Syllabus:
Heavy Truck & Heavy Equipment Technician

Subject Code: 171200
Course Numbers:
HT 2201and HE 2202
CIP Code: 47.0605
SOC Code: 49-3000

C-TEC of Licking County
150 Price Road
Newark, Ohio 43055

Instructors:

Brad Hager
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Instructor Contact:

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- Appointments as scheduled
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Class Meeting Times:

- Monday – Thursday 5:00 p.m. to 10:00 p.m.

Class Location:

- Classroom 902 LAB 235 for Heavy Truck
- Classroom TBD for Heavy Equipment

Program Hours:

- 900 Hours

Course Prerequisites:

- WorkKeys pretesting
- Copy of High School Diploma or GED

Required and Recommended Texts and Resources*:

Module	Textbook
Electrical/Electronic Systems HTET2211	Heavy Duty Truck Systems, 5th Edition Delmar/Cengage
Diesel Engines HTET2212	Diesel Technologies Text & Workbook, 7th Edition Goodheart-Wilcox
Drive Trains HTET2217 (Heavy Truck only)	Heavy Duty Truck Systems, 5th Edition Delmar/Cengage
Power Trains (Heavy Equip. only) HTET2221	Heavy Equipment Systems, 2nd Edition ISBN: 9781418009502
HVAC HTET2213	Modern Diesel Tech. HVAC & R, 2nd Edition ISBN: 9781133716259
PM Maintenance HTET2216 (Heavy Truck only)	Preventative Maintenance & Inspection Delmar/Cengage

Shop & Field Safety & Maint. HTET2220 (Heavy Equip. only)	Heavy Equipment Systems, 2nd Edition ISBN: 9781418009502
Braking Systems HTET2214 (Heavy Truck only)	Heavy Duty Truck Systems, 5th Edition Delmar/Cengage
Hydraulics HTET2218 (Heavy Equip. only)	Eaton Mobile Hydraulic Manual, 2nd Edition ISBN: 0963416251 Bird Bones & Sludge Manual, 1st Edition ISBN: 09634416243
Steering & Suspension HTET2215 (Heavy Truck only)	Heavy Duty Truck Systems, 5th Edition Delmar/Cengage
Welding & Fabrication HTET2219 (Heavy Eq. only)	Hobart Pocket Welding Guide, 31st Edition ISBN: 9781936058280

Course Description:

In this 900-hour program students choose one of two tracks- Heavy Truck or Heavy Equipment. The track chosen will determine the modules that the student will take.

This 900-hour program provides lecture and hands-on lab experience so the students will gain knowledge and skills for diagnosing and repairing semi-truck and major equipment systems. These include engine systems, fluid power (hydraulic) systems, power trains/drive trains, lubrication systems, electrical/electronic systems, HVAC systems, control systems, etc. The use of computer diagnostic equipment will also be taught. The selection and use of shop tools and precision instruments is a major component of the lab.

Successful completers of this program will be prepared to take one of the following tests of occupational competency:

- **Heavy Truck** students take the ASE Student Certification exams for Heavy & Medium Trucks.(4 total)
- **Heavy Equipment** students take the AED Foundation Graduate student Technology Assessment.

Course Objectives/Outcomes:

The course objectives include:

- Preparing students for post-program success, both in the work force and in their educational pursuits.

- Preparing students to process information using higher order thinking skills and to engage in sound decision-making.

- Providing a rich learning environment utilizing research-based methods of instruction, and current resources and materials.

- Maintaining high expectations for all students regardless of educational needs and providing support necessary for achievement.

- Providing a challenging, worthwhile curriculum based on current industry/academic expectations. Specifically and upon successful completion of the program/course students will be able to demonstrate proficiency with the following content:

Module 1 – Safety, Basic & Preventative Maintenance (Heavy Truck only) 120 hours

A. Commercial truck shop safety
B. Equipment safety
C. Basic truck and trailer shop skills (lines, fittings, cutting, welding and electrical cables)
D. Principles of systematic troubleshooting
E. Commercial truck shop hand tools
F. Fasteners
G. Preventative maintenance and federal inspections
H. CVSA out of service criteria
I. Diesel engine systems (cooling, lubrication, fuel, intake and exhaust)
J. Drive trains (clutches, manual and automatic transmissions, drive shafts and drive axles.
K. Tires, wheels and hubs
L. Brakes, air and hydraulic
M. Cabs and trailers
N. Steering and suspension
O. Electrical and electronic systems
P. Coupling systems (fifth wheels and pintle hooks)

Module 2 – Shop & Field Safety, Maintenance & Tools (Heavy Equipment only) 105 hours

A. Shop and field safety
1. MSDS and environmental safety
2. Crane and rigging
3. Blocking and jacking
4. PPE
5. Electrical
6. Lifting techniques
7. Fall protection, ladders, etc.

B. Personal responsibility and professionalism
1. Personal employability
2. Customer relations (internal & external)
3. Continuing education opportunities

C. Identification & proper use of power and hand tools
1. Electrical
2. Pneumatic
3. Torque multipliers
4. Mechanics tools

Module 3 – Drive Trains (Heavy Truck only) **90 hours**

- **A**. Safety guidelines
- **B**. Clutches
- **C**. Manual transmissions
- **D.** Automatic transmissions
- **E.** Drive shafts
- **F.** Drive axles and differentials
- **G.** Drive train service

Module 4 – Power Trains (Heavy Equipment only) **90 hours**

- **A.** Safety guidelines
- **B.** Identification of basic machine components
- **C.** Torque converters
- **D.** Powershift transmissions
    1. Control valves/clutch packs
    2. Electrically/electronically controlled transmissions
- **E.** Steering clutches and brakes
- **F.** Hydraulic braking systems
- **G.** Hydrostatic steering
- **H.** Final drives
- **I.** Manufacturer-specific features
- **J.** Systematic troubleshooting

Module 5 – Electronics & Electrical Systems (Both Tracks) **210 hours**

- **A.** Safety guidelines
- **B.** Fundamentals of electricity
- **C.** Fundamentals of electronics and computers
- **D.** Batteries
- **E.** Charging Systems
- **F. St**arting Systems
- **G.** Chassis Electrical Systems
- **H.** Diagnosis and repair of electronic circuits
- **J.** Multiplexing
- **K.** Generating systems and magnetic controllers
- **L.** Systematic troubleshooting

Module 6 – Diesel Engines (Both Tracks) **195 hours**

- **A.** Safety guidelines
- **B.** Diesel engine fundamentals
- **C.** Precision tools
- **D.** Diesel engine components
- **E.** Lubrication system
- **F.** Cooling system
- **G.** Intake/exhaust system including tier-4 regeneration systems
- **H.** Fuel and injection systems
- **I.** Electronic fuel management and emissions
- **J.** Engine removal
- **K.** Engine rebuilding and testing

Module 7 – Air Conditioning and Heating Systems (Both Tracks) **90 hours**

- **A.** Safety guidelines
- **B.** Purpose of HVAC
- **C.** Fundamentals of HVAC
- **D.** Environmental and safety practices
- **E.** HVAC Components
- **F.** HVAC system operation

G. HVAC tools and service
H. EPA 609 certification

Module 8 – Braking Systems (Heavy Truck only) **105 hours**

A. Safety guidelines
B. Air supply system
C. Air brake components
D. Fundamentals of hydraulics
E. Hydraulic brake components
F. Hydraulic brakes booster systems
G. Foundation brake service
H. ABS and EBS

Module 9 – Hydraulics (Heavy Equipment only) **120 hours**

A. Safety
B. Theory and principles of hydraulics and hydrodynamics
C. Components
    1. Tanks
    2. Filters
    3. Valves including main control valves
    4. Pumps
    5. Accumulators
D. Main hydraulic systems
    1. Steering systems
    2. Brake systems
    3. Suspension systems
    4. Hoists
E. Systematic Troubleshooting
    1. Reading and interpreting schematics
    2. Proper use of test equipment
        a. Pressure gauges
        b. Flow meters
        c. Computer diagnostics

Module 10 – Steering & Suspensions (Heavy Truck only) **90 hours**

A. Safety guidelines
B. Steering system components
C. Manual and power assist steering gears
D. Steering system service and repair
E. Rear axle alignment
F. Suspension system components
G. Suspension service and repair
H. Coupling devices (fifth wheels and pintle hooks)
I. Frame inspection and service

Module 11 – Welding & Fabrication (Heavy Equipment only) **90 hours**

A. Welding Safety
B. Metal and electrode identification
C. Welding symbols
D. Oxy-fuel processes including cutting, tube welding, etc.
E. Shielded metal arc welding (SMAW)
F. Gas and metal arc welding (GMAW)
G. Repair Fabrication

Grading:
Evaluation of student performance is based upon pupil performance objectives relating to course competencies study. The number of competencies mastered and the degree of mastery is translated into appropriate grades consistent with the C-TEC Board of Education policy on grading guidelines, practices, and procedures.

In the process of evaluation, instructors obtain several grades for each student within the time frame of the program/course. These grades may include, but are not limited to, performance on tests, quizzes, homework, assignments, special research projects, classroom participation, lab competency mastery and/or improvement and the demonstration of positive employability traits.

Grading Scale

A	93-100%
A-	90-92.99%
B+	87-89.99%
B	83-86.99%
B-	80-82.99%
C+	77-79.99%
C	73-76.99%
C-	70-72.99% Students falling below this point are not making satisfactory progress.
D+	67-69.99%
D	63-66.99%
D-	60-62.99%
F	59.99% or below

Journal Summary: A journal summary should begin with an introductory paragraph that introduces the main topic of the article and summarizes its content. Following the introduction, several paragraphs should be written detailing insights, implications, and how the information might be applied in your career. In addition, the reflection should include your thoughts and opinions concerning the content of the article. Summaries should be approximately 1 1/2 to 2 pages in length.

Final grades will be assigned based upon the student's accumulated points. Letter grades will be assigned using the following scale:

Credentialing:

- Heavy Truck Track→Automotive Service Excellence (ASE) Student Certification
- Heavy Equipment Track→AED Foundation Graduate Student Technician Assessment

Course Policies:

- **Disruptive Behavior** – Disruptive behavior of any type is NOT permitted and may result in dismissal from the program. Sleeping during class, tardiness to

class, excessive talking during class and disrespectful behavior are examples of disruptive behavior.

- **Plagiarism** – Submitting plagiarized work for an academic requirement is considered academic misconduct. Plagiarism is the representation of another's work or ideas as one's own; it includes the unacknowledged word-for-word use and/or paraphrasing of another person's work, and/or inappropriate unacknowledged use of another person's ideas.

- **Diversity** - It is the responsibility of the instructor and the students to foster and maintain a harmonious, non-threatening and non-discriminating environment in the classroom. Therefore, all individuals are to be respected as equal and contributing partners of our society.

- **Attendance:** Must maintain at least **90% rate of attendance**. You are required to attend all classes. However, you may miss up to 2 classes and still pass the course. Any other absences must be approved by the program supervisor.

Sequences:

Heavy Truck Track	**Heavy Equipment Track**
Electricity/Electronic Systems 210 hours	**Electricity/Electronic Systems** 210 hours
Diesel Engines 195 hours	**Diesel Engines** 195 hours
HVAC 90 hours	**HVAC** 90 hours
Braking Systems 105 hours	**Hydraulics** 120 hours
Steering & Suspension 90 hours	**Welding & Fabrication** 90 hours
Safety, Basic & PM Maintenance 120 hours	**Shop & Field Safety & Maintenance** 105 hours
Drive Trains 90 hours	**Power Trains** 90 hours