

**ENERGY EFFICIENT ARCHITECTURE (ARCH 801)**

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

**METHODOLOGY :**

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

**Module 1**

**- 9pds**

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

**Module 2**

**- 9pds**

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

**Module 3**

Ozone layer depletion, Global Warming and effects of pollution.

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

**- 9 pds**

**Module 4**

**- 9pds**

Contemporary Trends - Sustainability and Architecture, ECBC guidelines and recommendations, Green buildings and its criteria, various ratings systems and accreditations.

**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.
5. O.P. Gupta, Energy Technology, Khanna Publishing House, 2018

**OUTCOME:**

Students will gain knowledge of alternative sources of energy and passive design considerations, day lighting and natural ventilation in design. They will also understand future trends in creating sustainable built environment.

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

**HOUSING & COMMUNITY PLANNING (ARCH 802)**

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

**OBJECTIVE:**

To understand the fundamentals of housing design

**METHODOLOGY :**

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**

**- 18 pds**

Social factors influencing Housing Design, affordability, economic factors and housing concepts – Slum upgrading and sites and services schemes.

Social problems and programmes: Urban society – Social and economic problems; Rural society: Social and economic problem

Developmental programs- urban and rural. Impact of programmes on social development.

Different types of Housing standards – Methodology of formulating standards – Relevance of standards in Housing Development.

**Module 3**

**- 12 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. GeoffreyK.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
6. Housing for ALL, Ashok Kumar Jain, Khanna Publishing House, 2018.

**OUTCOME:**

Students will have an overall view of the housing policies within India and third world countries.

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

**URBAN DESIGN (ARCH 803)**

<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 aspects of urban design and to provide introductory knowledge of urban design.

**METHODOLOGY :**

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 and forms in public domain including spatial organization , transformation of building fabric , study of patterns and characteristics including skyline analysis and their sectional relationship :special focus on graphical representation.

**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 .Analytical study of micro level urban design projects with special focus on site survey. Pathway analysis including serial vision, figure ground relationships with more emphasis on circulation of spaces and their inter- linkages.

**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. Architecture of Towns and Cities – P.D.Sprieregen
6. Architecture and Buildings, Ashok Kumar Jain, Khanna Publishing House.

**OUTCOME:**

Students will be aware of the evolution and characteristics of urban forms, their components and interdependencies. and understand elements, principles, concepts & components of urban design.

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

**DISASTER MITIGATION (ARCH 804)**

<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 awareness and introduction to earthquake resistant design of buildings.

**METHODOLOGY :**

Lecture-presentations, case studies and seminars.

**Module 1**

**-6 pds**

Introduction to disaster mitigation: Different types of Environmental hazards & Disasters –natural & man-made ( earthquake , flood, Tsunami , cyclones , landslides etc )and its effect on architecture with special reference to Indian context and general outline of broad safety measures with respect to 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

An integrated approach for Disaster Mitigation & awareness, Integrated Planning- Contingency management Preparedness, Monitoring Management, Management at different levels like public and private enterprises..

People's participation and public awareness, integrated planning , contingency management, International trends with reference to planning , role of UN, Red Cross etc.

**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.
5. Disaster Management, S.C. Sharma, Khanna Publishing House (Ed. 2018)

**OUTCOME:**

The students will be aware about disasters and the strategies for disaster management and mitigation. They will also understand the design guidelines in disaster resistant construction.

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

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

<b>Credit</b>	<b>9</b>
<b>Contact Periods per week</b>	<b>9 sessional pds</b>

**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

<b>Module 1</b>	<b>- 18 pds</b>
-----------------	-----------------

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.

<b>Module 2</b>	<b>- 90 pds</b>
-----------------	-----------------

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

**OUTCOME:**

The students will develop design approach in Institutional projects and also learn the details.

**THESIS PROGRAMMING (ARCH 882)**

<b>Credit</b>	<b>4</b>
<b>Contact Periods per week</b>	<b>4 sessional pds</b>

**OBJECTIVE:**

To guide the students to give a project proposal for an area of interest or specific types of buildings for the upcoming thesis project.

**METHODOLOGY:**

Power point presentation and report submission.

<b>Module 1</b>	<b>-24 pds</b>
-----------------	----------------

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.

<b>Module 2</b>	<b>-24 pds</b>
-----------------	----------------

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

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

- d. Site data analysis
- e. Aims and Objectives
- f. Project questions

**OUTCOME:**

Students will equip themselves with the all round knowledge to take up their thesis project in their final semester.

**OFFICE MANAGEMENT (ARCH 883)**

**Credit**

**1**

**Contact Periods per week**

**2 prac pds**

**OBJECTIVE:**

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

**METHODOLOGY :**

Intensive lecture-presentations, interactive sessions with professional Architects

**Module 1**

**- 6pds**

Architect's role in society, professional ethics, salient features of Architect's Act 1972, Council of Architecture – Architects office, its management and organizational structure, Architecture as a professional service to the society, conditions of agreement and scope of work, comprehensive architectural services and Terms of Reference, conditions of engagement, remuneration, professional fees and charges as per IIA norms. Architectural competitions of different types, Council of Architecture guidelines for conducting national and international competitions.

**Module 2**

**- 6pds**

Understanding of laws and codes, interaction with Development Authorities, Urban Local Bodies and other monitoring agencies, Special consideration for heritage districts and inner city areas to be included.

**Module 3**

**- 6pds**

Preparing Tenders, BOQ, Types of tender, tender documents, tender notice, conditions of tender, submission, scrutiny, recommendations & award of contract.

Conditions of contract, articles of agreement, certification of contractors bills, defects, liability, handing over of site/job, etc., period of warranty.

**Module 4**

**- 6 pds**

Specification - Definition, purpose, procedure for writing specifications for the purpose of calling tenders, types of specification. General specifications for basic building works.

**OUTCOME**

Student will gain knowledge of the role of professional and statutory bodies and understand the role of an architect and professional ethics.

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

**Semester-IX**

**PROFESSIONAL TRAINING (ARCH 981)**

**Credit**

**26**

**Contact Periods per week**

**52 prac pds**

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.

**OUTCOME**

Students will gain hands on knowledge of all aspects of Architectural Practice, specifically knowledge of design and details of varied types of buildings.

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

**Semester-X**

**ELECTIVES I, II**

**OBJECTIVE:**

To expose students to related areas of architecture

**METHODOGY :**

Lecture-presentations, case studies and seminars.

**ADVANCED STRUCTURES (ARCH 1001a)**

**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.

**OUTCOME**

Students will understand concepts and applications of critical and advance structures for future applications.

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

**COST EFFECTIVE BUILDING TECHNOLOGY (ARCH 1001b)**

<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
3. O.P Gupta, Energy Technology, Khanna Publishing House, New Delhi (Ed. 2018).
4. O.P. Jahkar, Energy Conservations in Buildings, Khanna Publishing House, New Delhi.

**OUTCOME:**

Students will learn cost effective materials and construction methods of sustainable and green building design.

**BUILDING MAINTENANCE (ARCH 1001c)**

<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.

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
*(Formerly West Bengal University of Technology)*  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

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

**OUTCOME:**

Students will learn important aspects of building maintenance.

**INDUSTRIAL ARCHITECTURE (ARCH 1001d)**

<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.

**OUTCOME:**

Students will understand design aspects of industrial buildings and the codes affecting it.

**BARRIER FREE ARCHITECTURE (ARCH 1001e)**

<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.

**OUTCOME:**

Students will understand the special design considerations for barrier free architecture and the guiding norms.

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

**ADVANCED LANDSCAPE (ARCH 1002a)**

<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>

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.

**OUTCOME:**

The students will understand the contemporary Landscape planning in urban scenario and assess the current trends for application in their design.

**VERNACULAR ARCHITECTURE (ARCH 1002b)**

<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

**OUTCOME:**

The students will gain knowledge about materials and methods of construction, planning and forms of vernacular architecture in different regions of the country.

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

**ENVIRONMENTAL PLANNING (ARCH 1002c)**

<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>

**OBJECTIVES:**

To student will get an exposure to environmental impact, considerations, legislations and optimization.

**METHODOLOGY:**

Lecture-presentations, interactive sessions

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.RodneyHowes, Infrastructure for the built environment, Butterworth Heineman.
- 6.G.Tyler Miller JR, Living in the Environment, Ward
7. O.P. Gupta, Energy Technology, Khanna Publishing House, New Delhi.
8. M.P. Poonia & S.C. Sharma, Environmental Studies, Khanna Publishing House, New Delhi.

**OUTCOME:** The students will gain knowledge of the existing natural resources, various ecosystems the need for preserving the resources and the environmental legislations.

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

**CONSERVATION (ARCH 1002d)**

<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

OUTCOME:

The students will understand current trends in conservation, its need and the governing laws.

**RETROFITTING (ARCH 1002e)**

<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

**Maulana Abul Kalam Azad University of Technology, West Bengal**  
(Formerly West Bengal University of Technology)  
**Syllabus for Bachelor in Architecture (B. Arch)**  
(Applicable from the academic session 2019-2020)

REFERENCES

1. A.GMudhuraRao 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.

OUTCOME:

The students will learn different methods of retrofitting for future application.

**ARCHITECTURAL THESIS (ARCH 1081)**

**Credit**

**20**

**Contact Periods per week**

**20 sess pds**

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

METHODOLOGY :

Architectural Thesis can be of any scale and size (in terms of built areas) as long as the required rig our 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**

**-60 pds**

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

**Module 2**

**-60 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**

**-20 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.

**Maulana Abul Kalam Azad University of Technology, West Bengal**

*(Formerly West Bengal University of Technology)*

**Syllabus for Bachelor in Architecture (B. Arch)**

(Applicable from the academic session 2019-2020)

**OUTCOME:**

The students will learn to handle a complete architectural design project at an advanced level and give a complete solution to the problem through design and details.