**GUJARAT TECHNOLOGICAL UNIVERSITY (GTU)**

**Competency-focused Outcome-based Green Curriculum-2021 (COGC-2021)**
Semester - ll

**Course Title: Advanced Architectural Design**
(Course Code: 4325001)

| Diploma programme in which this course is offered | Semester in which offered |
|---|---|
| Architectural Assistantship | Second |

## 1. RATIONALE

Advanced Architectural Design is in continuation with the course 'Architectural Design Fundamentals' offered in the First Semester of this programme. In this course, the study, knowledge and appropriate application of the relationship between form & space helps the learners to design a building with multiple volumes e.g. a given residential bungalow in relation to given site situation. Knowledge about characteristics of architectural spaces both built & open and their use, allows them to create functional hierarchy of spaces within the designed form for residential use. Understanding of suitable structural systems as applicable to various kinds of buildings helps the learner to select an appropriate one for his design for a residential building. A learner is required to create architectural space and form considering variables like anthropometry, light, movement, transformation, scale, structure and skin in the formation and evolution of architectural form. Learners need to develop an understanding about space standards and basic local building control regulations. Design proposals should be conceptualized with the help of models and sketches. Scale of project shall be formulated as a process of integrating the various elements of space-making, which was taught in the previous semester. The purpose here is also to hone the respective skill-sets of the learners to enable them to approach ensuing design complexities in a strategic way to address their architectural representation capacity for conveying different ideas. Presentation drawings & models help in visualizing and comprehending the overall form and function of given projects.

## 2. COMPETENCY

The purpose of this course is to help the learner to attain the following industry identified competency through various teaching learning experiences:

- Prepare an architectural design for a residential bungalow with given requirements and prepare its presentation drawings and model.

## 3. COURSE OUTCOMES (COs)

The practical exercises, the underpinning knowledge and the relevant soft skills associated with the identified competency are to be developed in the learner for the achievement of the following COs:

a) Analyze the collected primary and secondary data of existing residential bungalows considering the given parameters.
b) Prepare an architectural design for the residential bungalow as per given requirements.

c) Prepare a set of architectural presentation drawings for the designed residential bungalow along with its model to appropriate scale.

## 4. TEACHING AND EXAMINATION SCHEME

| Teaching Scheme (In Hours) | | | Total Credits (L+T+P/2) | Examination Scheme | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Theory Marks | | Practical/Studio Marks | | Total Marks |
| L | T | P/S | C | CA | ESE | CA | ESE | |
| 0 | 0 | 8 | 4 | 00 | 00 | 50* | 50 | 100 |

*(*): For this practical/studio only course, 50 marks under the practical CA includes the assessment of residential building, which will be done for the assessment of design and presentation drawings. This is designed to facilitate attainment of COs holistically, as there is no theory ESE. However this course should be considered as an applied theory course where the theory portion is taught during the practical/studio hours.*

***Legends: L**-Lecture; **T** – Tutorial/Teacher Guided Theory Practice; **P/S**–Practical/studio; **C** – Credit, **CA** - Continuous Assessment; **ESE** -End Semester Examination.*

## 5. SUGGESTED PRACTICAL/STUDIO EXERCISES

The following practical outcomes (PrOs) are the sub-components of the COs. T*hey are crucial for that particular CO at the 'Precision Level' of Dave's Taxonomy related to 'Psychomotor Domain'*.

| S. No. | Practical Outcomes (PrOs) | Unit No. | Approx. Hrs. Required |
|---|---|---|---|
| 1 | **Collect Primary Data:** Collect/Prepare data of existing Residential buildings which includes circulation plan, floor plans, sections, elevations, furniture layout and related drawings.<br>**Collect Secondary Data**: Collect/Prepare similar data of an existing Residential building From books, journals, magazines, internet, etc. | I | 08 |
| 2 | Graphically analyze collected data of existing residential bungalows with respect to all architectural design parameters like area, lighting & ventilation, form, space design, circulation, structure, façade and inter-connectivity. | I | 08 |
| 3 | Prepare conceptual drawings and models on the basis of given requirements. | II | 16 |
| 4 | Prepare a set of preliminary architectural presentation drawings. | III | 16 |
| 5 | Prepare a site layout with all necessary components. | III | 08 |
| 6 | Prepare a furniture layout for the designed building. | III | 08 |
| 7 | Prepare a set of final presentation drawings including plans, sections and elevations. | IV | 32 |
| 8 | Draw an axonometric/isometric/perspective view of the designed building. | IV | 08 |

| | | | |
|---|---|---|---|
| 9 | Make a model of the designed project to scale. | IV | 08 |
| | **Total Hrs.** | | **112** |

***Note***

*i. More **Practical Exercises** can be designed and offered by the respective course teacher to develop the industry relevant skills/outcomes to match the COs. The above table is only a suggestive list.*

*ii. Care must be taken in assigning and assessing study report as it is a first year study report. Study report, data collection and analysis report must be assigned in a group. Teacher has to discuss about type of data (which and why) before group start their data collection.*

*iii. The following are some **sample** 'Process' and 'Product' related skills (more may be added/deleted depending on the course) that occur in the above listed **Practical Exercises** of this course required which are embedded in the COs and ultimately the competency.*

| Sr. No. | Sample Performance Indicators for the PrOs | Weightage in % |
|---|---|---|
| Assessment should be done on the basis of demonstration of, | | |
| 1 | Skills | 25 |
| 2 | Learning Process | 25 |
| 3 | Communication | 25 |
| 4 | Learning Attitude | 25 |
| **Total** | | **100** |

## 6. MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED

These major equipment with broad specifications for the PrOs is a guide to procure them by the administrators to usher in uniformity of practicals in all institutions across the state.

| S. No. | Equipment Name with Broad Specifications | PrO. No. |
|---|---|---|
| 1 | Measuring Tape, Laser measure tape, etc. | 1-9 |
| 2 | Drawing Board (A1 size @ 23"X32") with other Instruments like Parallel, Set squares (45˚ and 30˚-60˚), Adjustable set square, Triangular scale, Tracing papers, Drawing Sheets, Model making set, etc. | 1-9 |
| 3 | Interactive board with LCD overhead projector | 1-9 |

## 7. AFFECTIVE DOMAIN OUTCOMES

The following ***sample*** Affective Domain Outcomes (ADOs) are embedded in many of the above mentioned COs and PrOs. More could be added to fulfill the development of this competency.

a) Work as a leader/a team member.
b) Follow ethical practices.
c) Follow the Social and Functional aspects in design.
d) Participates in class discussions and present the design effectively.
e) Practice environmental friendly methods and processes. (Environment related).

The ADOs are best developed through the laboratory/field based exercises. Moreover, the level of achievement of the ADOs according to Krathwohl's 'Affective Domain Taxonomy' should gradually increase as planned below:

i. 'Valuing Level' in 1st year
ii. 'Organization Level' in 2nd year.
iii. 'Characterization Level' in 3rd year.

## 8. UNDERPINNING THEORY

The major underpinning theory is given below based on the higher level UOs of *Revised Bloom's taxonomy* that are formulated for development of the COs and competency. If required, more such UOs could be included by the course teacher to focus on attainment of COs and competency.

| Unit | Unit Outcomes (UOs) | Topics and Sub-topics |
|---|---|---|
| **Unit –I Primary and Secondary Data collection** | **1a.** Collect/Prepare primary of existing residential buildings like circulation plan, floor plans, sections, elevations, furniture layout and related drawings while secondary data from books, journals, magazines, internet, etc.<br>**1b.** Graphically analyze collected data of existing residential bungalows with respect to all architectural design parameters like area, lighting & ventilation, form, space design, circulation, structure, façade and inter-connectivity.<br>**1c.** Formulate design requirements for the given design project. | **1.1 Introduction to existing residential Bungalow** designed for some professionals/characters like Doctor, Actors, Politician, Musician, etc. (Concerned faculty is free to decide on any other appropriate character apart from the above).<br>• **Primary data collection:** With the help of site visit/visits, existing drawings, measurements and prepared drawings, photos, sketches, etc.<br>• **Secondary Data Collection**: Collection of data from books, magazines, internet, etc.<br>**1.2 Formulation of requirements** |
| **Unit– II Develop-ment of Concept** | **2a.** Prepare conceptual design alternatives considering various architectural design parameters for further design development of bungalow.<br>**2b.** Develop the conceptual alternatives with functional land-building relationship interrelationship drawing/s based on given requirements. | Various design development parameters<br>**2.1. Design Requirements**: Application of inferences derived from primary and secondary data collection.<br>**2.2. Conceptual Design**: Graphical representation of functional co-relationships between given requirements.<br>**2.3. Derivation of Form**: Derivation of a form with regard to functional requirements by developing activity-space relationship.<br>**2.4. Building orientation on site with respect to -** Form & Space, |

| Unit | Unit Outcomes (UOs) | Topics and Sub-topics |
|---|---|---|
| | | Margins, Wind direction, Natural light & ventilation, Openings, Qualities of architectural space, Structural system, landscaping, parking, etc.<br>**2.5 Land-building relationship –** Understanding and application of various principles of design like creating a hierarchy of spaces with reference to site topography, site surroundings, climatic considerations, etc. |
| **Unit – III Preparing Sketch Design** | **3a.** Use spatial ordering principles for the given building project<br>**3b.** Prepare improved sketch design with respect to light, space and form | **3.1** Order of spaces based on organizing principles like Axial, Symmetrical, Clustered, Grid, Centralized, Linear, any other, etc.<br>**3.2** Two Dimensional Graphical Representation: Development of plan, sections, elevations in sketch form with spatial relationships<br>**3.3** Light, space and form as essentials of architecture<br>**3.4** Materials and Finishes: Development of elevations and sections with consideration of levels as well as building materials |
| **Unit – IV Design & Develop-ment of Drawings** | **4a.** Develop the sketches to appropriate scale as per requirements of building<br>**4b.** Develop the sketch showing elevations, massing in relationship to exterior spaces<br>**4c.** Draw the necessary 3D building drawings to scale<br>**4d.** Prepare a block study model of the designed house as well as the site layout | **4.1** Development of floor plans, sections, elevations and spatial relationships at appropriate scale<br>**4.2** Development of sections and elevations with respect to building finishes fenestrations and levels<br>**4.3** Development of site layout with road network and landscaping<br>**4.4** Axonometric/isometric view of the designed building as well as of the site layout |
| **Unit – V Space – Activity Relations-hip** | **5a.** Prepare furniture layout drawings for the designed units<br>**5b.** Prepare complete site layout drawings with unit locations, roads, common spaces and amenities, parking and landscaping | **5.1** Furniture Layout drawings for various activities / functions of the house based on given requirements<br>**5.2** Site layout drawing for various activities/functions based on given requirements |

| Unit | Unit Outcomes (UOs) | Topics and Sub-topics |
|---|---|---|
| **Unit – VI Final Presentat-ion of Drawings and Models** | **6a.** Prepare a set of final presentation drawings including all of the above.<br>**6b.** Make a model of the designed project to a suitable scale with details of site development. | **6.1** Final presentation drawings with rendering<br>**6.2** Preparation of a model/s |

## 9. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

| Unit No. | Unit Title | Teaching Hours | Distribution of Theory Marks | | | |
|---|---|---|---|---|---|---|
| | | | R Level | U Level | A Level | Total Marks |
| I | Primary and Secondary Data collection | **Not Applicable** | | | | |
| II | Development of Concept | | | | | |
| III | Preparing Sketch Design | | | | | |
| IV | Design & Development of Drawings | | | | | |
| V | Space – Activity Relationship | | | | | |
| VI | Final Presentation of Drawings and Models | | | | | |
| **Total** | | | | | | |

***Legends:*** *R=Remember, U=Understand, A=Apply and above (Revised Bloom's taxonomy)*

***Note****: This specification table provides general guidelines to assist students for their learning and to teachers to teach and question paper designers/setters to formulate test items/questions to assess the attainment of the UOs. The actual distribution of marks at different taxonomy levels (of R, U and A) in the question paper may slightly vary from above table.*

## 10. SUGGESTED STUDENT ACTIVITIES

Other than the classroom and laboratory learning, following are the suggested student-related **co-curricular** activities which can be undertaken to accelerate the attainment of the various outcomes in this course: Students should perform following activities in group and prepare reports of about 5 pages for each activity. They should also collect/record physical evidences for their (student's) portfolio which may be useful for their placement interviews:

a) Undertake periodic site visits to relate to the present architectural practices
b) Identify and explore the design parameters of an architect-designed residential bungalow/s
c) Attend Interactive sketching workshops and design juries in other architecture degree institutes
d) Visit and explore art exhibitions and libraries
e) Give seminars on the relevant topic under consideration
f) Prepare portfolio of given Advanced Architectural Design Project
g) Participate in model making workshops

## 11. SUGGESTED SPECIAL INSTRUCTIONAL STRATEGIES

These are sample strategies, which the teacher can use to accelerate the attainment of the various outcomes in this course:

a) Learnings from massive open online courses (***MOOCs***)/Council of Architecture (**CoA**) trainings/workshops may be used to teach various topics/sub topics
b) Guide student(s) in undertaking micro-projects
c) ***'L' in section No. 4***means different types of teaching methods that are to be employed by teachers to develop the outcomes
d) About ***20% of the topics/sub-topics*** which are relatively simpler or descriptive in nature is to be given to the students for ***self-learning***, but to be assessed using different assessment methods
e) With respect to ***section No.10***, teachers need to ensure to create opportunities and provisions for ***co-curricular activities***
f) Guide students on how to address issues on sketching, model making, etc.
g) Use relevant video/animation films to explain various concepts and processes related to basic Architectural design themes.
h) Use different instructional strategies in classroom teaching.
i) Use the relevant architectural assignments/time problems in the given situation.
j) Guide students on form, functions utility, method of construction, etc. to facilitate them to prepare necessary drawings.
k) Use the technique of individual/group table top discussions along with design jury sessions to teach the relevant content to the students.
l) Adopt various strategies to enhance each student's individual creative ability especially with reference to concept and form

## 12. SUGGESTED DESIGN MICRO-PROJECTS

**A micro-project** to be undertaken by a student that needs to be assigned to him/her in the beginning of the semester. In the first four semesters, the micro-project is group-based (group of 3 to 5). However, **in the fifth and sixth semesters**, the number of students in the group should **not exceed three**.

The micro-project could be industry application based, internet-based, workshop-based, laboratory-based or field-based. Each micro-project should encompass two or more COs which are in fact, an integration of PrOs, UOs and ADOs. Each student will have to maintain dated work diary consisting of individual contribution in the project work and give a seminar presentation of it before submission. The duration of the micro-project should be about **14-16 (fourteen to sixteen) student engagement hours** during the course. The students ought to submit micro-project by the end of the semester to develop the industry-oriented COs.
A suggestive list of micro-projects is given here. This has to match the competency and the CO. Similar micro-projects could be added by the concerned course teacher:

a. Undertake a case study project in consultation with the teacher

## 13. SUGGESTED LEARNING RESOURCES

| S. No. | Title of Book | Author | Publication with place, year and ISBN |
|---|---|---|---|
| 1 | Principles of three Dimensional Design | Wucius Wong | New York, Van Nostrand Reinhold Co., 1977.<br>ISBN :0442295618 9780442295615<br>1 March 1977 |
| 2 | Time Saver Standards for Architectural Design | Michael Crosbie, Donald Watson | McGraw Hill Education India,December 2011;<br>ISBN-10 9781259002892 :<br>ISBN-13 12590028-978 : 92 |
| 3 | Daylighting – Natural light in Architecture | Derek phillips | Architectural press<br>An Imprint of Elsevier, Burlington<br>ISBN 0750663235<br>First Publication 20041 |
| 4 | Visual Dictionary of Architecture | Francis D.K.Ching | John Wiley & Sons, United States<br>ISBN-10 : 8126535644<br>ISBN-13 : 978-8126535644,<br>Second edition (23 April 2012) |
| 5 | Neufert,Architects' Data | Ernst Neufert | Wiley-Blackwell, United Kingdom<br>ISBN-10 : 111928435X<br>ISBN-13 : 978-1119284352,<br>5th edition (12 July 2019) |
| 6 | Architecture + Design | Journal/Magazine | Burda Media India<br>ISSN: 0970-2369 |
| 7 | Inside Outside | Journal/Magazine | Business India Group<br>ISSN: 0970-1761 |
| 8 | Indian Architect and Builder | Journal/Magazine | Jasubhai Media Pvt. Ltd.<br>ISSN:0971-5509 |

## 14. SOFTWARE/LEARNING WEBSITES

- www.greatbuildings.com
- www.architecturalrecord.com
- www.archdaily.com
- www.dezeen.com
- www.archpaper.com
- www.architectmagazine.com
- www.archello.com
- www.designboom.com

## 15. PO-COMPETENCY-CO MAPPING

| Semester I | Architectural Design Fundamentals(Course Code:4315001) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | POs and PSOs | | | | | | | | |
| Competency & Course Outcomes | PO 1 Basic & Discipline specific knowledge | PO 2 Problem Analysis | PO 3 Design/ development of solutions | PO 4 Engineering Tools, Experimentation &Testing | PO 5 Engineering practices for society, sustainability & environment | PO 6 Project Management | PO 7 Life-long learning | * PSO 1 Planning & Design | #PSO 2 Execution |
| **Competency** | **Prepare architectural design for a single volume building, its presentation drawings and models** | | | | | | | | |
| **Course Outcomes** a) Analyze the collected primary and secondary data of existing residential bungalows considering the given parameters | 3 | 3 | - | 1 | - | 2 | 2 | 1 | - |
| b) Prepare architectural design for the residential bungalow as per given requirements | 3 | 3 | 3 | 1 | 2 | 1 | 3 | 2 | 1 |
| c) Prepare a set of architectural presentation drawings for the designed residential bungalow along with its model to appropriate scale | 3 | 1 | 3 | 1 | 1 | 2 | 3 | 3 | 1 |

*Legend: '**3**' for high, '**2**' for medium, '**1**' for low and '**-**' for no correlation of each CO with PO/PSO.*

*__PSO 1: Planning and Design:__ Prepare architectural designs and all types of drawings with appropriate material specifications and application techniques as per specific requirements of the project.

**#PSO 2: Execution:** Work competently as assistants in architectural firms so as to contribute and coordinate both office work and execution on site

## 16. COURSE CURRICULUM DEVELOPMENT COMMITTEE

**GTU Resource Persons**

| S. No | Name and Designation | Institute | Contact No. | Email |
|---|---|---|---|---|
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