SOUTHWEST TECH

SOUTHWEST TECHNICAL COLLEGE

TEAU 2840 - Engine Performance II (4 Credits)

Course Description

Engine Performance II is an in-depth practical course dealing with advanced automotive systems. In this course, you will be introduced to ECU operations and controls, programming and reprogramming ECU systems, networking systems, and other systems and components necessary to maintain proper operation of new vehicles. When you have completed this course, you will be eligible to take the certification exam in ASE (Automotive Service Excellence) Engine Performance.

Course Objectives

- Safely and appropriately use the tools and theories designed to repair high tech vehicles.
- Use vehicle on-board diagnostics, and emission testing to repair vehicles to manufacture operating specifications.
- Diagnose, and repair on-board computers, sensors, ignition, and fuel systems.
- Correctly find, and repair emission and evaporative system failures.

Course Outline

- Overview, Safety, Tools and Theories
- On-Board Diagnostics and Emission Testing
- On-Board Diagnostic Scanners and Oscilloscopes
- Computers and Input Sensors
- Ignition System and Related Input/Output Sensors
- Fuel System and Related Input/Output Actuators
- Emission Control and Evaporative Systems
- I/M Failure Diagnosis and Five-Gas Exhaust Analysis

Textbook & Reading Materials

Cengage Unlimited (1 year subscription), Cengage

Assignments and Assessments

Orientation
Orientation Acknowledgement
Engine Performance II Syllabus 20211-22
Remind Txt Group
Automotive Student OE Inst ructions
Right to Know Agreement
Student Information Sheet
INTERNET USAGE POLICY
Engine Performance II Job Sheet Checklist
Cleaning Expectations
Southwest Technical College Automotive Video Playlist
Student Tool and Equipment Use Waiver
Cell Phone
Instructions
Digital Lab Explanation
Module Breakdown
Module 1 Labs
Module 2 Labs
Module 3 Labs
Module 4 Labs
Module 5 Labs
Module 6 Labs
Module 7 Labs
Module 8 Labs
Cleaning Labs
Cleaning Lab 1
Cleaning Lab 2
Cleaning Lab 3
Cleaning Lab 4
Cleaning Lab 5
Chapter 1 Reading: Classroom
Chapter 1 Multiple Choice Quiz
Chapter 1 Fill in the Blank Questions
Chapter 1 Matching Activity Classroom
Chapter 1 Reading: Shop
Chapter 1 Shop Manual Video Ql!liz
Chapter 1 Matching Activity Shop Manual
Using Ohm's Law
Series Circuits
Parallel Circuits
Series-Parallel Circuits
Applying Ohm's Law
Using an Ammeter
Reading Wiring Diagrams
Testing For Shorts
Testing Relays
Using the Lab Scope
Basic Electricity
Electrical Circuit Designs and Components
Air Density Principles
Chapter 2 Reading: Classroom
Chapter 2 Multiple Choice Quiz
Chapter 2 Fill in the Blank Questions
Chapter 2 Reading: Shop
Chapter 2 Labeling Activity
Measuring Electricity
Voltage Drop Testing
Chapter 2 ASE-Style Review Questions
Lab 1: Identify and Interpret Engine Performance Concerns
Lab 2: Engine Manifold Vacuum Test
Lab 3: Diagnosis Engine Mechanical, Electrical, Electronic, Fuel, and Ignition Concerns
Lab 4: Cylinder Power Balance Test
Lab 5: Cylinder Compression Test
Lab 6 Retrieve & Record Diagnostic Trouble Codes from the OBD II Control System
Lab 7 Access and Use Service Information to Perform a Diagnosis
Lab 8 Cylinder Leakage Test
Checkpoint Meeting Module 1
Chapter 03 Reading: Classroom
Chapter 3 Multiple Choice Quiz
Chapter 3 Fill in the Blank Questions
Chapter 3 Matching Activity Classroom
Chapter 3 Labeling Activity
Chapter 03 Reading: Shop
Diagnostic Strategies (8-step process)
Using a Vacuum Gauge
Performing a Compression Test
Chapter 3 ASE-Style Review Questions
Chapter 3 ASE-Style Challenge Questions
Chapter 3 Shop Manual Video Quiz
Photo Sequence 1: EVAP Code Set Simulation
Lab 9: Reitrieve & Record Diagnostic Trouble Codes from the OBO II Control System
Lab 10 Access and Use Service Information to Perform a Diagnosis
Lab 11 Checking Common Sensors
Lab 12 Obtain and Interpret Scan Tool Data
Lab 13 Research Vehicle Information and Technical Service Bulletins
Lab 14 Exhaust Inspection
Lab 15 Cooling System Tests
Checkpoint Meeting Module 2
Chapter 04 Reading: Classroom
Chapter 4 Multiple Choice Quiz
Chapter 4 Fill in the Blank Questions
Scan Tool Designs and Capabilities
Chapter 4 Video and Questions
Chapter 4 Labeling Activity
Chapter 04 Reading: Shop
Purpose of Diagnostic Trouble Codes
Diagnosing an Engine Performance OTC
Chapter 4 ASE-Style Review Questions
Photo Sequence 2: Typical Procedure for Connecting an OBD II Enhanced Tablet Scan tool

Chapter 4 Video and Questions
Snap-on Zeus Scan Tool Training
Lab 16 Retrieve & Diagnosis Codes from the OBD I Control System
Lab 17 Retrieve & Record Diagnostic Trouble Codes from the OBD II Control System
Lab 18 Access and Use Service Information to Perform a Diagnosis
Lab 19 Perform Active Test of Actuators
Lab 20 Checking Common Sensors with a Scan Tool
Lab 21 Obtain and Interpret Scan Tool Data
Checkpoint Meeting Module 3
Chapter OS Reading: Classroom
Oxygen Sensors
Coolant Temp Sensor
Throttle Position Sensor
Air Flow Monitoring
Computer Networks
Chapter 5 Multiple Choice Quiz
Chapter 5 Fill in the Blank Questions
Chapter 5 Labeling Activity
Chapter 5 Classroom Video Quiz
Chapter 05 Reading: Shop
Chapter 5 ASE-Style Review Questions
Chapter 5 Labeling Activity
Lab 22 Retrieve & Record Diagnostic Trouble Codes from the OBD II Control System
Lab 23 Access and Use Service Information to Perform a Diagnosis
Lab 24 Perform Active Test of Actuators
Lab 25 Checking Common Sensors
Lab 26 Checking Common Sensors with a Scan Tool
Lab 27 Obtain and Interpret Scan Tool Data
Lab 28 Diagnose Drivability Concerns with Stored DTC's
Lab 29 Diagnose Drivability Concerns with no stored DTC's
Lab 30 PCM Communication Errors & Reprogramming
Lab 31 Diagnosis hot or cold no-start, hard start, poor drivability, idle speed, flooding, surging, misfire, power loss, st alling, poor mileage, dieseling; on fuel injection vehicles
Lab 32 Throttle Body Inspection
Checkpoint Meeting Module 4
Chapter 06 Reading: Classroom
Hot Plug - Slow Heat Transfer
Cold Plug - Fast Heat Transfer
Coil on Plug Ignition
Waste Spark Ignition
Crankshaft Angle Sensor (Position Sensor)
Chapter 6 Multiple Choice Quiz
Chapter 6 Fill in the Blank Questions
Chapter 6 Labeling Activity
Chapter 6 Classroom Video Quiz
Chapter 06 Reading: Shop
Hall-Effect Sensors
Timing a Distributorless Ignition System
Chapter 6 ASE-Style Review Questions
Chapter 6 Shop Manual Video Quiz
Chapter 6 Labeling Activity
Lab 33 Oscilloscope Testing the Ignition System
Lab 34 Retrieve & Record Diagnostic Trouble Codes from the OBD II Control System
Lab 35 Access and Use Service Information to Perform a Diagnosis
Lab 36 Diagnose the Causes of Emission or Drivability Concerns
Lab 37 Diagnose Drivability and Emi ssion Problems Resulting from Related Systems
Lab 38 Obtain and Interpret Scan Tool Data
Lab 39 Diagnose Ignition Related Pr,oblems
Lab 40 Test and Service Idle Speed Controls (IAC Systems)
Checkpoint Meeting Module 5
Chapter 07 Reading: Classroom
Types and Operation of Fuel Injection Systems
Pulse Width Modulation at 50%
Pulse Width Modulation at 75%
Operation of a Typical Gasoline Engine Fuel Injector
Chapter 7 Multiple Choice Quiz
Chapter 7 Fill in the Blank Questions
Chapter 7 Labeling Activity
Chapter 07 Reading: Shop
Fuel Pressure Testing
Noid Light Test
Testing Fuel For Alcohol Content
Chapter 7 ASE-Style Review Questions
Chapter 7 ASE-Style Challenge Questions
Chapter 7 Shop Manual Video Quiz
Chaoter 7 Matchine Activitv Shoo Manual
Lab 41 Retrieve & Record Diagnostic Trouble Codes from the OBD II Control System
Lab 42 Access and Use Service Information to Perform a Diagnosis
Lab 43 Obtain and Interpret Scan Tool Data
Lab 44 Test and Service Fuel Pumps
Lab 45 Fuel Pressure Test "Fuel Injected"
Lab 46 Fuel Pressure Test "Fuel Injected" and Service/Clean System
Lab 47 Replace Fuel Filters
Lab 48 Check Fuel for contaminants; determine needed action
Lab 49 Verify Engine Operating Temperature
Lab 50 Diagnosis hot or cold no-start, hard start, poor drivability, idle speed, flooding, surging, misfire, power loss, stalling, poor mileage, dieseling; on fuel injection vehicles
Lab 51 Inspect and Test Fuel lnjecto:rs
Lab 52 Inspect and Test Fuel lnjecto:rs
Checkpoint Meeting Module 6
Chapter 08 Reading: Classroom
Emission Control Systems
Exhaust Gas Contaminants

Catalytic Converter Operation
Crankcase Ventilation
EGR Valve Open and Closed
Chapter 8 Multiple Choice Quiz
Chapter 8 Fill in the Blank Questions
Chapter 8 Labeling Activity
Chapter 8 Classroom Video Quiz
Chapter 08 Reading: Shop
EVAPTesting
Chapter 8 ASE-Style Review Questions
Chapter 8 ASE-Style Challenge Questions
Photo Sequence 5: Typical Procedure for Diagnosing EGR Solenoids
Chapter 8 Shop Manual Video Quiz
Lab 53 Retrieve & Record Diagnostic Trouble Codes from the OBD II Control System
Lab 54 Access and Use Service Information
Lab 55 Perform Active Test of Actuators
Lab 56 Throttle Body Inspection
Lab 57 Exhaust Back-Pressure Test
Lab 58 Inspect, Test, and Service PCV Systems
Lab 59 Inspect and Test Secondary Air Inj ection Systems (AIR)
Lab 60 Evaporative Emission Control System Diagnosis (Carb. or OBD I)
Lab 61 Evaporative Emission Control System Diagnosis (OBD 11)
Lab 62 Interpret EVAP Emission Related DTC's
I Checkpoint Meeting Module 7
Chapter 09 Reading: Classroom
Chapter 9 Multiple Choice Quiz
Chapter 9 Fill in the Blank Questions
Chapter 9 Labeling Activity
Chapter 9 Matching Activity Classroom
Chapter 09 Reading: Shop
Chapter 9 ASE-Style Review Questions
Chapter 9 ASE-Style Challenge Questions
Photo Sequence 6: Typical Procedure for Testing the Misfire Detection System
Chapter 10 Reading: Classroom
Chapter 10 Multiple Choice Quiz
Chapter 10 Fill in the Blank Questions
Chapter 10 Matching Activity Classroom
Chapter 10 Labeling Activity
Chapter 10 Reading: Shop
Chapter 10 ASE-Style Review Questions
Chapter 10 ASE-Style Challenge Questions
Chapter 10 Matching Activity Shop Manual
Chapter 11 Reading: Classroom
Chapter 11 Multiple Choice Quiz
Chapter 11 Fill in the Blank Questions
Chapter 11 Matching Activity Classroom1
Chapter 11 Matching Activity Classroom2
Chapter 11 Reading: Shop
Chapter 11 ASE-Style Review Questions
Chapter 11 ASE-Style Challenge Questions
Chapter 11 Matching Activity Shop Manual
Photo Sequence 9: Typical Procedure for Five-Gas Emission Analysis
Lab 63 Describe the Importance of OBD II Monitors and Repaiir Verification
Lab 64 Diagnose the Causes of Emission or Drivability Concerns
Lab 65 Check and Refill Diesel Exhaust Fluid (DEF)
Lab 66 Using an Exhaust Gas Analyzer
Lab 67 Using an Exhaust Gas Analyzer
Lab 68 Using an Exhaust Gas Analyzer
Lab 69 Using an Exhaust Gas Analyzer
Lab 70 Drivability and emission problems resulting from interrelated systems
Lab 71 Test Turbocharger/Supercharger Systems
Lab 72 Diagnose EGR System Problems
Lab 73 Intake Air Temperature Control Systems
Student Feedback
End of Course Survey
Engine Performance Competency Profile 2020
Final Exam Review
Final Exam

Subject to change. Please consult your Canvas course for the most current instructions and updates.

Classroom Hours

Mo, Tu, W, Th
8:00 AM - 12:00 PM
1:00 PM - 5:00 PM

Friday
8:00 AM - 12:00 PM

For a full list of course hours visit: Course Schedule

Instructor Contact Information

Cody Dawson — cdawson@stech.edu
Shad Esplin — sesplin@stech.edu
Dallin Robinson — drobinson@stech.edu
McKael Stapel — mstapel@stech.edu

Office Hours: By appointment

Email is the preferred method of communication; you will receive a response within 24 hours during regular business hours.

Canvas Information

Canvas is the where course content, grades, and communication will reside for this course.

- stech.instructure.com
- For Canvas passwords or any other computer-related technical support contact Student Services.
- For regular Hours and Weekdays call (435) 586 - 2899.
- For after Hours & Weekends call (435) 865 - 3929 (Leave a message if no response).

Course Policies

Class attendance is required, this is not an online course. Work at home can be done on Canvas but attendance is required during your scheduled time.
Grade Scale — A: 100 - 90%, B: 89 - 80%, F: 79% or lower.
Cell phones for many have become a distraction. When you are in class or lab we encourage you to keep your cell phones put away in a secure location. If you use ear buds we ask that you only use one so you can still hear the things going on around you. If you are using your phone for things other than school related items, instructors will ask you to put them away. Please follow the direction of your instructors. Those who have been asked to refrain from using your cell phone and fail to do so will be asked to meet with the Director of Transportation and student services will be notified.
The program is designed to provide the student with as much hands-on work as possible. In the automotive industry you may be required to lift heavy objects and stand for hours at a time to complete work required. Technicians deal with chemicals and materials which require caution, these will be identified in the Right to Know Agreement provided to you. You will also be required to use computers to track and complete work.

High School Power School Grades: Quarter student grades will be determined by student progress percentage. Faculty will use the higher percentage of either 1) quarter progress, or 2) cumulative progress for the current training plan year. The progress percentage will be used with the grading scale to determine the minimum grade. High School Grade Scale: The following grading scale will be used to determine a letter grade from the progress percentage:

- A : 94 - 100%
- A- : 90 - 93%
- B+ : 87 - 89%
- B : 83 - 86%
- B- : 80 - 82%
- C+ : 77 - 79%
- C : 73 - 76%
- C- : 70 - 72%
- D+ : 67 - 69%
- D : 63 - 66%
- D- : 60 - 62%
- F : 0 - 59%

Additional Information

InformaCast Statement: Southwest Tech uses InformaCast to ensure the safety and well-being of our students. In times of emergency, such as weather closures and delays, this app allows us to promptly deliver notifications directly to your mobile devices. To stay informed and receive real-time updates, we encourage all students to sign up for notifications. Your safety is our priority, and staying connected ensures a swift response to any unforeseen circumstances. More information and directions for signing up are available at: https://stech.edu/emergency-notifications/

Internet Acceptable Use Policy: The student is expected to review and follow the Southwest Technical College Internet Safety Policy at: https://stech.edu/students/policies/

Student Code of Conduct Policy: The student is expected to review and follow the Southwest Technical College Student Code of Conduct Policy at: https://stech.edu/students/policies/

Accommodations: Students with medical, psychological, learning, or other disabilities desiring accommodations or services under ADA, must contact the Student Services Office. Student Services determines eligibility for and authorizes the provision of these accommodations and services. Students must voluntarily disclose that they have a disability, request an accommodation, and provide documentation of their disability. Students with disabilities may apply for accommodations, based on an eligible disability, through the Student Services office located at 757 W. 800 S., Cedar City, UT 84720, and by phone at (435) 586-2899. No diagnostic services are currently available through Southwest Technical College.

Safety and Building Maintenance: The College has developed and follows a variety of plans to ensure the safe and effective operation of its facilities and programs. The following plans are available online:
1) Facilities Operations and Maintenance Plan; 2) Technical Infrastructure Plan; and 3) Health and Safety Plan.

Withdrawals and Refunds: Please refer to the Southwest Technical College Refund Policy at:
https://stech.edu/students/policies/

Any high school or adult student, who declares a technical training objective is eligible for admission at Southwest Technical College (Southwest Tech). Program-specific admissions requirements may exist and will be listed on the Southwest Tech website. A high school diploma or equivalent is not required for admission but is mandatory for students seeking Title IV Federal Financial Aid.

Non-Discriminatory Policy: Southwest Technical College affirms its commitment to promote the goals of fairness and equity in all aspects of the educational enterprise, and bases its policies on the idea of global human dignity.

Southwest Tech is committed to a policy of nondiscrimination. No otherwise qualified person may be excluded from participation in or be subjected to discrimination in any course, program or activity because of race, age, color, religion, sex, pregnancy, national origin or disability. Southwest Technical College does not discriminate on the basis of sex in the education programs or activities that it operates, as required by Title IX and 34 CFR part 106. The requirement not to discriminate in education programs or activities extends to admission and employment. Inquiries about Title IX and its regulations to STECH may be referred to the Title IX Coordinator, to the Department of Education, and/or to the Office for Civil rights.

If you believe you have experienced discrimination or harassment on our campus, please contact the Title IX Coordinator, Cory Estes: cestes@stech.edu, (435) 865-3938.

For special accommodations, please contact the ADA Coordinator, Cyndie Tracy: ctracy@stech.edu, (435) 865-3944.
Southwest Technical College
757 West 800 South
Cedar City, UT 84720
info@stech.edu
(435) 586-2899