

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)

LANGUAGE LAB. /TECHNICAL ENGLISH (ARCH 101)

Credit	2
Contact Periods per week	2 lecture pds
Semester Exam	3 hrs

OBJECTIVE:

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

METHODOLOGY:

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

MODULE -1

18 pds

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; Formats .
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

OUTCOME:

Improvement of communicative and presentation skills .

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MATHEMATICS – I (ARCH 102)

Credit	3
Contact Periods per week	3 lecture pds
Semester Exam	3 hrs

OBJECTIVE:

To revise the aspects of Mathematics learned earlier.

METHODOLOGY:

Lectures and exercises.

Module-1 Differential Calculus: 10PDS

Successive differentiation: Higher order derivatives of a function of single variable, Leibnitz's theorem (statement only and its application, problems of the type of recurrence relations in derivatives of different orders and also to find $(y^n)_0$)

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 min matrix with $m, n \leq 4$).

REFERENCE

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

OUTCOME:

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

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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 Quantity – Vector Quantity – Addition & Subtraction of Vectors – Basic units – Derived Units – SI units – Relationship: M.L.T.

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

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

Condition of Equilibrium: Lami's Theorem – Triangle Law & Polygon Law of equilibrium – Conditions of equilibrium of co-planer system of concurrent forces – Conditions of equilibrium of co-planar system of non-concurrent parallel forces (like & unlike) – Conditions of equilibrium of co-planar system of non-concurrent non-parallel forces (simple problems excluding statically indeterminate).

Module-2

- 12 pds

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

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

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

Module-3

- 12 pds

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

CURVILINEAR MOTION: Angular displacement – Angular speed – Angular velocity – Relation between angular speed & angular velocity – Angular acceleration – Relation between linear & angular velocity – Relation between linear &

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angular acceleration – Motion and path of a projectile (numerical problems) – Centripetal and centrifugal force (numerical problems).

REFERENCE

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

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.

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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

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 Gympel / KÖNEMANN (Pb)
7. The Great Ages of World Architecture / G. H. Hiraskar / Dhanpat Rai.

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OUTCOME:

- The students will be able to 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.

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ARCHITECTURAL DESIGN I (ARCH 181)

Credit

6

Contact Periods per week

6 sessional 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 a design concept and represent the same in Architectural drawings using composition of different design elements ,forms and basic design principles.
- Application of anthropometric data and standards in designing of space.

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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 1st angle and 3rd 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. A Textbook of Engineering Drawing - B. Gupta;
2. 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.

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MODEL MAKING (ARCH 183)

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

OBJECTIVE:

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

METHODOLOGY:

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

Module 1: 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 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 pd**

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.
- Imparting a sense of responsibility and team work.