ANNA UNIVERSITY, CHENNAI

AFFILIATED INSTITUTIONS

R- 2009

B. ARCH.

I SEMESTER CURRICULUM AND SYLLABUS

SEMESTER I					
Code No	**Course Title**	**L**	**T**	**P/S**	**C**
THEORY					
MA2112	Mathematics	3	0	0	3
AR2101	History of Architecture & Culture I	2	0	0	2
AR2102	Building Materials I	2	0	0	2
AR2103	Environmental Science	3	0	0	3
THEORY CUM STUDIO					
AR2104	Art Studio	1	0	4	3
AR2105	Architectural Drawing I	1	0	4	3
STUDIO					
AR2106	Basic Design	0	0	14	7
	Sub Total	**12**	**0**	**22**	**23**

MA2112 **MATHEMATICS** **L S P/S C**
3 0 0 3

AIM

This course aims to develop the skills of the students in engineering mathematics. They will be trained on the basis of chosen topics of Mathematics necessary for effective understanding of engineering subjects. At the end of this course, the students would have an understanding of the appropriate role of the mathematical concepts learnt.

OBJECTIVES

- Identifying Eigenvalue problems, obtain solution and acquired the technique of diagonalizing a matrix.
- Studying the properties of lines and plans in space, along with sphere and providing a tool to understand 3D material.
- Understand geometrical aspects of curvature and elegant application of differential calculus.
- Understand function of more than one variable, along with differentiation under integral sign.
- Solving differential equation of certain type

CONTENT:

UNIT I MATRICES 9

Eigenvalue problem – Eigenvalues and eigenvectors of real matrix – Characteristic equation – Properties of eigenvalues and eigenvectors – Cayley – Hamilton theorem (without proof) – Diagonalization by orthogonal transformation of a symmetric matrix.

UNIT II THREE DIMENSIONAL ANALYTICAL GEOMETRY 9

Direction cosines and ratio's – Angle between two lines – Equations of a plane – Equations of a straight line – Coplanar lines – Shortest distance between skew lines – Sphere – Tangent plane – Plane section of a sphere.

UNIT III GEOMETRICAL APPLICATIONS OF DIFFERENTIAL CALCULUS 9

Curvature – Cartesian and polar co_ordinates – Centre and radius of curvature – Circle of curvature – Involutes and evolutes – Envelopes.

UNIT IV FUNCTIONS OF SEVERAL VARIABLES 9

Function of two variables – Partial derivatives – Total derivative – Jacobians-Taylor's series of two variableMaxima and Minima – Constrained maxima and minima – Lagrange's Multiplier method.

UNIT V ORDINARY DIFFERENTIAL QUATIONS 9

Linear equations of second order with constant coefficients - Simultaneous first order linear equations with constant coefficients - Homogeneous equation of Euler type - Equations reducible to homogeneous form.

TOTAL: 45 PERIODS

REQUIRED READINGS

1. Veerarajan, Y., "Engineering Mathematics (for first year)', Second edition, Tata Mc Graw – Hill pub., Co., Ltd., New Delhi 2002.
2. Venkataraman, M.K., "Engineering Mathematics", Volume I, Fourth Edition. The National Pub, Co., Chennai, 2003.

REFERENCES

1. Grewal, B.S., "Higher Engineering Mathematics", Thirty Sixth Edition, Khanna Publishers, Delhi, 2001
2. Kandaswamy, P., Thilagavathy, K., and Gunavathy, K., "Engineering Mathematics" Volume I, Fourth Revised Edition, S. Chand & Co., New Delhi, 2000.
3. Kreyszig E., "Advanced Engineering Mathematics", Eight Edition, John Wiley and Sons (Asia) Ltd., Singapore, 2001.
4. 'Engineering Mathematics", Manikavasagan Pillai – S.V. Publication.
5. "Calculus and 3 Dimensions" – P.R. Vittal Margam Publications.

AR2101 HISTORY OF ARCHITECTURE AND CULTURE I

L	S	P/S	C
2	0	0	2

AIM:

To inform about the development of architecture in the Ancient Western World and the cultural and contextual determinants that produced that architecture.

OBJECTIVES:

To understand architecture as evolving within specific cultural contexts including aspects of politics, society, religion and climate

To gain knowledge of the development of architectural form with reference to technology, style and character in the prehistoric world and in Ancient Egypt, West Asia, Greece and Rome.

CONTENT:

UNIT I PREHISTORIC AGE 4

Introducing concepts of culture and civilization - Paleolithic and Neolithic culture - art forms and evolution of shelter - megaliths - agricultural revolution and its impact on culture and civilization.

UNIT II ANCIENT RIVER VALLEY CIVILIZATIONS: EGYPT 4

Landscape and culture of Ancient Egypt- history - religious and funerary beliefs and practices - monumentality – tomb architecture: evolution of the pyramid from the mastaba - temple architecture: mortuary temples and cult temples

Great Pyramid of Cheops, Gizeh - temple of Ammon Ra, Karnak - temple of Abu Simbel (Rock Cut)

UNIT III ANCIENT RIVER VALLEY CIVILIZATIONS: MESOPOTAMIA 4

Urbanization in the Fertile Crescent - Sumerian, Babylonian, Assyrian and Persian culture - evolution of city-states and their character- law and writing - theocracy and architecture - evolution of the ziggurat - palaces

Ziggurat of Ur, Urnamu - Palace of Sargon, Khorsabad - Palace at Persepolis

UNIT IV CLASSICIAL PERIOD: GREECE 10

Landscape and culture of Greece- Minoan and Mycenaean cultures- Hellenic and Hellenistic cultures – Greek character- Greek polis and democracy – Greek city planning- - architecture in the archaic and classic periods – Domestic architecture; Public Buildings: Agora, stoas, theaters, bouletrion and stadias – Greek temple: evolution and classification- Parthenon and Erecthion- orders in architecture: Doric, Ionic, Corinthian - optical illusions in architecture

UNIT V CLASSICAL PERIOD: ROME 8

Roman history: Republic and Empire- Roman religion and the Roman temple- Roman character- lifestyle- Roman urban planning- art and architecture as imperial propaganda: forums and basilicas- domestic architecture – structural forms, materials and techniques of construction - orders in architecture: Tuscan and Composite

Rome: Forum Romanum and other Imperial Forums, Enclosure and manipulation of space: Pantheon- Public buildings: Colloseum, Circus Maximus, Thermae of Caraculla.

TOTAL: 30 PERIODS

REQUIRED READINGS

1. Sir Banister Fletcher, A History of Architecture, University of London, The Antholone Press, 1996.
2. Spiro Kostof - A History of Architecture - Setting and Rituals, Oxford University Press, London, 1985.
3. Leland M Roth; Understanding Architecture: Its elements, history and meaning; Craftsman House; 1994

REFERENCES

1. Pier Luigi Nervi, General Editor - History of World Architecture - Series, Harry N.Abrams, Inc.Pub., New York, 1972.
2. S.Lloyd and H.W.Muller, History of World Architecture - Series, Faber and Faber Ltd., London, 1986.
3. Gosta,E.Samdstrp, Man the Builder, Mc.Graw Hill Book Company, New York, 1970.
4. Webb and Schaeffer; Western Civilisation Volume I; VNR: NY: 1962
5. Vincent Scully: Architecture; Architecture – The Natural and the Man Made: Harper Collins Pub: 1991.

AR2102 BUILDING MATERIALS I L S P/S C
2 0 0 2

AIM:

This course is devised to make students understand the basic materials of construction such as soil, lime, stone and rocks and other naturally occurring materials such as bamboo, palm, straw, etc.

OBJECTIVES:

- To have an understanding of the properties, characteristics, strength, manufacture, processing and application of materials such as soil, lime, rocks and stones.
- To inform the properties, characteristics and use of bamboo, palm, straw, etc. and methods of preservation and treatment.
- To sensitize the students to the use of these naturally occurring materials in the context of creating a green architecture.

CONTENT:

UNIT I SOILS 6

Fundamentals of Soil Science, Types of soils, Principles of Soil Stabilization, Charactertics of core, Types of Stabilizers, Requirements and Types of mudwall building and surface protection.

UNIT II LIME **4**

Types of lime, Classification of lime, comparison between fat lime and hydraulic lime, Manufacturing process slaking, Hardening – Testing and Storage, Lime putty, Precautions in handling and uses of lime.

UNIT III BAMBOO AND OTHER MATERIALS **10**

Bamboo – Bamboo as plant classification, species, geographical distribution, Anatomy of Bamboo, Properties, strength, processing, harvesting, working of Bamboo tools – Treatment and preservation of Bamboo and uses of Bamboo.

Cane, gate, coir, coconut - Growth, Form, Shape, Leaves, Flowering, Propagation

Roofing materials – Thatch, grass, Bamboo, reeds – Basics

UNIT IV STRAW BALES **6**

Straw as a building material, - Basics, Fire, moisture, insects and pests proof.

UNIT V ROCKS AND STONES **4**

Classification of rocks, Classification, Sources, Seasoning, Quarrying of stones, Dressing, Characteristics of stones, Testing of stones, Common building stones and their uses.

Preservation of stones

Deterioration of stones, Durability, Preservation, Selection of stones, Artificial stones.

TOTAL: 30 PERIODS

REQUIRED READINGS

1. P.C. Varghese, Building Materials, Prentice Hall of India put Ltd New Delhi 110001, 2005.
2. S. C. Rangwala, Engineering Materials, Character Publishing house, Anand – 388 001, India, 2002.
3. Dunkelberg (K), Bambus – Bamboo, Bamboo as a Building Material, Karl Kramer Verlag Stuttgart, 2000.
4. UNO, Use of Bamboo and reeds in construction – UNO publications
5. Chris magword and petermack, straw bale building, New society publishers , Canada, 2000.

REFERENCES

1. S.K. Duggal, Building materials, Oxford and IBH publishing Co, put, Ltd, New Delhi 110001, 1997.
2. R. F spencke and D.J.Cook. Building Materials in Developing Countries – John Wiley and sons 1983.
3. Rural Construction NBO – New Delhi

AR2103 ENVIRONMENTAL SCIENCE **L S P/S C**

3 0 0 3

AIM:

To sensitize the students to understand the diversities and complexities in natural environments and the need for intervention in the context of global warming and climate change.

OBJECTIVES:

- To provide an overview of natural resources, various ecosystems & its characteristics and conservation of biodiversity.
- To create an awareness about impact of human activities such as pollution and its consequences.
- To stress the importance of environmental protection and sustainable development.

CONTENT:

UNIT I THE MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES 3

Definition, Scope and importance;
Need for public awareness.

UNIT II RENEWABLE AND NON-RENWABLE RESOURCES 6

Natural resources and associated problems

(a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal peoples.
(b) Water resources: Use and over-utilization of surface and ground water, dams-benefits and problems.
(c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
(d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
(e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies.
(f) Land resources: Land as a resource, land degradation, man included landslides, soil erosion and desertification.
    - Role of an individual in conservation of natural resources.
    - Equitable use of resources for sustainable lifestyles.

UNIT III ECOSYSTEMS 6

Concept of ecosystem.

- Structure and function of an ecosystem.
- Procedures, consumers and decomposers.
- Energy flow in the ecosystem.
- Ecological succession.
- Food chains, food webs and ecological pyramids.
- Introduction, types, characteristic features, structure and function of the following ecosystem:
    (a) Forest ecosystem
    (b) Grassland ecosystem
    (c) Desert ecosystem
    (d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

UNIT IV BIODIVERSITY AND ITS CONSERVATION 6

- Introduction - Definition: Genetic, species and ecosystem diversity.
- Biogeographical classification of India.
- Value of biodiversity: Consumptive use, productive use, social, ethical, and aesthetic and option values.
- Biodiversity at global, National and local levels.
- India as a mega-diversity nation.
- Hot spots of biodiversity.
- Threats to biodiversity: Habitat loss, poaching of wildlife, man-wildlife conflicts.
- Endangered and endemic species of India.
- Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT V ENVIRONMENTAL POLLUTION 6

Definition

- Causes, effects and control measures of:
    (a) Air pollution

(b) Water pollution
(c) Soil pollution
(d) Marine pollution
(e) Noise pollution
(f) Thermal pollution
(g) Nuclear pollution

- Soil waste Management: Causes, effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution.
- Pollution case studies.
- Disaster management: Floods, earthquake, cyclone and landslides.

UNIT VI SOCIAL ISSUES AND THE ENVIRONMENT 6

- From unsustainable to sustainable development.
- Urban problems related to energy.
- Water conservation, rain water harvesting, watershed management.
- Resettlement and re habitation of people; its problem and concerns. Case studies.
- Environmental ethics: Issues and possible solutions.
- Climate changes, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
- Wasteland reclamation.
- Consumerism and waste products.
- Environmental protection Act.
- Air (prevention and control of Pollution) Act.
- Water (prevention and control of Pollution) Act.
- Wildlife protection Act.
- Forest conservation Act.
- Issues involved in enforcement of environmental legislation.
- Public awareness.

UNIT VII HUMAN POPULATION AND THE ENVIRONMENT 6

- Population growth, variation among nations.
- Population explosion - Family Welfare Programme.
- Environment and human health.
- Human rights.
- Value education.
- HIV/AIDS
- Women and Child Welfare.
- Role of information Technology in Environment and human health.
- Case studies.

UNIT VIII FIELD WORK 6

- Visit to a local area to document environmental asserts-river/ forest/ grassland/ hill/ mountain.
- Visit to a local polluted site - Urban/ Rural/ Industrial/ Agricultural.
- Study of common plants, insects, birds.
- Study of simple ecosystem-pond, river, hill slopes, etc. (Field work Equal to 5 lecture hours).

TOTAL: 45 PERIODS

REQUIRED READINGS:

1. Miller T.G. Jr., Environmental Sciences, Wadsworth Publishing Co. (TB)
2. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumbai, 1196p.

REFERENCES:

1. Hawkins.R.E, Encyclopedia of Indian Natural History, Bombay Natural History Sdociety, Bombay (R).
2. Heywood, V.H & Watson, R.T. 1995. Global Biodiversity Assesment. Cambridge Univ. Press 1140p.
3. McKinney, M.L & Schoch, R.M. 1996. Environmental Science System & Solutions, Web enhanced edition. 639p.
4. Trivedi R.K., Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol I and II, Enviro Media (R).

AR2104 ART STUDIO L S P/S C
1 0 4 3

AIM:

To develop presentation skills, visual expression and representation, imaginative thinking and creativity through a hands on working with various mediums and materials.

OBJECTIVES:

1. To familiarize the students with the various mediums and techniques of art through which artistic expression can be achieved
2. To familiarize students with the grammar of art by
   - Involving them in a series of free hand exercises both indoor and outdoor to understand form, proportion, scale, etc
   - Involving them in a series of exercises which will help them experiment with form and volume.
   - To involve students in a series of exercises which will look at graphic and abstract representations of art.

CONTENT:

UNIT I DRAWING 15

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

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

UNIT II PAINTING I 15

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

UNIT III PAINTING II 20

Indoor and out door painting – Rendering techniques

Exercise involving Water colour – Water soluble colour pencil – Tempra – Acarali – Water soluble oil colour – Oil colour – Pen and ink – Brush – Air brush – Mixed mediums – Study of multi colour and 3D effects from nature and built environment.

UNIT IV SCULPTURE 15

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

UNIT V APPLIED ART 10

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

TOTAL: 75 PERIODS

REQUIRED READINGS

1. Webb, Frank, "The Artist guide to Composition", David & Charles, U.K., 1994.
2. Drawing a Creative Process", Ching Francis, Van Nostrand Reinhold, New York, 1990.
3. Alan Swann, Graphic Design School, Harper Collins, 1991.

REFERENCES

1. Moivahuntly, "The artist drawing book", David & Charles, U.K., 1994.
2. Arundell (Jan) Exploring sculpture, Mills and Boon, London/Charles, T. Brand Ford Company, U.S.A.
3. The art of drawing trees, heads, colours, mixing, drawing, landscape and painting, water colour, oil colour, etc. – The Grumbacher Library Books, New York – 1996.
4. Caldwell peter, "Pen and Ink Sketching", B.T. Bats ford Ltd., London, 1995**.**

AR2105 ARCHITECTURAL DRAWING I L S P/S C
1 0 4 3

AIM:

To introduce the concepts and fundamentals of architectural drawing to develop representation skills and to nurture the understanding of the nature of geometrical forms and simple building forms and to teach the language of architectural and building representation.

OBJECTIVES:

- To involve students in a number of exercises that will help them to understand the nature of geometrical forms in terms of drawing plane and solid projections. .
- To involve students in a number of exercises that will help to understand the representation of 3 Dimensional forms through isometric and axonometric drawings.
- To introduce basic measured drawing of simple objects and building components.

CONTENT:

UNIT I GEOMETRICAL DRAWING: PLANE GEOGRMETRY 12

Introduction to fundamentals of drawing/drafting - Construction of lines, angles - scales and area. Construction of plane - circles, tangent, curves and conic sections – construction and development of planar surface – square, rectangle, polygon etc.

UNIT II GEOMETRICAL DRAWING :ORTHOGRAPHIC PROJECTION OF PLANAR SURFACES 12

Isometric, axonometric and multi-view projection of geometric shapes namely square, circle, and polygon etc.

UNIT III GEOMETRICAL DRAWING: SOLID GEOMETRY 12

Introduction to simple projection – projection and development of solid surfaces – sections of solid, true shape of section and penetration of solids.

UNIT IV GEOMETRICAL DRAWING: ORTHOGRAPHIC PROJECTION OF SOLIDS 12

Isometric, axonometric and multi-view projection of solid – cube, prism combination of solid etc.

UNIT V MEASURED DRAWING 27

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

TOTAL: 75 PERIODS

REQUIRED READINGS

1. IH. Morris, Geometrical Drawing for Art Students - Orient Longman, Madras, 2004.
2. Francis Ching, Architectural Graphics, Van Nostrand Rein Hold Company, New York, 1964.

REFERENCES

1. George K.Stegman, Harry J.Stegman, Architectural Drafting Printed in USA by American Technical Society, 1966.
2. C.Leslie Martin, Architectural Graphics, The Macmillan Company, New York, 1964

AR2106 BASIC DESIGN L S P/S C
0 0 14 7

AIM:

To understand the elements and principles of Basic Design as the building blocks of creative design through exercises that will develop the originality, expression, skill and creative thinking.

OBJECTIVES:

- To involve students in a number of exercises to understand the grammar of design and visual composition.
- To enable the understanding of 3 D Composition by involving students in a number of exercises which will help generation of a form from a two dimensional / abstract idea.
- To enable the understanding of the relationship between the grammar of design and architecture by involving the students in seminars/ workshops and simple exercises which will look at building form analytically.

CONTENT:

Introduction to Architectural Design through Basic Design – Elements of Design :
Properties, qualities and characteristics of point, line, direction shape, form, colour and texture – Principles of Design: Scale, Proportion, Balance, Harmony, Rhythm and Contrast.

The course shall be conducted by giving a number of exercises in the form of design studios, seminars and creative workshops that are aimed at teaching the following:

i) Elements and Principles of Visual Composition using point, line, shape.
ii) Exploring colour schemes and their application in a visual composition and in Architectural forms and spaces.
iii) Study of texture and schemes of texture both applied and stimulated and their application
iv) Study of linear and Planar forms using simple material like Mount Board, metal foil, box boards, wire string, thermocol etc.
v) Study of Solids and voids to evolve sculptural forms and spaces and explore the play of light and shade and application of color.
vi) Study of fluid and plastic forms using easily mouldable materials like clay, plaster of paris etc.

vii) Analytical appraisal of building form in terms of visual character, play of light and shade, solids and voids etc.

viii) Application of Basic design in Architectural Design through the manipulation of line, plane, solid and voids and application of texture colour, proportion etc.

TOTAL: 210 PERIODS

REQUIRED READINGS

1. Owen Cappleman & Michael Jack Jordon, Foundations in Architecture : An Amotated Anthology of Beginning Design Project, Van Nostrand Reinhold New York, 1993.
2. Charles Wallschlacgerm & Cynthia Busic-Snyder, Basic Visual Concepts and Principles for Artists, Architects and Designers, Mc Graw Hill, New York 1992.

REFERENCES

1. V.S.Pramar, Design fundamentals in Architecture, Somaiya Publications Pvt. Ltd., New Nelhi, 1973.
2. Francis D.K.Ching - Architecture - Form Space and Order Van Nostrand Reinhold Co., (Canaa), 1979.
3. John W.Mills - The Technique of Sculpture, B.T.Batsford Limited, New York - Reinhold Publishing Corporation, London, 1966.
4. Elda Fezei, Henny Moore, Hamlyn, London, New York, Sydney, Toronto, 1972.
5. C.Lawrence Bunchy - Acrylic for Sculpture and Design, 450, West 33rd Street, New York, N.Y.10001, 1972.