



# Engineering Program

Specialization	Automotive Maintenance
Course Number	20211121
Course Title	Vehicle chassis systems
Credit Hours	2
Theoretical Hours	2
Practical Hours	0



**Brief Course Description:**

Fundamentals of Automobile systems: Steering system, Braking system, suspension system Wheels and Tiers and wheel alignment. Computerizes Chassis systems {Anti-lock Braking system (ABS),Traction control system(TCS) ,Electronic stability program(ESP) ,Electronic steering systems ,Electronic suspension systems}

**Course Objectives:**

Upon the completion of this course, the student will be able to:

1. Identify vehicle chassis systems' components.
2. Explain the operation principle of each vehicle chassis system.
3. Understand the functions of each system.
4. Read and understand computerizes chassis systems wiring diagrams.



**Detailed Course Outline:**

Unit Number	Unit Title	Unit Content	Time Needed
1.	<b>Steering system</b>	<ul style="list-style-type: none"> <li>• Basic types of steering system.</li> <li>• Steering gear reduction.</li> <li>• Steering column assembly.</li> <li>• Tilt able steering mechanism.</li> <li>• Steering lock mechanism.</li> <li>• Power steering system.</li> <li>• Steering system electronic control.</li> </ul>	4
2.	<b>Braking system</b>	<ul style="list-style-type: none"> <li>• Types of braking systems.</li> <li>• Hydraulic brake system construction and operation.</li> <li>• Construction and operation of tandem master cylinder.</li> <li>• Wheel cylinder construction and operation.</li> <li>• Servo brake construction and operation.</li> <li>• Disc brake assembly construction and operation.</li> <li>• Drum brake assembly construction and operation.</li> <li>• Hand brake assembly construction and operation.</li> <li>• Fluid level warning switch operation.</li> </ul>	4
3.	<b>Suspension system</b>	<ul style="list-style-type: none"> <li>• Function and operation of suspension system.</li> <li>• Oscillation and riding comfort.</li> <li>• Springs function and types.</li> <li>• Function, types and operation of shock absorber.</li> <li>• Types of suspension systems.</li> <li>• Suspension bars and rods.</li> <li>• Ball joints.</li> <li>• Electronic suspension and ride control.</li> <li>• Electronically controlled air suspension.</li> </ul>	4

4.	<b>Wheel alignments angles</b>	<ul style="list-style-type: none"> <li>• Front end geometry.</li> <li>• Suspension height.</li> <li>• Steering axis inclination.</li> <li>• Camber, caster and Toe.</li> <li>• Scrub radius, turning radius, setback and thrust angle.</li> </ul>	3
5.	<b>Wheels and tires</b>	<ul style="list-style-type: none"> <li>▪ Function and types of tires.</li> <li>▪ Tire construction.</li> <li>▪ Tire valve.</li> <li>▪ Tire pressure and pressure monitoring.</li> <li>▪ Tire size and tire wall marking.</li> <li>▪ Tubes.</li> <li>▪ Wheels construction and attachment.</li> </ul>	3
6.	<b>Anti-lock brake system (ABS)</b>	<ul style="list-style-type: none"> <li>▪ Purpose and construction of (ABS) system.</li> <li>▪ Types and operation of (ABS) systems.</li> <li>▪ (ABS) system sensors.</li> <li>▪ (ABS) system electronic control unit.</li> <li>▪ (ABS) system hydraulic unit.</li> <li>▪ (ABS) system warning lamp.</li> <li>▪ (ABS) system wiring diagram.</li> </ul>	5
7.	<b>Integrated (ABS) / Traction control system (TCS)</b>	<ul style="list-style-type: none"> <li>▪ Hydraulic control unit construction and operation.</li> <li>▪ Electronic brake force distribution.</li> <li>▪ Active warning lamp module.</li> </ul>	4
8.	<b>Electronic stability program (ESP)</b>	<ul style="list-style-type: none"> <li>▪ ABS in "add on " design (integrated type).</li> <li>▪ ABS + TCS + Active Yaw Control.</li> <li>▪ ESP control module.</li> <li>▪ Basic function of ESP.</li> <li>▪ Hydraulic control unit.</li> <li>▪ ESP control system.</li> <li>▪ Warning lamp control</li> </ul>	5

**Evaluation Strategies:**

Exams		Percentage	Date
Exams	First Exam	20%	
	Second Exam	20%	
	Final Exam	50%	
Homework and Projects Discussions and lecture Presentations		10%	

**Teaching Methodology:**

- ❖ Lectures and presentations.

**Text Book**

1. Comfort and safety systems/ BOSCH / Automotive technology / forth edition.

**References**

1. William H. Crouce and Donald Anglin, Automotive Mechanics, Hill school publishing company, USA, 1993.
2. Fundamentals of motor vehicles technology / Hiller V.A.W , Anchor. UK
3. Comfort and safety systems/ BOSCH / Automotive technology / forth edition.

