

## Program Information Report

**Engineering Technologist-Manufacturing (APETEC)****Associate in Applied Science Degree****Program Effective Term: Fall 2018**

Students in this program will demonstrate proficiency in the operation of various types of automated design/machine tool equipment. Competencies in design, programming, and materials and machine processing will be developed. In addition, students will hone skills in the manufacturing and troubleshooting of mechanical parts and the setup and operations of advanced manufacturing systems. Students will apply problem-solving skills learned in the program to create innovative solutions for real-world manufacturing challenges in preparation for entry-level Engineering Technologist or Technician positions.

**Program Admission Requirements:**

College level reading and writing levels of 6 and math level 4 are required.

<b>First Semester</b>		<b>(13 credits)</b>
MEC 100	Materials and Processes	3
MEC 101	3D Modelling and Blueprint Reading	2
MTT 102	Machining for the Technologies	2
NCT 101	Introduction to Computerized Machining (CNC) - I	2
NCT 110	Introduction to Computerized Machining (CNC) - II	2
ROB 101	Robotics I - I	2
<b>Second Semester</b>		<b>(16 credits)</b>
COM 101	Fundamentals of Speaking	3
MTH 178	General Trigonometry*	3
MTT 111	Machine Shop Theory and Practice	4
NCT 120	Introduction to 2D CAD CAM Programming and Applications	2
NCT 121	Manual Programming and NC Tool Operation	4
<b>Third Semester</b>		<b>(13 credits)</b>
ART 150	Monuments and Cultures	3
NCT 123	2D CAD CAM CNC Programming for Mills and Lathes	2
NCT 221	Advanced Manual Programming and NC Tool Operation	4
PHY 111	General Physics I	4
<b>Fourth Semester</b>		<b>(11 credits)</b>
ECO 110	Introduction to Economics	3
NCT 255	Probes, Macros and Conversational Programming for CNC	4
NCT 259	MasterCam 2D and 3D CAM CNC Programming for Mills	4
<b>Fifth Semester</b>		<b>(11 credits)</b>
ENG 107	Technical Writing Fundamentals	3
MEC 120	3D-Printing: Machine, Process and Innovation	4
NCT 269	4 and 5 Axis Machining for the CNC Vertical Mills	4

**Minimum Credits Required for the Program:****64****Notes:**

\*MTH 178 requires academic math level 5.

\*\*Students may elect to take optional courses to meet MTA. Please refer to the WCC MTA Transfer Agreement web page <http://www.wccnet.edu/services/transferresources/mta/> for more information.

**PROGRAM PROPOSAL FORM**

- Preliminary Approval** – Check here when using this form for preliminary approval of a program proposal, and respond to the items in general terms.
- Final Approval** – Check here when completing this form after the Vice President for Instruction has given preliminary approval to a program proposal. For final approval, complete information must be provided for each item.

<p><b>Program Name:</b></p> <p><b>Division and Department:</b></p> <p><b>Type of Award:</b></p> <p><b>Effective Term/Year:</b></p> <p><b>Initiator:</b></p>	<p><u>Engineering Technologist - Manufacturing</u></p> <p><u>ATP / AMTD</u></p> <p> <input type="checkbox"/> AA    <input type="checkbox"/> AS    <input checked="" type="checkbox"/> AAS  <input type="checkbox"/> Cert.    <input type="checkbox"/> Adv. Cert.    <input type="checkbox"/> Post-Assoc. Cert.    <input type="checkbox"/> Cert. of Comp.         </p> <p><u>Fall 2018</u></p> <p><u>Tom Penird and Bonnie Tew</u></p>	<p><b>Program Code:</b></p> <p><i>APETEC</i></p> <p><b>CIP Code:</b></p> <p><i>15.0405</i></p>
<p><b>Program Features</b>            Program's purpose and its goals.            Criteria for entry into the program, along with projected enrollment figures.            Connection to other WCC programs, as well as accrediting agencies or professional organizations.            Special features of the program.</p>	<p>This program prepares students for entry-level Engineering Technologist/Technician positions in manufacturing within sectors including automotive, computers, aerospace, medical devices, and more. Skills taught include the design, modification, troubleshooting, operation, integration and maintenance of automated mechanical equipment and component parts. Students receive hands-on laboratory training experience in control systems, mechanics, programming, robotics, systems development, design, materials, machining processes, and setup/operation of advanced manufacturing systems. The Engineering Technologist, or Technician, applies practical knowledge in engineering science/technology, production, mechanical operation of machines/tools, and mathematics. Technical skills are leveraged in areas of control systems, programming, robotics, systems development, design, materials and machine processes, as well as the setup and operation of advanced manufacturing systems.</p> <p>NOTE: Unique Program Features:</p> <ol style="list-style-type: none"> <li>1. The program will be compressed into 11 months to more quickly respond to industry needs for workers with these skills and to provide students with an opportunity to complete the degree, instead of pieces of it. Initially, it is expected a cohort of 15-20 individuals will successfully graduate with a two-year degree, every eleven months.</li> <li>2. A unique value added portion of the program is the contextualization of all General Education courses to specifically address the skills needed to be successful in an Engineering Technologist position.</li> </ol>	
<p><b>Need</b>            Need for the program with evidence to support the stated need.</p>	<p>Employers in multiple manufacturing sectors are experiencing a severe gap between the supply of skilled workers and the demand for workers on the Engineering Technologist/Technician level in organizations. Indeed.com currently lists over 18,000 job postings/openings around the United States in this field, and over 1,500 in Michigan. The Bureau of Labor Statistics anticipates an average projected growth (5 - 9%) between 2016 and 2026. The median salary in 2016 was \$29.96 hourly or \$62,330 annually. Michigan employment data predicts an 11% increase in jobs annually.</p>	

Program Outcomes/Assessment	Outcome	Assessment method
<p>State the knowledge to be gained, skills to be learned, and attitudes to be developed by students in the program.</p> <p>Include assessment methods that will be used to determine the effectiveness of the program.</p>	<ol style="list-style-type: none"> <li>1. Use multiple processes, materials and types of equipment in the creation of a capstone project.</li> <li>2. Develop systems to design, machine, assemble and create a capstone project</li> </ol>	<ol style="list-style-type: none"> <li>1. Capstone project/portfolio</li> <li>2. Capstone project/portfolio</li> </ol>

Curriculum	Semester 1			
<p>List the courses in the program as they should appear in the catalog. List minimum credits required. Include any notes that should appear below the course list.</p>	NCT 101	Introduction to Computerized Machining (CNC) - I	2	
	NCT 110	Introduction to Computerized Machining (CNC) - II	2	
	ROB 101	Robotics I - I	2	
	MTT 102	Machining for the Technologies	2	
	MEC 100	Materials and Processes	3	
	MEC 101	3D Modeling and Blueprint Reading	2	
	<b>Total</b>			<b>13</b>
	<b>Semester 2</b>			
	MTH 178	General Trigonometry *	3	
	COM 101	Fundamentals of Speaking	3	
	MTT 111	Machine Shop Theory and Practice	4	
	NCT 120	Introduction to 2D CAD CAM Programming and Applications	2	
	NCT 121	Manual Programming and NC Tool Operation	4	
	<b>Total</b>			<b>16</b>
	<b>Semester 3</b>			
	PHY 111	General Physics I	4	
	ART 150	Monuments and Cultures	3	
	NCT 123	2D CAD CAM CNC Programming for Mills and Lathes	2	
	NCT 221	Advanced Manual Programming and NC Tool Operation	4	
	<b>Total</b>			<b>13</b>
	<b>Semester 4</b>			
	ECO 110	Introduction to Economics	3	
	NCT 255	Probes, Macros and Conversational Programming for CNC	4	
	NCT 259	MasterCam 2D and 3D CAM CNC Programming for Mills	4	
	<b>Total</b>			<b>11</b>
	<b>Semester 5</b>			
ENG 107	Technical Writing I	3		
MEC 120	3D-Printing: Machine, Process and Innovation	4		
NCT 269	4 and 5 Axis Machining for the CNC Vertical Mills	4		
<b>Total</b>			<b>11</b>	
<b>Minimum Credits Required for the Program</b>			<b>64</b>	
* MTH 178 requires academic math level 5 or MTH 176 minimum grade "C"; may enroll concurrently				

Budget		START-UP COSTS	ONGOING COSTS
Specify program costs in the following areas, per academic year:	<b>Faculty – Full Time Lab-Tech</b>	\$50,000	\$50,000
	Training/Travel	0	0
	Materials/Resources	0	0
	Facilities/Equipment	0	0
	Other		
	<b>TOTALS:</b>	<b>\$50,000</b>	<b>\$50,000</b>
<b>Program Description for Catalog and Web site</b>	Students in this program will demonstrate proficiency in the operation of various types of automated design/machine tool equipment. Competencies in design, programming, and materials and machine processing will be developed. In addition, students will hone skills in the manufacturing and troubleshooting of mechanical parts and the setup and operation of advanced manufacturing systems. Students will apply problem-solving skills learned in the program to create innovative solutions for real-world manufacturing challenges in preparation for entry-level Engineering Technologist or Technician positions.		
<b>Program Information</b>	<p><b>Accreditation/Licensure</b> – None</p> <p><b>Advisors</b> - TBD</p> <p><b>Advisory Committee</b> - TBD</p> <p><b>Admission requirements</b> – College Entry Scores in Math (4), Reading (6), Writing (6)</p> <p><b>Articulation agreements</b> - None</p> <p><b>Continuing eligibility requirements</b> – Minimum grade of “C” in most program courses.</p>		

**Assessment plan:**

Program outcomes to be assessed	Assessment tool	When assessment will take place	Courses/other populations	Number students to be assessed
1. Use multiple processes, materials and types of equipment in the creation of a capstone project.	Capstone Project/Portfolio	Fall 2019	Students Completing Program	All
2. Develop systems to design, machine, assemble and create a capstone project.	Capstone Project/Portfolio	Fall 2019	Students Completing Program	All

**Scoring and analysis plan:**

1. Indicate how the above assessment(s) will be scored and evaluated (e.g. departmentally-developed rubric, external evaluation, other). Attach the rubric.

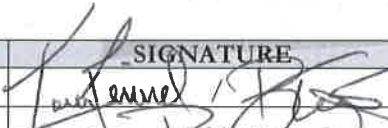
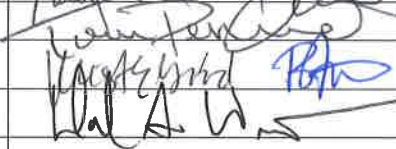
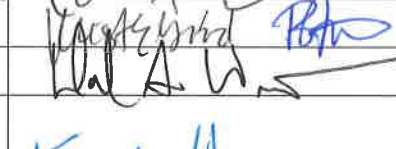
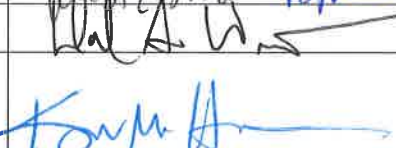

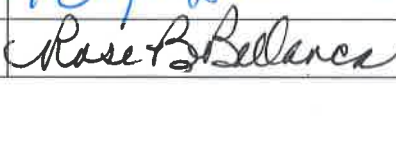
**Departmentally-developed rubric**

2. Indicate the standard of success to be used for this assessment.

**75% of the students will attain a minimum of 70% on the capstone project**

3. Indicate who will score and analyze the data.

**Department faculty**

REVIEWER	PRINT NAME	SIGNATURE	DATE
Faculty Preparer:	T. Penird & B. Tew		12/11/2017
Department Chair/Area Director	Tom Penird		12/11/2017
Dean	B. Tucker & K. Good		12/11/2017
Curriculum Committee Chair	David Wooten		1/8/18
Vice President for Instruction <input type="checkbox"/> Approved for Development <input type="checkbox"/> Final Approval	Kimberly Hurns		1/9/18
President	Rose Bellanca		1/21/18

*Approved by BOT 2/27/18*