Uka Tarsadia University

B. Tech
Auto System Design
(030130603)
6th Semester
EFFECTIVE FROM January-2013
A. **Prerequisite:** Basics of Auto System Design

B. **Aim and Objective:** To provide a comprehensive knowledge of overall Automobile engineering and design of different Auto systems.

C. **Subject Code:** 030130603  **Subject:** Auto System Design

D. **Total:** 78 Hrs.  
   [Lecture: 4  
   Tutorial: 0  
   Practical: 2 ]

E. **Detailed Syllabus:**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Topic Name</th>
<th>Weightage (%)</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>Statistical Consideration in Design and Optimization</td>
<td>18</td>
</tr>
<tr>
<td>1.1</td>
<td>Ergonomics and Aesthetic Design, Statistics in design, design for natural tolerances, statistical analysis, and mechanical reliability.</td>
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<td>1.2</td>
<td>Introduction to design optimization of mechanical elements, adequate &amp; optimum design, methods of optimization, Johnson’s method of optimum design-Simple problems in optimum design like axially loaded members, shaft subjected to tensional and bending moments and other machine elements.</td>
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<td>2.</td>
<td>Design of Clutches</td>
<td>16</td>
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<tr>
<td>2.1</td>
<td>Design requirements of friction clutches, selection criterion, torque transmission capacity, lining materials,</td>
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<tr>
<td>2.2</td>
<td>Design of single plate clutch, multi-plate clutch and centrifugal clutch</td>
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<td>3.</td>
<td>Design of Gearbox</td>
<td>16</td>
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<tr>
<td>3.1</td>
<td>Selection of gear ratios &amp; final drive ratio</td>
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<tr>
<td>3.2</td>
<td>Design of gears, shafts, splines and housing, selection of bearings.</td>
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<td>4.</td>
<td>Design of Propeller Shafts and Axles</td>
<td>16</td>
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<tr>
<td>4.1</td>
<td>Design of Propeller shafts for bending, torsion &amp; rigidity, Design of universal joints and slip joints, final drive, Design of front &amp; rear axles.</td>
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<td>5.</td>
<td>Brake Systems</td>
<td>16</td>
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</table>
5.1 Design of Hydraulic Braking System, Internal Expanding Shoe Brake and Disc Brake Design of master cylinder, drum cylinder and piping design.

6. Design of Suspension and Steering System

6.1 General design considerations of suspension system, Design of leaf springs for automobile suspension system, Design considerations of Belleville springs, Elastomeric springs, Air (Pneumatic) springs.

6.2 Design considerations of Steering System and Vehicle Frame.

F. Modes of Transaction (i.e. Delivery)
1. Lectures /discussion method shall be fruitful. It should be supplemented with various appropriate audio-visual aids.
2. Activity assignment or presentation shall be given to students.

G. Teachers Activities/Practicum
The following activities should be carried out by the teachers:
1. Demonstrating through video lecture.
2. Assign Assignments on regular period.
3. Assessment of submissions.

H. Student Activities/Practicum
The following activities may be carried out by the students:
1. Assignment submission
2. Sample calculation and result analysis.
3. Making graph related to the experiment done.

I. Text Books

J. Reference Books