# GUJARAT TECHNOLOGICAL UNIVERSITY
## B.E. SEMESTER : VIII
## AUTOMOBILE ENGINEERING

Subject Name: **AUTOMOTIVE COMPUTER AIDED DESIGN**

| Sr. No. | Course Contents | Total Hrs |
|---|---|---|
| 1. | **Basics of CAD** <br> Fundamentals of CAD, phases of CAD, benefits, applications, Display techniques, Hardware and software of CAD, programming and tools in CAD, Computer aided design, computer graphics, transformations, 2-D & 3-D drawing and viewing, modeling in 3-D. | **6** |
| 2. | **Numerical methods** <br> Modeling and Programming, Gauss elimination method, numerical integration, finite differences, curve fitting, Newton raphson technique. | **10** |
| 3. | **Computer graphics** <br> Elements, raster scan technique, Graphic elements drawing , algorithms for line, circle, ellipse, arc, rectangle etc., drawing of 2-D elements, filling of object, programming methods, transformation in 2-D as scaling , rotation, rotation about any point, scaling about any point, translation, mirror and shear, transformation in 3-D as scaling ,translation and rotation ,mirror, shear <br> Modeling in 3-D, surface, wireframe and solid modeling | **10** |
| 4. | **Design of Vehicle components** <br> Application for design of vehicle components and mathematical modeling with program on design problems like shaft, propeller shaft, axles, gear box, gears, spring and suspension system, brake design, clutch design , body design, optimization concepts and techniques for reducing weight and cost of the components. | **10** |
| 5. | **Finite elements techniques** <br> Procedure , methods, element , types, modeling, single dimensional analysis on beam element, shape function, stress matrix, connectivity table, thermal stresses, horizontal and vertical element structure, global load matrix, global deflection matrix, stiffness matrix, elimination approach and penalty approach, heat transfer analysis , fluid flow analysis, programming , mesh generation | **14** |
| 6. | **Computer Aided Design packages, 3-D modeling technique and Design Analysis Soft ware Introduction:** Various soft ware capabilities AND limitations (Ansys Fluent, CFD, Hyper works, Solid works, ProE, CATIA, Adams, Car SIM). Basic knowledge to be imparted to the students. Coverage in the examinations should be limited to only 1 question. | **10** |

**Text Books:**

1. Computer Aided Design by Rammurthy, TMH.
2. Computer Graphics by Radhakrishnan Kothandraman
3. Finite element technique by Belagondu, PHI

**Reference Books:**

1. Computer Aided Design by Krishnamurthy, Narsova Publications.
2. Finite element methods by Lagon, Thomson Asia Pvt. Ltd.