



New CTE Program Development Process Stage 1: Program Abstract Proposal

The “Program Abstract” is the first step for those individuals or teams interested in proposing a new career and technical education (CTE) program. When complete, submit the information to the Vice President for Instruction, who will solicit feedback from the President’s Advisory Team and the President. The president may then approve the abstract as is, ask for additional information, or deny the proposal.

Details regarding the full process for developing new CTE programs is available through the Vice President for Instruction’s office.

Proposer(s): Ken Mays – Automotive Technology

COCC has offered the AAS Automotive Technology in Electronics and Diagnostics (TED) as an *option* to the AAS in Automotive Management degree *since 2014*. The National Science Foundation / Advanced Technological Education Grant # **1500573** assisted in the formation of the five advanced courses / certificates incorporated into the (TED) degree.

The intent of this proposal is to establish the AAS Automotive Technology in Electronics and Diagnostics (TED) as a degree – not an option to another degree.

The West Coast region has demonstrated significant business development and political commitment to the HEV/EV and the fuel cell (FC) industry through initiatives like the development of the West Coast Electric Highway, which is installing electric vehicle DC fast charging stations every 25 to 50 miles stretching from British Columbia to Baja California. The state of California has made a significant commitment to zero level vehicle emissions, aggressively implementing the fuel cell corridor through California along Interstate 5 to the Oregon border. **Hydrogen Fuel Cell Electric Vehicle Deployment and Hydrogen Fuel Station Network Development** http://www.arb.ca.gov/msprog/zevprog/ab8/ab8_report_2016.pdf

Oregon and Washington are developing electric highway infrastructure that can accommodate an ever-increasing number of electric drive vehicles. (Attachment A) This degree proposal (and related certificates) seeks to address the need for automotive technicians with significant new STEM driven skills to serve this rapidly emerging industry through nationally normed training standards for instructors and technicians in electric drive diagnostics, maintenance, and repair. We need to address the hybrid electric vehicle (HEV), electric vehicle (EV), and now the Fuel Cell (FC) along with the automated vehicle technology education gap (collectively called electric drive vehicles).

- 1. Program Overview:** Provide a general description of the program and program goals. If the program needs to start quickly, the proposer should indicate whether the program should be offered in a non-credit format and a plan to transition it to credit offerings. If program courses were previously offered as noncredit courses, describe program enrollment trends, program history, and other lessons learned from the noncredit offerings.

AAS of Automotive Technology in Electronics and Diagnostics (TED)

This degree is an addition to our current Master Automotive Technician Certificate, with emphasis on the electrical / electronic portions of the automotive industry. Three major areas are included in this proposal: electronic and hybrid power systems, clean diesel, and on-board vehicle networking. The title places emphasis on the ever-advancing electronics that are contained on all current vehicles, clearly stating the intent of the degree. Degree seeking students are still able to take short-term certificate courses from other certificate areas and receive a degree plus short-term certificates. The accrediting body of the COCC Automotive Technology Program is NATEF (National Automotive Technicians Education Foundation). Many of the electronic competencies in certifying areas, required by NATEF, are embedded into the current A1 through A9 NATEF Certifications. With the new degree, the Automotive Program will be very effective preparing graduates for the full range of vehicle technology.

- 2. Strategic Alignment:** Describe how the new program fits with the COCC mission, strategic plan, and accreditation core themes.

Although effective in placing students into transportation related occupations, preparation for entry level jobs requires that the student adapt and continue their education through the employer. The student is required to perform 288 hours of work experience near completion of the program. The advisory and the automotive staff would like to promote the new Automotive Technology in Electronics and Diagnostics Degree to prepare students for current and advancing technologies and bring training to the current technicians and local businesses. We continue to be a leader in training, yet we are ready to strengthen that leadership by providing enhanced electronics training to build workforce knowledge and skills necessary for a technician to improve within their career as a lifelong learner. Second year students will be attending classes at the Redmond Tech Center which opens opportunities to add training access with shorter distance for Warm Springs, Jefferson County, and Crook County. The new program will include multiple short-term certificates to promote student success. We remain articulated with regional high schools and work well with Oregon community colleges. As a NATEF Accredited Training Program, we are continually improving the quality of

training and new technologies, which is the reason for promoting the AAS in Automotive Technology in Electronics and Diagnostics (TED) Degree.

- 3. Employment Projections:** Provide evidence of employment opportunities after program completion, including anticipated wage upon entry, wage progression potential and a statement of need for the occupation. Possible resources include: [Oregon Labor Market Information System \(OLMIS\)](#); (attachment B) discussion with the regional economist (541.388.6442 or 541.306.1645); and [the U.S. Bureau of Labor Statistics](#) (attachment C). Professional organizations and other data sources may also be used.

The labor market analysis should include regional and national data on the following questions, noting that both Central Oregon and national trends may be considered:

- a. Why is this program necessary?
100% of all owners of cars and trucks owners are serviced by an automotive or truck technician. To build an economy of electric drive and autonomous vehicles – a new level of technician is needed.

There is a dramatic shortage of Automotive Technicians who are equipped to service and repair electric drive vehicles. Automotive programs throughout the nation currently have a wealth of training material and curriculum in place, but automotive technology is changing, and there is wide recognition that training programs for students and technicians need to be dramatically redesigned to guarantee mastery of new systems and their controllers.

When teaching traditional automotive systems, the typical instructor is not required to possess any “special” knowledge or skills because the topic content is mature; the instructors have significant legacy knowledge and there is no technology transfer concern. On the other hand, electric drive technologies, which include Hybrid Electric (HEV) Electric Vehicles (EV)/Fuel Cell, and automated vehicle technologies, are completely new areas for automotive technicians. There is virtually no knowledge from a traditional vehicle that can be used to learn electric drive technology (*legacy knowledge*), and the same is true for transferring knowledge about this new area (*technology transfer*). As examples, traditional vehicles do not use high voltage battery packs, propulsion generated by 3-phase high power electric machines, power inverters, dc-dc converters, interlock circuits, isolation fault circuits, or electric air conditioning compressors.

Automotive training institutions currently align training programs and certifications with standards defined by the National Automotive Technicians Education Foundation (NATEF). Program accreditation is based on adhering to these standards. To date, minimum program standards have been established

by NATEF for electric drive technologies. Thus, current technology and the need for advanced technology education are at a crossroad where traditional technology programs are missing key elements - especially in the area of “state-of-health” of electric drive technology. This type of advanced training – proactively repairing a problem before a catastrophic failure – is defined by the term “state-of-health” or “predictive maintenance”.

Lowering carbon emissions and passenger safety are driving technology development and will continue to do so in the near future. Vehicle designers are tasked with developing vehicles that have zero vehicle emissions and operate safely in high traffic with an overall goal of zero deaths. As vehicle designs or technologies change, there is and will continue to be a need for highly trained technicians to maintain the vehicles and keep them safe and functioning. A parallel concern is technician safety. In the United States, there is no licensure or credential requirement for technicians who work with high voltage systems and high-pressure gaseous fuels. To compare, technicians who work with commercial or residential high voltage or heating, ventilation, and air conditioning (HVAC) systems MUST be licensed by each State.

The AAS in Automotive Technology in Electronics and Diagnostics (TED) Degree has been designed to address these subject areas.

- b. Does the workforce data show that the proposed program is needed?

<https://www.nytimes.com/2017/04/27/automobiles/wheels/automobile-repair-jobs.html>

The workforce data does show that this occupation, in all of its forms, is very much needed.

- c. Can training be provided without creating a new program?

This degree is a branch of a long history of Automotive Technology at COCC – since 1958. Updated training has been developed as electric drive systems have developed.

The AAS of Automotive Technology in Electronics and Diagnostics (TED) is needed.

- d. What other data resources have been utilized in addition to the Employment Department, e.g., professional organizations, national census, and regional workforce specialists?

<https://www.moderntiredealer.com/news/726263/industry-needs-75-900-new-automotive-technicians>

<https://www.thezebra.com/insurance-news/3829/future-of-the-auto-mechanic/>

<https://www.caranddriver.com/features/automotive-service-departments-are-scrambling-for-technicians-feature>

- e. What career pathways, employment opportunities, and further educational opportunities exist for students who complete the program?

Career Pathways – Engineering / BS in Diesel Technology / BA in Business Management

This is not new. COCC graduates already have a job before they graduate. We have a strong track record of placing students into our local and regional business locations.

- 4. Implementation Timeline:** The typical timeline for implementing a new CTE program is included in Appendix A. Describe the anticipated timeline for program implementation, indicating any modifications to the traditional timeline described in Appendix A. Note that the timeline provided is for a traditional start up only; *extraordinary* resources may allow a more rapid implementation timeline and should be explained in the program proposal.

The timeline will work for this proposal.

- 5. Organizational Structure and Implementation Team:** Identify campus faculty and staff who will be involved in implementing this program, including the program developer, the department to which this program will report, and the chair, dean and other implementation team members. Include specific names and at what stage it is anticipated that a content expert may need to be hired.

This structure and reporting already exists in the NIR Department.

- 6. Specialized Accreditation:** Indicate whether the program requires specialized accreditation and any known accreditation requirements which may impact program delivery, staffing, budget, or other factors.

The current NATEF (National Automotive Technicians Education Foundation) Accreditation was established for COCC in 1987. We continue to be accredited.

- 7. Diversity:** Explain how this program may help support or foster diversity of our student population, academic programs, values, or other considerations.

As a historically male dominated occupation, we are seeing open doors for gender equity. Still need to be working on making this better.

- 8. Exceptional Needs:** Describe extraordinary needs anticipated as a result of this program; this includes teaching and/or support staff, facilities, policy changes, accreditation requirements or other considerations.

When the Tesla START site visit occurred, it brought some challenges that we may want to address at this time. There are new definitions that apply to apprenticeship programs through the DOL and DOE. Grants Coordinator, Dr. Mary Ann Asson-Batres, is currently investigating the new criteria for COCC to possibly become an approved apprenticeship site for future technologies and occupations. A conversation with Vickery Viles has been ongoing as we talk about a “business and industry” degree option. I am looking for a method to reintroduce apprenticeship into a degree structure as we look at reworking the TED degree.

Student data report for the advanced classes offered at RTC from fall 2015 through spring 2018.

(Attachment D)