

## 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.

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### 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.
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### 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
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### 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 Instructions  
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 Quiz  
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: Retrieve & Record Diagnostic Trouble Codes from the OBD 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 05 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, stalling, 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 Emission Problems Resulting from Related Systems  
 Lab 38 Obtain and Interpret Scan Tool Data  
 Lab 39 Diagnose Ignition Related Problems  
 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  
 Chapter 7 Matchline Activity Shop 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 Injectors  
 Lab 52 Inspect and Test Fuel Injectors  
 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  
EVAP Testing  
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 Injection Systems (AIR)  
Lab 60 Evaporative Emission Control System Diagnosis (Carb. or OBD I)  
Lab 61 Evaporative Emission Control System Diagnosis (OBD II)  
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 Repair 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

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*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](#)

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## Instructor Contact Information

Cody Dawson — [cdawson@stech.edu](mailto:cdawson@stech.edu)  
Shad Esplin — [sesplin@stech.edu](mailto:sesplin@stech.edu)  
Dallin Robinson — [drobinson@stech.edu](mailto:drobinson@stech.edu)  
McKael Stapel — [mstapel@stech.edu](mailto: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.

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## Canvas Information

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

- [stech.instructure.com](http://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. 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% | • B : 83 - 86%  | • C : 73 - 76%  | • D : 63 - 66%  |
| • A- : 90 - 93% | • B- : 80 - 82% | • C- : 70 - 72% | • D- : 60 - 62% |
| • B+ : 87 - 89% | • C+ : 77 - 79% | • D+ : 67 - 69% | • 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](mailto:cestes@stech.edu), (435) 865-3938.

For special accommodations, please contact the ADA Coordinator, Cyndie Tracy: [ctracy@stech.edu](mailto:ctracy@stech.edu), (435) 865-3944.

Southwest Technical College

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