I. INTRODUCTION

A. Advanced topics involving welding of pipe using the shielded metal arc welding (SMAW) process. Topics include electrode selection, equipment set up, and safe shop practices. Emphasis on weld positions 5G and 6G using various electrodes.

B. Advanced Pipe Welding (WLDG 2453) is a required course for the completion of a two year Associate of Applied Science degree in Welding or a Level I or II Certificate of Completion in the Welding Technology Program.

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

D. Prerequisites: This course has a prerequisite of WLDG 1435 or consent of the Dept. 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, Advanced Pipe Welding, the student will:

A. Describe equipment and required pipe preparation. (F6) (C18, 19)
B. Perform 5G and 6G welds using various electrodes. (C18, 19)
C. Draw templet. (F2)
D. Identify and use pipe templet tools and equipment. (C18, 19)
E. Discuss GTAW pipe welding. (C7) (F6)
F. Set-up GTAW pipe welding equipment. (C18, 19)
G. Prepare pipe for GTAW pipe welding operations. (19)
H. Prepare GTAW coupons for testing. (C18, 19)
I. Perform GTAW pipe tests. (F8, 9)
J. Properly and safely use and maintain tools and equipment. (C20)
K. Practice shop safety. (F12)
III. INSTRUCTIONAL MATERIALS
   A. The instructional materials identified for this course are viewable through 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 competency-based 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 144 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 visual material. 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.

       Laboratory tasks (performance exam) will be completed on an individual basis except when limited by tools and/or materials. The maximum lab grade is 500 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 an "F" for the course.

F. There will be four (4) written examinations in this course (3 module/unit exams and an exit exam). **Written exams must be completed before taking the performance exam for each module.** Written exams will consist of **1 hour time** testing using all resource materials, IE notes and books. The exit exam is a comprehensive exam that covers the entire course. **No resource material will be allowed.**

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.** Students must complete reading and written assignments at home or in the Learning Resource Center.

V. EXAMINATIONS

All students will take module exams online through Coursesites. All exit exams will be proctored and taken on site in Bldg. 118 Room 18. Online exams are available 24/hr a day. Exit Exams may also be taken during testing hours. 10AM-9PM (subject to change)

VI. GRADING COMPUTATIONS

Students will be graded using the standard Skills Center 1000 point grading system. Students who fail to make the 700 points for the course must retake the course. **The student must satisfactory complete all written and performance exams to receive a passing grade of (C).**

\[
\begin{align*}
1000-900 &= A \\
899-800 &= B \\
799-700 &= C \\
699-600 &= D \\
599-0 &= F \\
\end{align*}
\]

Students will be graded using an "alphanumeric" 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.**

A. Written exams: Average of written exams will count 20% of the final grade or 200 points.

B. Written exit exam: Percent scored on exit exam will count 20% of the final grade or 200 points.

C. Class Participation activities will count 20% of the student's final grade or 200
points.

D. Performance Exams (Lab work) will count 40% of the final grade or 400 points.

E. Grade Computations: (Example)
Written Exam Scores: (There will be 3 written exams)
Exam 1  90
Exam 2  80
Exam 3  70
\[ \frac{240 \text{ divided by 3}}{3} = 80 \text{ (Average Written Exams)} \]

Written Module Exam Scores 200 x 80% = 160 points
Written Exit Exam Score 200 x 80% = 160 points
Attendance and Participation 200 x 80% = 160 points
Performance Exam Score 400 x 85% = 340 points

Total = 820 points = B

VII. NOTES AND ADDITIONAL INSTRUCTIONS FROM THE INSTRUCTOR

A. Course Withdrawal: It is the student’s responsibility to officially withdraw from a course if circumstances prevent attendance. 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.”

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 the Withdrawal E-Form upon 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 “IP” 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 central campus. This service is
available to all students, regardless of location. Explore 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.

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. **Dress Code:** You are expected to dress and groom (including hygiene) in a manner that does not interfere with the educational mission or is disruptive to the operation of the institution while on campus and while participating in activities sponsored by the College. Students, whose conduct and dress cast an unfavorable reflection upon the College, or are in violation of this policy, may be subject to disciplinary action. Use good taste and judgment. As a guideline, we recommend that you not wear clothing that reveals your chest, midriff, or buttocks. Clothing with derogatory or inflammatory wording or pictures will not be tolerated. Appropriate PPE (personal protective equipment) must be worn while in shops/labs (No tank tops, shorts, sandals, house shoes, or flip flops).

I. **Tools/Equipment required**
Welding helmet and jacket, safety glasses, gloves, and chipping hammer.
VIII. 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 students’ name does not appear on the log on screen for labtrac or degree program class roster, they must bring it to the attention of the instructor and must present the instructor with enrollment billing statement 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. Campus and Industrial Technology Policy letters
   3. Student handouts
   4. Lab sheet and lab work (Learning activities, 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/SDS information
   13. Shop safety
IX. COURSE OUTLINE OR SEQUENCE

I. Module 2453-01: Pipe Templet Development

A. Time: 46 Hours

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

1. Describe equipment and required pipe preparation. (F6) (C18, 19)
2. Perform 5G and 6G welds using various electrodes. (C18, 19)
3. Draw templates. (F2)
4. Identify and use pipe templet tools and equipment. (C18, 19)
5. Properly and safely use and maintain tools and equipment. (C20)
6. Practice shop safety. (F12)

C. Read Chapter 2 and review module book.

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

E. See your instructor and ask him to demonstrate the proper use of pipe templets, tools and equipment.

F. Refer to the Laboratory Learning Activities (Lab Sheet) in this module book and complete the Learning Activities for this module. (See your instructor)

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

H. Review for Module 2453-01 Written Exam: Study all previous assignments in this module. See your instructor and ask him to explain anything you do not understand.

I. Module 2453-01 Written Exam: (See your instructor)

J. Critique Module 2453-01 Written Exam: (See your instructor)

K. Performance Exam Module 2453-01: Refer to the Laboratory Learning Activities (Lab Sheet) in this module book and complete the Performance exam for this module. (See your instructor)

L. Students should complete this module by the end of the 45th clock hour.
II. Module 2453-02: Pipe Welding (TIG)

A. Time: 45 Hours

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

1. Describe equipment and required pipe preparation. (F6) (C18, 19)
2. Perform 5G and 6G welds using various electrodes. (C18, 19)
3. Discuss GTAW pipe welding. (C7) (F6)
4. Set-up GTAW pipe welding equipment. (C18, 19)
5. Prepare pipe for GTAW pipe welding operations. (19)
6. Prepare GTAW coupons for testing. (C18, 19)
7. Perform GTAW pipe tests. (F8, 9)
8. Properly and safely use and maintain tools and equipment. (C20)
9. Practice shop safety. (F12)

C. Read Chapter 2 & 18 in Resource 1323-01 and review module book.

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

E. See your instructor and ask him to demonstrate GTAW pipe welding.

F. Refer to the Laboratory Learning Activities (Lab Sheet) in this module book and complete the Learning Activities for this module. (See your instructor)

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

H. Review for Module 2453-02 Written Exam: Study all previous assignments in this module. See your instructor and ask him to explain anything you do not understand.

I. Module 2453-02 Written Exam: (See your instructor)

J. Critique Module 2453-02 Written Exam: (See your instructor)

K. Performance Exam Module 2453-02: Refer to the Laboratory Learning Activities (Lab Sheet) in this module book and complete the Performance exam for this module. (See your instructor)

L. Certificate students should complete this module by the end of the 90th clock hour. Degree students should complete this module by the end of the 15th (10th*) week.
III. Module 2453-03: Pipe Welding (6G-45 deg. Vertical Up) (6010 Root-7018 all other)

A. Time: 45 Hours

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

1. The student will describe equipment and required pipe preparation. (C18, 19)
2. Perform 1G, 2G, 5G, and 6G welds using various electrodes. (C18, 19)
3. Select equipment for a pipe welding job. (C18)
4. Set-up and use pipe cutting, fitting and welding equipment. (C18, 19)
5. Prepare pipe for welding. (C18, 19)
6. Perform weld tests. (F8, 9)
7. Select electrodes for a job. (C3)
8. Properly and safely use and maintain tools and equipment. (C20)
9. Practice shop safety. (F12)

C. Read Chapter 2 and review your module book.

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

E. See your instructor and ask him to demonstrate pipe welding in the 6G-45 deg. vertical up position.

F. Refer to the Laboratory Learning Activities (Lab Sheet) in this module book and complete the Learning Activities for this module. (See your instructor)

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

H. Review for Module 2453-03 Written Exam: Study all previous assignments in this module. See your instructor and ask him to explain anything you do not understand.

I. Module 2453-03 Written Exam: (See your instructor)

J. Critique Module 2453-03 Written Exam: (See your instructor)

K. Performance Exam Module 2453-03: Refer to the Laboratory Learning Activities (Lab Sheet) in this module book and complete the Performance exam for this module. (See your instructor)

L. Students should complete this module by the end of the 90th clock hour.
IV. Module 2453: Exit Exam

A. Time: 8 Hours

B. Module Learning Outcomes: Upon 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 welding safety, tools and equipment.

E. Module 2453 Exit Exam: (See your instructor) Degree students must complete this exam by the end of the 16th (11th*) week. Certificate students must complete their exam by the end of the 96th clock hour.

F. Critique Module 2453 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)