SOUTHWEST TECH

SOUTHWEST TECHNICAL COLLEGE

TEAU 1140 - Engine Repair (5 Credits)

Course Description

The Engine repair course conforms to ASE/NATEF standards. In this course, you will work with both classroom instruction and hands-on lab training. You will evaluate the design and operation of internal combustion engines, diagnosis of engine operation, failure analysis of engine components, and complete engine machining and rebuilding procedures. When you have completed this course, you will be eligible to take the exam for ASE certification.

Course Objectives

- Diagnose internal engine failures.
- Remove, repair/rebuild, and reinstall modern automobile engines.
- Demonstrate a working knowledge of modern hybrid drive systems.

Course Outline

- Automotive Engines and Rebuilding
- Theory of Engine Operation and Operating Systems
- Factors Affecting Engine Performance and Materials
- Engine Configurations, Intake and Exhaust Systems
- Cylinder Heads
- Camshafts, Valvetrains, and Timing Mechanisms
- Engine Block Construction
- Pistons, Rings, Connecting Rods, and Bearings
- Alternative Fuel and Advanced Tech Vehicles

Textbook & Reading Materials

Cengage Unlimited (1 year subscription), Cengage

Assignments and Assessments

Orientation
Orientation Acknowledgement
Syllabus
Remind Txt Group
Student Contract
Right to Know Agreement
Engine Repair Job Sheet Checklist
COVID-19 Student Safety Agreement
INTERNET USAGE POLICY
Cleaning Expectations
Southwest Technical College Automotive Video Playlist
Student Tool and Equipment Use Waiver
Cell Phone
Digital Lab Explanation
Module Breakdown
Module 1 Labs
Module 2 Labs
Module 3 Labs
Module 4 Labs
Module 5 Labs
Module 6 Labs
Module 8 Labs
Cleaning Labs
Cleaning Lab 1
Cleaning Lab 4
Cleaning Lab 3
Cleaning Lab 2
Cleaning Lab 5
Reading
Basic Engine Operation
Cylinder Head
Engine Block
Chapter 1 Multiple-Choice and True-False Questions
Chapter 1 Fill-in-the-Blank Questions
Chapter 1 Labeling Activity
Chapter 1 Video 1 and Questions
Chapter 1 Video 2 and Questions
Chapter 1 Video 3 and Questions
Reading
Identifying Safety Hazards
Personal Safety
Air Tools
Chapter 1 ASE-Style Review Questions
Chapter 1 ASE Challenge Questions
Photo Sequence 1: Typical Procedure for Lifting a Vehicle on a Hoist
Photo Sequence 2: Typical Procedure for Lifting a Vehicle on a Drive-On Hoist
Chapter 1 Video 1 and Questions (Shop)
Chapter 1 Video 2 and Questions (Shop)
Chapter 1 Video 3 and Questions (Shop)
Engine Stamping Video
Removing a Piston Video
Removing a Crankshaft Video
Removing Camshaft Bearings Video
ER 01 Identify and Interpret Engine Concern
ER 02 Research Vehicle Information
ER 03 Verify Operation of IP & warnings
ER 04 Identify and Interpret Engine Concerns
ER 05 Diagnosis Engine Noises and Vibrations
ER 06 Engine Vacuum Tests
ER 07 Diagnosis Excessive Oil Consumption
ER 08 Cylinder Power Balance
ER 09 Cylinder Compression Test
ER 10 Cylinder Leakage Test
Checkpoint Meeting Module 1
End Module 1
Reading
Cylinder Block
Crankshaft
Cam Lobe
Chapter 12 Multiple-Choice and True-False Questions
Chapter 12 Fill-in-the-Blank Questions
Chapter 12 Short Answer Essays
Chapter 12 Labeling Activity 1
Chapter 12 Labeling Activity 2
Chapter 12 Video 1 and Questions
Chapter 12 Video 2 and Questions
Chapter 12 Video 3 and Questions
Reading
Block Underside
Chapter 12 ASE-Style Review Questions
Chapter 12 ASE Challenge Questions
Chapter 12 Labeling Activity 1
Chapter 12 Labeling Activity 2
Photo Sequence 26: Typical Procedure for Checking Main Bore Alignment
Chapter 12 Video 1 and Questions (Shop)
Reading
Engine Bearings
Connecting Rod
Chapter 13 Multiple-Choice and True-False Questions
Chapter 13 Fill-in-the-Blank Questions
Chapter 13 Labeling Activity 1
Chapter 13 Labeling Activity 2
Chapter 13 Video 1 and Questions
Chapter 13 Video 2 and Questions
Reading
Installing Piston Rings
Installing the Crankshaft
Chapter 13 ASE-Style Review Questions
Chapter 13 ASE Challenge Questions
Chapter 13 Labeling Activity 1
Chapter 13 Labeling Activity 2
Photo Sequence 28: Typical Procedure for Checking Main Bearing Oil Clearances

Photo Sequence 29: Typical Procedure for Installing the Main Bearings and Crankshaft
Chapter 13 Video 1 and Questions (Shop)
Chapter 13 Video 2 and Questions (Shop)
Engine Block Cleaning Video
Installing Cam Bearings Video
Expansion Plug Video
Checking Bearing Clearance Video
ER 11 Verify Engine Mechanical Timing
ER 12 Remove Cylinder Head and inspect
ER 13 Inspect Camshaft Drives and Components
ER 14 Engine Block Disassembly
ER 15 Inspect Main and Connecting Rod Bearings
ER 16 Engine Block Inspection
ER 17 Inspect and Measure Cylinders
ER 18 Inspect Crankshaft
ER 19 Inspect and Measure Pistons
Checkpoint Meeting Module 2
End Module 2
Reading
Chapter 2 Multiple-Choice and True-False Questions
Chapter 2 Fill-in-the-Blank Questions
Reading
Measurements
Using Scan Tools
Chapter 2 ASE-Style Review Questions
Chapter 2 Labeling Activity 1
Chapter 2 Labeling Activity 2
Photo Sequence 3: Typical Procedure for Reading a Dial Caliper
Photo Sequence 4: Typical Procedure for Reading a Micrometer
Chapter 2 Video 1 and Questions
Chapter 2 Video 2 and Questions
Reading
Chapter 8 Multiple-Choice and True-False Questions
Chapter 8 Fill-in-the-Blank Questions
Chapter 8 Labeling Activity
Reading
Rebuilding Preparation
Remove Engine
Reconnect Engine
Pre-Oil an Engine
Chapter 8 ASE-Style Review Questions
Chapter 8 ASE Challenge Questions
Chapter 8 Labeling Activity 1
Chapter 8 Labeling Activity 2
Photo Sequence 18: Typical Procedure for RWD Engine Removal
Photo Sequence 19: Mounting the Engine on a Stand
Chapter 8 Video 1 and Questions
Chapter 8 Video 2 and Questions
Chapter 8 Video 3 and Questions
Chapter 8 Video 4 and Questions
ER 20 Inspect Pushrods, Rocker Arms & Pivots
ER 21 Inspect Hydraulic or Mechanical Lifters
ER 22 Cylinder Head Inspection
ER 23 Clean Inspect a Cylinder Head for Cracks
ER 24 Deglaze and Clean Cylinder Walls
ER 25 Bore Engine Cylinders
ER 26 Hone Engine Cylinders/Determine Taper
ER 27 Inspect and Identify Piston Problems
ER 28 Inspect, Measure and Install Piston Rings
Checkpoint Meeting Module 3
End Module 3
Reading
Pressure and Vacuum
Engine Cycle
Compression Ratio
Locating the VIN
Chapter 3 Multiple-Choice and True-False Questions
Chapter 3 Fill-in-the-Blank Questions
Chapter 3 Image Labeling Activity 1
Chapter 3 Image Labeling Activity 2
Reading
Chapter 3 Video 1 and Questions
Chapter 3 Video 2 and Questions
Chapter 3 Video 3 and Questions
Chapter 3 Video 4 and Questions
Chapter 3 ASE-Style Review Questions
Chapter 3 ASE Challenge Questions
Chapter 3 Video and Questions
ER 29 Perform Common Fastener and Thread Repair
ER 30 Inspect Camshaft Runout
ER 31 Remove and Replace Piston Pin
ER 32 Install Freeze or Core Plugs
ER 33 Check Crankshaft End Play
ER 34 Check Crankshaft to Bearing Clearances
ER 35 Inspect and Service Auxiliary Balancer
Checkpoint Meeting Module 4
End Module 4
Chapter 9 Labeling Activity 4
Chapter 9 Video 1 and Questions
Chapter 9 Video 2 and Questions
Reading
Remove Cylinder Head
Disassemble and Remove Valve Assembly
Machining a Cylinder Head
Cylinder Head Valve Seat
Chapter 9 ASE-Style Review Questions
Chapter 9 ASE Challenge Questions
Chapter 9 Labeling Activity 1
Chapter 9 Labeling Activity 2
Chapter 9 Labeling Activity 3
Photo Sequence 20: Typical Procedure for Disassembling an OHC Cylinder Head
Chapter 9 Video 1 and Questions (Shop)
Chapter 9 Video 2 and Questions (Shop)

Chapter 9 Video 3 and Questions
Chapter 9 Video 4 and Questions
ER 36 Test and Inspect Valve Springs
ER 37 Replace Valve Seals on an Assembled...
ER 38 Inspect Valve Guides
ER 39 Inspect Valves and Valve Seats
ER 40 Valve Grinding
ER 41 Valve Seat Cutting
ER 42 Check Valve Face-to-Seat Contact
ER 43 Check Valve Spring Installed Height
ER 44 Inspect and Restore Threads
Checkpoint Meeting Module 5
End Module 5
Reading
Fasteners
Gaskets
Inspect Engine
Chapter 6 Multiple-Choice and True-False Questions
Chapter 6 Fill-in-the-Blank Questions
Chapter 6 Labeling Activity 1
Chapter 6 Labeling Activity 2
Chapter 6 Video 1 and Questions
Chapter 6 Video 2 and Questions
Chapter 6 Video 3 and Questions
Reading
Screw Extraction
Internal Thread Repair
Install Cylinder Heads
Chapter 6 ASE-Style Review Questions
Chapter 6 ASE Challenge Questions
Photo Sequence 13: Removing a Broken Bolt and Using a Tap
Photo Sequence 14: Replacing a Valve Cover Gasket
Chapter 6 Video 1 and Questions (Shop)
Chapter 6 Video 2 and Questions (Shop)
Chapter 6 Video 3 and Questions (Shop)
Reading
Cam Lobe
Overhead Camshafts
Chapter 10 Multiple-Choice and True-False Questions
Chapter 10 Fill-in-the-Blank Questions
Chapter 10 Labeling Activity 1
Chapter 10 Labeling Activity 2
Chapter 10 Labeling Activity 3
Chapter 10 Video 1 and Questions
Chapter 10 Video 2 and Questions
Reading
Valvetrain
Installing a Camshaft
Installing a Valve Spring Assembly
Chapter 10 ASE-Style Review Questions
Chapter 10 ASE Challenge Questions
Chapter 10 Labeling Activity 1
Chapter 10 Labeling Activity 2
Photo Sequence 22: Typical Procedure for Adjusting Valves
Photo Sequence 23: Replacing Valve Seals on the Vehicle
Chapter 10 Video 1 and Questions (Shop)
Chapter 10 Video 2 and Questions (Shop)
ER 45 Inspect Oil Pump and Oil Pump Drive
ER 46 Inspect and Measure Camshaft Bearings
ER 47 Inspect and Replace Camshaft Bearings
ER 48 Install Cylinder Head(s)
ER 49 Inspect and Replace Crankshaft Damper
ER 50 Install Engine Covers Using Gaskets...
ER 51 Inspect and Replace Camshaft Drive belt/chain
ER 52 Adjust Valves, Pushrod Engine
ER 53 Adjust Valves Overhead Cam Engine
ER 54 Camshaft Timing and Cam Sensor Inde...
ER 55 Assemble the Engine
Checkpoint Meeting Module 6
End Module 6
Reading
Performing a Power Balance Test Using a Scan Tool
Performing a Cranking Compression Test
Performing a Running Compression Test
Plug Firing Voltage
Factors to Consider When Diagnosing Noise and Vibration Concerns
Chapter 5 Multiple-Choice and True-False Questions
Chapter 5 Fill-in-the-Blank Questions
Chapter 5 Short Answer Essays
Chapter 5 Video 1 and Questions
Chapter 5 Video 2 and Questions
Reading
Dry and Wet Compression Tests and Results Analysis
Chapter 5 ASE-Style Review Questions
Chanter 5 ASF Challenge Oniectinne
Chapter 5 Image Labeling Activity
Photo Sequence 11: Typical Procedure for Performing a Cranking Compression Test
Photo Sequence 12: Typical Procedure for Performing a Cylinder Leakage Test
Chapter 5 Video and Questions
Reading
Starting System Diagnostics
Charging System Diagnostics
Checking for Codes and Monitor Status
Cooling System Inspection and Testing
Oil Pressure Testing
Starting System
Lube System
Cooling System
Cooling Fan
Combustion
Chapter 4 Multiple-Choice and True-False Questions
Chapter 4 Fill-in-the-Blank Questions
Chapter 4 Short Answer Essays
Chapter 4 Image Labeling Activity 1

Chapter 4 Image Labeling Activity 2
Chapter 4 Video 1 and Questions
Chapter 4 Video 2 and Questions
Chapter 4 Video 3 and Questions
Chapter 4 Video 4 and Questions
Chapter 4 Video 5 and Questions
Reading
Cooling pressure
Chapter 4 ASE-Style Review Questions
Chapter 4 ASE Challenge Questions
Chapter 4 Image Labeling Activity 1
Chapter 4 Image Labeling Activity 2
Photo Sequence 5: StarterR +R
Photo Sequence 7: Typical Procedure for Resetting the Engine Oil Life Indicator-
Reminder
Photo Sequence 8: Typical Procedure for Changing Engine Oil
Chapter 4 Video and Questions
ER 56 Inspect, Remove and Replace Engine Mounts
ER 57 Remove and Reinstall FWD Engine
ER 58 Remove and Reinstall RWD Engine
ER 59 Check and Adjust Ignition Timing
ER 60 Camshaft Run-in (break-in) Procedure
ER 61 Inspect Auxiliary Oil Coolers
ER 62 Inspect, Test and Replace Oil Switches
ER 63 Oil and Filter Change
ER 64 Perform Oil Pressure Tests
Checkpoint Meeting Module 7
End Module 7
Reading
Performing a Vacuum Test
Intake System
Forced Induction
Superchargers
Chapter 7 Multiple-Choice and True-False Questions
Chapter 7 Fill-in-the-Blank Questions
Chapter 7 Labeling Activity 1
Chapter 7 Labeling Activity 2
Chapter 7 Labeling Activity 3
Chapter 7 Video 1 and Questions
Chapter 7 Video 2 and Questions
Chapter 7 Video 3 and Questions
Reading
Vacuum Gauge
Chapter 7 ASE-Style Review Questions
Chapter 7 ASE Challenge Questions
Chapter 7 Labeling Activity 1
Chapter 7 Labeling Activity 2
Photo Sequence 16: Typical Procedure for Inspecting Turbochargers and Testing Boost
Pressure
Chapter 7 Video and Questions
Reading
Chapter 11 Multiple-Choice and True-False Questions
Chapter 11 Fill-in-the-Blank Questions
Chapter 11 Short Answer Essays
Chapter 11 Labeling Activity 1
Chapter 11 Labeling Activity 2
Chapter 11 Labeling Activity 3
Reading
Installing a Timing Set
Chapter 11 ASE-Style Review Questions
Chapter 11 ASE Challenge Questions
Chapter 11 Labeling Activity
Photo Sequence 25: Replacing Timing Chains on a DOHC Engine with Balance Shafts
Chapter 11 Video 1 and Questions
ER 65 Cooling System Tests
ER 66 Identify Causes of Engine Overheating
ER 67 Inspect, Replace, and Adjust Drive Belts
ER 68 Cooling System Service
ER 69 Inspect, Test and Replace Water Pump
ER 70 Remove and Replace Radiator
ER 71 Remove, Inspect, and Replace Thermostat
ER 72 Inspect Fans and Cooling System Acc...
Checkpoint Meeting Module 8
End Module 8
Reading
General Hybrid Electric Vehicle Safety
Preparing the HEV for Service
Alternative Fuels
Electric Vehicle Design
Hybrid Systems
Chapter 14 Multiple-Choice and True-False Questions
Chapter 14 Fill-in-the-Blank Questions
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Chapter 14 Labeling Activity 2
Chapter 14 Video 1 and Questions
Chapter 14 Video 2 and Questions
Chapter 14 Video 3 and Questions
Chapter 14 ASE-Style Review Questions
Chapter 14 ASE Challenge Questions
Chapter 14 Labeling Activity 1
Chapter 14 Labeling Activity 2
Checkpoint Meeting Module 9
End Module 9
Student Feedback
End of Course Survey
Engine Repair Competency Profile 2020
Final Exam Review
Final Exam
Hands-on Engine Measurement

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. 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.
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