GUJARAT TECHNOLOGICAL UNIVERSITY (GTU)

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

Course Title: Architectural Design Fundamentals
(Course Code: 4315001)

Diploma programme in which this course is offered	Semester in which offered
Architectural Assistantship	First

1. RATIONALE

Architectural design is the core course of this programme. Student has to learn about application of all other courses. One component of this course introduces students to different building components and their measurements so that they develop skills to draw plans, elevations and sections of both buildings as well as the layout of the furniture inside, using appropriate scale. In short, this course prepares students for conceptual drawings, presentation drawings, working drawings, etc. involved in architectural design subject of latter semesters of the programme.

Thus, the learner is required to conceive different types of forms that will help to design a single volume building so as to be able to understand and apply the nuances of anthropometry by making a model in accordance with the furniture layout.
In order to develop these skills among learners as mentioned above, this course has been introduced with its genesis as a contemporary technique where the expected output will be a conventional architectural representation. 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.

2. COMPETENCY

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

- **Prepare architectural design for a single volume building, its presentation drawings and models**

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 student for the achievement of the following COs:

a) Prepare measured drawings of objects and human body in different postures to a given scale
b) Analyze the collected primary and secondary data of a single volume building considering the given design project requirements
c) Prepare architectural design for the given single volume design project to the scale
d) Prepare a set of architectural presentation drawings for the designed single volume building 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 has two components i.e. the assessment of single volume building, which will be done out of 25 marks and the remaining 25 marks are for the assessment of measured 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	Draw front view and top view of any given object/s to the given scales. (1:1, 1:2, 1:5, 1:10, etc.)	I	08
2	Draw various anthropometric figures in different postures to a given scale	I	08
3	Collect Primary Data: Prepare a set of measured drawings of a designed single volume building which include its plan, sections, elevations and furniture layout with human figures to an appropriate scale (E.g. a watchman's cabin, milk booth, food kiosk, BRTS bus-stand, construction site office etc.)	II	32
4	Collect Secondary Data: Comparison of similar single volume building with respect to all architectural design parameters from various secondary sources like internet, books, journals, magazines, etc.	II	08
5	Prepare a conceptual layout by formulating design requirements for a given single volume design project.	III	08
6	Prepare preliminary sketch designs of the given design project to the scale using anthropometric requirements	III	16
7	Prepare a set of final presentation drawings including plans, sections, elevations and views for the designed building	IV	16
8	Draw an axonometric/isometric 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 market survey.*
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.*

S. No.	Sample Performance Indicators for the PrOs	Weightage in %
1	Accurate measurement and graphical representation of data collection for the given design project	20
2	Ability to analyze the form and functional clarity of the studied buildings.	10
3	Prepare bubble diagram showing inter-relationships and circulation	10
4	Concept development with originality of idea	20
5	Apply the inferences from the studied buildings in the design process	20
6	Final presentation drawings and model	10
7	Adherence to deadlines	10
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	1-9
2	Drawing Board (A1 size @ 23"X32")	1-9
3	Other Instruments: Parallel, Set squares (45˚ and 30˚-60˚), Adjustable set square, Triangular scale	1-9
4	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 fulfil the development of this competency.

a) Work as a leader/a team member.
b) Follow ethical practices.
c) 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) (4 to 6 UOs at different levels)	Topics and Sub-topics
Unit – I **Measured drawings of objects and human body in different postures**	1a Draw front view and top view of any given object/s to the given scale/s. 1b Draw the anthropometric figures for the given postures to a given scale	**1.1 Introduction to scale :** Graphical two dimensional representation of a given object/s **1.2 Introduction to Anthropometry**: Importance of study of anthropometry and its need for architectural design
Unit –II **Primary and Secondary Data collection**	2a Prepare a set of measured drawings of a designed single volume building including plan, sections, elevations and furniture layout along with human figures to an appropriate scale (E.g. a watchman's cabin, milk booth, food kiosk, BRTS bus-stand, etc.) 2b Compare the different single volume building with respect to all architectural design parameters using secondary sources like internet, books, journals, magazines, etc.	**3.1 Primary Data Collection**: Explanation and methodology of taking measurements on site and maintenance of observations in graphical form (sketching, measuring, photography, videography, etc.) **3.2 Secondary Data Collection**: Collection of data from books, magazines, internet, etc.
Unit– III **Architec-tural design of the given design**	3a. Formulate design requirements for a given single volume design project 3b. Prepare conceptual design to scale for a given single volume design project using anthropometric considerations	**3.1. Design Requirements** : Application of inferences from primary and secondary data collection **3.2. Conceptual Design** : Graphical representation of functional co-relationships between given

Unit	Unit Outcomes (UOs) (4 to 6 UOs at different levels)	Topics and Sub-topics
project	3c. Prepare preliminary sketch designs for a given single volume design project to the scale	requirements – Bubble Diagram **3.3 Derivation of Form** : Derivation of a form with regard to functional requirements by developing activity-space relationship **3.4 Two Dimensional Graphical Representation**: Development of plan, sections, elevations and spatial relationships at an appropriate scale **3.5 Materials and Finishes**: Development of elevations and sections with consideration of levels as well as building materials
Unit– IV **Final presen-tation drawings and model of designed single volume building**	4a Prepare a set of final presentation drawings for the designed single volume building to appropriate scale 4b Prepare a three-dimensional view of the designed single volume building to scale 4c Make a model of the designed project to appropriate scale	**4.1 Preparation of presentation drawings** : Draw plans, sections and elevations of designed building with rendering **4.2 3D Drawings** : Draw a three-dimensional graphical representation of the designed building **4.3 Preparation of a model** : Make a model of the designed building to scale

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	Measured drawings of objects and human body in different postures	**Not Applicable**				
II	Primary and Secondary Data collection					
III	Architectural design of the given design project					
IV	Final presentation drawings and model of designed single volume building					
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 for the locally available single volume buildings.
c) Attend Interactive sketching workshops.
d) Visit and explore art exhibitions and libraries
e) Give seminar on the relevant topic under consideration.
f) Prepare portfolio of Architectural Design Fundamentals
g) Participate in model making workshops

11. SUGGESTED SPECIAL INSTRUCTIONAL STRATEGIES (if any)

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

a) Massive open online courses (***MOOCs***) 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 in the given situation.
j) Guide students on form, functions utility, method of construction, etc. to facilitate them to prepare actual measured drawings.
k) Use the technique of 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

Only one micro-project is planned 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 are 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 microproject 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 an architectural apprenticeship to gain practical exposure of the actual on-going projects.
b. Undertake a design project in consultation with the teacher.

13. SUGGESTED LEARNING RESOURCES

S. No.	Title of Book	Author	Publication with place, year and ISBN
1	Form Space & Order	Francis D.K.Ching	John Wiley & Sons, United States. ISBN-10 : 9781118745083 ISBN-13 : 978-1118745083 , 4th Edition (September 2014)
2	Building Construction	Rangwala S.C.	Charotar Publishing House, Anand, Gujarat. ISBN-10 : 9385039040 ISBN-13 : 978-9385039041, 33rd Edition (1 January 2016)
3	Building Drawing	Shah, Kale, Patki	Tata Mcgraw Hill Publishing, India. ISBN-10 : 9389538122 ISBN-13 : 978-9389538120, Sixth edition (28 October 2019)
4	Visual Dictionary of Architecture	Francis D.K.Ching	John Wiley & Sons, United States ISBN-10 : 8126535644 ISBN-13 : 978-8126535644, Second edition (23 April 2012)
5	Neufert, Architects' Data	Ernst Neufert	Wiley-Blackwell, United Kingdom ISBN-10 : 111928435X ISBN-13 : 978-1119284352, 5th edition (12 July 2019)
6	Architecture + Design	Journal/Magazine	Burda Media India ISSN: 0970-2369

S. No.	Title of Book	Author	Publication with place, year and ISBN
7	Inside Outside	Journal/Magazine	Business India Group ISSN: 0970-1761
8	Indian Architect and Builder	Journal/Magazine	Jasubhai Media Pvt. Ltd. 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
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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/ develop-ment of solutions	PO 4 Engineer-ing Tools, Experimen tation &Testing	PO 5 Engineer-ing practices for society, sustain-ability & environ-ment	PO 6 Project Manage-ment	PO 7 Life-long learning	* PSO 1 Planning & Design	#PSO 2 Execu-tion
Competency	**Prepare architectural design for a single volume building, its presentation drawings and models**								
Course Outcomes a) Prepare measured drawings of objects and human body in different postures to a given scale	3	-	-	2	-	-	1	1	1
b) Analyze the collected primary and secondary data of a single volume building considering the given design project requirements	3	2	-	-	-	1	1	2	2
c) Prepare architectural design for the given single volume design project to the scale	3	-	3	2	1	2	2	3	2
d) Prepare a set of architectural presentation drawings for the designed single volume building along with its model to appropriate scale	3	-	3	2	1	1	2	3	2

*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

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