

Tri-County Technical College
Mechatronics Technology Program
Technical Advanced Placement (TAP)

Competency Verification and Teacher Recommendation Form

TCTC Course: IMT 131 (Hydraulics and Pneumatics)

SECTION I (For the student)

Please read this form completely, including Section III, TAP Policies and Disclosure Information. Also, please note that a score of 80% or higher is required for successful completion of the TAP exam.

Please complete this section of the form and give it to your Mechatronics teacher.

Your Name (PLEASE PRINT): _____ Phone: _____

Address: _____ SSN: _____

City: _____ State: _____ Zip: _____

High School: _____ Grade: _____

SECTION II (For the teacher)

By placing my initials next to the appropriate competency statement listed on the back of this form, I verify that this student has mastered major competencies of IMT 131 (*Hydraulics and Pneumatics*), as defined in the approved syllabus. I understand that in order to progress in the validation process for Technical Advanced Placement credit, *a minimum of 75 percent of the competencies must be verified*. Having met this requirement, I recommend this student be permitted to continue the validation process by completing the TAP exam, which I understand will be arranged through the Mechatronics Technology Program at Tri-County Technical College.

Teacher Name (PLEASE PRINT): _____

Signature: _____ Date: _____

Name of high school course(s) in which this student gained the required competencies for possible TAP credit:

Date of course completion or expected completion: _____

Comments (if applicable): _____

SECTION III

Technical Advanced Placement (TAP) Policies and Disclosure Information

1. It is the student's responsibility to provide the appropriate Tri-County Technical College curriculum program coordinator with all materials and documentation necessary to verify completion of TAP procedures.
2. The Tri-County Technical College program coordinator will keep accurate records to ensure that all College forms and processes associated with the awarding of academic credit are completed appropriately, and to ensure that the student's academic advisor is informed of his/her progress in completing TAP procedures.

3. The student will receive a copy of the Tri-County Technical College Advanced Standing Credit Form showing the courses for which he/she will receive credit.
4. When a student works with a College advisor to register for Tri-County Technical College courses, it is the student's responsibility to inform the advisor of any credit earned through TAP.
5. TAP credit earned will be documented as a grade of "E" on the student's official Tri-County Technical College transcript after he/she has been formally admitted to the College, has satisfactorily completed all TAP procedures, and has registered for one or more Tri-County Technical College courses. TAP credit will appear on his/her TCTC transcript at the end of the first term in which the previous three conditions have been met. "E" grades earn credit hours but do not affect the grade point average.
6. TAP credit earned may apply to a required course(s) or an elective course(s) depending on whether or not the course is listed as required for a specific curriculum in the College catalog. If a student enters a program at Tri-County Technical College for which that course is not required, the student may use the credit as elective credit, with the program coordinator's permission.
7. TAP credit earned at Tri-County Technical College does not imply or guarantee that such credit will be honored by other institutions of higher education.
8. A high school student will have one year following the time of his/her high school graduation to complete TAP procedures.
9. A high school student who successfully completes TAP exams but who does not successfully complete all the other procedures will have one year to complete the procedures and receive credit.
10. The program coordinator (or designee) may decide whether or not a student who does not successfully complete a TAP exam is eligible to retake the exam.
11. A high school student who takes a TAP exam will have his/her score kept on file in the appropriate department office for one year following the test date. A student who has completed TAP but who has not been admitted or enrolled will have his/her Advanced Standing Credit Form kept on file for one year.
12. All TAP exams will be developed, administered, and scored by Tri-County Technical College faculty and/or staff.

COMPETENCIES (please initial each one)

- _____ 1. Describe the characteristics of a liquid; determine how static force is transmitted through liquids; define S.S.U.
- _____ 2. Describe the operation at the suction side of a pump; discuss different pressure scales and a different unit of pressure as used on the suction side; discuss true cavitation; contrast entrained and dissolved air in a fluid.
- _____ 3. Determine pressure, force, area, rod speed torque and hydraulic horsepower; discuss cylinder stroke and volume; identify hydraulic motors; define torque; construct a hydraulic system to test the relationship between pressure, area and force.
- _____ 4. Identify and discuss four type of valves (directional control, pressure control, flow control, and check) used to control hydraulics; construct hydraulic circuits using the four valves.
- _____ 5. Name and identify types of accumulators; discuss the functions of accumulators and check valves; describe the operation of hydraulic cylinder; construct a hydraulic circuit using a cylinder and accumulator.
- _____ 6. Identify and describe operation of flow control valves; identify applications of a flow control valve; construct a hydraulic circuit using a flow control valve.
- _____ 7. Identify 4-way, 3-way and 2-way valves; name types of center positions used in directional control valves describe operation and applications of directional control valves.
- _____ 8. Identify two types of pressure control valves; describe operation of simple pressure control valves; construct a hydraulic circuit to test operation of pressure control valve.
- _____ 9. Name and describe the operation of the three types of pumps used in hydraulics; identify positive and non-positive displacement pumps.

IMT 131: COMPETENCIES - Continued

- ____ 10. Classify hydraulic motors as uni-directional or bi-directional; identify vane, gear and piston types of hydraulic motors; discuss variable displacement and overcenter types; determine torque rating and operation speed.
- ____ 11. List types of fluids used in hydraulics; discuss fluid additives; describe hydraulic system reservoirs; discuss requirements for oil coolers and filters; discuss bypass valves.
- ____ 12. Calculate pressure, temperature and volume of gases using Boyle=s Law, Charles= Law and General Gas Law; identify parts of positive displacement compressor; contrast flow rate and critical velocity.
- ____ 13. Describe functions of pressure switches, safety relief valves and pressure regulators; describe the operation of directional control valves and flow control valves; identify basic components used in pneumatic systems.
- ____ 14. Identify five basic compressors; calculate displacement; describe single-stage and two-stage compressors; describe methods of unloading compressors; describe the effects of altitude on compressors.
- ____ 15. Discuss elevated temperature of air released from compressors; identify components to remove water and/or oil vapor from air; discuss the difference among refrigerant, absorption and absorption air dryers; explain sizing of receiver for constant and variable demand; compare basic piping systems.
- ____ 16. Describe operation and application of simple check valve; describe types, operations, and sizing of pneumatic motors; discuss use and application of pneumatic cylinders; size pneumatic cylinders.
- ____ 17. Discuss ball, globe, needle and sandwich flow control valves; explain the use of silencers; describe use of quick exhaust valves, including advantages.
- ____ 18. Describe sequence valve; describe venting, non-venting and reverse flow regulators; describe boosters and air-oil tanks.
- ____ 19. Describe the origin of pneumatics system contaminants; describe the rating of air line filters; explain air line lubricators; explain the selection of Filter Regulator Lubricator units.

Please make a copy of this form for your records and mail the original to Ms. Tonia McClain, Engineering and Industrial Technology Division Office Manager, Tri-County Technical College, PO Box 587, Pendleton, SC 29670. (Questions regarding TAP procedures for IMT 131 should be directed to Mr. Mark Franks, Mechatronics Instructor 646-1329.)

2/27/15