



Automotive Mechanical Faculty



Curriculum with Course Syllabus

Department: CHASSIS SYSTEMS

Semester 1-4 | Core Courses + ATA 2040 Electives + SIWES + Capstone with Course Codes (CHS 101-CHS 404)

CHS 101 – Workshop Safety & Chassis Tools

Credit Hours	2 (1T/1P)
Course Description	Safety practices and chassis-specific tools.
Syllabus / Topics	• PPE • Lifting equipment • Alignment tools
Practical Activities / Lab Work	• Jacking, hoisting, safety drills
Assessment Methods	CA 20% Practical 40% Exam 40%
Learning Outcomes	Apply safe handling of chassis equipment.
Accreditation Mapping	NBTE NID Safety
AI/Future Module ↵	VR Safety Trainer

CHS 102 – Fundamentals of Vehicle Structures

Credit Hours	3 (2T/1P)
Course Description	Vehicle frames, subframes, monocoque, and load distribution.
Syllabus / Topics	• Frame types • Load distribution • Subframes
Practical Activities / Lab Work	• Frame inspection and analysis
Assessment Methods	CA 20% Practical 40% Exam 40%
Learning Outcomes	Explain fundamentals of chassis structures.
Accreditation Mapping	NBTE NID ASE



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AI/Future Module ↘

AI Stress Analysis Tool

CHS 103 – Suspension Systems I

Credit Hours	2 (1T/1P)
Course Description	Leaf springs, coil springs, dampers.
Syllabus / Topics	• Suspension types • Shock absorbers
Practical Activities / Lab Work	• Suspension teardown and inspection
Assessment Methods	CA 20% Practical 40% Exam 40%
Learning Outcomes	Understand and service basic suspension systems.
Accreditation Mapping	NBTE NID IMI-UK
AI/Future Module ↘	AR Suspension Visualizer





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CHS 104 – Steering Systems I

Credit Hours	2 (1T/1P)
Course Description	Mechanical steering, rack-and-pinion, steering geometry basics.
Syllabus / Topics	• Rack-and-pinion • Steering geometry
Practical Activities / Lab Work	• Inspect and align rack-and-pinion system
Assessment Methods	CA 20% Practical 40% Exam 40%
Learning Outcomes	Service mechanical steering systems.
Accreditation Mapping	NBTE NID ASE
AI/Future Module ↘	AI Steering Geometry Analyzer

CHS E1 – CAD Chassis Design Basics (Elective)

Credit Hours	2 (0T/2P)
Course Description	Basics of CAD for chassis and frame design.
Syllabus / Topics	• CAD basics • Frame modeling
Practical Activities / Lab Work	• Create CAD model of vehicle frame
Assessment Methods	Project 100%
Learning Outcomes	Use CAD for basic chassis design.
Accreditation Mapping	NBTE Elective IMI-UK
AI/Future Module ↘	CAD/VR Frame Modeling

CHS 201 – Suspension Systems II

Credit Hours	3 (1T/2P)
Course Description	Independent suspension, MacPherson struts, multi-link systems.
Syllabus / Topics	• Independent suspension • MacPherson strut • Multi-link
Practical Activities / Lab Work	• Service MacPherson strut
Assessment Methods	CA 20% Practical 40% Exam 40%
Learning Outcomes	Service and repair intermediate suspension systems.
Accreditation Mapping	NBTE NID ASE
AI/Future Module ↘	AI Suspension Analyzer

CHS 202 – Steering Systems II

Credit Hours	3 (1T/2P)
Course Description	Hydraulic power steering, EPS, ADAS integration.
Syllabus / Topics	• Hydraulic PS • EPS • ADAS integration
Practical Activities / Lab Work	• Diagnose EPS system
Assessment Methods	CA 20% Practical 40% Exam 40%
Learning Outcomes	Service power steering and EPS systems.
Accreditation Mapping	NBTE NID ASE



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AI/Future Module ↘

AI Steering Diagnostic Tool

CHS 203 – Braking Systems I

Credit Hours	2 (1T/1P)
Course Description	Hydraulic brakes, discs, drums.
Syllabus / Topics	• Drum brakes • Disc brakes • Hydraulics
Practical Activities / Lab Work	• Overhaul drum and disc brakes
Assessment Methods	CA 20% Practical 40% Exam 40%
Learning Outcomes	Service hydraulic braking systems.
Accreditation Mapping	NBTE NID IMI-UK
AI/Future Module ↘	Smart Brake Tester

CHS 204 – Vehicle Dynamics & Handling

Credit Hours	2 (1T/1P)
Course Description	Center of gravity, weight transfer, stability.
Syllabus / Topics	• Weight transfer • Handling • Stability control
Practical Activities / Lab Work	• Skidpad test analysis
Assessment Methods	CA 20% Practical 40% Exam 40%
Learning Outcomes	Apply principles of vehicle dynamics.
Accreditation Mapping	NBTE NID ASE
AI/Future Module ↘	AI Vehicle Dynamics Simulator

CHS E2 – AR Chassis Troubleshooting (Elective)

Credit Hours	2 (0T/2P)
Course Description	AR-based diagnosis of suspension and steering faults.
Syllabus / Topics	• AR tools • Chassis visualization
Practical Activities / Lab Work	• Simulate AR chassis troubleshooting
Assessment Methods	Project 100%
Learning Outcomes	Use AR to troubleshoot chassis issues.
Accreditation Mapping	NBTE Elective IMI-UK
AI/Future Module ↘	AR Suspension/Steering Fault Finder

CHS 301 – SIWES Internship

Credit Hours	6 (0T/6P)
Course Description	Six-month supervised training in suspension, steering, and brake workshops.
Syllabus / Topics	• Weekly logbook • Supervisor reports
Practical Activities / Lab Work	• Industry-based diagnostics and servicing
Assessment Methods	Supervisor Report 50% Logbook 30% Oral 20%



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Learning Outcomes	Apply knowledge in chassis servicing environments.
Accreditation Mapping	NBTE SIWES ASE
AI/Future Module ↘	IoT Internship Logbook

CHS 401 – Capstone Project

Credit Hours	6 (0T/6P)
Course Description	Independent project in chassis innovation.
Syllabus / Topics	• Proposal • Execution • Defense
Practical Activities / Lab Work	• Develop AI-based alignment tool or suspension retrofit
Assessment Methods	Project 50% Report 30% Defense 20%
Learning Outcomes	Plan and execute a chassis innovation project.
Accreditation Mapping	NBTE NID ASE
AI/Future Module ↘	AI Smart Chassis Optimizer

CHS 402 – Advanced Braking Systems II

Credit Hours	3 (1T/2P)
Course Description	ABS, EBD, traction control, regenerative braking.
Syllabus / Topics	• ABS • EBD • Traction control
Practical Activities / Lab Work	• Diagnose ABS/EBD faults
Assessment Methods	CA 20% Practical 40% Exam 40%
Learning Outcomes	Service advanced braking systems.
Accreditation Mapping	NBTE NID ASE
AI/Future Module ↘	AI ABS Diagnostic Trainer

CHS 403 – Active & Adaptive Suspensions

Credit Hours	2 (1T/1P)
Course Description	Air suspensions, magnetorheological dampers.
Syllabus / Topics	• Air suspension • Adaptive systems
Practical Activities / Lab Work	• Service air suspension
Assessment Methods	CA 20% Practical 40% Exam 40%
Learning Outcomes	Analyze and service adaptive suspensions.
Accreditation Mapping	NBTE NID IMI-UK
AI/Future Module ↘	AI Adaptive Suspension Analyzer



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CHS 404 – Entrepreneurship in Chassis Services

Credit Hours	2 (1T/1P)
Course Description	Business planning and customer management for chassis services.
Syllabus / Topics	• Business setup • Marketing • Finance
Practical Activities / Lab Work	• Draft chassis service business plan
Assessment Methods	CA 20% Business Plan 40% Exam 40%
Learning Outcomes	Develop entrepreneurship skills in chassis services.
Accreditation Mapping	NBTE NID IMI-UK
AI/Future Module ↘	AI Business Planner

CHS E3 – Smart Mobility & Future Chassis (Elective)

Credit Hours	2 (0T/2P)
Course Description	Future mobility systems, autonomous chassis technologies.
Syllabus / Topics	• Smart mobility • Autonomous chassis
Practical Activities / Lab Work	• Create simulation of autonomous chassis system
Assessment Methods	Project 100%
Learning Outcomes	Design future-ready chassis systems.
Accreditation Mapping	NBTE Elective IMI-UK
AI/Future Module ↘	AI/VR Autonomous Chassis Simulator

