Career and Technical Education
Program of Study Application
2019 Version
(Full Application)

Directions—please enter information into ALL the fields in this application. If you have technical problems with this application, contact Ron Dodge ron.dodge@ode.state.or.us.
(For detailed information on how to complete this application consult the Guide to Using the Oregon CTE Program of Study Application 2019.) DEADLINE for submission: June 28, 2019 (Early Bird: April 30, 2019)

CTE POS—Title: Mechatronics
Career Area: Industrial Engineering Systems--IE
Cluster Area (& appropriate secondary CTE licensure): IE--Engineering Technology
Focus Area (if applicable):
Secondary CIP Code: (Link to CIP website) 15.1199 (6 digit)
Community College CIP Code: (Link to CIP website) 15.0613 (6 digit)

Secondary School Name: Forest Grove High School
Secondary School District: Forest Grove
Secondary School ID Number: (Link to ID lookup) 1134

Secondary Teacher Name | Email | Current CTE License
--- | --- | ---
John Worst (Lead Teacher) | jworst@fgsd.k12.or.us | IES--Engineering Technology
John Worst | jworst@fgsd.k12.or.us | IES-Manufacturing

Secondary Technical Skill Assessment (TSA): Use the code from this table for your selected TSA.
PREX109

CC Technical Skill Assessment (TSA): Use the code from this table for your selected TSA.
2AREG058

Primary Oregon Community College Name: Portland Community College
(Insert link, or identify location where sample of visual can be found)
https://drive.google.com/file/d/1hogf3e2ZLQb4Xx3YKJw5QC1VzxYWwC22/view?usp=sharing

Regional Coordinator/Contact: 2A--Beth Molenkamp elizabeth.molenkamp@pcc.edu

CTE Teacher: Submit complete electronic application materials to your CTE Regional Coordinator.
Regional Coordinator: Submit completed applications to ODE using the Submission Process on the last page of this application.

DEADLINE for submission: June 28, 2019
New: CTE POS Course Matrix—Secondary & Postsecondary

Sample Screen Shot: Finance Cluster

Please Submit Course-to-Skill Sets Matrix (crosswalk) with this application:

- Follow the instructions on the Skill Set Matrix home page
- Complete one matrix for both secondary and postsecondary courses; add columns as necessary
- Please enter all information for each course: title, course number, NCES Code (secondary), credits, if required for TSA.
- Check only those skills or standards taught with intent and purpose and assessed in each course
- Submit the matrix through the SmartSheet process with this Application

Link to CTE POS Course Matrices—all Clusters
Element 1: Standards & Content

This POS design includes:

- A. Relevant, rigorous technical skill standards-based content, including or aligned with challenging academic standards
- B. Shared secondary and post-secondary technical content that incorporates the knowledge and skills identified in the Oregon Skill Sets or other industry-based standards, which are validated through national and state employer input
- C. Sufficient size, scope and sequence to include curriculum and instruction leading to student attainment of academic and technical knowledge and skills for high school graduation, college entry, and careers within high wage, high demand fields
- D. A systemic approach to instructional delivery of academic and technical knowledge and skills where students demonstrate skill through contextual assessments, as well as valid and reliable technical skill assessments (TSA) aligned to industry standards
- E. A plan for continuous improvement of program design and instructional delivery that provides the opportunity for each CTE POS student to:
  - Meet diploma requirements, post-secondary entry requirements, and/or certificate/degree/industry credential requirements
  - Demonstrate mastery of academic and technical content that is aligned with industry standards
  - Apply learning through authentic experiences
  - Develop skills and build confidence to compete in high wage, high skill, and/or high demand occupations.

Directions for using the Comment box—The box below expands to accommodate your comments. Enter in this box explanation for missing checks above, or notes regarding program strengths worth consideration during POS review. If you already have documents or files that do this more quickly, simply upload those documents or files (or links to them) with this application to the SmartSheet® folder. (Consult the Guide to Using the Oregon CTE Program of Study Application 2019 for more details.)

Please address these questions through your comments in Element 1 Comment Box below (or attach documentation in an appropriately identified and uploaded file/folder):

- Address any unchecked box above
- Explain how this POS is aligned with challenging academic standards at the HS and CC levels
- Identify those who participated in the decision of which skill set to use for this POS
- Who participated in the crosswalk of the skill sets to HS and CC courses

Element 1 Comment Box:

A. All boxes are checked.
B. The FGHS Mechatronics POS is aligned with challenging academic standards at the HS and CC levels. In particular, the FGHS Mechatronics POS is aligned to and articulated with the PCC Microelectronics Technology (MT) Program, which prepares students for the high-demand high-wage high-tech manufacturing/engineering technician field. More specifically, as can be seen in the included crosswalks and linked visual summary (https://docs.google.com/presentation/d/1MlaWTjiUjjYyX7vba37rHPfJZfwvk7cyyjVBLFu0IA/edit?usp=sharing), FGHS Mechatronics 1 and 2 courses build digital and mechanical skills necessary for success in Mechatronics 3 and 4, with Mechatronics 3 being articulated with PCC MT121 (Digital Systems 1) and Mechatronics 4 (3D printer building) in process (advisory board review) for being articulated with the in-development Mechatronics 1-year certificate at PCC that aligns with the current PCC MT Program. Moreover, parallel FGHS Mechatronic Design and Advanced Mechatronic Design courses are aligned with PCC MT Engineering Technology cluster standards, and capstone FGHS Mechatronic Processes and Advanced Mechatronic Processes courses are aligned with additional Manufacturing and Mechanical Systems cluster standards of the PCC MT Program.

C. Those who participated in the decision of which skills set to use for this POS include the advisory committee and PCC partners.

D. Those who participated in the crosswalk of the skill sets to HS and CC courses include high school and community college partners.
Element 2: Alignment and Articulation

The alignment of this POS includes:

☑ A. A unified, cohesive sequence of content among secondary and post-secondary partners contained in a non-duplicative sequence of courses or learning experiences.

☑ B. Alignment of content between secondary and post-secondary education partners may include course articulation or other ways students can acquire post-secondary education credits (e.g. Credit for Proficiency, Dual Credit, Oregon Transfer credit, etc.).

☑ C. Articulation agreements are developed, implemented and supported at the institutional level to ensure long-term sustainability and cross-sector cooperation.

☑ D. Based on the program design and instructional plan, each student will:
  ☑ Continually progress in knowledge and skills when ready;
  ☑ Earn high school or college credit based on performance; and
  ☑ Make the connection between educational preparation and entry into a career.

Directions for using the Comment box—The box below expands to accommodate your comments. Enter in this box explanation for missing checks above, or notes regarding program strengths worth consideration during POS review. If you already have documents or files that do this more quickly, simply upload those documents or files (or links to them) with this application to the SmartSheet® folder. (Consult the Guide to Using the Oregon CTE Program of Study Application 2019, for more details.)

Please address these questions through your comments in Element 2 Comment Box below (or attach documentation in an appropriately identified and uploaded file/folder):

- Address any unchecked box above
- Briefly describe the level of alignment and/or articulation that exists for this POS (you may also identify non-Perkins eligible alignments that exist with private schools, universities, etc.)
- Briefly describe the alignment and/or articulation activities that have occurred, and who participated from HS and CC levels

Element 2 Comment Box:

A. All boxes are checked.

B. There is a significantly high-level of alignment and articulation that exists between the FGHS Mechatronics POS and the PCC Microelectronics Technology program. The FGHS Mechatronics POS coordinator, John Worst, participates, receives POS feedback, and provides reports in all PCC MT Industrial Advisory Committee meetings, enabling synchronous vertical alignment between industry, the PCC MT Program, and the FGHS Mechatronics POS. In particular, updates to the PCC MT Program suggested by industry partners can then be simultaneously planned and implemented in aligned and articulated courses in the FGHS Mechatronics POS.

C. Alignment and articulation activites that have occurred (in addition to the synchronous Industrial Advisory Committee meetings) include multiple site visits by FGHS Mechatronics POS faculty to the PCC MT Program, multiple site visits by PCC MT Program faculty to the FGHS Mechatronics POS, sharing of MT121 curriculum and materials, and long-term collaboration on FGHS Mechatronics 4 curriculum (with collaboration from the PCC MT Program on 3D printer kit types, and presentation of the selected kit type and schematics to the Industrial Advisory Committee for review to consider for PCC MT Program articulation).
Element 3: Accountability & Evaluation

In this POS design:

- **A.** Performance will be measured against the Perkins-required performance measures as described in Perkins IV Measurement Definitions identified in Oregon’s State Plan (re: Data Collection).
- **B.** Business, community and education partners (specifically, an Advisory Committee) participate in CTE Program of Study design, development, and evaluation, including:
  - Assistance in evaluating program vision, goals and priorities
  - Validation of industry skill standards for curriculum content and technical skill assessment, where appropriate
  - Participation in the CTE teacher recruitment, instructor appraisal process, and ongoing faculty professional development
- **C.** Perkins performance data is used for data-driven, CTE program of study design and improvement decisions
- **D.** Students have the opportunity to learn in a contextual career related environment that allows them to:
  - Monitor their own progress through their demonstration of attaining technical and academic skill standards
  - Demonstrate their technical and academic proficiency in meaningful ways, e.g., Technical Skill Assessment, industry credential, etc.
  - Adapt their program to meet personal goals based on industry requirements and performance outcomes

- **Directions for using the Comment box**—The box below expands to accommodate your comments. Enter in this box explanation for missing checks above, or notes regarding program strengths worth consideration during POS review. If you already have documents or files that do this more quickly, simply upload those documents or files (or links to them) with this application to the SmartSheet® folder. (Consult the Guide to Using the Oregon CTE Program of Study Application 2019, for more details.)

Please address these questions through your comments in **Element 3 Comment Box** below (or attach documentation in an appropriately identified and uploaded file/folder):

- Address any unchecked box above
- Identify the data used in designing this POS, and the effect that the data had on the design
- Identify the members of the Business Advisory Committee
- How will the POS be evaluated, and by whom?
- How will you know if the POS is successful?
- What process will you use to decide any changes that need to occur because of the POS evaluation?
- **Required:** List the TSA(s) code used for this POS on Page 1 (ODE approved list)

Element 3 Comment Box:

A. All the boxes are checked.

B. The FGHS Mechatronics POS was developed using data from industry partner feedback, community member feedback, community college partner articulation and feedback, and high-demand high-wage career sources (e.g., electronic and computer product manufacturing is by far the leading sector in Oregon in terms of jobs, average pay, and total revenue https://www.oregonednet.org/sites/default/files/attachments/omep_april_manufacturing_presentation.pdf. The effect that the data had on the design is that the POS includes use, troubleshooting, and design of mechatronic apparatus, as well as manufacturing/engineering processes on mechatronic equipment. In other words, we build mechatronic systems and also use mechatronic systems to build other products (i.e., in Mechatronic Processes and Advanced Mechatronic Processes courses akin to how industry uses mechatronic equipment).

C. The members of the Business Advisory Committee include (i) Jennifer Hof representing Qorvo, (ii) Jim Ryan, Forest White, and George Eberly representing Intel, (iii) Janel Dalin representing ASM, (iv)
Colin Madden and Brian Clay representing Lam Research, (v) Anthony Rethwill representing Micro Systems Engineering, (vi) Molly Torbert representing Aerotek, and (vii) Juan Jimenez representing Sigma Design, as well as numerous members representing PCC Microelectronics Technology including Dean Matthew Altman, Department Chair Eric Kirchner, and Program Advisor Jenny Kirchler.

D. The POS will be evaluated based on TSA results, the rate of and equity in student credits earned by proficiency in the POS, the number of and equity in students earning dual credit in the POS, and the number of and equity in students graduating into related post-secondary high-tech education (e.g., PCC Microelectronics Technology, or the like) or high-tech career path (e.g., semiconductor processing or electronics assembly). Those making the evaluation determinations will include the advisory committee, ODE, and Forest Grove staff and faculty.

E. We will know whether the POS is successful based on the ability/proficiency of FGHS Mechatronics POS program completers in entering post-secondary high-tech education/training and/or high-tech career paths.

F. With feedback from the advisory committee, the program of study will be updated as local industry needs change. As program growth and funding occur, the FGHS Mechatronics POS will expand to meet the needs of students and industry, so students are prepared to enter the industry.

G. The Secondary TSA code used for this POS is PREX109, corresponding to the Robotics and Automation (612) TSA produced by Precision Exams. The Post Secondary TSA Code is 2AREG058.
Element 4: Student Support Services

In this POS design:

☑️ A. All CTE students will have informational guidance support and advising to assist them in progressing through a CTE program of study in an efficient and seamless manner (e.g. Career Pathway Templates and/or Roadmaps, Education Plan and Profile, POS visual guides, Career Information System, etc.).

☑️ B. Each student will be able to:
   - Identify the career path options he/she can follow to a chosen career;
   - Receive consistent and informed messages about career and possible financial options for post-secondary education;
   - Take ownership of their education through maintaining a current education plan;

☑️ C. Compliance is evident with Federal regulations, including Title VI- Civil Rights Act of 1964; Title IX – Education Amendments of 1972; Section 504 of the Rehabilitation Act of 1973; Vocational Education Programs Guidelines for Eliminating Discrimination and Denial of Services on the Basis of Race, Color, Sex, Religion, National Origin, Age or Disability; Title II of the Americans with Disabilities Acts of 1990; therefore, this POS provides:
   - Appropriate access for all students, including non-traditional and special populations.
   - A non-biased and non-discriminating learning environment (with respect to race, color, national origin, gender and disability status).
   - Program facilities with physical access and instruction that accommodates students with disabilities, including various learning styles (e.g. the use of visual, auditory, tactile, and kinesthetic teaching methods, and other appropriate forms of instruction).
   - Responsiveness to the needs of students for whom English is a second language.

☑️ D. Opportunities for structured student leadership are a program component and integrated into CTE POS instruction. This POS integrates either:
   - 1) One of the state chartered CTSO’s: [☐ DECA, ☐ FBLA, ☐ FCCLA, ☐ FFA, ☐ FNRL, ☐ HOSA, ☐ SkillsUSA, ☐ TSA —or—
   - 2) Another local or national organization that meets the criteria listed in the ODE Student Leadership criteria document.
   - The locally developed student organization or experience provides leadership development opportunities that meet the following expectations (see details in linked document above):
     - Context related instruction, career development, and practical assessment
     - Community-based learning experiences
     - Organizational management and administrative experiences

Directions for using the Comment box—The box below expands to accommodate your comments. Enter in this box explanation for missing checks above, or notes regarding program strengths worth consideration during POS review. If you already have documents or files that do this more quickly, simply upload those documents or files (or links to them) with this application to the SmartSheet® folder. (Consult the Guide to Using the Oregon CTE Program of Study Application 2019, for more details.)

Please address these questions through your comments in Element 4 Comment Box below (or attach documentation in an appropriately identified and uploaded file/folder):

- Address any unchecked box above
- Briefly describe the POS-specific student support services that HS and CC students will receive in this POS that will support their success in the courses
- How will those student support services help inform and prepare HS and CC students for their next educational and career steps?
- Briefly describe the specific efforts that will be made to recruit all types of students into this POS (both HS and CC levels)
- Briefly describe any student leadership opportunities that will be available for both HS and CC

Element 4 Comment Box:
A. All boxes are checked.

B. Forest Grove High School has a high level of commitment to student support services. We have dedicated instructional assistants to assist students with disabilities, English language barriers, special populations, and we make recruitment efforts specifically for non-traditional students.
C. Recruitment posters, in class discussion, and our career center help inform and recruit students into the FGHS Mechatronics POS and provide support into the PCC Microelectronics Technology Program. Further, the PCC Microelectronics Technology Program Advisor makes multiple site visits per year to FGHS to support students in transition into related post-secondary education.

Students also have access to the course curriculum guide (in both Spanish and English - https://fghs.fgsdk12.org/apps/pages/index.jsp?uREC_ID=1129406&type=d&pREC_ID=1402923) for educational and career planning. In advisory courses, all students use Oregon Career Information Systems (https://oregoncis.uoregon.edu/Portal.aspx) which supports career exploration and preparation. We have a college and career center where students can get information on careers, scholarships, internships, and apprenticeships.

D. Recruitment posters are available in classrooms and throughout the school PCC student handbook and information is given to every dual credit student, available in classroom and at PCC. In addition, every year we make a concerted effort to directly advertise the Mechatronics POS to students in an equitable manner, such as going table to table in the lunch room with materials in Spanish and English and/or presenting hands-on lessons across subject classrooms (e.g., across science classrooms since all students are required to take science and thereby going to all science classrooms ensures all students are being advertised to).

E. All students at Forest Grove High School have the opportunity to be involved in the Forest Grove Chapter of SkillsUSA. A calendar of opportunities can be found at https://www.skillsusaoregon.org/
Element 5: Professional Development

The planned professional development for this POS will:

- A. Connect to teacher effectiveness evaluations.
- B. Help teachers and administrators develop and improve standards-based curriculum and learning experiences that promote the integration of coherent and challenging academic content and industry-based technical standards, including opportunities for the appropriate academic and CTE instructors to jointly develop and implement classroom-based curriculum and instructional strategies.
- C. Include professional development that is high quality, sustained, intensive, and focused on instruction designed to increase the academic knowledge and understanding of industry standards.
- D. Encourage applied learning methodology that contributes to the academic and CTE knowledge of the student.
- E. Provide research and training opportunities that help teachers develop appropriate and useful assessment tools and strategies.
- F. Provide training and guidance geared to help improve instructional delivery methodology that helps improve student performance and skill acquisition, particularly skills needed to work with and improve instruction for special populations.
- G. Assist teachers in accessing and utilizing CTE accountability data, student achievement data, and data from assessments.

Directions for using the Comment box—The box below expands to accommodate your comments. Enter in this box explanation for missing checks above, or notes regarding program strengths worth consideration during POS review. If you already have documents or files that do this more quickly, simply upload those documents or files (or links to them) with this application to the SmartSheet® folder. (Consult the Guide to Using the Oregon CTE Program of Study Application 2019, for more details.)

Please address these questions through your comments in Element 5 Comment Box below (or attach documentation in an appropriately identified and uploaded file/folder):
- Address any unchecked box above
- Briefly describe how PD will be planned and implemented, based on the needs of this POS
- Briefly describe any planned joint PD ventures for HS and CC teachers, as well as regional trainings

Element 5 Comment Box:
A. All boxes are checked.

B. Forest Grove School District provides professional development opportunities yearly to improve student engagement, collect and review student data, teacher performance improvement, as well as offering time for Professional Learning Communities. PLCs allow teachers of similar subject areas to discuss student performance, compare student data, and improve instructional practices for increased student success.

C. PCC offers yearly articulation meetings to provide feedback and evaluation of Mechatronic POS and PCC MT programs and how to improve and adjust to meet industry standards.

CTE Teacher: Submit complete electronic application materials to your CTE Regional Coordinator.
Regional Coordinator: Submit completed applications to ODE using the Submission Process on the last page of this application.

DEADLINE for submission: June 28, 2019
Certification of Assurance

<table>
<thead>
<tr>
<th>Name of CTE POS</th>
<th>Mechatronics</th>
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<tbody>
<tr>
<td>Name of Secondary School</td>
<td>Forest Grove High School</td>
</tr>
<tr>
<td>Name of Community College</td>
<td>Portland Community College</td>
</tr>
</tbody>
</table>

**SECONDARY LOCAL SUPPORT and CERTIFICATE OF ASSURANCE**

I have reviewed this program application document for clarity, completeness and adherence to program quality standards, and support its approval. I agree that the CTE program area requirements for secondary CTE programs, including appropriate CTE certification for teachers, the rules and regulations for Public Law 109-270, and the requirements contained in the Oregon State Plan for Career and Technical Education will be complied with in the operation of the CTE programs and services offered by the district or through contract between the district and other agencies, institutions, or individuals. I agree to furnish CTE program data as requested by the Oregon Department of Education.

<table>
<thead>
<tr>
<th>Secondary School District Administrator Signature</th>
<th>Date:</th>
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</thead>
<tbody>
<tr>
<td>Administrator's Name</td>
<td>Karen O'Neill</td>
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</tbody>
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**LOCAL SUPPORT and CERTIFICATE OF ASSURANCE**

The program advisory committee has been involved in the design and development of this program.

<table>
<thead>
<tr>
<th>Advisory Committee Signature</th>
<th>Date:</th>
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<tbody>
<tr>
<td>Advisory Committee Member’s name</td>
<td></td>
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**POST-SECONDARY LOCAL SUPPORT AND CERTIFICATE OF ASSURANCE**

This community college has been involved in the design and development of this CTE program of study and agrees to continue collaboration, meeting all 5 Core Elements, especially alignment and articulation and reliable and valid technical skills assessment.

<table>
<thead>
<tr>
<th>Community College Administrator’s Signature</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC Administrator’s Name</td>
<td>Matthew Altman</td>
</tr>
</tbody>
</table>

For Regional Coordinator Use Only

Recommended Status:
- [ ] RECOMMENDED FOR STATE APPROVAL (Perkins Eligible)
- [ ] DISAPPROVED (and returned for revision)

Regional Coordinator Signature
Select Regional Coordinator Name

Date: ____

For ODE Use Only

Approval Status:
- [ ] FINAL STATE APPROVAL (Perkins Eligible)

Education Specialist Signature
Select Specialist Name

Expiration Date: ____

Date: ____
Final Submission

Submission Process

New instructions this year--2019!

Instructions

**CTE Teacher:** Submit complete electronic application materials to your CTE Regional Coordinator.

**Regional Coordinator:** Submit all POS applications to ODE using the SmartSheet® process described below.

Regional Coordinators will submit complete electronic copies of the application materials through uploads to SmartSheets® by following this procedure:

1. [It is recommended that you create a folder on your computer using the name of the secondary school, the name of the Program of Study, whether it is a full or renewal application, and the year of submission, e.g., “BeavervilleHSAccountingFull2019.” This way, you will have an “original” in case you need that for some reason.]
   a. “1_BeavervilleHSAcctgFullPOSApp2019.doc” (Please include the Word® version of the application)
   b. “2_BeavervilleHSAcctg2019Assurances.pdf”
   c. “3_BeavervilleHS_LBCCAcctg2019Matrix.xls” (Please include all courses in the matrix, secondary and postsecondary)
   d. BeavertonHSAcctg2019RoadMap
   e. BeavertonHSAcctg2019StudSuprtSrvs
   f. LBCCAcctg2019StudSuprtSrvs
   g. LinnCountyLMI_Data (proof of high wage, high demand)
   h. List of advisory members, letters of support, etc., all files identified properly (*The numbering on the titles for the first three documents listed above helps the ODE specialist review the application, and helps ODE staff properly process the completed application.)*

2. Place all the teacher’s POS application materials in your folder, using consistent names for each file. For example:
   a. “1_BeavervilleHSAcctgFullPOSApp2019.doc” (Please include the Word® version of the application)
   b. “2_BeavervilleHSAcctg2019Assurances.pdf”
   c. “3_BeavervilleHS_LBCCAcctg2019Matrix.xls” (Please include all courses in the matrix, secondary and postsecondary)

3. Create a SmartSheet® record for the POS application and supporting materials.

4. Open the attachments dialogue box and upload all the files from your folder to the attachment box.

5. Each application needs to include a completed Assurance page with all signatures included on one form—please, no duplicate pages with partial signatures.
   - For Regional Programs of Study, however, each secondary institution will need to have its own application documents, which includes a copy of the Application, the school specific Matrix, and the school specific Assurance page. (Suggestion: for Regional applications, please secure Community College signatures first, then photocopy for each secondary partner and acquire secondary signatures.)

   - **DEADLINE for submission:** June 28, 2019
   - **Early Bird deadline (assures feedback before teachers leave for summer):** April 30, 2019

(You may delete this page before submitting this application.)

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