

UNIVERSITY DEPARTMENTS
ANNA UNIVERSITY, CHENNAI- 600 025

REGULATIONS -2013

M. ARCH (DIGITAL ARCHITECTURE) – FULL TIME
I TO IV SEMESTERS OF CURRICULA AND SYLLABI

S.NO.	COURSE CODE	COURSE NAME	L	T	P/S	C
SEMESTER I						
1.	DG8101	Visualization Studio	2	0	6	5
2.	AA8151	Contemporary Processes in Architectural Design I	3	0	0	3
3.	AA8152	Urban Design Studio	2	0	6	5
4.	DG8151	Architecture and Critical Theory	3	0	0	3
5.	DG8152	Building Management and Control Systems	3	0	0	3
TOTAL						19
SEMESTER II						
6.	DG8201	Digital Design Studio I	0	0	12	6
7.	DG8202	Visual Design through Algorithms	3	0	0	3
8.	AA8251	Contemporary Processes in Architectural Design II	3	0	0	3
9.	DG8251	Performance Evaluation of Buildings	2	0	2	3
10.		Elective I	*	*	*	3
11.		Elective II	*	*	*	3
TOTAL						21
SEMESTER III						
12.	DG8301	Advanced Digital Design Studio II	0	0	12	6
13.	DG8302	Digital Production, Solid Modeling and RP	1	0	4	3
14.	DG8303	Dissertation	0	0	6	3
15.	AA8351	Research Methodologies in Architecture	3	0	0	3
16.		Elective III	*	*	*	3
17.		Elective IV	*	*	*	3
TOTAL						21

SEMESTER IV						
18.	DG8451	Web Design and Portfolio Production	0	0	6	3
19.	DG8411	Thesis	0	0	22	11
TOTAL					14	
Total no of credits required for the award of the degree						
					75	
List of Electives- M. Arch (Digital Architecture)						
20.	DG8001	High End 3 D Modeling	1	0	4	3
21.	DG8002	Introduction to Algorithms	2	0	2	3
22.	DG8003	Introduction to Scripting	2	0	2	3
23.	DG8004	Virtual Society	3	0	0	3
24.	AA8071	GIS Modeling in Urban Planning	3	0	0	3
25.	AA8252	Services in High Rise Buildings	3	0	0	3
26.	AA8451	Building Information Modeling	0	0	6	3
27.	LN8153	Urban Landscape Design	3	0	0	3
L- Lecture T- Tutorial P- Practical / S-Studio C- Credits						



UNIVERSITY DEPARTMENTS
ANNA UNIVERSITY, CHENNAI- 600 025
REGULATIONS – 2013

M. ARCH (DIGITAL ARCHITECTURE) – PART TIME- DAY TIME
I TO VI SEMESTERS OF CURRICULA AND SYLLABI

S.NO.	COURSE CODE	COURSE TITLE	L	T	P/S	C
SEMESTER I						
1.	AA8151	Contemporary Processes in Architectural Design I	3	0	0	3
2.	DG8101	Visualization Studio	2	0	6	5
3.	AA8152	Urban Design Studio	2	0	6	5
TOTAL			13			
SEMESTER II						
4.	AA8251	Contemporary Processes in Architectural Design II	3	0	0	3
5.	DG8251	Performance Evaluation of Buildings	2	0	2	3
6.	DG8202	Visual Design through Algorithms	3	0	0	3
7.		Elective I	*	*	*	3
TOTAL			12			
SEMESTER III						
8.	DG8152	Building Management and Control Systems	3	0	0	3
9.	DG8151	Architecture and Critical Theory	3	0	0	3
10.		Elective II	*	*	*	3
11.	DG8302	Digital Production, Solid Modeling and RP	1	0	4	3
TOTAL			12			
SEMESTER IV						
12.		Elective III	*	*	*	3
13.		Elective IV	*	*	*	3
14.	DG8201	Digital Design Studio I	0	0	12	6
TOTAL			12			

Attested

SEMESTER V						
15.	AA8351	Research Methodologies in Architecture	3	0	0	3
16.	DG8303	Dissertation	0	0	6	3
17.	DG8301	Advanced Digital Design Studio II	0	0	12	6
TOTAL			12			
SEMESTER VI						
18.	DG8451	Web Design and Portfolio Production	0	0	6	3
19.	DG8411	Thesis	0	0	22	11
TOTAL			14			
Total no of credits required for the award of the degree			75			
List of Electives- M. Arch. (Digital Architecture)						
20.	DG8001	High End 3 D Modeling	1	0	4	3
21.	DG8002	Introduction to Algorithms	2	0	2	3
22.	DG8003	Introduction to Scripting	2	0	2	3
23.	DG8004	Virtual Society	3	0	0	3
24.	AA8071	GIS Modeling in Urban Planning	3	0	0	3
25.	AA8252	Services in High Rise Buildings	3	0	0	3
26.	AA8451	Building Information Modeling	0	0	6	3
27.	LN8153	Urban Landscape Design	3	0	0	3
L- Lecture T- Tutorial P- Practical / S- Studio C- Credits						

PROGRESS THROUGH KNOWLEDGE

OBJECTIVES:

- To explain and inform the students on the importance of visualization as a tool in the interpretation of design data.
- To introduce the role of computer graphics as a design generation tool.

UNIT I BASICS OF 3DS MAX 10
Basics of 3DsMax- Introduction to interface, standard and extended primitives, modifiers, splines. Basics of modeling – nurbs and polygon modeling, Exercises involving the above

UNIT II MATERIAL APPLICATION, LIGHTING AND CAMERA 10
Material editor - Various material types available in 3DS MAX, mapping materials – Types of lights and lighting systems – cameras – target and free camera.

UNIT III DYNAMICS 25
Dynamics – Particle systems, forces and deflectors in 3DS MAX – exercise involving the above.

UNIT IV ANIMATION 25
Animation – Introduction to timeline – playback controls – keyframe animation – path animation – fix and constraining cameras to path – render engines and rendering – exercises involving the above.

UNIT V 3DS MAX SCRIPT 20
Overview – Coordinate, object primitives and materials that mirror high-level concepts in the 3DS MAX user-interface. Learning MAX Script – Drawing an object in MAX Script, Step by step execution of max script using Listener. Creating Scripts, Creating Scripted Utilities, Creating Scripted Plug-ins.

TOTAL: 90 PERIODS**OUTCOME:**

- To make the students equip with digital visualization tool at exploring the design development

REFERENCES:

1. A. Watt, Fundamentals of Three-Dimensional Computer Graphics, Addis Wesley, Massachusetts, 1989.
2. J. Foley et.al. Computer Graphics: Principles and Practice, Addison-Wes Massachusetts, 1995
3. Mitchell, W. J. and McCullough, M, Digital Design Media, Van Nostrand Rheint New York, 1995.

AA8151 CONTEMPORARY PROCESSES IN ARCHITECTURAL DESIGN I

L T P/S C
3 0 0 3**OBJECTIVES:**

- To investigate the contemporary theories of media and their influence on the perception of space and architecture.
- To provide an overview of various contemporary design processes and its relation to computation.

UNIT I INTRODUCTION 6
Investigation of contemporary theories of media and their influence on the perception of space and architecture. Technology and Art – Technology and Architecture – Technology as Rhetoric – Digital Technology and Architecture

- UNIT II ASPECT OF DIGITAL ARCHITECTURE 9**
Aspects of Digital Architecture – Design and Computation – Difference between Digital Process and Non-Digital Process – Architecture and Cyber Space – Qualities of the new space – Issues of Aesthetics and Authorship of Design – Increased Automatism and its influence on Architectural Form and Space
- UNIT III CONTEMPORARY PROCESS 12**
Overview of various Contemporary design process and its relation to computation: Diagrams – Diagrammatic Reasoning – Diagrams and Design Process – Animation and Design – Digital Hybrid Design Protocols – Concept of Emergence - Introduction to Cellular Automata and Architectural applications – Genetic algorithms and Design Computation
- UNIT IV GEOMETRIES AND SURFACES 12**
Fractal Geometry and their properties – Architectural applications - Works of Zvi Hecker-- Shape Grammar - Shapes, rules and Label - Shape Grammar as analytical and synthetic tools- Combining Shape grammar and Genetic algorithm to optimize architectural solutions - Hyper Surface-- Introduction to Hyper surface and concepts of Liquid architecture.
- UNIT V CASE STUDIES 6**
Case studies- Study, understanding and analysis of known examples at the national and international levels which demonstrates the contemporary theories of media and their influence on the perception of space and architecture, contemporary design processes and its relation to computation.

TOTAL:45 PERIODS

OUTCOMES:

- Understanding of the effect of contemporary theories of media on contemporary architectural design.
- Understanding of various contemporary design process and their relation to computation

REFERENCES:

1. Peter Eisenmann, Diagram: An Original Scene of Writing, Diagram Diaries
2. MOVE, UN Studio
3. Grey Lynn, The Folded, The Pliant and The Supple, Animate form
4. Contemporary Techniques in Architecture, Halsted Press, 2002
5. Ali Rahim, Contemporary Process in Architecture, John Wiley & Sons, 2000
6. Walter Benjamin, Practices of Art in the Age of Mechanical Reproduction Colin press, 1977
7. Work of Architecture in the Age of Mechanical Reproduction, Differences MIT press, 1997.
8. William J Mitchell, the Logic of Architecture: Design, Computation and Cognition. MIT Press, Cambridge, 1995
9. Marcos Novak, invisible Architecture: An Installation for the Greek Pavilion, Venice Biennale, 2000.

AA8152

URBAN DESIGN STUDIO

L T P/S C

2 0 6 5

OBJECTIVES:

- To introduce and identify the issues/ aspects of contemporary urban form through study of history of urbanism, contemporary urban theories, urbanism and urban design precedents.
- To intervene through design, addressing the effects of some of these aspects/ issues

Attested
Sahana
DIRECTOR
Centre For Academic Courses
Anna University, Chennai-600 025.

UNIT I	INTRODUCTION	25
Introduction to origin and evolution of cities and urbanism- historic review of the development of the urban design discipline and principles- introduction to various issues and aspects that impinge on the urban condition today such as globalisation, digital revolution, contemporary processes, sustainability, splintering urbanism through changes in information and communication networks and transportation.		
UNIT II	READING THE URBAN FABRIC	20
Introduction to different ways of reading of the urban fabric- ways of interpreting the city such as type, phenomenology, etc.,- tools of mapping		
UNIT III	SUSTAINABLE DEVELOPMENT	25
Sustainable development– Sustainable Cities Program - Revitalization of brown field sites- Transit Metropolis- Case Studies		
UNIT IV	RESTRUCTURING THE CITY	20
Contemporary Processes in Urban Design- Place making in the Digital Age – reconfiguring public realm – Urbanisation and Excursions on density		
UNIT V	APPLICATION OF DIGITAL TECHNIQUES IN URBAN DESIGN	30
Depiction of Urban Spaces in Digital Media - Role of Digital Media in Reconfiguring Urban Space – Case studies – Application of Geographic Information Systems, diagramming and 3D Modeling tools in Urban Design - Digital Media as a facilitator for participatory, sustainable urban design.		

TOTAL:120 PERIODS

OUTCOMES:

- The students would become aware of the determinants of contemporary urban form and ways to understand their effects.
- The students would learn to address issues of contemporary urban form through planning and design using appropriate tools.

REFERENCES :

1. Crigore Birdea (ed.), Virtual Reality Technology. Wiley and Sons, New York, 1994
2. William J. Mitchell, City of Bits: Space, Place and the infobahn, MIT Press, 1996
3. Charles Correa, Housing and Urbanisation, Thames and Hudson, 1999
4. Neil leach, Designing for the digital world, John Wiley and Sons, 2002
5. Edmond Bacon, Design of Cities, Penguin 1967
6. Christian Norberg Schulz- Towards a Phenomenology of Architecture, Rizzoli New York, 1980
7. Donald Appleyard, Kevin Lynch, John R. Myer, The View from the Road, MIT Press 1965
8. Benjamin Woolley, Virtual Worlds. Penguin Books, 1993/1994
9. Peter Calthorpe, The Next American Metropolis, Princeton Architectural Press, 1993
10. Thomas A, Horan, Digital Places: Building our city of bits, Urban Land Institute, 2000

OBJECTIVES:

- To introduce the idea of architecture as enmeshed in the society and a product of larger socio-cultural issues and practices, and not as an autonomous object determined by a hermetically sealed discipline.
- To introduce the various interdisciplinary critical theories and explain their interpretation of architecture.

UNIT I INTRODUCTION**6**

Definition of theory - Architectural theory and its nature, purpose and its relation to practice - overview of some traditional architectural theories- context for the rise of more critical theories in architecture – Introduction to Critical Theory- Architecture and Critical Theory.

UNIT II POWER AND BUILT ENVIRONMENT**10**

Definition of power- Forms of power- Power in the built environment at various scales- ideas of power and society, power-knowledge- Colonialism in India as a form of dominance- introduction to architecture and urbanism of colonialism in India- Production of Indo-Saracenic architecture- New Delhi as a part of imperial vision- Case studies of the architecture and urbanism of power in the modern world.

UNIT III PLACE AND ARCHITECTURE**10**

Critical reactions to modernity/ modernism with reference to the concept of context/ place - Critical Regionalism and architectures of resistance- Place and phenomenology in architecture

UNIT IV SEMIOTICS AND ARCHITECTURE**10**

Architecture as communication and representation- introduction to linguistic concepts of semiotics, structuralism, post structuralism and deconstruction- brief over view of postmodern and deconstructivist architecture with reference to these concepts

UNIT V CONTEMPORARY ISSUES IN ARCHITECTURE**9**

Conditions of late capitalism and postmodern society- Society of spectacle- Architecture as spectacle and seduction- Theme parks and shopping malls-privatisation of public spaces-aesthetisation of architectural issues- influence of globalisation and digital revolution on architectural processes- debates of heritage- gender and space

TOTAL: 45 PERIODS**OUTCOMES:**

- The students would gain an understanding of architecture as an integral production of society as well as engage in critical thinking to interpret architecture.
- The students' awareness through this course would inform their practice/ research .

REFERENCES:

1. Neil Leach (ed) Rethinking Architecture, Routledge 2000
2. Michael Hays (ed) Architectural Theory since 1960, MIT Press, 2000
3. Kate Nesbitt, Theorizing a New Agenda for Architecture, Princeton Architectural Press, 1996
4. Anthony D. King, Colonial Urban Development, Routledge & Paul, London, 1976
5. Thomas Metcalf Imperial vision, Oxford, 2002
6. Jane Rendell, Barbara Penner, Iain Borden, Gender Space Architecture, Routledge, 2000
7. Kim Dovey, Framing Places: Mediating Power in Built Form, Routledge 1999.
8. Neil Leach, Anaesthetics of Architecture, MIT Press 1999,
9. Guy Debord. Society of Spectacle, Ian Borden & Jane Rendell, (ed), Intersections, Routledge 2000
10. Paul Allan Johnson, Theory of Architecture, Routledge 2000
11. Christian Norberg Schulz- Towards a Phenomenology of Architecture, Rizzoli New York, 1980

OBJECTIVES:

- This course provides a detailed exposure to students regarding the design & application in the field of life safety, electronic security & services automation requirements.
- To expose the students to the mandatory and inevitable integration of building management systems in building construction..

UNIT I SAFETY SYSTEMS – FIRE ALARM & PUBLIC ADDRESS SYSTEM 9

Objective of a Fire Alarm System, essential components of a Fire Alarm System, Type of detection technology currently in use and Statutory Standards to be followed in design. Explanation of the essential Clauses of the codes, and various types of Technologies employed in the Fire Alarm System, basic knowledge on how a Fire Alarm system works, designed and installed.

Objective of a Public Address System, essential components of a Public Address System, various types of technologies currently in use and design guidelines to be followed and basic knowledge on how a Public Address System works, is designed and installed

UNIT II SAFETY SYSTEMS – FIRE SUPPRESSION SYSTEM 9

Objective of a Fire Suppression System, Explanation on Fire triangle, Essential Components of a Fire Suppression System, different type of Fire Suppression Systems, detailed design criteria for Hand held extinguishers Wet Riser, Sprinkler Systems and various gas Based Fire Suppression System, and Type of Statutory Standards followed in Suppression, Explanation on the essential Clauses and Basic Knowledge on how a Fire Suppression System works, is designed and installed.

UNIT III SECURITY SYSTEMS – ACCESS CONTROL SYSTEM AND INTRUDER ALARM SYSTEM 9

Introduction to Access Control, Intruder Alarm, Essential Components of each System, and Various types of Technologies employed in the system, Basic knowledge as how they work, are designed and installed.

UNIT IV SECURITY SYSTEMS – CCTV AND PERIMETER PROTECTION 6

Introduction to CCTV, Perimeter protection system, Essential Components of each System, and Various types of Technologies employed in the system, Basic knowledge as how they work, are designed and installed.

UNIT V INTEGRATED BUILDING MANAGEMENT SYSTEM 12

The objective of the Integrated Building Management System (IBMS), the list of utility, safety & security systems that are generally monitored & controlled through IBMS, the various components of IBMS, types of integration with the utility, Safety & security systems, explanation in detail on how each utility, safety & security system is integrated to IBMS, details of various parameters that can be monitored & controlled on each utility, safety & security system and the basic knowledge on how they work, are designed and installed.

TOTAL: 45 PERIODS**OUTCOME:**

- To ensure that every architect understands & designs the buildings that facilitates safe, code compliant, secure & comfortable buildings for the occupants

REFERENCES:

1. Building Automation Systems – A Practical Guide to Selection and Implementation, Maurice Eyke
2. The Principles and Practice of Closed Circuit Television, Mike Constant & Peter Turnbull
3. Rules for Automatic sprinkler Installation – second edition – Pub: Tariff Advisory Committee.
4. CCTV Surveillance, Herman Kruegle.
5. National Building Code of India 2005 (Part IV)
6. Bureau of Indian Standards IS2189, IS2190, IS15105, IS13039.
7. Fire Suppression Detection System, John L. Bryan.
8. Security Systems and Intruder Alarm System, Vivian Capel.

DG8201**DIGITAL DESIGN STUDIO I****L T P/S C**
0 0 12 6**OBJECTIVES:**

- This course focuses in understanding various Contemporary processes and translating them into architecture.
- To compute the methods of quantifying architecture and developing Design from codified data.

The project involves in developing Design prototype to explore various contemporary processes and ideas using shape grammar, fractal, parametric models, and Biometric etc. using major software used in design and video making.

TOTAL: 120 PERIODS**OUTCOME:**

- Students will develop the skill to develop architectural project based on process driven architecture through computational tool and physical model.

REFERENCES:

1. Gausa M, Metropolis Dictionary for advanced architecture, Published Actar – 2003.
2. Mathews K, Three Dimensional Sketching Berkeley, California, College of Environmental Design Library, University of California, Berkeley, 1988.

DG8202**VISUAL DESIGN THROUGH ALGORITHMS****L T P/S C**
3 0 0 3**OBJECTIVES:**

- To introduce the students to the method or technique to translate the visual configuration of Design by geometric data structure and abstraction modeling.
- To learn and comprehend the application of digital-based model system in generation and performance of architectural design solution.

UNIT I LINEAR ALGORITHMS**12**

Introduction to algorithms- finite element methods-application in 3d interface design, including sketch modeling-translation of architecture models into geometric data structures, structural abstraction such as nodes, elements, modeling forces and restraints- applications such as unified user interface.

UNIT II GENETIC ALGORITHMS**12**

Introduction to genetic algorithms –evolutionary art- application of evolutionary principles of genetic algorithms in configuration design of complex structures- synthesis of topology, geometry and component properties of a structure using genetic algorithm- genetic algorithm application in site design, architectural design and modeling, structural design.

*Attested**Sobhan*
DIRECTOR

UNIT III BASICS OF NEURAL NETWORKS 9

Introduction to neural networks basics, computational models and application areas- identification of generic problem areas in building design suitable for neural network application- pre processing of data and capabilities of neural networks- selection of neural network model characteristics for a given application- learning algorithms for widely used neural network models.

UNIT IV APPLICATIONS OF NEURAL NETWORKS 6

Application of neural network models in architectural design and advanced modeling including acoustic design, diagnosis and forecasting, maintenance and control, building performance evaluation etc.

UNIT V FRACTALS 6

Introduction to Fractals- types of fractals- fractal creation, generators and initiators, direction and proportion – generating fractals based on spatial design and application in architectural design.

TOTAL: 45 PERIODS

OUTCOMES:

- The students will be able to identify and differentiate algorithm tools, its characteristics and the application technique.
- The students will develop the ability to compute and apply the tools /technique in Design process to generate, differentiate and evaluate its composition and spatial analysis.

REFERENCES:

1. Bovill, C, Fractals in architecture and design, Birhauser, Boston, 1996.
2. Mitchell, W and McCullough, M, Digital Design Media, 2nd edition. New York, Van Nostrand Reinhold , 1995
3. Stephen Todd and William Latham. Evolutionary Art and Computers. (Academic Press, New York, 1992)
4. Malcolm McCullough. Abstracting Craft : The Practiced Digital Hand. MIT Press, Reprint edition, September 1998.
5. Black, R. G. and Duff, S. F, A Model for Teaching Structures: Finite Element Analysis and Architectural Education, Journal of Architectural Education 48(1), 38-55,199
6. B. J. Novitski. Rendering Real & Imagined Buildings : The Art of Computer Modeling. Rockport Pub., Book and CD-ROM edition, January 1999.
7. Matthews, K, Three Dimensional Sketching. Berkeley, California, College of Environmental Design Library, University of California, Berkeley, 1988.

AA8251

CONTEMPORARY PROCESSES IN ARCHITECTURAL DESIGN II

**L T P/S C
3 0 0 3**

OBJECTIVES:

- To provide an overview of various contemporary architects in terms of their works, design philosophies and processes.
- To investigate the effect of various digital technologies on architecture in the real and virtual realms

UNIT I QUALITIES OF VIRTUAL ARCHITECTURE 9

Discussing the differences between the real and virtual space. Virtual space as the potential space. Qualities of the new space: Disconnection of the body, new laws of proximity and increased automatism and its influence on architectural form and space

UNIT II	MEDIA AND ARCHITECTURE	9
Visions unfolding/ Media Architecture as desirable/ Films as a space for virtual architecture		
UNIT III	ISSUES	9
Towards new paradigm – A myth or a promise. / Need versus desire/ anxiety of new/ identity and Fashion.		
UNIT IV	IDEAS AND WORKS OF CONTEMPORARY ARCHITECTS	12
Ideas and works of contemporary architects - Greg Lynn, Reiser + Umemotto, Lars Spuybroek / NOX Architects, UN studio, Diller Scofidio, Dominique Perrault, Decoi, Marcos Novak, Foreign Office Architects, Asymptote, Herzog and de Meuron, Neil Denari.		
UNIT V	SEMINAR PRESENTATION	6
Students presentation on the ideas and works of architects known for process oriented approach to architecture. Topics to be discussed with course faculty prior to presentation.		

TOTAL: 45 PERIODS

OUTCOMES:

- The student will learn about various design methodologies employed by contemporary architects.
- The student will be acquainted with the use of computation and digital technologies in contemporary architectural design.
- The student will learn to investigate the influence of various media, especially films, on architecture and vice versa.

REFERENCES:

1. L. Convey et. al. Virtual Architecture, Batsford, 1995.
2. William J Mitchell, City of bits: Space, Place and the Infobahn. MIT Press, Cambridge, 1995

DG8251	PERFORMANCE EVALUATION OF BUILDINGS	L T P/S C
		2 0 2 3

OBJECTIVE:

- To investigate the simulation and audit techniques for assessing the energy performance, environmental response and impact of built form.

UNIT I	INTRODUCTION TO BUILDING PERFORMANCE EVALUATION	3
Emerging role of performance evaluation in building design and master planning- Performance audit and rating systems- GRIHA, LEED IGBC and BREEM – Architectural Computation and performance audit- Introduction to ECOTECH.		

UNIT II	PRINCIPLES OF SUSTAINABLE DESIGN	12
E's of sustainability - Integrated approach to environmental design - Case studies – Comparative analysis of green rating systems, LEED, BREEM and GRIHA – Cognitive, analytical and simulated modeling and design of buildings. Zero Carbon Footprint Building.		

UNIT III	ENVIRONMENTAL ASSESSMENT METHODS AND MODELING FOR PASSIVE SYSTEMS.	12
Modelling and experimental techniques for building assessment/ evaluation and design – Basics of thermal comfort, solar shading/access/ control, day lighting, acoustics air movement etc. – issues and opportunities with current assessment modes/ evaluation tools- Evaluation and assessment based on Building type/ function and program – Building performance with respect to function, program, micro climate, urban planning, envelope design, material – Computer studio and simulation-Mathematical models of heat and mass transfer phenomena through building components: transfer function		

methods and numerical methods – Models of radiative and convective heat transfer phenomena within buildings

UNIT IV ADVANCE ECOTECH AND ENERGY MODELLING 12
Integration of ECOTECH with BIM, RAPID ENERGY MODELLING - Modelling and performance simulation of existing buildings – residential-institutional- design of a new residential building with ECOTECH

UNIT V SEMINAR AND CASE STUDY PRESENTATION 6
Case study presentation of students on performance evaluation of a building identified by them and approved by the course faculty – Seminar on topics approved by the course faculty.

TOTAL: 45 PERIODS

OUTCOMES:

- The students will gain knowledge on environmental assessment methods, audit and simulation techniques.
- Will add value to architectural design processes and equip students with energy modeling skills.

REFERENCES:

1. Energy Audit of Building Systems – Moneef Krarti (Ph.D) – CRC Press 2000
2. Clarke, J.A., “Energy simulation in building design”, Adam Hilger Ltd, Bristol, 1985
3. ESRU,. “ESP-r A Building Energy Simulation Environment; User Guide Version 9 Series. “ESRU Manual U 96/1, University of Strathclyde, Energy Systems Research Unit, Glasgow, 1996.
4. Kabele, K., “Modeling and analyses of passive solar systems with computer simulation”, in Proc. Renewable energy sources, PP. 39 – 44, Czech Society for Energetics Kromeriz 1998 (in Czech)

DG8301

ADVANCED DIGITAL DESIGN STUDIO II

L T P/S C
0 0 12 6

OBJECTIVE:

- To train students in using advanced Digital media involving complex situations that require handling of multiple information and algorithmic principles.

This course investigates how digital media can be employed as a generative tool for derivation of form and its transformation. This course takes designers beyond the limits of the commercial digital tools. By applying algorithmic principles, computer programs can be used for form generation. The design projects will focus on parametric modeling and proceed towards complex form generation. Students will develop a brief for a design or a product and through generative process develop complex forms.

TOTAL: 180 PERIODS

OUTCOME:

- The students will develop the aptitude to use Digital Media as a medium to generate complex forms.

REFERENCES:

1. H. A Simon. Sciences of the Artificial, MIT Press, Cambridge, 1996
2. B. Colajanni and G. Pelliteri (ed.), Multimedia and Architectural Disciplines, Italy, 1996.
3. M.L. Maher, et. al, Understanding Virtual Design Studios, Verlag, London 1999
4. Robin Baker, Designing the future: The Computer Transformation of Reality. (London), 1993.

DG8302

DIGITAL PRODUCTION: SOLID MODELING AND RP

L T P/S C
1 0 4 3

OBJECTIVES:

- To outline various Digital Production tool to build artifacts as part of the creative design process.
- To utilize the Prototyping and Modeling as a design medium that supports the full spectrum of digital design as a paperless process.

This course focuses on advanced 3d modeling tools with Computer numerically controlled production processes. It aims to develop prototypes that will enhance design learning. Complex virtual 3d-models would be converted to tactile models through Prototyping. This is to achieve by combining lectures on fabrication technology, exercises on CNC machines and prototyping interfaces.

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Working with Stereo Lithography Machines: Introduction to the stereo lithography tools
Procedures to transfer solid model into a tessellated surface file. Using Polymer resin to produce prototypes. Practical exercise will be given to model simple objects.

TOTAL: 120 PERIODS

OUTCOME:

- The students will be able to translate the design process through Digital Prototype or Model attribute.

REFERENCES:

1. Daniel Schodek, Digital Design and Manufacturing: CAD/CAM applications in Architecture and Design, John Wiley&sons, 2005.
2. Nick Callicott, Computer Aided Manufacture in Architecture, Architectural press, 2001.
3. McGraw Hill Text, Rapid Prototyping and Manufacturing: Fundamentals of Stereo Lithography, 1993
4. Paul Jacobs, Stereo lithography and Other Rpandm Technologies : From Rapid Prototyping to Rapid Tooling, Amer Society of Mechanical Engineers, 1995.
5. Michael D. Ciletti, modelling, synthesis, and Rapid Prototyping with the VERILOG (TM) HDL, Prentice hall, 1999.
6. Leu, Handbook of Rapid Prototyping and Layered Manufacturing, Academic Press, 2001.

DG8303

DISSERTATION

L T P/S C
0 0 6 3

OBJECTIVES:

- To promote research in Digital architecture and
- Train the students in collecting, critically analyzing and presenting information in a logical sequence.

Students will identify research topics and in depth explore either the theoretical issue or develop mathematical models/ algorithms. While it is not mandatory, the students subsequently carry both the findings and research into the project work. The topic has to be approved by the supervisor and periodic reviews will be held to asses the progress of the work and also facilitate exchange of ideas. The final oral submission has to be accompanied by a CD and report submission.

TOTAL: 90 PERIODS

OUTCOME:

- Student will be skilled to collect, process and present relevant information in their research topic.

OBJECTIVES:

- To make the students to distinguish various theoretical ideologies influencing the philosophy and values of architecture.
- To establish the sense of systematic inquiry in students mind to analyze and infer the issues and aspects relating to Architecture.

UNIT I INTRODUCTION**9**

Basic research issues and concepts- orientation to research process- types of research: historical, qualitative, co-relational, experimental, simulation and modeling, logical argumentation, case study and mixed methods- illustration using research samples

UNIT II RESEARCH PROCESS**9**

Elements of Research process: finding a topic- writing an introduction- stating a purpose of study- identifying key research questions and hypotheses- reviewing literature- using theory- defining, delimiting and stating the significance of the study, advanced methods and procedures for data collection and analysis- illustration using research samples

UNIT III RESEARCHING AND DATA COLLECTION**9**

Library and archives- Internet: New information and the role of internet; finding and evaluating sources- misuse- test for reliability- ethics

Methods of data collection- From primary sources: observation and recording, interviews structured and unstructured, questionnaire, open ended and close ended questions and the advantages, sampling- Problems encountered in collecting data from secondary sources-

UNIT IV REPORT WRITING**6**

Research writing in general- Components: referencing- writing the bibliography- developing the outline- presentation; etc.

UNIT V CASE STUDIES**12**

Case studies illustrating how good research can be used from project inception to completion- review of research publications

TOTAL: 45 PERIODS**OUTCOMES:**

- The student will develop the skill to identify, decipher and interpret the issues relating to Architecture, based on research enquiry methods.
- The student will widen the information and will prepare the students for scientific method of researching and research process.

REFERENCES:

1. Linda Groat and David Wang; Architectural Research Methods;
2. Wayne C Booth; Joseph M Williams; Gregory G. Colomb; The Craft of Research, 2nd Edition; Chicago guides to writing, editing and publishing;
3. Iain Borden and Kaaterina Ruedi; The Dissertation: An Architecture Student's Handbook; Architectural Press; 2000
4. Ranjith Kumar; Research Methodology- A step by step guide for beginners; Sage Publications; 2005
5. John W Creswell; Research design: Qualitative, Quantitative and Mixed Methods Approaches; Sage Publications; 2002

DG8451

WEB DESIGN AND PORTFOLIO PRODUCTION

L T P C
0 0 6 3

UNIT I INTRODUCTION TO WEB DESIGN

15

Basics of web design – Introduction to software used for web design – ADOBE IMAGE READY, DREAMWEAVER, FLASH etc.

UNIT II STATIC PAGES

15

Slice – URL in ADOBE IMAGEREADY. Creation and Editing of site map – layer, tables, frameset, - CSS style – Forms – tools like insert, roll over etc., in DREAMWEAVER

UNIT III ANIMATION IN FLASH

15

Introduction to MACROMEDIA FLASH, importing other file formats to Flash- saving and exporting Flash files, Frame by frame animation – Motion Tweening – Shape Tweening

UNIT IV INTRODUCTION TO SCRIPTING

15

Using Timeline – Frames –Key frames- Creating and using Symbols- Simple scripting in flash – Publishing SWF files

UNIT V DEVELOPING A WEB SITE

30

Using the skills and concepts learnt with the ADOBE IMAGEREADY,DREAMWEAVER, FLASH softwares . students will develop their portfolio in the form of web pages. These pages have to be uploaded in free public domains.

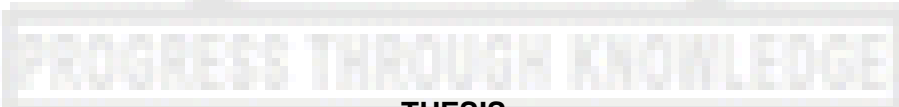
TOTAL: 90 PERIODS

REQUIRED READING

1. Photoshop 7 Bible Professional Edition, Wiley John & Son INC, New York, DekeMcClelland, 2000.
2. Flash Web Design, The Art of Motion Graph, Curtis Hillman, New Riders Publishing, Indianapolis, IN. U.S.A, 2000
3. M.E. Morris, and R.J. Hinrichs, Web Page Design, Prentice Hall, 1996.
4. Mark Von Wodtke, Mind over Media : Creative Thinking Skills for Electronic Media, McGraw-hill, New York, 1993
5. Adobe Flash CS3 professional on demand by Steve Johnson, Andy Anderson, Perspection inc, 2012.

REFERENCES

1. Adobe Photoshop CS3 studio techniques, Ben Wilmore, 2012.
2. Adobe Dreamweaver CS6 classroom in a book, Adobe creative team, 2012.



DG8411

THESIS

L T P/S C
0 0 22 11

OBJECTIVE:

- To develop a prototype or express theoretical issues using Digital Media in the final design project.

Students will submit a detailed proposal on their topic of interest. The proposal will focus on the development of a product design/ building form/ developing interfaces between modeling and machining or between two graphic modeling tools/ building automation/ developing intelligent building controls. The project will be oriented towards developing prototypes and theoretical issues could be exhausted in the dissertation section. The Proposal has to be approved by the committee and the supervisor. There would be periodic reviews of the project. The final presentation will focus at developing and demonstrating a prototype.

TOTAL: 330 PERIODS

Attested
Sobhan
DIRECTOR
Centre For Academic Courses
Anna University, Chennai-600 025.

OUTCOME:

- The student will be competent to define creative problems within his/her field of design, including research and synthesis of technical, aesthetic, and conceptual knowledge.

DG8001**HIGH END 3D MODELLING**

L	T	P/S	C
1	0	4	3

OBJECTIVE:

- To allow the students to comprehend and prepare Digital design solution using advance High end modeling and animation.

This course will train students on the high end-3D modeling and animation. This course would specifically focus on MAYA - The state of art modeling software. The training will look at the following sections HypergraphModeling: Nurb Modeling/ Polygon Modeling / Organic Modeling Animation: Working with Key frames and Breakdowns/ Deformers/ Character setup/Rendering: Lighting/ Shading/ Texture Advanced Effects and MEL Scripting Language.

TOTAL: 60 PERIODS**OUTCOME:**

- The student will be able to Identify the basic elements in the process of creating a 3D scene and construct 3D models using well proven techniques;

REFERENCES:

- Users Manual for MAYA, Alias Wavefront.
- Perry Hrovav, et.al, MAYA Complete 2, BPB Publications New Delhi, 2000.

DG8002**INTRODUCTION TO ALGORITHMS**

L	T	P/S	C
2	0	2	3

OBJECTIVE:

- This course introduces basic methods for the design and analysis of efficient algorithms emphasizing methods useful in practice.

UNIT I THE 'C' LANGUAGE AND CONTROL FLOW STRUCTURES 12

'C' program structure – Datatypes, Variables and constants – C Operators – Input/Output – Exercises and solutions using the above said utilities - Sequential control structure – Selective control structure – Iterative Control Structure – Exercises and solutions using the above said utilities.

UNIT II ARRAYS, STRING FUNCTIONS AND POINTERS 12

Single Dimensional arrays – Multidimensional arrays – String and String functions. Pointer declaration – Initialization of pointers – Using Pointers – Exercises and solutions using the above said utilities.

UNIT III FUNCTIONS AND STRUCTURES 12

User defined functions – Function categories – Storage classes. Introduction to structures – Arrays of Structures – Structures and functions – Exercises and solutions using the above said utilities.

UNIT IV FILE HANDLING AND FILE I/O 8

Introduction to files – Character I/O from files – Line I/O with Files - Writing records onto files – Reading records from files – Exercises and solutions using the above said utilities.

Attested

Sobhan
DIRECTOR

UNIT V DATA STRUCTURES, STACKS, QUEUES AND BINARY TREES**16**

Introduction to Data Structures – Introduction to Linked lists – Manipulation of Singly Linked lists – Doubly linked list – Exercises and solutions using the above said utilities -Introduction of Stacks and Queues – Representing Stacks in C – Queues – Binary trees – Exercises and solutions using the above said utilities.

TOTAL: 60 PERIODS**OUTCOME:**

- The student will be proficient in analysis and design of algorithms and recurrences and techniques to solve them.

REFERENCES:

1. Thinking in C++ second edition Vol. one, Bruce Eckel
2. Thinking in C++ second edition Vol. two, Bruce Eckel & Chuck Allison
3. The C++ programming language (3rd edition) by Bjarne Stronstrup

DG8003**INTRODUCTION TO SCRIPTING**

L	T	P/S	C
2	0	2	3

OBJECTIVES:

- To deepen the understanding of a range of programming languages and its features.
- To convey the idea of scripting language as a medium between software and create a large systems.

UNIT I INTRODUCTION TO SCRIPTING**2**

Definition and purpose of scripting – Introduction to programming language and software used for scripting.

UNIT II BASICS OF JAVA**23**

Introduction to Java – Basic Object Oriented Programming – Advanced Object Oriented Programming – Basic Java Syntax – Java Input/Output – Applets and Basic Graphics – Mouse and Keyboard Events – AWT Components – Layout Managers – Java 2D.

UNIT III JAVA APPLICATIONS AND APPLETS**10**

Basic Swing – Advanced Swing and MVC – Multithreaded Programming – Multithreaded Programming – Network Programming clients/severs.

UNIT IV DIRECTOR**15**

Director Basics – Element of Animation – Time line – Simple presentation using Director

UNIT V DIRECTOR LINGO**10**

Introduction to Interactive Anatomy of Lingo – Element of Scripting - Building Interactive Movie – Working with Multiple Movie and Casts – MIAW - Scripting with Net savvy Lingo – Lingo and Lists – Lingo and Audio Video – Xtras

TOTAL: 60 PERIODS**OUTCOME:**

- To develop student's concern of the role of different programming paradigms in configuring /managing system.

REFERENCES:

1. The Java Class Libraries, Volume 1& Volume 2by Patrick Chan, Rosanna Lee, Douglas Kramer
2. JavaScript: The Definitive Guide by David Flanagan
3. Java Software Solutions by John Lewis, William Loftus
4. Director 7 and Lingo Bible by Robert Martin, John R. Nyquist, Jonathan P. Bacon

DG8004

VIRTUAL SOCIETY

L T P/S C
3 0 0 3

OBJECTIVE:

- To sensitize the student on the evolution, aspects and characteristics of Virtually Society and its role in Digital architecture in graphic representation and visualizing social structures, etc.

UNIT I CULTURAL BASIS

6

Social visualisation through readings, drawn from sociology / Psychology and interface design.

UNIT II ISSUES OF REPRESENTATIONS IDENTITY AND EXPRESSION

12

Meaning through association - subjective - transitory - cross cultural meanings ascribed to an object / Cultural phenomena in virtual objects: nature of identity in an immaterial and intangible environment / Issues of identity deception

UNIT III COMMODIFICATION, COMMERCE AND FASHION

6

Globalization, e-com and marketing- Fashion, identity and marketing- Machines as part of fashion - Role of Fashion and status in the virtual world.

UNIT IV COMMUNICATION AND PEDAGOGY

12

Virtual education and issues of Commodification/ virtual classrooms/ universities Virtual organisational existence / Society of Audience / online social world / Chat rooms / news groups and mailing lists

UNIT V CITY AND ONLINE WORLD

9

City as a metaphor for online world/ city as a hub of information/ place of strange fears/crime and doubtful morality/surveillance and security

TOTAL: 45 PERIODS

OUTCOME:

- The students develop an insight into virtual society for students to know, interact and visualize through specific social media in order to pursue mutual interests or goals.

REFERENCES:

- Nicholas Negroponte, Being Digital. 1995
- Michael Benedikt (ed.), Cyberspace: The First Steps, MIT Press, Cambridge, 1991
- G. Steven Jones, Cyber society: Computer-mediated Communication and Community. 1995
- Jon Dovey, et.al, Fractal dreams: New media in social context. Sage Publications, 1996
- McCracken. Culture and Consumption.
- Judith Donath. Identity and Deception in the Virtual Community

PROGRESS THROUGH KNOWLEDGE

AA8071

GIS MODELLING IN URBAN PLANNING

L T P/S C
3 0 0 3

OBJECTIVE:

- To examine the role and application of Geographic Information Systems in environmental design, community charities and other urban design projects.

UNIT I INTRODUCTION

6

GIS – Spatial data, non Spatial data, Plan, Map, Scale, Map Projection, GPS, GCP collection, Spectral signature curve, Image processing – Geo coding / Geo referencing, GIS software, Two tier architecture, Three tier architecture, Thin client, Thick client

Attested

Sobhan
DIRECTOR

Centre For Academic Courses
Anna University, Chennai-600 025.

UNIT II DATABASE CONCEPTS 9

Data structures, Databases, Files, Types of Tables, Table operations, Creating a Table, Accessing Records in a Table, Manipulating records in a Table, Modifying Table structure, Reports, Advantages of database, Primary key and data access, Composite primary key, Defining a primary key, Sorting, Indexing, Master Detail relationships, Types of relationships, Foreign key, Deleting, updating and adding records to linked tables, ER Diagram, Data Model – Physical, logical and conceptual.

UNIT III SPATIAL DATA 9

Comparative methods for obtaining images, Aerial Photograph, Satellite Imagery – High resolution imagery – LISS, PAN, MSS – Ortho rectification, Digitization – Layers, Digital Elevation model, Digital Terrain Modelling, Existing maps – Problems and Issues, Rubber sheeting, Digitization, overlay, union, intersection.

UNIT IV INTRODUCTION TO GIS SOFTWARE 9

Arc Info – Coverage – Arc, Node, Tics, Add, get, put, Map extent, edit, Topology creation – Clean, Build, Tables – Creating tables, updating tables, join, drop item, Export, Import, overlay, union, intersection, buffer.

UNIT V MODELLING GIS PROJECTS FOR URBAN AREAS 12

Preparation of Land use map, Land use suitability analysis, Screen design, Visual Basic application using Map objects.

TOTAL:45 PERIODS

OUTCOMES:

- The student will increase the knowledge on GIS and the various characteristics of Data.
- The student will accept the potential of GIS and develop integrated practice of using the GIS application with architecture.

REFERENCES:

1. Information systems for Urban Planning – Robert Laurini
2. Modelling our world – ESRI Press
3. An Introduction to Data base Systems – C.J.Date
4. Fundamentals of Data base Management System by Elmasri & Navethi
5. ESRI (1992) Understanding GIS, The Arc Info Methods, ESRI, USA

AA8252

SERVICES IN HIGH RISE BUILDINGS

**L T P/S C
3 0 0 3**

OBJECTIVES:

- This course will examine various services in high rise buildings.
- Understand how services integration can translate into an intelligent and energy efficient system which will enable sustainability of the structure.

UNIT I INTRODUCTION 3

Standards of high Rise buildings- Indian Standards and Global Standards on High Rise Buildings; Introduction to various services; their significance with regards to High Rise Buildings; Some examples of Buildings and services used in them A brief on evolution of High Rise Buildings. Aspects and Integration of services - Concepts of Intelligence Architecture and Building Automation.

UNIT II WATER SUPPLY AND WASTE DISPOSAL 9

Water supply and waste water collection systems- water storage and distribution systems- Planning and Design- Selection of pumps- rain water harvesting – Sewage collection systems and recycling of water- solid waste disposal . “Some latest Trends Observation, NBC’s recommendations. in these areas can be included.

UNIT III HVAC, ELECTRICAL AND MECHANICAL SYSTEMS 15

Natural and Mechanical Ventilation systems- Air conditioning systems and load estimation- Planning and design for efficiency-Basic concepts - Automation and Energy Management- concepts. Natural lighting systems- Energy efficiency in lighting systems- load and distribution- Planning and Design for energy efficiency- Automation- basic concepts , Glass and Glazing system for natural lighting. Types of elevators, systems and services- Lobby design- Escalators- safety principles, Some latest Trends, NBC’s recommendations

UNIT IV SAFETY AND SECURITY 6

Security systems- Access Control and Perimeter Protection- CCTV Intruder alarms- Passive fire safety- Fire Detection and Fire Alarm Systems- Planning and Design- NBC Some latest Trends

UNIT V CASE STUDIES 12

Case Studies of High Rise buildings and skyscrapers through appropriate examples- Norman Foster; Ove Arup; Ken Yeang, etc.

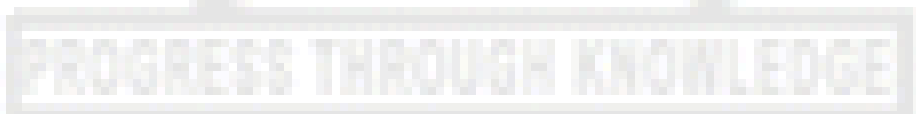
TOTAL: 45 PERIODS

OUTCOME :

- Students can apply some or all of these services in one of their design projects.

REFERENCES:

1. William J. Mcguinness, Benjamin Stein and John S. Reynolds, Mechanical and Electrical Equipment for Buildings, John Wiley & Sons, Inc. 1980.
2. Donald Watson, Michael J. Crosbie and John Hancock Callender, Time-Saver Standards for Architectural Design Data, McGraw – Hill International Editions, 1997.
3. A K Mittal, Electrical and Mechanical Services in High Rise Buildings Design and Estimation Manual, 2001
4. Yahya Mohamad Yatim, Fire Safety Issues in High-Rise Residential Buildings: escape routes design and specification, Lambert Academic Publishing, 2011
5. Johann Eisele and Ellen Kloft, High-Rise Manual, Birkhäuser-Publishers for Architecture, 2003



AA8451 BUILDING INFORMATION MODELING L T P/S C
0 0 6 3

OBJECTIVE:

- To equip students with skills and information to build comprehensive Building Information Models (BIM) using appropriate Digital software and Media.

UNIT I INTRODUCTION TO THE FUNDAMENTALS 10

Key concepts of BIM - reading and manipulating the software Interface - navigating within views - selection methods - the importance of levels and grids- creating walls, doors, windows, and components - working with essential modification commands and load family. Creating floors, ceilings, and stairs - working with type and instance parameters - importing CAD drawings - understanding the project browser and type properties palettes - adding sheets - inserting views onto sheets - adding dimensions and text to the mode and plotting

