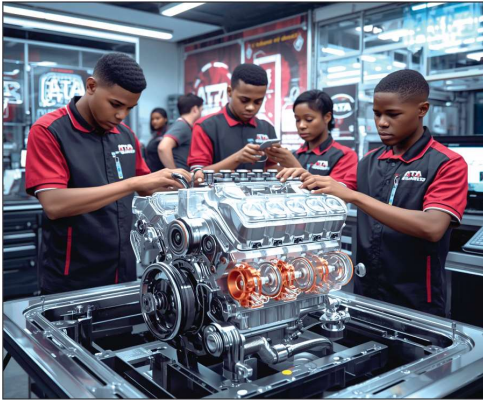




Automotive Mechanical Faculty



Curriculum with Course Syllabus

Department: ENGINE TECHNOLOGY

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

ENG 101 – Workshop Safety & Engine Tools

Credit Hours	2 (1T/1P)
Course Description	Safety in mechanical workshops; use of hand, power, and diagnostic tools.
Syllabus / Topics	• PPE • Tool care • Workshop layout
Practical Activities / Lab Work	• Tool calibration • PPE drills • Engine bay inspection
Assessment Methods	CA 20% Practical 40% Exam 40%
Learning Outcomes	Apply workshop safety and tool use.
Accreditation Mapping	NBTE NID Safety
AI/Future Module ↵	VR Safety Simulator

ENG 102 – Fundamentals of Internal Combustion Engines

Credit Hours	3 (2T/1P)
Course Description	Basics of SI/CI engines, cycles, and components.
Syllabus / Topics	• SI/CI engines • Otto/Diesel cycles • Engine parts
Practical Activities / Lab Work	• Strip and assemble single-cylinder engine
Assessment Methods	CA 20% Practical 40% Exam 40%
Learning Outcomes	Explain and demonstrate fundamentals of



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	IC engines.
Accreditation Mapping	NBTE NID ASE
AI/Future Module ↘	AI Engine Simulator

ENG 103 – Engineering Materials for Engines

Credit Hours	2 (1T/1P)
Course Description	Metals, alloys, and composites in engine design.
Syllabus / Topics	• Metals • Alloys • Composites
Practical Activities / Lab Work	• Identify and test materials
Assessment Methods	CA 20% Practical 40% Exam 40%
Learning Outcomes	Identify materials used in engine manufacturing.
Accreditation Mapping	NBTE NID IMI-UK
AI/Future Module ↘	AI Material Selector

ENG 104 – Thermodynamics I

Credit Hours	3 (2T/1P)
Course Description	Heat, work, cycles, and efficiency in engines.
Syllabus / Topics	• Heat transfer • Energy balance • Efficiency
Practical Activities / Lab Work	• Calculate thermal efficiency of engines
Assessment Methods	CA 20% Practical 40% Exam 40%
Learning Outcomes	Apply thermodynamic principles to IC engines.
Accreditation Mapping	NBTE NID ASE
AI/Future Module ↘	AI Cycle Analyzer

ENG E1 – Intro to Digital Engine Simulations (Elective)

Credit Hours	2 (0T/2P)
Course Description	Basics of digital simulations for engine operation.
Syllabus / Topics	• Digital modeling • Simulation practice
Practical Activities / Lab Work	• Create VR simulation of engine flow
Assessment Methods	Project 100%
Learning Outcomes	Use VR and digital tools for engine modeling.
Accreditation Mapping	NBTE Elective IMI-UK
AI/Future Module ↘	VR Engine Flow Simulator

ENG 201 – Engine Systems I

Credit Hours	3 (1T/2P)
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Course Description	Fuel, lubrication, cooling, and intake/exhaust systems.
Syllabus / Topics	• Fuel system • Lubrication • Cooling • Exhaust
Practical Activities / Lab Work	• Overhaul carburetor, oil pump, radiator
Assessment Methods	CA 20% Practical 40% Exam 40%
Learning Outcomes	Diagnose and service engine support systems.
Accreditation Mapping	NBTE NID ASE
AI/Future Module ↘	IoT Cooling Flow Analyzer

ENG 202 – Engine Performance & Testing

Credit Hours	2 (1T/1P)
Course Description	Testing power, torque, efficiency, emissions.
Syllabus / Topics	• Power/torque • Efficiency • Emissions testing
Practical Activities / Lab Work	• Conduct dynamometer test
Assessment Methods	CA 20% Practical 40% Exam 40%
Learning Outcomes	Measure and interpret engine performance.
Accreditation Mapping	NBTE NID ASE
AI/Future Module ↘	AI Engine Diagnostic Dashboard





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ENG 203 – Thermodynamics II

Credit Hours	2 (1T/1P)
Course Description	Advanced cycles, supercharging, turbocharging.
Syllabus / Topics	• Advanced cycles • Supercharging • Turbocharging
Practical Activities / Lab Work	• Disassemble and test turbocharger
Assessment Methods	CA 20% Practical 40% Exam 40%
Learning Outcomes	Apply thermodynamics to advanced engine systems.
Accreditation Mapping	NBTE NID ASE
AI/Future Module ↘	AI Boost Optimizer

ENG 204 – AutoCAD for Engine Design

Credit Hours	2 (0T/2P)
Course Description	CAD software for engine modeling.
Syllabus / Topics	• CAD basics • Engine block design • Assembly models
Practical Activities / Lab Work	• Draft engine block & piston assembly
Assessment Methods	Project 100%
Learning Outcomes	Design engine components using CAD tools.
Accreditation Mapping	NBTE NID IMI-UK
AI/Future Module ↘	AI CAD Co-Designer

ENG E2 – AR Engine Troubleshooting (Elective)

Credit Hours	2 (0T/2P)
Course Description	Augmented reality tools for engine diagnostics.
Syllabus / Topics	• AR basics • Engine visualization • Fault-finding
Practical Activities / Lab Work	• Simulate AR-based troubleshooting
Assessment Methods	Project 100%
Learning Outcomes	Use AR for diagnostic purposes.
Accreditation Mapping	NBTE Elective IMI-UK
AI/Future Module ↘	AR Fault-Finding Assistant

ENG 301 – SIWES Internship

Credit Hours	6 (0T/6P)
Course Description	Six-month supervised training in engine repair/service centers.
Syllabus / Topics	• Weekly logbook • Supervisor reviews
Practical Activities / Lab Work	• Hands-on servicing in industry
Assessment Methods	Supervisor Report 50% Logbook 30% Oral 20%



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Learning Outcomes	Apply knowledge in industrial engine repair settings.
Accreditation Mapping	NBTE SIWES ASE
AI/Future Module ↘	IoT Digital Logbook

ENG 401 – Capstone Project

Credit Hours	6 (0T/6P)
Course Description	Independent project on engine innovation, hybrid adaptation, or efficiency optimization.
Syllabus / Topics	• Proposal • Execution • Defense
Practical Activities / Lab Work	• Develop prototype or innovation
Assessment Methods	Project 50% Report 30% Defense 20%
Learning Outcomes	Plan, execute, and defend an engine innovation project.
Accreditation Mapping	NBTE NID ASE
AI/Future Module ↘	AI Hybrid Engine Optimizer

ENG 402 – Advanced Engine Systems II

Credit Hours	3 (1T/2P)
Course Description	Variable valve timing, direct injection, emissions control.
Syllabus / Topics	• VVT • Direct injection • Emissions systems
Practical Activities / Lab Work	• Analyze ECU-controlled injection system
Assessment Methods	CA 20% Practical 40% Exam 40%
Learning Outcomes	Service and analyze advanced engine systems.
Accreditation Mapping	NBTE NID ASE
AI/Future Module ↘	AI Valve Timing Optimizer

ENG 403 – Hybrid & Alternative Powertrains

Credit Hours	2 (1T/1P)
Course Description	Hybrid engines, hydrogen, biofuels, synthetic fuels.
Syllabus / Topics	• Hybrid systems • Hydrogen • Biofuels
Practical Activities / Lab Work	• Retrofit IC engine with hybrid components
Assessment Methods	CA 20% Practical 40% Exam 40%
Learning Outcomes	Evaluate alternative powertrains.
Accreditation Mapping	NBTE NID IMI-UK
AI/Future Module ↘	AI Hybrid Analyzer



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ENG 404 – Entrepreneurship in Engine Services

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

ENG E3 – Smart Diagnostics & Predictive Maintenance (Elective)

Credit Hours	2 (0T/2P)
Course Description	Predictive maintenance and AI diagnostics for engines.
Syllabus / Topics	• Predictive models • Maintenance planning
Practical Activities / Lab Work	• Use AI diagnostic systems
Assessment Methods	Project 100%
Learning Outcomes	Apply predictive AI systems for engine maintenance.
Accreditation Mapping	NBTE Elective IMI-UK
AI/Future Module ↗	AI Predictive Maintenance Engine

FABRICATION PANEL BEATING