



High Performance and Racing Technology



This comprehensive and exciting program is designed for those students who are looking to pursue a career in the performance and racing industries. The course provides students with the learning experiences of the high performance industry giving students a proficient understanding of: engine basics, high performance engine building, electrical systems, electronic/ignition and fuel systems, forced air induction, welding, chassis fabrication, sheet metal fabrication, motorsports management, bolt-on components, carburetors and intakes, and professional career development. This course will provide the fundamental core skills required by the High Performance and Racing Industries, building a foundation of knowledge so that the student may continue to an advanced level. This program provides training for entry level positions as an automotive technician, racing technician, chassis fabricator, performance technician, aftermarket parts installer, service writer, service and parts manager, service manager, specialty shop technician, repair business owner and engine builder.

<u>Course</u>	<u>Course Title</u>	<u>Clock Hours</u>	<u>Weeks</u>	<u>Quarter Credit Hours</u>
HPR-101	Electrical & Electronic Systems I	150	6	9.00
HPR-102	Electrical & Electronic Systems II	150	6	9.00
HPR-103	Introduction & Basic High Performance Engine	150	6	8.50
HPR-104	Engine Building: Cylinder Heads & Valves	150	6	8.50
HPR-105	Carburetors, Intakes & Tuning	150	6	9.00
HPR-106	Forced Air Induction Bolt-On	150	6	9.00
HPR-107	Automatic & Standard Transmissions: Driveline & Differential	150	6	9.00
HPR-108	Steering & Suspension	150	6	8.50
HPR-109	Welding and Fabrication	150	6	8.50
HPR-110	Chassis Fabrication	150	6	8.50
HPR-111	Brakes	150	6	8.50
HPR-112	Motor Sports Management	<u>150</u>	<u>6</u>	<u>8.50</u>
		1800	72	104.50

HPR-101 Electrical & Electronic System I

This course is designed to introduce students to the fundamentals of electricity. Students will learn how to read schematics, understanding both the terms and symbols. Proper usage of a DVOM, principles of battery composition and service, and the inspection, diagnosis and repair of starters will be covered through both hands-on and written activities. Lab projects will include the use of oscilloscopes, DVOM, load testers, training simulators, computers, and live vehicles.

HPR-102 Electrical & Electronic System II

This course will train students on the theory and concept of aftermarket high performance electronic systems. Students will perform hands-on and written activities on the components, installation, diagnosis, and repair of these systems. Aftermarket systems, such as electric fuel pumps, electric water pumps, ignition systems, cooling fans, electronic fuel injection, and electronic nitrous systems are covered in the module.

HPR-103 Introduction & Basic High Performance Engine

Students will learn safety principles, tools, and equipment, then move forward into piston engine operation, diagnosing and repairing cooling and lubricating systems, and engine failure. Students will begin the disassembly process by cleaning, inspecting, and measuring various engine components. While the engine is disassembled, students will learn proper servicing procedures for the cylinder head and block assembly.

HPR-104 Engine Building: Cylinder, Heads, & Valves

This course educates students on the necessary components and tactics of building a winning high performance engine. Students will gain an understanding of aftermarket engine blocks and how to increase cubic inch displacement. Students will learn the concept of high performance components, application, procedures, and configurations of today's aftermarket cylinder heads. This course will also introduce students to the high performance world of add-on computers. Students will learn the concepts, operation, installation, and testing of aftermarket systems and how they improve vehicle performance.

HPR-105 Carburetors, Intakes, & Tuning

This course is designed to provide students with a basic knowledge of carburetors and multi-carburetor systems. Students will learn the proper cfm to cubic inch ratio on high performance engines and how to set up these carburetors for maximum horsepower and performance. Students will also learn high performance mathematics utilizing a desk top dyno, combining hands-on activities with classroom instruction. Students will learn engine simulations, as well as how to properly document and record both horsepower and torque specifications, enabling students to match up the best combinations for both foreign and domestic cars to achieve maximum horsepower.



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HPR-106 Forced Air Induction: Bolt-On

This course introduces students to the theories and principles behind forced air induction. Students will learn the effects of nitrous oxide, superchargers, and turbochargers as they relate to horsepower. Students will gain knowledge of proper application to both foreign and domestic vehicles. Once students become familiar with these systems, they will apply them to troubleshooting techniques. Students will learn how to install, diagnose, and repair bolt on equipment such as turbochargers, superchargers, aftermarket ignition systems, and exhaust systems on sport compact vehicles. Students will gain an understanding of how these bolt on systems increase or could decrease horsepower. Students will also learn the operating principles of both heating and air conditioning diagnosis and repair procedures.

HPR-107 Automatic & Standard Transmissions: Driveline & Differential

This course is designed to train students on the inspection, diagnosis, and repair of torque converters. As students continue to understand hydraulics principles, they will be challenged to diagnose and repair hydraulic control components and disassemble and reassemble a transmission through both hands-on and written activities. After students learn the basics of the automatic transmission, they will learn high stall converters, transmission brakes, manual shift automatic transmissions, and high performance modifications. Students will learn the basics of manual transmission, rear axles, and drive shaft. Students will then learn how to select the best driveline components for the various types of on- and off-road applications for both foreign and domestic vehicles. Students will learn proper setup and installation of aftermarket differentials, clutches, pressure plate, and manual transmissions using mathematics for finding correct rear end ratios for racing applications.

HPR-108 Steering & Suspension

150 Clock Hours/ 8.50 QCH

This course is designed to train students on the basics of diagnosis, troubleshooting, and conduct failure analysis of high performance steering and suspension systems through both hands-on and written activities. Students will be exposed to modifications and applications of steering and suspension in anticipation of high stress systems on both on- and off-road vehicles. Students will learn the different alignment configuration for the different types of racing environments.

HPR-109 Welding and Fabrication

Students will learn the safety and basics of MIG welding, TIG welding, heat forming, and plasma cutting. Students will gain an understanding of the proper methods and techniques used for building modern racing applications including tube welding and light gauge metals which are specific to motor sports.

HPR-110 Chassis Fabrication

This course provides the students with a detailed introduction to the fabrication of the race car chassis from the front to the rear. Students will learn blueprint reading, building multi-link suspensions, engine and suspension brackets, sheet metal and body paneling pattern development, mounting procedures, and the necessary types of metal. Students will assemble a chassis, measuring the rear end housing, and determine the proper angle of shocks. Students will also gain the basic skills to construct sheet metal and interior and body parts used for racing. Students will learn how to use a bead roller and metal brake to fabricate aluminum interior panels. Students will learn the importance of aerodynamics of wings, foils, and air dams.

HPR-111 Brakes

This course is designed to train students on the diagnosis, troubleshooting, and repair procedures of hydraulic systems, drum brakes, disc brakes, antilock brakes, and system failures. Hands-on and written activities will cover brake relining and brake lathe. After completing the basic brakes portion of the course, students will learn how to identify high performance braking components and applications. Students will also learn the effects of high speed braking on high performance vehicles and conclude the course by learning proper testing and diagnostic techniques utilized on high performance braking systems.

HPR-112 Motor Sports Management

Students will learn all aspects of motor sport management including accounting, inventory control, purchasing, sponsorships, and maintaining a team image to manage the complete operation. Students will travel to local racetracks to learn motorsport management first hand. This course is also designed to teach students how to become employable professionals, covering the development of personal employability traits, resume writing, communicating with potential employers, interviewing, and the after interview follow up. Students are coached in strategies to market themselves effectively and are encouraged to view their job search from an employer's prospective. Workplace skills, in conjunction with technical skills, will ensure students excellent career opportunities.

Courses applicable to both Diploma or Associate of Applied Science Degree Programs