I. INTRODUCTION

A. An introduction to the basic principles of brake systems of diesel powered equipment. Emphasis on maintenance, repairs, and troubleshooting.

B. Basic Brake Systems (DEMR 1417) is a required course for the completion of a two year Associate of Applied Science degree in Diesel Engine Mechanic and Repairer or a Level I or Level II certificate of completion in the Diesel Technician Program.

C. This course is occupationally related and serves as a preparation for a career in the Diesel Service and Repair field.

D. Prerequisites: This course has a prerequisite or co requisite (A.A.S. Degree) of DEMR 1401 and DEMR 1405 or consent of the Department Chair.

E. Alphanumeric coding used throughout this module book denotes integration of SCANS occupational competencies (C1, etc.) and Foundation skills (F1, etc.).

II. LEARNING OUTCOMES

Upon successful completion of this course, Basic Brake Systems, the student will:

A. Explain the function of the components of a hydraulic brake system. (C7)
B. Demonstrate knowledge of power assist units and parking brake system. (C7)
C. Locate, identify and explain the function of air brake system components. (C7)
D. Explain the function of the components of air brake parking and emergency system. (C7)
E. Apply knowledge and understanding of the basic theory and operation of the brake system. (C19)
F. Diagnose brake components for wear and usability. (C20)
G. Repair brake components by rebuilding or replacing parts. (C19)
H. Adjust brake components. (C20)
I. Demonstrate knowledge of the function and troubleshooting of the anti-lock brake system. (C20)
J. Use tools and equipment. (C18)
K. Use service publications.  (C18)
L. Practice shop safety.  (C19)

III. INSTRUCTIONAL MATERIALS

A. Instructional materials for this course may be found at www.ctcd.edu/books
B. Supplemental Reading: As assigned by the instructor.
C. Audio-visual aids: See resource list at end of this module book.
D. Other instructional material: as selected by the instructor.

IV. COURSE REQUIREMENTS

A. This course is being taught in a self-paced mode. It differs from the traditional college course in that you are allowed to work on your own and at your own speed within limitation. This course is 128 clock hours in length. The student may set his/her own schedule within the time frame the course is offered. You must attend class on the days and at the times you selected when you enrolled in the course.

You will have an assigned instructor. If at any time you do not understand a reading assignment, audio visual presentation or lab work, ask your instructor for assistance. He is there for you!

This module book is designed to inform you of the sequence in which this course will be presented. You must follow this sequence and you must do what the module book says. It contains reading assignments, written assignments, audio visual presentations and lab assignments that you must complete or watch. Written assignments will be turned in as directed by the instructor. Late assignments will not be accepted. You must let your instructor know when you are ready to do a learning activity, performance exam or take a scheduled exam.

B. The student must take notes when viewing filmstrips, slides, or videos. Exams may be taken from audio visual aids, reading and lab assignments. If instructor notes or handouts are given to you, you must study them; exams may be taken from these notes also.

C. The instructor may give written assignments or “pop” quizzes as he deems necessary.
D. Performance Exams: Each student will clean all tools and equipment that they use and properly store them and clean their work area after the completion of each task.

Certificate Students: All lab work will be completed on an individual basis. The student will receive a “pass” or “fail” on the task. Students who fail to complete a task correctly to industry standards must repeat the task. The instructor will date and initial each performance exam task as it is satisfactorily completed. NOTE: Students who have selected the alpha-numeric grading system will be graded as outlined for degree students (see below).

Degree Students: Laboratory tasks (performance exam) will be completed on an individual basis except when limited by tools and/or materials. Each performance exam is worth a maximum of 11.1 points. The maximum lab grade is 100 points. The instructor will deduct points from each lab task score for failure to follow safety precautions and/or a failure to complete the project to industry standards. The instructor will date, initial, and post the points earned for each performance exam as it is completed.

E. The following is part of the course requirements: Each student will assist in lab clean-up at the close of the evening classes and will assist in unloading and storing supply shipments. Failure to do so will result in a failure to complete all course requirements and the student could receive a “F” or “N” for the course.

F. There will be ten (10) written examinations in this course (9 module/unit exams and an exit exam). Written exams must be completed before taking the performance exam for each module. The exit exam is a comprehensive exam that covers the entire course. Certificate students must score 70% on the exit exam. Certificate students will be allowed to take the exit exam a maximum of three (3) times. Failure to achieve a 70% score on the exit exam in three (3) tries will result in an "N" for the course and the student must retake the course. Degree Students should refer to the "grading" section of this outline for guidance.

G. The student must complete the written assignments to receive a grade. Written assignments for each unit will be turned into the instructor prior to starting performance exams for that module. Degree students must complete reading and written assignments at home.

H. If you have special needs because of learning disabilities or other kinds of disabilities, please feel free to discuss this with the instructor. The instructor will attempt to meet your needs with the assistance of counselors, tutors (Project Mainstream), and the assistance of the Disabilities Services Office. Program/course integrity will not be sacrificed. Students must meet all course requirements.
GRADING

Certificate Students: Students will be graded using the standard Skills Center "Pass-Fail" system used for self-paced programs. To satisfactorily complete the written exams, the student must score 80% on tests (except the exit exam, 70%). Students who fail to make the 80% on any exam (except the exit exam) must retake the exam. The current test retake policy will apply to all certificate students. The student must satisfactory complete all written and performance exams to receive a passing grade ("P").

Degree Students: Students will be graded using an "alpha-numeric" system as outlined below. Grades made on performance and written exams will be the grade received, including the exit exam. **Students will not be allowed to retake written exams or redo performance exams.**

A. Written exams: Average of written exams will count 40% of the final grade.

B. Completion of written assignments/activities will count 10% of the student’s final grade.

C. Performance Exams (Lab work) will count 50% of the final grade.

D. Grade Computations: (Example)

Written Exam Scores: (There will be 16 written exams)

<table>
<thead>
<tr>
<th>Exam</th>
<th>Score</th>
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<tbody>
<tr>
<td>1</td>
<td>90</td>
</tr>
<tr>
<td>2</td>
<td>80</td>
</tr>
<tr>
<td>3</td>
<td>70</td>
</tr>
</tbody>
</table>

$$\frac{240}{3} = 80$$ (Average Written Exams)

- Written Exam Score Average: 80 x 40% = 32 points
- Written Assignments: 100 x 10% = 10 points
- Performance Exam Score: 80 x 50% = 40 points

Total = 82 points = B

V. NOTES AND ADDITIONAL INSTRUCTIONS FROM THE COURSE INSTRUCTOR

A. Course Withdrawal: It is the student’s responsibility to officially withdraw from a course if circumstances prevent attendance. Any student who desires to, or must, officially withdraw from a course after the first scheduled class meeting must file a Central Texas College Application for Withdrawal (CTC Form 59). The withdrawal form must be signed by the student.
CTC Form 59 will be accepted at any time prior to Friday of the 12\textsuperscript{th} week of classes during the 16-week fall and spring semesters. The deadline for sessions of other lengths is:

<table>
<thead>
<tr>
<th>Session Length</th>
<th>Deadline</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-week session</td>
<td>Friday of the 8\textsuperscript{th} week</td>
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<tr>
<td>8-week session</td>
<td>Friday of the 6\textsuperscript{th} week</td>
</tr>
<tr>
<td>5-week session</td>
<td>Friday of the 4\textsuperscript{th} week</td>
</tr>
</tbody>
</table>

The equivalent date (75\% of the semester) will be used for sessions of other lengths. The specific last day to withdraw is published each semester in the Schedule Bulletin.

A student who officially withdraws will be awarded the grade of “W” provided the student’s attendance and academic performance are satisfactory at the time of official withdrawal. Students must file a withdrawal application with the College before they may be considered for withdrawal.

A student may not withdraw from a class for which the instructor has previously issued the student a grade of “F”, “N”, “FN”, or “XN” for nonattendance.

B. Administrative Withdrawal: An administrative withdrawal may be initiated when the student fails to meet College attendance requirements. The instructor will assign the appropriate grade on CTC Form 59 for submission to the registrar.

C. Incomplete Grade: The College catalog states, “An incomplete grade may be given in those cases where the student has completed the majority of the coursework but, because of personal illness, death in the immediate family, or military orders, the student is unable to complete the requirements for a course. . . .” Prior approval from the instructor is required before the grade of “I” for Incomplete is recorded. A student who merely fails to show for the final examination will receive a zero for the final and an “F” for the course.

D. Cellular Phones and Beepers: Cellular phones and beepers will be turned off while the student is in the classroom or laboratory.

E. American’s With Disabilities Act (ADA): Disability Support Services provide services to students who have appropriate documentation of a disability. Students requiring accommodations for class are responsible for contacting the Office of Disability Support Services (DSS) located on the central campus. This service is available to all students, regardless of location. Explore the website at www.ctcd.edu/disability-support for further information. Reasonable accommodations will be given in accordance with the federal and state laws through the DSS office.
F. **Instructor Discretion:** The instructor reserves the right of final decision in course requirements.

G. **Civility:** Individuals are expected to be cognizant of what a constructive educational experience is and respectful of those participating in a learning environment. Failure to do so can result in disciplinary action up to and including expulsion.
H. Absence from the class may be unavoidable in some situations. These include illness, military/civilian job requirements, or a death in the immediate family. Documentation is required in the case of excused absences for job requirements. Excuses will be on company letterhead stationary signed by the immediate supervisor stating the reason for the absence for civilian jobs. Excuses for military personnel must be signed by the 1st Sergeant or the Company Commander. **NOTE:** This does not apply to VA, VA/Voc, or Financial Aid students. There are no excused absences for these students. Talk to your funding agency if you have questions.

Disability Support Services provides services to students who have appropriate documentation of a disability. Students requiring accommodations for class are responsible for contacting the Office of Disability Support Services (DSS) located on the central campus. This service is available to all students, regardless of location. Review the website at [www.ctcd.edu/disability-support](http://www.ctcd.edu/disability-support) for further information. Reasonable accommodations will be given in accordance with the federal and state laws through the DSS office.
VI. FIRST CLASS MEETING

A. The instructor will introduce the course and show the student the textbook.

B. The instructor will verify the class roster/enrollment form:
   1. Call roll
   2. Have each student verify the spelling of his/her name and the social security number by initialing the class roster/enrollment form.
      NOTE: When a student’s name does not appear on the degree program class roster, they must bring it to the attention of the instructor and must present the instructor with CTC Form 29 (Add/Drop Slip) reflecting that he/she has properly registered for the course.

C. The instructor will have the student read and sign the course requirements sheet.

D. The instructor will discuss the following topics with the student:
   1. Course requirements, objectives and how the course works
   2. Policy letters
   3. Student handouts
   4. Lab sheet and lab work (Enabling tasks, Performance exams, competency profile)
   5. Exam, grading, reading and written assignments.
   6. Absences
   7. Shop/classroom cleanup-tools
   8. Dress code
   9. Parking
   10. Sign-in computer
   11. Course outline/fact sheets/student handouts
   12. Hazardous communications/MSDS information
   13. Shop safety
Module 1417-01: The Basic Theories of Truck Brake Systems

A. Time:
   Certificate Students: 9 Clock Hours
   Degree Students: 1 Week

B. Module Learning Outcomes: Upon satisfactory completion of this module the student will:

   1. Apply knowledge and understanding of the basic theory and operation of brake system. (C19)

C. Read Fact Sheet 1417-01-01

D. Read Chapter 28 pgs. 932 through 937 in Resource DEMR 1417-01

E. See your instructor and ask him to explain any part of the reading assignment that you do not understand.

F. Video Audio Visuals: (See your instructor) Student must take notes.
   1. Resource DEMR 1417-01, Brake Systems, Meridian Ed Corp. # V5177 (Video)
   2. Resource DEMR 1417-02, Air Brake System Fundamentals Bendix Westinghouse # 1559 (Video)

G. See your instructor and ask him to explain any part of the audio visuals that you do not understand.

H. See your instructor and ask him if there is anything else that you should read or see that pertains to this module.

I. Complete the learning activities listed below for this module. (See your instructor)
   1. Complete worksheet 1417-01-01

J. Review for Module 1417-01 Written Exam: Study all previous assignments. See your instructor and ask him to explain any areas that you do not understand.

K. Module 1417-01 Written Exam (See your instructor)

L. Critique Module 1417-01 Written Exam (See your instructor)

M. Performance Exam Module 1417-01: Refer to the Laboratory Learning Activities
(Lab Sheet) in this module book and complete the performance exam for this module. (See your instructor)

N. Certificate students should complete this module by the end of the 10th clock hour. Degree students should complete this module by the end of the 1st week.

II. Module 1417-02: Air Brake and Air Supply System

A. Time:
Certificate Students: 9 Clock Hours
Degree Students: 1 Week

B. Module Learning Outcomes: Upon satisfactory completion of this module the student will:

1. Apply knowledge and understanding of the basic theory and operation of the brake system. (C19)
2. Explain the function of air brake supply system components. (C7)

C. Read chapter 28 pgs. 937 through 947 in Resource DEMR 1417-01 (Textbook)

D. See your instructor and ask him to explain any part of the reading assignment that you do not understand.

E. View Audio Visuals: (See your instructor) Student must take notes.

1. Resource DEMR 1417-03 Air Brake System: Air Generation System, Bendix Westinghouse # 1674 (Video)
2. Resource DEMR 1417-04 System Sauer Series Single Cartridge Air Dryers, Arvin Meritor # T97105V (Video)

F. See your instructor and ask him to explain any part of the audio visuals that you do not understand.

G. Complete Fact Sheet DEMR 1417-02-01.

H. Complete Fact Sheet DEMR 1417-02-02.

I. See your instructor and ask him if there is anything else that you should read or see that pertains to this module.
J. Complete the learning activities listed below for this module. (See your instructor)
   1. Complete Worksheet 1417-02-01
   2. Complete Worksheet 1417-02-02

K. Review for Module 1417-02 Written Exam: Study all previous assignments in this module. See your instructor and ask him to explain any area that you do not understand.

L. Module 1417-02 Written Exam: (See your instructor)

M. Critique Module 1417-02 Written Exam: (See your instructor)

N. Performance Exam 1417-02: Refer to the Laboratory Learning Activities (Lab Sheet) in this module and complete the Performance Exam for this module. (See your instructor)

O. Certificate students should complete this module by the end of the 18th clock hour. Degree students should complete this module by the end of the 2nd week.

III. Module 1417-03: Air Brake and Service Brake System

A. Time:
   Certificate Students: 9 Clock Hours
   Degree Students: 1 Week

B. Module Learning Outcomes: Upon satisfactory completion of this module the student will:
   1. Apply knowledge and understanding of the basic theory and operation of the brake system. (C19)
   2. Explain the function of air brake service and brake system components (C7)

C. Read Chapter 28 pgs. 967 through 971 ("Relay Valves") in Resource DEMR 1417-01 (Textbook)

D. Read Chapter 28 pgs. 964 through 966, and 972 through 979 ("Service Brake Application Valve" and "Stoplight Switch") in Resource DEMR 1421-01. (Textbook)

E. Complete Fact Sheet DEMR 1417-03-01

F. Complete Fact Sheet DEMR 1417-03-02

G. See your instructor and ask him to explain any part of the reading assignment that you do not understand.
H. View Audio Visuals: (See your instructor) **Student must take notes.**
      Bendix Westinghouse #1675 (Video)

I. See your instructor and ask him to explain any part of the audio visuals that you do
not understand.

J. See your instructor and ask him if there is anything else that you should read or see
that pertains to this module.

K. Complete the learning activities listed below for this module. (See your instructor)
   1. Complete Worksheet 1417-03-01
   2. Complete Worksheet 1417-03-02

L. Review for Module 1417-03 Written Exam: Study all previous assignments in this
module. See your instructor and ask him to explain any area that you do not
understand.

M. Module 1417-03 Written Exam: (See your instructor)

N. Critique Module 1417-03 Written Exam: (See your instructor)

O. Performance Exam Module 1417-03: Refer to the Laboratory Learning Activities
   (Lab Sheet) in this module book and complete the Performance Exam for this
   module. (See your instructor)

P. Certificate students should complete this module by the end of the 27th clock hour.
Degree students should complete this module by the end of the 3rd week.

IV. **Module 1417-04: Air Brake Parking and Emergency Brake System**

A. Time:
   Certificate Students: 9 Clock Hours
   Degree Students: 1 Week

B. Module Learning Outcomes: Upon satisfactory completion of this module the
   student will:
   1. Apply knowledge and understanding of the basic theory and operation of
      the brake system. (C19)
   2. Explain the function components of air brake, parking and emergency
      system (C7)

C. Read Chapter 28 pgs 947 through 954 (“Double Check Valves” and “Relay Valve”)
   in Resource DEMR 1417-01. (Textbook)
D. Read Chapter 28 pgs 954 through 958 in Resource DEMR 1417-01. (Textbook)

E. Review Chapter 28 pgs 972 through 979 ("Spring Brake Chambers") in Resource DEMR 1417-01. (Textbook)

F. See your instructor and ask him to explain any part of the reading assignment that you do not understand.

G. View Audio Visuals: (See your instructor) Students must take notes.

H. See your instructor and ask him to explain any part of the audio visuals that you do not understand.

I. See your instructor and ask him if there is anything else that you should read or see that pertains to this module.

J. Complete the learning activities listed below for this module. (See your instructor)
   1. Complete Worksheet 1417-04-01
   2. Complete Worksheet 1417-04-02

K. Review for Module 1417-04 Written Exam: Study all previous assignments in this module. See your instructor and ask him to explain any area that you do not understand.

L. Module 1417-04 Written Exam (See your instructor)

M. Critique Module 1417-04 Written Exam: (See your instructor)

N. Performance Exam Module 1417-04: Refer to the Laboratory Learning Activities (Lab Sheet) in this module book and complete the Performance Exam for this module. (See your instructor)

O. Certificate students should complete this module by the end of the 36th clock hour. Degree students should complete this module by the end of the 4th week.
V. Module 1417-05: Air Brake Tractor and Trailer Brake System

A. Time:
Certificate Students: 9 Clock Hours
Degree Students: 1 Week

B. Module Learning Outcomes: Upon satisfactory completion of this module the student will:
1. Apply knowledge and understanding of the basic theory and operation of the brake system. (C19)
2. Explain the function of air brake, tractor and trailer brake system components. (C7)

C. Read Chapter 28 pgs 971 through 972 (“Tractor Protection Control Valves” and TP-3 Tractor Protection Valve”) in Resource DEMR 1417-01. (Textbook)

D. Review Chapter 28 pgs 972 through 981 in Resource DEMR 1417-01. (Textbook)

E. Read Chapter 28 pgs 966 and 967 (“Trailer Application Valve”) in Resource DEMR 1417-01. (Textbook)

F. Read Chapter 28 pgs 967 through 969 (“SR5 Trailer Spring Brake Valve”) in Resource DEMR 1417-01. (Textbook)

G. See your instructor and ask him to explain any part of the reading assignment that you do not understand.

H. View Audio Visuals: (See your instructor) Students must take notes.


J. See your instructor and ask him to explain any part of the audio visuals that you do not understand.

K. See your instructor and ask him if there is anything else that you should read or see that pertains to this module.

L. Complete the learning activities listed below for this module. (See your instructor)
1. Complete Worksheet 1417-05-01
2. Complete Worksheet 1417-05-02
M. Review for Module 1417-05 Written Exam: Study all previous assignments in this module. See your instructor and ask him to explain any area that you do not understand.

N. Module 1417-05 Written Exam: (See your instructor)

O. Critique Module 1417-05 Written Exam: (See your instructor)

P. Performance Exam Module 1417-05: Refer to the Laboratory Learning Activities (Lab Sheet) in this module book and complete the Performance Exam for this module. (See your instructor)

Q. Certificate students should complete this module by the end of the 45th clock hour. Degree students should complete this module by the end of the 5th week.

VI. Module 1417-06: The Anti-Lock Brake System

A. Time:
   Certificate Students: 10 Clock Hours
   Degree Students: 1 Week

B. Module Learning Outcomes: Upon satisfactory completion of this module the student will:
   1. Demonstrate knowledge of the function and troubleshooting of anti-lock brake systems. (C20)

C. Read Chapter 30 pgs 1023 through 1035 (“Anti-Brake Skid Systems”) in Resource DEMR 1417-01. (Textbook)

D. Read Chapter 30 pgs 1035-1035 (“Automatic Traction Control”) (ATC) in Resource 1417-01. (Textbook)

E. Read Chapter 30 pgs 1035 through 1049 in Resource DEMR 1417-01. (Textbook)

F. Answer the review questions in Resource DEMR 1417-01. (Textbook)

G. See your instructor and ask him to explain any part of the reading assignment that you do not understand.

H. View Audio Visuals: (See your instructor) Students must take notes.
   1. View Resource DEMR 1417-17, “Bendix Anti-Lock with Automatic Traction Control”, Bendix Westinghouse #1714. (Video)

Westinghouse #1684 (Video)


4. View Resource DEMR 1417-20, Easy-Stop Trailer ABS Training Program, Arvin Meritor T9813V.

5. View Resource DEMR 1417-21, Enhanced Easy-stop with PLC Training Program, Arvin Meritor T-0197V.

I. See your instructor and ask him to explain any part of the audio visuals that you do not understand.

J. See your instructor and ask him if there is anything else that you should read or see that pertains to this module.

K. Complete the learning activities listed below for this module. (See your instructor)

1. Complete Worksheet 1417-06-01

L. Review for Module 1417-06 Written Exam: Study all previous assignments in this module. See your instructor and ask him to explain any area that you do not understand.

M. Module 1417-06 Written Exam: (See your instructor)

N. Critique Module 1417-06 Written Exam: (See your instructor)

O. Performance Exam Module 1417-06: Refer to the Laboratory Learning Activities (Lab Sheet) in this module book and complete the Performance Exam for this module. (See your instructor)

P. Certificate students should complete this module by the end of the 55th clock hour. Degree students should complete this module by the end of the 6th week.

VII. Module 1417-07: Troubleshoot, Service and Repair the Air Brake System

A. Time:
Certificate Students: 25 Clock Hours
Degree Students: 3 Weeks

B. Module Learning Outcomes: Upon satisfactory completion of this module the student will:
1. Diagnose brake components for wear and usability. (C20)
2. Repair brake components by rebuilding or replacing parts. (C19)
3. Adjust brake components. (C20)
4. Use tools and equipment. (C18)
5. Use service publications. (C18)
6. Practice shop safety. (C19)

C. Read Chapter 28 pgs 979 through 985 (“Slack Adjusters”) in Resource DEMR 1421-01. (Textbook)

D. Read Fact sheet 1417-07-01

E. Read Fact sheet 1417-07-02

F. See your instructor and ask him to explain any part of the reading assignment that you do not understand.

G. View Audio Visuals: (See your instructor) **Students must take notes.**

H. See your instructor and ask him to explain any part of the audio visuals that you do not understand.

I. See your instructor and ask him if there is anything else that you should read or see that pertains to this module.

J. Complete the learning activities listed below for this module. (See your instructor)
   1. Complete Worksheet 1417-07-01
   2. Complete Worksheet 1417-07-02

K. Review for Module 1417-07 Written Exam: Study all previous assignments in this module. See your instructor and ask him to explain any area that you do not understand.

L. Module 1417-07 Written Exam: (See your instructor)

M. Critique Module 1417-07 Written Exam: (See your instructor)

N. Performance Exam Module 1417-07: Refer to the Laboratory Learning Activities (Lab Sheet) in this module book and complete the Performance Exam for this module.
   (See your instructor)

O. Certificate students should complete this module by the end of the 80th clock hour. Degree students should complete this module by the end of the 9th week.

**VIII. Module 1417-08: Troubleshoot Service and Repair Air Brake**
Mechanical/Foundation Systems

A. Time:
   Certificate Students: 40 Clock Hours
   Degree Students: 4 Weeks

B. Module Learning Outcomes: Upon satisfactory completion of this module the student will:

   1. Diagnose brake components for wear and usability. (C20)
   2. Repair brake components by rebuilding or replacing parts. (C19)
   3. Adjust brake components. (C20)
   4. Use tools and equipment. (C18)
   5. Use service publications. (C18)
   6. Practice shop safety. (C19)

C. Read Chapter 31 in Resource DEMR 1417-01. (Textbook)

I. Answer the review questions in Resource DEMR 1417-01.

E. See your instructor and ask him to explain any part of the reading assignment that you do not understand.

F. View Audio Visuals: (See your instructor) Students must take notes.
   1. View Resource DEMR 1417-13, Parts Failure Analysis, Arvin MeritorT-87124V (Video)

G. See your instructor and ask him to explain any part of the audio visuals that you do not understand.

H. See your instructor and ask him if there is anything else that you should read or see that pertains to this module.

I. Complete the learning activities listed below for this module. (See your instructor)
   1. Complete Worksheet 1417-08-01
   2. Complete Worksheet 1417-08-02
   3. Complete Worksheet 1417-08-03
   4. Complete Worksheet 1417-08-04

J. Review for Module 1417-08 Written Exam: Study all previous assignments in this module. See your instructor and ask him to explain any area that you do not understand.

K. Module 1417-08 Written Exam: (See your instructor)
L. Critique Module 1417-08 Written Exam: (See your instructor)

M. Performance Exam Module 1417-08: Refer to the Laboratory Learning Activities (Lab Sheet) in this module book and complete the Performance Exam for this module. (See your instructor)

N. Certificate students should complete this module by the end of the 120th clock hour. Degree students should complete this module by the end of the 13th week.

IX. Module 1417-09: Hydraulic Brake System Fundamentals and Component Function

A. Time:
Certificate Students: 6 Clock Hours
Degree Students: 1 Week

B. Module Learning Outcomes: Upon satisfactory completion of this module the student will:

1. Explain the function of the components of a hydraulic brake system. (C7)

C. Read Chapter 29 in Resource DEMR 1417-01. (Textbook)

D. See your instructor and ask him to explain any part of the reading assignment that you do not understand.

E. View Audio Visuals: (See your instructor) **Students must take notes.**

   2. View Resource DEMR 1417-23, Servicing Rockwell SCL2 Series Dry Disc Brake Calipers, Arvin Meritor T-9514V
   3. View Resource DEMR 1417-24, Meritor Air Disc Brake Main Tenance, Arvin Meritor T-92108V (Video)

F. See your instructor and ask him if there is any additional information that you should read or see that pertains to this module.

G. Complete the learning activities listed below for this module. (See your instructor)

   1. Complete Worksheet 1417-09-01

H. Review for Module 1417-09 Written Exam: Study all previous assignments. See your instructor and ask him to explain any area that you do not understand.
I. Module 1417-09 Written Exam: (See your instructor)

J. Critique Module 1417-09 Written Exam: (See your instructor)

K. Performance Exam 1417-09: Refer to the Laboratory Learning Activities (Lab Sheet) in this module and complete the Performance Exam for this module. (See your instructor)

L. Certificate students should complete this module by the end of the 126th clock hour. Degree students should complete this module by the end of the 15th week.

X. Module 1417-10: Exit Exam

A. Time:
   Certificate Students: 2 Clock Hours
   Degree Students: 1 Week

B. Module Learning Outcomes: Upon satisfactory completion of this module the student will:

   1. Use basic thinking skills and demonstrate personal qualities and work practices used in the work place.
   2. Complete the Exit Exam.

C. Review for Exit Exam: Review all previous assignments.

D. See your instructor and ask him to explain anything that you do not understand about brake systems.

E. Module 1417-10 Written (Exit) Exam: (See your instructor)

F. Critique Module 1417-10 Written (Exit) Exam: (See your instructor)

G. There is no performance exam for this module.

H. End of Course Critique and enrollment in the next course in the program. (See your instructor)

I. Certificate students must complete this module by the end of the 128th clock hour. Degree students should complete this module by the end of the 16th week.