### GUJARAT TECHNOLOGICAL UNIVERSITY (GTU)

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

### **Course Title: Architectural Design for Public Buildings**

(Course Code: 1036301)

Diploma programme in which this course is offered	Semester in which offered
Diploma in Architecture	Third

### 1. RATIONALE

Architectural design is the core course of this programme. Public Building Design is in continuation with the course 'Advanced Architectural Design' offered in the Second Semester. In this course, the knowledge and appropriate application of the relationship between form & space enables the learner to design multiple-volume buildings with relation to each other for public needs and for given site situation. Knowledge about architectural spaces - both built & open and their use allows them to create functional hierarchy within the site. Knowledge about interlocking spaces & spaces linked by a common space helps the learner in spatial organization on site. Knowledge of repetitive spaces, radial spaces & clustered spaces help the learner to functionally organize a layout. Knowledge of disciplines of structure, design parameters, spatial order helps them create co-relation between space-structure. Understanding about environmental concerns, energy efficiency and structural systems as applicable to kinds of building enables the learner to comprehend how a building practically stands and functions in particular environmental situation. Knowledge of different types of openings and their locations in a building with respect to climate helps them to design suitable architectural elements. 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

To familiarize the learners with various **Public Building** projects, their design approaches, methods, principles and techniques of design and attain industry identified competency through various teaching learning experiences:

• Prepare architectural design for a public building based on different architectural design parameters, 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 learner for the achievement of the following COs:

- a) Analyze the collected primary and secondary data of existing public building considering the given parameters.
- b) Prepare an architectural design for the public building as per given requirements and site situation.

c) Prepare a set of architectural presentation drawings for the designed public building along with its model and sketches to appropriate scale.

Teach	ing Sc	heme	Total Credits	Examination Scheme				
(Ir	n Houi	rs)	(L+T+P/2)	Theory Marks		Practical/Studio Marks		Total
L	Т	P/S	С	СА	ESE	CA	ESE	IVIALKS
0	0	12	6	00	00	50	50	100

# 4. TEACHING AND EXAMINATION SCHEME

(\*): For this practical/studio only course, 50 marks under the practical CA should be done by assessment of process of designing a public building with all design parameters. This is designed to facilitate attainment of COs holistically. Thus, this course should be considered as an **Applied 'Theory' Course** where the theory portion has to be 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. They 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 data of an existing public building like Circulation plan, Floor Plans, sections, elevations and furniture layout with indoor outdoor connectivity, space organization etc. to an appropriate scale to analyze the same with design parameters, land-building relationship, environmental and energy efficiency concerns. Collect Secondary Data: Collect similar data of an existing public building From Books, Magazines, Internet, etc.	Ι	12
2	Graphical analysis and comparison of similar type of Public Building with respect to all architectural design parameters like area, light ventilation, form, space, circulation, structure, skin and indoor-Outdoor connectivity. Preparation of pie charts, sketches and their <b>appraisal.</b> Then formulation of requirements for proposed design project.	Ι	12
3	Prepare flow diagram, conceptual drawing like sketch design, block models, site plan, floor plans, elevations, sections and Sketches for the given Public Building Project including environmental and energy efficiency parameters.	=	24
4	Prepare Set of design drawing based on the given requirements with considerations of principles of design, relationship between human feelings and architectural form	111	24
5	Prepare site Layout with parking, Circulation and other outdoor site features		12

6	Prepare furniture layout for the designed building		12
7	Prepare a set of final presentation drawings including all given parameters in plans, sections, elevations and internal views for the designed building	IV	48
8	Draw an axonometric/isometric/perspective view of the designed building	IV	12
9	Make a model of the designed project to scale		12
	Total Hrs.		168

### <u>Note</u>

- *i.* More *Practical/Studio 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.* 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 site visits.
- 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/Studio 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 %			
Asses	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				

### 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, Drawing Sheets, Tracing papers	1-9
2	Drawing Board (A1 size @ 23"X32") with other Other Instruments like Parallel, Set squares (45° and 30°-60°), Adjustable set square, Triangular scale, Tracing papers, Drawing Sheets	1-9
3	Interactive board with LCD overhead projector	1-9
4	Desktop PCs with latest configuration	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) Social and Functional Competence of design
- d) Participates in class discussions and present the design effectively, Generate new ideals.
- e) Practice environmentally friendly methods and design processes.

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 1<sup>st</sup> year
- ii. 'Organization Level' in 2<sup>nd</sup> year.
- iii. 'Characterization Level' in 3<sup>rd</sup> 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
	(4 to 6 UOs at different levels)	
Unit –I Primary and Secondary Data collection	<ul> <li>1a. Collect/Prepare primary data of existing public buildings like circulation plan, floor plans, sections, elevations, furniture layout and related drawings while secondary data from books, journals, magazines, internet, etc.</li> <li>1b. Graphically analyze collected data of existing public building with respect to all architectural design parameters like area, lighting &amp; ventilation, form, space design, circulation, structure, façade and interconnectivity.</li> <li>1c. Formulate design project.</li> </ul>	<ul> <li>1.1 Introduction to existing public building designed like Library, Primary/Secondary School, Old Age Home, community centers, Urban Health Centers, sport training center etc. (Or any other appropriate public building project apart from the above).</li> <li>Primary data collection: With the help of site visit/visits, existing public building, take measurements and prepared drawings, photos, sketches, etc.</li> <li>Secondary Data Collection: Collection of data from books, magazines, internet, etc.</li> <li>1.2 Formulation of requirements</li> </ul>
Unit– II Developme nt of Concept and locating the building on site	<ul> <li>2a. Prepare conceptual alternatives for design considering various design parameters for further development of given project</li> <li>2b. Develop the conceptual alternatives with functional landbuilding relationship diagram based on requirements</li> </ul>	<ul> <li>Design development parameters</li> <li>2.1 Design Requirements : Application of inferences from primary and secondary data collection</li> <li>2.2 Conceptual Design : Graphical representation of functional correlationships between given requirements – Bubble Diagram</li> <li>2.3 Derivation of Form : Derivation of a form with regard to functional requirements by developing activity-space relationship</li> </ul>

Unit	Unit Outcomes (UOs)	Topics and Sub-topics
	(4 to 6 UOs at different levels)	
		2.4 Building orientation on site with respect to - Form & Space, Margins,
		Wind direction, Natural light &
		ventilation, Openings, Qualities of
		architectural space, Structural system
		2.5 Land-building relationship
		principles for creating a hierarchy of
		spaces with reference to Site
		topography, Site surroundings, Climatic
		considerations
Unit – III	<b>3a.</b> Use spatial ordering principles for	4.1 Order of spaces based on organizing
Preparing	the given building project.	principles like Axial, Symmetrical,
Sketch	<b>3b.</b> Prepare improved sketch design	Clustered, Grid, Centralized, Linear
Design	with respect to light, space and	4.2 Two-Dimensional Graphical
	form.	Representation: Development of plan,
		sections, elevations in sketch form with
		spatial relationships
		efficiency
		Development of design considering
		parameters like environment and
		energy efficiency
		<b>4.4 Light, space and form</b> as essentials of
		architecture
		4.5 Materials and Finishes: Development
		of elevations and sections with
		consideration of levels as well as
		building materials
Unit – IV	4a.Develop the sketch to an	4.1. Development of floor plans, sections,
Design &	appropriate scale as per	elevations and spatial relationships at
Developme	requirements of building	appropriate scale
nt of	<b>4b.</b> Develop the sketch showing	<b>4.2. Development</b> of elevations and
Drawings	elevations, massing in relationship	sections with respect to building
	to exterior spaces	<b>1 3 Development</b> of site layout with read
	drawings to scale	<b>4.5 Development</b> of site layout with road
	<b>4d</b> Prepare a block study model of	<b>4.4</b> Avonometric/isometric view of the
	the designed house as well as the	designed huilding as well as of the site
	site lavout	lavout
Unit – V	<b>5a.</b> Prepare furniture layout drawings	<b>5.1 Furniture Layout</b> drawings for various
Space –	for the designed units	activities / functions of the house
Activity	<b>5b.</b> Prepare complete site layout	based on given requirements
Relationshi	drawings with unit locations,	5.2 Site layout drawing for various
р	roads, common spaces and	activities/functions based on given
	amenities, parking and landscaping	requirements

Unit Unit Outcomes (UOs)		Topics and Sub-topics
	(4 to 6 UOs at different levels)	
Unit – VI	6a. Prepare a set of final presentation	6.1. Final presentation drawings with
Final	drawings including all of the	rendering
Presentatio	above.	6.2. Preparation of a model
n of	<b>6b.</b> Make a model of the designed	
Drawings	project to a suitable scale with	
and	surroundings.	
Models		

### 9. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Unit	Unit Title	Teaching Distribution of Theory		Marks		
No.		Hours R U A		Total		
			Level	Level	Level	Marks
I	Primary and Secondary Data collection					
Ш	Development of Concept and locating the					
	building on site					
Ш	Preparing Sketch Design					
IV	Design & Development of Drawings		Not A		ole	
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 learners 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 LEARNER ACTIVITIES**

Other than the classroom and laboratory learning, following are the suggested learner-related **co-curricular** activities which can be undertaken to accelerate the attainment of the various outcomes in this course: Learners 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 (learner'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 Public 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 for Public Buildings
- g) Participate in model making workshops

The practical/exercises should be properly designed and implemented with an attempt to develop different types of practical skills (Course Outcomes in psychomotor and affective domain) so that

learners are able to acquire the competencies (Programme Outcomes). Following is the list of practical exercises for guidance.

**Note**: Here only Course Outcomes in psychomotor domain are listed as practical/exercises. However, if these practical/exercises are completed appropriately, they would also lead to development of Programme Outcomes/Course Outcomes in affective domain as given in a common list at the beginning of curriculum document for this programme. Faculty should refer to that common list and should ensure that learners also acquire those Programme Outcomes/Course Outcomes related to affective domain

### 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 learner(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 learners 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 learners 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 for Public Buildings.
- h) Use different instructional strategies in classroom teaching.
- i) Use the relevant architectural assignments in the given situation.
- j) Guide learners 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 learners.
- I) Adopt various strategies to enhance each learner'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 learner 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 learners 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 learner 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) learner engagement hours during the course. The learners 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 ongoing 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	Principles of three Dimensional Design	Wucius Wong	New York, Van Nostrand Reinhold Co., 1977. ISBN : 0442295618 9780442295615 1 March 1977
2	Time Saver Standards for Architectural Design	Michael Crosbie), Donald Watson	McGraw Hill Education; ISBN-10. 9781259002892 ISBN-13. 978-1259002892 8th edition (1 July 2017)
3	Daylighting – Natural light in Architecture	Derek phillips	Architectural press An Imprint of Elsevier, Burlington ISBN 0750663235 First Publication 20041
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	Architecture - Form, Space & Order	Francis D.K.Ching	John Wiley & Sons, United States <b>ISBN-10</b> : 047023153X <b>ISBN-13</b> : 978-0470231531 3rd Edition Set (25 September 2007)
6	Neufert, Architects' Data	Ernst Neufert	Wiley-Blackwell, United Kingdom ISBN-10 : 111928435X ISBN-13 : 978-1119284352, 5th edition (12 July 2019)
7	Contemporary Indian Architecture- After the Masters	Bhatt Vikram, Peter Scriver	Grantha Corporation - 1 January 1999 ISBN-10 : 0944142192 ISBN-13 : 978-0944142196
8	Architecture + Design	Journal/Magazine	Burda Media India ISSN: 0970-2369
9	Inside Outside	Journal/Magazine	Business India Group ISSN: 0970-1761
10	Indian Architect and Builder	Journal/Magazine	Jasubhai Media Pvt. Ltd. ISSN:0971-5509
11	David Adjaye: Making Public Buildings	Thames & Hudson	Garden Grove, California ISBN 10- 0500342245

S.	Title of Book	Author	Publication with place, year and ISBN
No.			
			ISBN 13- 9780500342244

#### 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	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	* PSO 1	#PSO 2	
& Course Outcomes	Basic &	Problem	Design/	Engineer	<b>Engineer-</b>	Project	Life-	Plannin	Execu-	
	Disciplin	Analysis	develo	-ing	ing	Manag	long	g &	tion	
	e specific		p-ment	Tools,	practices	e-ment	learnin	Design		
	knowled		of	Experim	for		g			
	ge		solutio	entation	society,					
			ns	& lesting	sustain-					
					ability &					
					ment					
Competency	Prepare	archited	tural de	esign for	a public	buildin	g based	on di	fferent	
	architectural design parameters, its presentation drawings and models									
Course Outcomes										
a) Analyze the collected primary										
and secondary data of existing	3	1	-	2	1	-	2	1	-	
public building considering the										
given parameters										
b) Prepare an architectural design										
for the public building as per	2	2	2	1	2	1	2	2	2	
given requirements and site	5	2	2	1	2	1	2	2	2	
situation.										
c) Prepare a set of architectural										
presentation drawings for the		_	_			_	_			
designed public building along	3	3	3	1	1	2	2	3	2	
with its model and sketches to										
appropriate scale.										

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

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# 16. COURSE CURRICULUM DEVELOPMENT COMMITTEE GTU Resource Persons