GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT

COURSE CURRICULUM
COURSE TITLE: COMPUTER AIDED DRAWING
(Code: 3340606)

Diploma Program in which this course is offered	Semester in which offered
Civil Engineering, Transportation Engineering	4th Semester.

1. RATIONALE

Computer Aided Design (CAD) is a good example of technological innovation that has had a significant impact on the drawing preparation and in civil engineering industry and other fields. Drawing is the tool by which civil engineer can express engineering detailing like layout of site, plan , elevation, section with interior details and design output to be used by marketing office , client , concern authority for execution , approval and for other works.

Formerly, such drawing were prepared manually, which resulted in time consuming process, repetition of work for editing again resulted in wastage of stationary and time of human resources.

Due to advancement in computer and development of versatile software like AutoCAD, civil engineers and architects are using computers and graphical software to generate necessary drawings with high precision and using less time compared to manual drafting and it has therefore became a necessity to have CAD skills among the engineers to improve the efficiency of drafting procedures. Keeping this in mind, the curriculum is framed to develop basic skills and competency required.

2.   COMPETENCY

The course content should be taught and curriculum should be implemented with the aim to develop different types of skills so that students are able to acquire following competency:
- **Prepare detailed engineering and construction designs and drawings required for civil engineering activities using advanced CAD software.**

3.   COURSE OUTCOMES

The theory should be taught and practical should be carried out in such a manner that students are able to acquire different learning out comes in cognitive, psychomotor and affective domain to demonstrate following course outcomes.
  i.   Apply basic CAD command to develop 2D and 3D drawings of residential & commercial building using AutoCAD.
 ii.   Prepare detailed engineering and construction drawings and designs required for civil engineering activities.
iii.   Use advanced CAD commands for edit/modification of existing drawings as per needs and suggestions and print the same.

4. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	ESE	PA	ESE	PA	
00	00	04	04	00	00	40	60	100

5.   COURSE DETAILS

Note: There are no separate classes for theory as given below. The relavant theory has to be discussed before the practical during the practical sessions**.**

Unit	Major Learning Outcomes (in Cognitive Domain)	Topics and Sub-topics
Unit – I **Introduction to AutoCAD**	1a. Demonstrate the basics of AutoCAD software and its important commands 1b. Prepare a simple building drawing file using basic draw and modify commands	1.1 File menu of AutoCAD with New, Open, Save, Save as and Close 1.2 Basic 2D commands like Line, Circle, Ellipse, Multi Line ,Construction Line, Polyline, Point, Donut, Ellipse, Polygon, Rectangle, Arc 1.3 Erase, Snap, Redraw, Regenerate , Zoom, Pan
Unit – II **Editing of AutoCAD Drawing**	2a.Explain the applications of Edit commands 2b. Modify existing AutoCAD Drawing 2c. Apply advanced command for edit /modification of drawing	2.1 Modify Properties of Drawing Entity 2.2 Copy, Move, Rotate, Mirror , Offset , 2.3 Array, Scale, Stretch, Lengthen, Trim, 2.4 Extend , Break, Chamfer , Fillet 2.5 Block, WBlock, Insert and Explode , Area 2.6 and Volume with Civil Engineering 2.7 Application
Unit – III **Advanced 2DCommands**	3a. Prepare typical Drawings using Different Layers 3b. Develop final Drawings with Dimension and Text and Hatching	3.1 Application of LAYER command in Civil Engineering 3.2 Layer command with its all sub commands, Line type, Color 3.3 Dimension command – linea , aligned, arc length, radius, Diameter, Centre, Leader, Baseline and Continuous Dimensioning,tolerance, override and Dimension updates Text and DTEXT commands with Text Style Hatch command
Unit – IV **3D Commands of AutoCAD**	4a. Use 3D commands to generate 3d view from 2D drawing 4b. Prepare 3D Drawings using 3D Commands of AutoCAD 4c. perform rendering/shading on 3d drawing	4.1 Units, Elevation, Thickness, UCS and UCS Icon 4.2 Viewports , Extrude , 3D Solids – Sphere, Box, Cylinder, Cone, Wedge, Interference 4.3 3D Surface – Revolved, Tabulated and Ruled Surfaces 4.4 Hide, Render and Shade of 3D drawings

Unit	Major Learning Outcomes (in Cognitive Domain)	Topics and Sub-topics
Unit – V **Plot of 2D & 3D Drawings**	5a. Setup printer , plotter for printing of drawings 5b. Plot 2D and 3D Civil Engineering Drawings as per requirement on different scale and sizes	5.1 PLAN , ELEVATION and 3D Views of Residential and Commercial Building 5.2 PLOT and its Sub Command for Plotting Drawing on A1, A2 and A3 Size Paper using Printer and / or Plotter

6. **SUGGESTED SPECIFICATION TABLE WITH HOURS & MARKS (THEORY)**

Not Applicable

7. **SUGGESTED LIST OF EXERCISES/PRACTICAL**

The practical/exercises should be properly designed and implemented with an attempt to develop different types of skills (**outcomes in psychomotor and affective domain**) so that students are able to acquire the competencies/programme outcomes. Following is the list of practical exercises for guidance.

Note: Here only outcomes in psychomotor domain are listed as practical/exercises. However, if these practical/exercises are completed appropriately, they would also lead to development of certain outcomes in affective domain which would in turn lead to development of Course Outcomes related to affective domain. Thus over all development of Programme Outcomes (as given in a common list at the beginning of curriculum document for this programme) would be assured.
Faculty should refer to that common list and should ensure that students also acquire outcomes in affective domain which are required for overall achievement of Programme Outcomes/Course Outcomes.

S. No.	Unit No.	Practical/Exercise (outcomes in psychomotor domain)	Approx Hours Reqd.
1	I	Draw Basic 2D objects such as line circle, polygon - (at least 04 objects)	04
2	II	Draw simple plan of a rectangular room or layout of given dimensions -- 02 drawings	08
3	III	Draw a drawing of a plan of two BHK house	14
4	IV	Draw Four 3D Geometrical Figures	12
5	V	Develop PLAN , ELEVATION and 3D Views of One Residential and One Commercial Building	18
Total Hours			**56**

8. **SUGGESTED LIST OF STUDENT ACTIVITIES**
   i.   Visit to architect/civil engineering firm for understating the CAD and its applications and study of typical drawings prepared by AutoCAD
   ii.   Collect different types of civil drawings in hard copy from architects , builders, and practicing engineers for preparing the same using CAD software

9.   SPECIAL INSTRUCTIONAL STRETAGIES (If Any):

i.   Use projector to explain and demonstrate the use of AutoCAD commands. and students must have computer with software
ii.   CAD tutorial can be given to the students (available on internet)
iii.   Collect and provide different drawings prepared through AutoCAD and will show to students to motivate to prepare such type of Drawings.

10. SUGGESTED LEARNING RESOURCES

A. List of Books:

S. No.	Title of Books	Author	Publication
1.	AutoCAD Manual	-----	Microsoft AutoDesk
2.	AutCAD – A problem solving Approach – 2013 & Beyound	Shamtikoo	AutoDesk
3.	Mastering AutoCAD	George Omura	Wily India
4.	AutoCAD	Rubenstein	Delmar

B.   List of Major Equipment/Materials

i.   Computer system -Intel Core 2 Dual with 32 MB RAM 200mb hard disk and Mouse and Key Board
ii.   Printer and/or Plotter as per printing requirement

C   List of Software/Learning Websites

i.   Authentic AutoCAD version 2006 or Higher can be down loaded from AICTE website
ii.   Autodesk web site

11.   COURSE CURRICULUM DEVELOPMENT COMMITTEE

Faculty Members from Polytechnics

- **Prof. B. G. Rajgor,** H.O.D, App. Mech., BBIT , V. V. Nagar
- **Prof. Ravi R. Gurnani,** Lecturer in Civil, T F G, Adipur
- **Prof. C. H. Bhatt,** Dr. S. & S.S. Ghandhy College, Surat
- **Prof. K. K. Patel,** H.O.D, G. P. Rajkot

Coordinator and Faculty Members from NITTTR Bhopal

- **Dr. J. P. Tegar,** Professor and Head Dept. of Civil and Environmental Engineering

- **Dr. Subrat Roy,** Professor, Dept. of Civil and Environmental Engineering