

**ACADEMIC SENATE PROPOSAL TRACKING SHEET**  
(Document To Be Originated By the Academic Senate Secretary On Canary Color Paper)

Proposal # <u>15-34</u>	Title: <u>Machinist Technician AAS</u>
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(Proposal explanation, submitter and college dean signatures on attached program/degree or course revision form.)



All proposals **MUST** have their originating college faculty body (Ex. Arts & Sciences, Education and Nursing; Technical Sciences) approval and must be signed by the submitter and the college dean before being submitted to the Academic Senate Secretary.

1. Submit all proposals (using the appropriate Academic Senate program/degree and/or course revision forms or General Education Inclusion form) to the Academic Senate Secretary. **NOTE: Level 1 or Level 2 forms must be submitted concurrent with this proposal where applicable. For Education proposals, PEU approval must be received prior to forwarding the proposal to the Senate.**
2. The Academic Senate Secretary logs and numbers items and forwards them to the appropriate Academic Senate subcommittee(s): General Education (if applicable), or Curriculum. A transmittal e-mail will be sent to the Recording Secretary of the receiving committee, cc Provost's Administrative Assistant, by the Academic Senate Secretary. A digital copy of the proposal will be linked on the Academic Senate Proposal page by the Academic Senate Secretary.
3. The Academic Senate subcommittee(s) consider(s) the proposal. If approved, the proposal is returned to the Academic Senate Secretary for forwarding to the next committee. If a committee disapproves the proposal, the originator may request that the item be forwarded to the next body for consideration. The committee will provide written rationale to the originator, via the Academic Senate, when a proposal is disapproved and the proposal is returned to the originator. Upon completion of committee action, the proposal will be returned to the Academic Senate Secretary, and a transmittal e-mail sent by the Committee Recorder to the Senate Secretary, cc Provost's Administrative Assistant.
4. The Academic Senate considers the proposal and recommends approval or disapproval. If approved, the proposal is forwarded to the Provost for consideration. If the Academic Senate disapproves the proposal, the originator may request that the item be forwarded to the Full Faculty for consideration, utilizing the procedures set forth in the Senate Bylaws. The Academic Senate will provide written rationale to the originator when proposals are disapproved and the proposal is returned to the originator.
5. Approved proposals will be forwarded to the Provost. The Provost approves or disapproves the proposal. If approved, the proposal is then forwarded to the Chancellor. From this point forward, the Provost's Administrative Assistant will update the Proposal page on the website by contacting the webmaster.
7. The Chancellor approves or disapproves the proposal.
8. The proposal will then either be implemented or referred to MSU for further action. The tracking page on the Provost site will be updated as required.

Subcommittee and Academic Senate college representatives will notify their respective colleges' of the progress of submitted proposals or the proposal may be tracked via the web page -- <http://www.msun.edu/admin/provost/senate/proposals.htm>

Documentation and forms for the curriculum process is also available on the web page:  
<http://www.msun.edu/admin/provost/forms.htm>

\*\*\*\*(If a proposal is disapproved at any level, it is returned through the Academic Senate secretary and the Senate President, to the Dean of the submitting college who then notifies the originator.

See back for tracking form

	Date	Action Taken	Signature	Date	Comments/Reason for Disapproval	Sent to	Date	Transmittal E-mail sent
*Abstract received by Senate Secretary		Copy to Senate President. Forward to Provost.						
*Provost		<input type="checkbox"/> Abstract Approved <input type="checkbox"/> Disapproved						
Received by Senate Secretary	1/26/16	Tracking form initiated	D. Bradley			Gary Sucas	3/30/16	Inter office
General Education Committee (if applicable)	3/30/16	<input type="checkbox"/> Approved <input type="checkbox"/> Disapproved NA	Gary Sucas	3/30/16	forward to Curriculum Committee	Byron Ophus	3/28/16	Inter office
Curriculum Committee (if applicable)	4-28-16	<input checked="" type="checkbox"/> Approved <input type="checkbox"/> Disapproved	Byron Ophus	4-28-16	forward to Ac. Senate	Loree Senkoff	5/2/16	inter office
Academic Senate	5-19-16	<input checked="" type="checkbox"/> Approved <input type="checkbox"/> Disapproved	Harve Pitts		Forward to Provost Office	William Rugg	6/1/16	inter office
Full Faculty (if necessary)		<input type="checkbox"/> Approved <input type="checkbox"/> Disapproved						
Provost	6-13-16	<input checked="" type="checkbox"/> Approved <input type="checkbox"/> Disapproved	Wm. J. Rugg	6-13-16	Forward to chancellor	Ereg Kegel	6-13-16	Hand Delivered
Chancellor		<input checked="" type="checkbox"/> Approved <input type="checkbox"/> Disapproved	Angie O. Kohl	6-13-16		Bozeman OCHC		via email
MSU		<input type="checkbox"/> Approved <input type="checkbox"/> Disapproved						
BOR		<input type="checkbox"/> Approved <input type="checkbox"/> Disapproved						
NWCCU		<input type="checkbox"/> Approved <input type="checkbox"/> Disapproved						
Provost		Advise originating college and Academic Senate of status. Update Web page.						
Registrar		Catalog/Policy Manual Update						

**NOTE:** The secretary of the Academic Senate will update the Academic Senate Proposal web page from initial receipt until the proposal reaches the Provost. The Provost's Administrative Assistant will ensure that the current status of each proposal is maintained on the Academic Senate Proposal web page from that point forward. \*Abstract and pre-approval required for new programs ONLY.

June 2016

171-2803-LI0616

**ITEM**

**Machinist Technician AAS-MSUN requesting permission to offer degree**

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**THAT**

Montana State University Northern requests permission to offer the Machinist Technician AAS degree program to facilitate course sharing agreement with Flathead Community College (FVCC).

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**EXPLANATION**

This request is to duplicate the Machinist Technician Associate of Applied Science as implemented at FVCC. FVCC will provide online instruction of lecture portions of the program. MSU Northern will provide hands-on laboratory instruction in support of the online program in accordance with course sharing policies established by OCHE and the BOR as formalized in MOU documentation between MSUN and FVCC.

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**ATTACHMENTS**

Academic Proposal Request Form  
Curriculum Proposal Form  
MSU Northern program proposal Attachment #3 –A3  
FVCC program information Attachment #4 –A4

Montana Board of Regents  
ACADEMIC PROPOSAL REQUEST FORM

ITEM 171-2803-LI0616 Submission Month or Meeting: June 2016

Institution: MSU Northern CIP Code: 15.0613

Program/Center/Institute Title: Machinist Technician AAS

Includes (please specify below): Online Offering  Options \_\_\_\_\_

Please mark the appropriate type of request and submit with an Item Template and any additional materials, including those listed in parentheses following the type of request. For more information pertaining to the types of requests listed below, how to complete an item request, or additional forms please visit <http://mus.edu/che/arsa/preparingacademicproposals.asp>.

**A. Level I:**

**Campus Approvals**

- 1a. Placing a postsecondary educational program into moratorium (Program Termination and Moratorium Form)
- 1b. Withdrawing a postsecondary educational program from moratorium
- 2. Establishing, re-titling, terminating or revising a campus certificate of 29 credits or less
- 3. Establishing a B.A.S./A.A./A.S. area of study
- 4. Offering an existing postsecondary educational program via distance or online delivery

**OCHE Approvals**

- 5. Re-titling an existing postsecondary educational program
- 6. Terminating an existing postsecondary educational program (Program Termination and Moratorium Form)
- 7. Consolidating existing postsecondary educational programs (Curriculum Proposal Form)
- 8. Establishing a new minor where there is a major or an option in a major (Curriculum Proposal Form)
- 9. Revising a postsecondary educational program (Curriculum Proposal Form)
- 10. Establishing a temporary C.A.S. or A.A.S. degree program *Approval limited to 2 years*

Montana Board of Regents  
ACADEMIC PROPOSAL REQUEST FORM

**B. Level II:**

1. Establishing a new postsecondary educational program (Curriculum Proposal and Completed Intent to Plan Form)
2. Exceeding the 120 credit maximum for baccalaureate degrees *Exception to policy 301.11*
3. Forming, eliminating or consolidating an academic, administrative, or research unit (Curriculum or Center/Institute Proposal and Completed Intent to Plan Form, except when eliminating or consolidating)
4. Re-titling an academic, administrative, or research unit

**Specify Request:**

MSU Northern requests permission to offer degree programs to facilitate a course sharing agreement with Flathead Valley Community College (FVCC). This request is to duplicate the Machinist Technician Associate of Applied Science as implemented at FVCC. FVCC will provide online instruction of the lecture portions of the program. MSU Northern will provide hands-on laboratory instruction in support of the online program in accordance with course sharing policies established by OCHE and the BOR and as formalized in MOU documentation between MSUN and FVCC.

**Montana Board of Regents**  
**CURRICULUM PROPOSAL FORM**

**1. Overview**

- A. Provide a one paragraph description of the proposed program. Be specific about what degree, major, minor or option is sought.**

This proposal will establish the Machinist Technician program currently approved for Flathead Valley Community College. Based on course sharing policies developed as part of the RevUP grant, MSU Northern will participate as an assessment center/training center for FVCC courses by providing the hands-on laboratory portions of the degree program. Students will enroll with MSU Northern and will simultaneously be enrolled in distance delivered (D2L) courses instructed by FVCC. The laboratory portions will be scheduled in cooperation and coordination with the programs at FVCC (Attachment #4-A4) and offered in labs at Northern using instructors on the MSUN campus.

**2. Institutional and System Fit**

- A. What is the connection between the proposed program and existing programs at the institution?**

Currently MSU Northern offers machining instruction as part of Automotive and Diesel Technology AAS and BS programs as well as part of the Secondary Ed Industrial Technology degree. Some coursework in machining/ manufacturing and CNC operations are included in the current Design Drafting program at Northern.

- B. Will approval of the proposed program require changes to any existing programs at the institution? If so, please describe.**

None anticipated. Instructors will include lab experiences as part of existing course load or receive overload/adjunct contracts to offer the lab instruction.

- C. Describe what differentiates this program from other, closely related programs at the institution (if appropriate).**

N/A

- D. How does the proposed program serve to advance the strategic goals of the institution?**

This program reinforces the commitment of MSU Northern to offer technical education programs and to cooperate with colleagues throughout the system in offering instruction.

- E. Describe the relationship between the proposed program and any similar programs within the Montana University System. In cases of substantial duplication, explain the need for the proposed program at an additional institution. Describe any efforts that were made to collaborate with these similar programs; and if no efforts were made, explain why. If articulation or transfer agreements have been developed for the substantially duplicated programs, please include the agreement(s) as part of the documentation.**

As indicated, this is a course-sharing program established through the RevUP course sharing initiative. A copy of the MOU with FVCC is attached. (Attachment #4-A4)

**Montana Board of Regents**  
**CURRICULUM PROPOSAL FORM**

### 3. Program Details

- A. Provide a detailed description of the proposed curriculum. Where possible, present the information in the form intended to appear in the catalog or other publications. NOTE: In the case of two-year degree programs and certificates of applied science, the curriculum should include enough detail to determine if the characteristics set out in Regents' Policy 301.12 have been met.**

See program details. (Attachment #3-A3)

- B. Describe the planned implementation of the proposed program, including estimates of numbers of students at each stage.**

A test run using a single student was undertaken in Spring 2016 for two course-shared offerings. If approved, FVCC courses will be implemented as part of the existing Design Drafting degree programs and promotion of this innovative program will begin Fall 2016 with the goal of enrolling 5 students during the 2016/17 academic year. Capacity of the program is roughly 20 total students, spread across the two-year program.

### 4. Need

- A. To what specific need is the institution responding in developing the proposed program?**

FVCC and the RevUP grant has identified a statewide demand for trained machinists. This program seeks to expand the audience and ability to deliver instruction to that audience.

- B. How will students and any other affected constituencies be served by the proposed program?**

Graduates will be qualified to fill good-paying jobs in a growing career field.

- C. What is the anticipated demand for the program? How was this determined?**

Estimates from FVCC indicate a demand of over 10 students per year using this course-sharing model.

### 5. Process Leading to Submission

- A. Describe the process of developing and approving the proposed program. Indicate, where appropriate, involvement by faculty, students, community members, potential employers, accrediting agencies, etc.**

The program of course sharing was developed as part of the Two-Year leadership council using the RevUP grant as impetus. The program itself echoes the successful program offered by FVCC (Attachment #4-A4), and as implemented at Northern has been reviewed and approved by COTS faculty, the MSUN Academic Senate and by the MSUN administration.

Montana Board of Regents  
CURRICULUM PROPOSAL FORM

**6. Resources**

- A. Will additional faculty resources be required to implement this program? If yes, please describe the need and indicate the plan for meeting this need.**

Faculty currently on staff will provide support for this program with the availability for adjunct instructors from the local community as the program expands.

- B. Are other, additional resources required to ensure the success of the proposed program? If yes, please describe the need and indicate the plan for meeting this need.**

FVCC has provided substantial equipment and material support through the RevUP grant. No additional resources are required at this time.

**7. Assessment**

- A. How will the success of the program be measured?**

Success will be gauged based on continued progress of enrolled students with successful completion within three years.



DRAFT 9/14/15

Memorandum of Understanding

This Agreement is made between Flathead Valley Community College ("FVCC") and \_\_\_\_\_, (the Enrolling Institution or "EI"); collectively the "Parties." This Agreement shall be deemed executed and agreed to by both Parties as of the date it has been signed by both Parties.

RECITALS

WHEREAS, FVCC and the Enrolling Institution wish to establish a course sharing agreement between them, for the purpose of enabling students enrolled at the EI to take certain online courses through FVCC; and

WHEREAS, both FVCC and the EI are Montana 2-year colleges that are participating as consortium members in the Trade Adjustment Assistance Community College and Career Training Grant #TC-25034-13-60-A-30 ("RevUp"); and

WHEREAS, RevUp establishes a mechanism to offer students across the State of Montana the opportunity to take advanced manufacturing online courses developed by FVCC at their Enrolling Institution, which also functions as an "Assessment Center" by offering the lab portions of such online courses to students; and

WHEREAS, this Course Sharing Memorandum of Understanding is necessary to establish the responsibilities of the EI and FVCC and to apportion funding and student counts between the colleges;

NOW, THEREFORE it is mutually agreed as follows:

- 1. Term of MOU.** This MOU shall be effective January 1, 2016 and shall be in effect through the end of the RevUp grant.
- 2. Academic Calendar.** FVCC's academic calendar governs this MOU.
- 3. Academic Catalog.** The EI agrees to put the FVCC programs and associated courses listed on the attached Exhibit A in their academic catalog (except those courses not offered online), including FVCC's pre-requisites, co-requisites, course sequencing and placement guidelines (see Course Profiles, Exhibit B), and will secure any necessary approvals for such action, including approvals required by the Montana Board of Regents.

All of FVCC's programs require: one quantitative (math) course, one or two communication courses, an interactions course and one basic computer course. If one of the EI's students would like to substitute a different course than specified in Exhibit A, the student must secure approval for such substitution from the EI.

- 4. Course Schedule.** FVCC will offer the online courses set forth below in the spring 2016 semester (See Exhibit A for details), and will add additional sections of these courses, subject to instructor availability, should demand and enrollment exceed existing class capacity.

Industrial Maintenance: Tier II

**Machinist Technician: Tier II and Tier IV**

**Electronics Technician: Tier II and Tier IV**

Following the spring 2016 semester, FVCC will collaborate with the EI on scheduling, and will determine the sequence of courses and course schedule, including labs, by mutual agreement.

**5. Course Content.** The EI agrees to the course syllabi prepared by FVCC instructors for the lecture component of FVCC's online courses for the spring 2016 semester, copies of which will be provided to the instructors teaching the lab portion of FVCC's online courses. EI lab instructors will prepare a syllabus for the lab portion of these courses that is integrated into the lecture portion of the course and that is consistent with the course profiles attached as Exhibit B. The EI lab instructors will be added as students to the online lecture courses, which access shall serve as the primary source of course content and course progress for the instructors.

The lab schedule will be determined by the FVCC online instructor and the EI lab instructor with sufficient flexibility to ensure student success while achieving course outcomes. FVCC will provide its own lab course schedule to the EI to assist in developing the EI's lab schedule. The lab schedule at the EI must be available to students when the EI course schedule is published.

In addition, the EI agrees to ensure qualified instructors teach the same learning outcomes in the labs as FVCC, per the Course Profiles and Common Course Numbering Guidelines, and that such instructors will confer as needed with FVCC's instructors to assure student success in the online courses. Course profiles for all FVCC online courses are attached on Exhibit B.

After the spring 2016 semester, FVCC and the EI will collaborate on the curriculum and any changes thereto will be mutually agreed upon.

**6. Class Size.** Current enrollments in FVCC's online courses are displayed in the Course Schedule located on FVCC's web site.

**7. Learning Management System.** FVCC will provide students secure access to FVCC's learning management system – Eagle Online. Each student will have a user name and password to access the system. FVCC will provide technical support to the students throughout their enrollment in online FVCC courses.

**8. Class Rules and Policies.** Unless otherwise mutually agreed to by the Parties, FVCC's class rules and policies regarding attendance, performance and behavior will be the applicable standard for FVCC's online courses. Any student misconduct will be reported to the EI, who assumes responsibility for addressing such misconduct.

**9. Grades.** Grades for the lecture portion of FVCC's courses will be sent to the EI no later than 5:00 p.m. five (5) business days following the end of the semester. Any grade appeals will be made by a student first to the FVCC instructor and then through the EI's academic appeals process. The EI will award and hold all student transcripts for students taking any FVCC online courses.

**10. Tuition and Fees.** The EI will remit tuition compensation (based on the lowest credit hour cost amongst RevUp consortium member colleges) and FVCC's Distance Education (DE) fees to FVCC as of the 15<sup>th</sup> class day by no later than the 35<sup>th</sup> class day. FVCC will determine the tuition amount each year and

will convey this information to the EI prior to the beginning of the fall semester. FVCC's current DE fees are posted in its academic catalog and on its website. Any other fees the EI may charge its students are kept by the EI.

FVCC student withdrawal dates will govern with respect to refunds, and in the event of a withdrawal, the EI will coordinate any such refunds with FVCC according to the EI's established practices.

**11. Student Enrollment Full Time Equivalency.** The EI is entitled to maintain and report all student FTEs for those students affected by this course sharing MOU.

**12. Advising.** All student advising will be the responsibility of the EI. The EI will include information for its students about FVCC's online advanced manufacturing courses as part of its student advising.

**13. Registration.** The EI will be responsible for student registration. The EI shall provide FVCC's Registrar and Instructional Technology Specialist a list of EI students enrolling in FVCC online courses in an Excel spreadsheet (including student contact information), plus the fully executed Student Information and Consent Agreement (Exhibit C), no less than five (5) days prior to the start of class.

**14. Financial Aid.** The EI is responsible for student financial aid. The EI will allow FVCC's online courses to be included in a student's course load for financial aid purposes.

**15. Family Educational Rights and Privacy Act (FERPA).** The Parties agree to abide by the provisions of FERPA. Students affected by this Course Sharing MOU will be required by the EI to sign the Student Information and Consent Agreement attached as Exhibit C, and an executed copy of the consent agreement will be provided to FVCC prior to the start of the class for which the student is registered. FVCC and the EI agree that they shall only communicate about matters directly related to students only through FERPA-compliant means, such as the use of encrypted email that is password protected.

**16. Termination of MOU.** Either party may terminate this MOU, with or without cause, with 30 days' prior written notice delivered to the non-terminating college's CEO.

**17. Indemnification.** The EI, on behalf of itself, its directors, trustees, partners, employees, affiliates, agents, guests, and each of their agents, affiliates, successors and assigns, hereby releases and shall defend FVCC and each of its officers, agents, employees, assigns and successors in interest from and against, any and all liability, damages, losses, claims, demands, actions, causes of action, costs (including attorney's fees and expenses), or any of them, past, present or future, known or unknown, arising out of or in connection with this MOU, and shall indemnify and hold FVCC harmless to the extent allowed by law.

FVCC, on behalf of itself, its directors, trustees, partners, employees, affiliates, agents, guests, and each of their agents, affiliates, successors and assigns, hereby releases and shall defend the EI and each of its officers, agents, employees, assigns and successors in interest from and against, any and all liability, damages, losses, claims, demands, actions, causes of action, costs (including attorney's fees and expenses), or any of them, past, present or future, known or unknown, arising out of or in connection with this MOU, and shall indemnify and hold the EI harmless to the extent allowed by law.

**18. Entire Agreement.** This Agreement contains the entire agreement and understanding between the Parties regarding course sharing of FVCC online advanced manufacturing courses, and merges and supersedes all prior representations and discussions pertaining to the subject matter herein.

**19. Amendment.** Any changes, exceptions, or different terms and conditions shall be only by written amendments to this Agreement, mutually agreed to and executed by the Parties.

**20. Severability.** The invalidity or unenforceability of any provisions of this course sharing MOU shall not affect the validity or enforceability of any other provision of this MOU, which shall remain in full force and effect.

**21. Interpretation and Jurisdiction.** This Agreement shall be interpreted, governed, and construed under the laws of the State of Montana.

**22. Binding Authority.** The person signing this Agreement represents that he or she is duly authorized to execute this Agreement on behalf of the Party for whom he or she signs, and to fully bind such Party to this Agreement.

Flathead Valley Community College:

By: \_\_\_\_\_

Date: \_\_\_\_\_

Jane A. Karas, Ph.D., President

\_\_\_\_\_, Enrolling Institution:

By: \_\_\_\_\_

Date: \_\_\_\_\_

Name and Title

## EXHIBIT A

### FVCC ONLINE ADVANCED MANUFACTURING PROGRAMS

*{Italicized courses are not offered online}*

#### Electronics Technician, CT, CAS, AAS

##### Fall Semester (Tier I)

<u>Course#</u>	<u>Title</u>	<u>Credits</u>
<i>CAPP 106*</i>	<i>Short Courses: Computer Applications</i>	1
or		
CAPP 114	Short Courses: MS Word	1
or		
CAPP 116	Short Courses: MS Excel	1
ECP 104	Workplace Safety	1
ELCT 100	Introduction to Electricity	3
ELCT 110	Basic Electricity I	5
ELCT 137	Electrical Drafting	2
M 114*	Extended Technical Mathematics	3
MCH 101	Intro to Manufacturing Processes	1
	<b>Semester Total</b>	<b>16</b>

*\*Indicates prerequisite and/or corequisite required; check course description.*

##### Spring Semester (Tier II)

<u>Course#</u>	<u>Title</u>	<u>Credits</u>
BMGT 205C	Professional Business Communication	
or		
<i>COMX 115C</i>	<i>Intro. to Interpersonal Communications</i>	3
ELCT 102*	Electrical Fundamentals II	4
ELCT 111	Electric Meters and Motors	3
ETEC 130	Panel Wiring and Soldering	2
PHSX 110*	Applied Physics	4
	<b>Semester Total</b>	<b>16</b>
	<b>CAS Total Credits</b>	<b>32</b>

*\*Indicates prerequisite and/or corequisite required; check course description.*

**Fall Semester (Tier III)**

<u>Course#</u>	<u>Title</u>	<u>Credits</u>
ELCT 210*	Advanced Current Theory	5
ELCT 250	Programmable Logic Controllers	4
ETEC 245*	Digital Electronics	4
ETEC 250*	Solid State Electronics I	4
<b>Semester Total</b>		<b>17</b>

*\*Indicates prerequisite and/or corequisite required; check course description.*

**Spring Semester (Tier IV)**

<u>Course#</u>	<u>Title</u>	<u>Credits</u>
BMGT 205C*	Professional Business Communication	
or		
COMX 115C	Intro to Interpersonal Communication	3
ELCT 211*	AC Measurements	3
ETEC 280*	Advanced Electronics	4
ETEC 285*	Adv. Programmable Controllers	4
ETEC 299*	Capstone: Electronics	3
<b>Semester Total</b>		<b>17</b>
<b>AAS Degree Total Credits</b>		<b>66</b>

*\*Indicates prerequisite and/or corequisite required; check course description.*

**Industrial Maintenance, CT****Fall Semester (Tier I)**

<u>Course#</u>	<u>Title</u>	<u>Credits</u>
ECP 104	Workplace Safety	1
ELCT 100	Introduction to Electricity	3
M 111*	Technical Mathematics	3
MCH 101	Intro. to Manufacturing Processes	1
MCH 120	Blueprint Reading & Int. Mach.	3
MCH 129	Machine Quality Control and Precision	
	Measurements	3
MCH 132*	Introduction to Engine Lathes	4
<b>Semester Total</b>		<b>18</b>

*\*Indicates prerequisite and/or corequisite required; check course description.*

**Spring Semester (Tier II)**

<u>Course#</u>	<u>Title</u>	<u>Credits</u>
BMGT 205C	Professional Business Communication	
or		
COMX 115C	<i>Intro to Interpersonal Communication</i>	3
CAPP 106*	<i>Short Courses: Computer Applications</i>	
or		
CAPP 114	Short Courses: MS Word	
or		
CAPP 116	Short Courses: MS Excel	1
CSTN 125	Basic Cabinetry and Furniture Making	3
ELCT 111	Electric Meters and Motors	3
MCH 102	Intro to Manufacturing Materials	2
WLDG 111*	Welding Theory I Practical	4
	<b>Semester Total</b>	<b>16</b>
	<b>CAS Total Credits</b>	<b>34</b>

**Industrial Machine Technology, AAS, CAS, CT****Fall Semester (Tier I)**

<u>Course#</u>	<u>Title</u>	<u>Credits</u>
ECP 104	Workplace Safety	1
M 111*	Technical Mathematics	3
MCH 101	Intro to Manufacturing Processes	1
MCH 120	Blueprint Reading & Int. Mach.	3
MCH 129	Machine Quality Control and Precision Measurements	3
MCH 132	Introduction to Engine Lathes	4
MCH 134	Introduction to Mills	4
	<b>Semester Total</b>	<b>19</b>

*\*Indicates prerequisite and/or corequisite required; check course description.*

**Spring Semester (Tier II)**

<u>Course#</u>	<u>Title</u>	<u>Credits</u>
BMGT 205C	Professional Business Communication	
or		
COMX 115C	<i>Intro to Interpersonal Communication</i>	3
DDSN 135	Solidworks	2

MCH 102	Intro. to Manufacturing Materials	2
MCH 122	Introduction to CAM	3
MCH 125*	Intro to CNC Lathe Operations	3
MCH 127*	Intro to CNC Mill Operations	3
MFGT 115	Machine Shop Fundamentals	2
	<b>Semester Total</b>	<b>18</b>

**CAS Total Credits 37**

**Fall Semester (Tier III)**

<u>Course#</u>	<u>Title</u>	<u>Credits</u>
MCH 220*	Geometric Dimensioning and Tolerancing	3
MCH 221*	Advanced Manual Mill	3
MCH 222*	Advanced CNC Mill Operations	3
MCH 225	Machinery's Handbook	3
MCH 226*	Advanced CAD/CAM	4
	<b>Semester Total</b>	<b>16</b>

*\*Indicates prerequisite and/or corequisite required; check course description.*

**Spring Semester (Tier IV)**

<u>Course#</u>	<u>Title</u>	<u>Credits</u>
BMGT 205C*	Professional Business Communication	
	or	
COMX 115C	Intro to Interpersonal Communication	3
MCH 227*	Swiss CNC and Mill-Turn Systems	4
MCH 223*	Advanced Manual Lathe	3
MCH 224*	Advanced CNC Lathe Operations	3
MCH 299*	Capstone: Machinist	3
	<b>Semester Total</b>	<b>16</b>

**AAS Degree Total Credits 69**

*\*Indicates prerequisite and/or corequisite required; check course description.*

**Note:** Although M111 and M114 are offered fully online, students are required to schedule a 1 hour conference with their instructor each week.



**EXHIBIT B: COURSE PROFILES**

<b>Proposed Course Splits</b>			
<b>ELCT</b>	<b>100</b>	<b>Introduction to Electricity</b>	<b>ELCT 107 – Lecture Only</b>
			<b>ELCT 108 – Lab Only</b>
<b>ELCT</b>	<b>110</b>	<b>Basic Electricity I</b>	<b>ELCT 112 – Lecture Only</b>
			<b>ELCT 113 – Lab Only</b>
<b>ELCT</b>	<b>137</b>	<b>Electrical Drafting</b>	<b>ELCT 135 – Lecture Only</b>
			<b>ELCT 136 – Lab Only</b>
<b>ELCT</b>	<b>210</b>	<b>Advanced Current Theory</b>	<b>ELCT 208 – Lecture Only</b>
			<b>ELCT 209 – Lab Only</b>
<b>ELCT</b>	<b>250</b>	<b>Programmable Logic Controllers</b>	<b>ELCT 248 – Lecture Only</b>
			<b>ELCT 249 – Lab Only</b>
<b>ETEC</b>	<b>245</b>	<b>Digital Electronics</b>	<b>ETEC 243 – Lecture Only</b>
			<b>ETEC 244 – Lab Only</b>
<b>ETEC</b>	<b>250</b>	<b>Solid State Electronics</b>	<b>ETEC 248 – Lecture Only</b>
			<b>ETEC 249 – Lab Only</b>
<b>MCH</b>	<b>101</b>	<b>Introduction to Manufacturing Processes</b>	<b>MCH 105 – Lecture Only</b>
			<b>MCH 106 – Lab Only</b>
<b>MCH</b>	<b>120</b>	<b>Blueprint Reading and Interpretations for Machining</b>	<b>MCH 118 – Lecture Only</b>
			<b>MCH 119 – Lab Only</b>
<b>MCH</b>	<b>129</b>	<b>Machine Quality Control and Precision Measurements</b>	<b>MCH 126 – Lecture Only</b>
			<b>MCH 128 – Lab Only</b>
<b>MCH</b>	<b>132</b>	<b>Introduction to Engine Lathes</b>	<b>MCH 131 – Lecture Only</b>
			<b>MCH 133 – Lab Only</b>
<b>MCH</b>	<b>134</b>	<b>Introduction to Mills</b>	<b>MCH 135 – Lecture Only</b>
			<b>MCH 138 – Lab Only</b>
<b>MCH</b>	<b>221</b>	<b>Advanced Manual Mill</b>	<b>MCH 216 – Lecture Only</b>
			<b>MCH 217 – Lab Only</b>
<b>MCH</b>	<b>222</b>	<b>Advanced CNC Mill Operations</b>	<b>MCH 218 – Lecture Only</b>
			<b>MCH 219 – Lab Only</b>
<b>MCH</b>	<b>226</b>	<b>Advanced CAD-CAM</b>	<b>MCH 228 – Lecture Only</b>
			<b>MCH 229 – Lab Only</b>

## EXHIBIT C

### STUDENT INFORMATION AND CONSENT AGREEMENT

For students enrolling in courses offered through the RevUp Consortium

\*To be posted on the Enrolling Institution's website with requirement that student read and execute prior to registration in FVCC online courses.

**1. Course Information.** Insert name of Enrolling Institution entered into a Course Sharing Memorandum of Understanding with Flathead Valley Community College (FVCC) which will expand your opportunity to select and access high-quality online courses from FVCC. Even though the online lecture courses are taught by FVCC faculty or instructors, credits earned count toward your degree/program here, your financial aid will not be affected, and you will not need to transfer credits. If there is a lab portion associated with the course you choose, it will be taught by our faculty or instructors on this campus. If you elect to register for one of these courses, you must be aware of the following information and agree to the policies that govern the course delivery.

**2. Registration.** Courses offered through FVCC will be listed in our academic catalog. You may register for the course through our usual registration process, paying all tuition and fees in the process. Since you will be enrolling as our student, you are responsible for adhering to the established policies and procedures found in our catalog and student handbook, including the refund policy. In addition, you are responsible for adhering to established academic policies and procedures of FVCC when enrolled in an FVCC online course.

Please note: Special discounts and tuition waivers may not apply to this course. Also, registration and enrollment deadlines at FVCC may differ from ours.

**3. Delivery.** FVCC is accredited by the Northwest Commission on Colleges and Universities. FVCC's course instructor will supply the syllabus via email or via a link in their learning management system. It is your responsibility to contact the course instructor and comply with the requirements and the schedule of the course. It is also your responsibility to comply with the academic policies of FVCC in areas such as academic integrity, course performance, and behavioral standards. Evaluation of your performance and computation of the grade in the lecture portion of your course is the responsibility of the instructor at FVCC. Any dispute regarding process or content of that evaluation is subject to the review policies of FVCC.

This course will be completed online and there will be no in-person meeting requirements for the lecture component of the course; however, some courses may require occasional conference calls between the student and instructor and the course may contain a lab component which you will take at Insert name of Enrolling Institution. The online instructor may require a proctored exam and will give you guidelines to follow. Course materials may be provided through FVCC's learning management system which may or may not be the same as ours. The course instructor or a representative from FVCC will contact you with information regarding how to enter its learning management system. It is your responsibility to remember the unique username and password for this course. Keep a record of this information and who to contact at FVCC in case there is an issue.

**4. Start/End Dates.** It is your responsibility to review the course syllabus and know when the course begins and ends. These dates may differ from a majority of the courses offered by our institution.

**5. Financial Aid.** If you are eligible for federal financial aid programs, this course will not affect your eligibility. Even though the online lecture instructor does not work for our institution, this course has been approved by the appropriate academic department at Insert name of Enrolling Institution.

**6. Records.** Data from your academic record at Insert name of Enrolling Institution will be shared with appropriate persons from FVCC including, but not limited to, name, address, phone number, email address, and student ID. This data will be used by the online course instructor to help maintain a record of your performance on the assignments and activities of the course. Furthermore, the online course instructor and the lab instructor at this college will confer about your progress in the course, in order to assure your success in the course.

**7. Course Grade.** The online course instructor will submit the final grade earned in the online lecture portion of the course to the Insert name of Enrolling Institution registrar. The grade will be posted on your Insert name of Enrolling Institution transcript and used in the calculation of your GPA. Grade appeals for this course will be addressed to the online course instructor first and then to the Insert name of Enrolling Institution through its academic appeals process. Please note that the course grade used by the instructor may be translated to fit Insert name of Enrolling Institution's grading system.

#### **Agreement**

By registering for an FVCC online course, you have chosen to agree and accept the information provided above and to consent to the sharing of data and information as described above.

\_\_\_\_\_  
Student Name

\_\_\_\_\_  
Date



## COURSE REVISION FORM

NEW X DROPPED \_\_\_\_\_ MAJOR REVISION \_\_\_\_\_ FOR INFORMATION ONLY \_\_\_\_\_

College COTS Program Area Advanced Manufacturing Date \_\_\_\_\_  
Submitter Steve Dem Dean [Signature] Date 1/29/16  
Signature (indicates "college" level approval)

Please provide a brief explanation & rationale for the proposed revision(s): As a part of the course-sharing arrangement with FVCC this is a new course for the Machinist Technician AAS degree.

Please provide the following information:

College: COTS  
Program Area: Advanced Manufacturing  
Date:  
Course Prefix & No.: ECP 104  
Course Title: Workplace Safety  
Credits: 1  
Required by: Machinist Technician AAS  
Electronics Technician AAS

Selective in:  
Elective in:  
General Education:

Lecture:  
Lecture/Lab: X  
Gradable Lab:  
Contact hours lecture: .5  
Contact hours lab: 1

**Current Catalog Description (include all prerequisites):**

**Proposed or New Catalog Description (include all prerequisites):**

This course incorporates the Related Instruction requirement for Interactions into the study of policies, compliance, enforcement, and reporting of work site safety issues. In addition, the American Red Cross Standards for First Aid and CPR training are presented to provide the skills necessary to efficiently respond to workplace emergencies. Coursework will focus on personal ability to act and interact ethically and effectively in both self-practice and co-worker enforcement of safety policies. The ethical responsibility to report safety violations and means of coping with accidents that involve the death of a team member or mass casualties within a workplace will also be studied. Students will employ hands-on practices to demonstrate skills in first aid and CPR. Real life scenarios will be presented to enable students in gaining an understanding of one's self and co-workers in relationship to responding, treating, and coping with workplace safety practices and medical emergencies.

**Course Outcome Objectives:**

**Upon successful completion of this course, the student should be able to:**

- Recognize one's personal strength and weakness in relationship to workplace safety and emergency care.
- Set goals and work in a self-directed manner to ensure a safe and efficient physical workplace.
- Demonstrate responsibility/accountability for personal actions/thoughts/emotions in responding to a work site emergency.
- Collaborate effectively with others in providing support medical treatment of mass casualties, including nature of injuries, treatment, and priority of evacuation.
- Demonstrate the interpersonal skills necessary to tactfully correct workplace safety violations by co-workers.
- Assess the moral issues and principles involved in reporting work site safety violations.
- Recognize that conflict is natural in the stages of grief associated to co-workers experiencing a death related to a workplace accident and demonstrate methods of successful conflict management.
- Recognize and then act using the skills needed in a situation requiring first aid and/or CPR.

**Additional instructional resources needed (including library materials, special equipment, and facilities). Please note: approval does not indicate support for new faculty or additional resources.**

Updated 09/29/05

## COURSE REVISION FORM

NEW X DROPPED \_\_\_\_\_ MAJOR REVISION \_\_\_\_\_ FOR INFORMATION ONLY \_\_\_\_\_

College COTS Program Area Advanced Manufacturing Date \_\_\_\_\_

Submitter Steve Don Signature  
Dean [Signature] Signature (indicates "college" level approval) Date 1/29/12

Please provide a brief explanation & rationale for the proposed revision(s): As a part of the course-sharing arrangement with FVCC this is a new course for the Machinist Technician AAS degree.

Please provide the following information:

College: COTS

Program Area: Advanced Manufacturing

Date:

Course Prefix & No.: MCH 101x

Course Title: Intro to Manufacturing Processes

Credits: .5

Required by: Machinist Technician AAS

Selective in:

Elective in:

General Education:

Lecture:

Lecture/Lab: X

Gradable Lab:

Contact hours lecture: .5

Contact hours lab:

**Current Catalog Description (include all prerequisites):**

**Proposed or New Catalog Description (include all prerequisites):**

This course is designed to provide the student a learning experience with the basic tools, equipment, and operations of manufacturing industries. The goal is for the student to understand the relationship among a manufacturing need, a design, the materials and processes used, as well as the tools and equipment necessary to manufacture a product. Corequisites: MCH 101y

**Course Outcome Objectives:**

Upon successful completion of this course, the student should be able to:

- Use tools and equipment to form and shape various materials in a manufacturing laboratory environment;

- Discuss processes necessary to cast and mold materials in a manufacturing laboratory environment;
- Use tools and equipment to machine various materials;
- Safely operate basic machinery and equipment.

**Additional instructional resources needed (including library materials, special equipment, and facilities). Please note: approval does not indicate support for new faculty or additional resources.**

Updated 09/29/05



## COURSE REVISION FORM

NEW X DROPPED \_\_\_\_\_ MAJOR REVISION \_\_\_\_\_ FOR INFORMATION ONLY \_\_\_\_\_

College COTS Program Area Advanced Manufacturing Date \_\_\_\_\_

Submitter Steve Den Dean [Signature] Date 1/29/10  
Signature Signature (indicates "college" level approval)

Please provide a brief explanation & rationale for the proposed revision(s): As a part of the course-sharing arrangement with FVCC this is a new course for the Machinist Technician AAS degree.

Please provide the following information:

College: COTS

Program Area: Advanced Manufacturing

Date:

Course Prefix & No.: MCH 101y

Course Title: Intro to Manufacturing Processes Lab

Credits: .5

Required by: Machinist Technician AAS

Selective in:

Elective in:

General Education:

Lecture:

Lecture/Lab: X

Gradable Lab:

Contact hours lecture:

Contact hours lab: 1

**Current Catalog Description (include all prerequisites):**

**Proposed or New Catalog Description (include all prerequisites):**

This course is designed to provide the student a learning experience with the basic tools, equipment, and operations of manufacturing industries. The goal is for the student to understand the relationship among a manufacturing need, a design, the materials and processes used, as well as the tools and equipment necessary to manufacture a product. Course Fee: \$45. Corequisites: MCH 101y

**Course Outcome Objectives:**

Upon successful completion of this course, the student should be able to:

- Use tools and equipment to form and shape various materials in a manufacturing laboratory environment;

- Discuss processes necessary to cast and mold materials in a manufacturing laboratory environment;
- Use tools and equipment to machine various materials;
- Safely operate basic machinery and equipment.

**Additional instructional resources needed (including library materials, special equipment, and facilities). Please note: approval does not indicate support for new faculty or additional resources.**

Updated 09/29/05

## COURSE REVISION FORM

NEW X DROPPED \_\_\_\_\_ MAJOR REVISION \_\_\_\_\_ FOR INFORMATION ONLY \_\_\_\_\_

College COTS Program Area Advanced Manufacturing Date \_\_\_\_\_  
Submitter Steve Dem Dean [Signature] Date 1/29/16  
Signature (Indicates "college" level approval)

Please provide a brief explanation & rationale for the proposed revision(s): As a part of the course-sharing arrangement with FVCC this is a new course for the Machinist Technician AAS degree.

Please provide the following information:

College: COTS  
Program Area: Advanced Manufacturing  
Date:  
Course Prefix & No.: MCH 120x  
Course Title: Blueprint Reading & Interpretation for Machining  
Credits: 1.5  
Required by: Machinist Technician AAS

Selective in:  
Elective in:  
General Education:

Lecture:  
Lecture/Lab: X  
Gradable Lab:  
Contact hours lecture: 1.5  
Contact hours lab:

**Current Catalog Description (include all prerequisites):**

**Proposed or New Catalog Description (include all prerequisites):**

This course introduces the fundamental concepts necessary to interpret drawings and produce sketches for machine tool applications as applied to Machine Tool Technology. Topics include: advanced sectioning, geometric dimensioning, geometric tolerance, and assembly drawings/sketching. Interpretation of specifications and determination of acceptable tolerance requirements to ensure quality control measures for design parts will also be stressed.  
Corequisites: MCH 120y

**Course Outcome Objectives:**

**Upon successful completion of this course, the student should be able to:**

Apply the blueprint reading and interpretations to the following learning objectives:

- identify lines and symbols used in blueprints

- distinguish between various views represented on typical manufacturing blueprints to include auxiliary views
- locate materials list and identify the material call-outs on lists of materials
- locate title blocks on various blueprint drawings
- read and interpret information on various manufacturing blueprint drawings
- Use sketching technique to record dimensions and shape of parts or assemblies in a manufacturing setting
- identify features contained on a blueprint in relation to actual work piece and identify features of the design part in relation to CNC production methods
- identify features of a sectional view in manufacturing blueprints
- identify and apply quality control procedures to ensure product integrity

**Additional instructional resources needed (including library materials, special equipment, and facilities). Please note: approval does not indicate support for new faculty or additional resources.**

Updated 09/29/05

## COURSE REVISION FORM

NEW X DROPPED \_\_\_\_\_ MAJOR REVISION \_\_\_\_\_ FOR INFORMATION ONLY \_\_\_\_\_

College COTS Program Area Advanced Manufacturing Date \_\_\_\_\_  
Submitter Steve Don Dean [Signature] Date 1/29/16  
Signature (indicates "college" level approval)

Please provide a brief explanation & rationale for the proposed revision(s): As a part of the course-sharing arrangement with FVCC this is a new course for the Machinist Technician AAS degree.

Please provide the following information:

**College:** COTS  
**Program Area:** Advanced Manufacturing  
**Date:**  
**Course Prefix & No.:** MCH 120y

**Course Title:** Blueprint Reading & Interpretation for Machining Lab  
**Credits:** 1.5

**Required by:** Machinist Technician AAS

**Selective in:**  
**Elective in:**  
**General Education:**

**Lecture:**  
**Lecture/Lab:** X  
**Gradable Lab:**  
**Contact hours lecture:**  
**Contact hours lab:** 3

**Current Catalog Description (include all prerequisites):**

**Proposed or New Catalog Description (include all prerequisites):**

This course introduces the fundamental concepts necessary to interpret drawings and produce sketches for machine tool applications as applied to Machine Tool Technology. Topics include: advanced sectioning, geometric dimensioning, geometric tolerance, and assembly drawings/sketching. Interpretation of specifications and determination of acceptable tolerance requirements to ensure quality control measures for design parts will also be stressed. Course Fee: \$15 Corequisites: MCH 120x

**Course Outcome Objectives:**

**Upon successful completion of this course, the student should be able to:**

Apply the blueprint reading and interpretations to the following learning objectives:

- o identify lines and symbols used in blueprints

- distinguish between various views represented on typical manufacturing blueprints to include auxiliary views
- locate materials list and identify the material call-outs on lists of materials
- locate title blocks on various blueprint drawings
- read and interpret information on various manufacturing blueprint drawings
- Use sketching technique to record dimensions and shape of parts or assemblies in a manufacturing setting
- identify features contained on a blueprint in relation to actual work piece and identify features of the design part in relation to CNC production methods
- identify features of a sectional view in manufacturing blueprints
- identify and apply quality control procedures to ensure product integrity

**Additional instructional resources needed (including library materials, special equipment, and facilities). Please note: approval does not indicate support for new faculty or additional resources.**

Updated 09/29/05

## COURSE REVISION FORM

NEW X DROPPED \_\_\_\_\_ MAJOR REVISION \_\_\_\_\_ FOR INFORMATION ONLY \_\_\_\_\_

College COTS Program Area Advanced Manufacturing Date \_\_\_\_\_

Submitter Steven Don Dean [Signature] Date 1/29/16  
Signature Signature (indicates "college" level approval)

Please provide a brief explanation & rationale for the proposed revision(s): As a part of the course-sharing arrangement with FVCC this is a new course for the Machinist Technician AAS degree.

Please provide the following information:

College: COTS

Program Area: Advanced Manufacturing

Date:

Course Prefix & No.: MCH 129x

Course Title: Machine Quality Control and Precision Measurements

Credits: 1.5

Required by: Machinist Technician AAS

Selective in:

Elective in:

General Education:

Lecture:

Lecture/Lab: X

Gradable Lab:

Contact hours lecture: 1.5

Contact hours lab:

**Current Catalog Description (include all prerequisites):**

**Proposed or New Catalog Description (include all prerequisites):**

Students will develop the knowledge and skills to prepare them to analyze and evaluate the processes and methodology required in an industrial production environment to determine if quality control standard are being met. Topics include: use of non-precision measuring tools, use of precision measuring tools, use of comparison gauges, and analysis of measurements in a CNC environment. Corequisites: MCH 129y

**Course Outcome Objectives:**

**Upon successful completion of this course, the student should be able to:**

Apply the following CNC concepts and functions employing the HAAS TM1 Mill:

- Demonstrate a knowledge and understanding of Precision Measurement and Quality Control Procedures.

- Accurately measure and record the outside diameters of a test piece with the Micrometer
- Accurately measure and record the outside diameters of a test piece with the Veneer Caliper
- Accurately measure and record the depth dimensions of a test piece with the Depth Micrometer
- Accurately index a part on the CNC Lathe and indicate the table and a vise on a CNC Milling Machine within .0001” with dial indicator
- Accurately index a part on the lathe and indicate the table and a vise on a CNC Milling Machine within .001” with the control console
- Define quality and the precision requirements associated with a CNC produced part
- Demonstrate quality assurance and quality management techniques.
- Describe a reporting and responsibility structure for production facility quality control
- Accurately measure the inside diameter of a test piece using inside micrometers and telescoping gages
- Accurately measure and identify threads, national coarse, national fine, acme and metric
- The student will be able to convert metric measurements to inch , and inch to metric

**Additional instructional resources needed (including library materials, special equipment, and facilities). Please note: approval does not indicate support for new faculty or additional resources.**

Updated 09/29/05



## COURSE REVISION FORM

NEW X DROPPED \_\_\_\_\_ MAJOR REVISION \_\_\_\_\_ FOR INFORMATION ONLY \_\_\_\_\_

College COTS Program Area Advanced Manufacturing Date \_\_\_\_\_

Submitter Steve Don Dean [Signature] Date 1/29/16  
Signature Signature (indicates "college" level approval)

Please provide a brief explanation & rationale for the proposed revision(s): As a part of the course-sharing arrangement with FVCC this is a new course for the Machinist Technician AAS degree.

Please provide the following information:

College: COTS  
Program Area: Advanced Manufacturing  
Date:  
Course Prefix & No.: MCH 129y

Course Title: Machine Quality Control and Precision Measurements Lab  
Credits: 1.5

Required by: Machinist Technician AAS

Selective in:  
Elective in:  
General Education:

Lecture:  
Lecture/Lab: X  
Gradable Lab:  
Contact hours lecture:  
Contact hours lab: 3

**Current Catalog Description (include all prerequisites):**

**Proposed or New Catalog Description (include all prerequisites):**

Students will develop the knowledge and skills to prepare them to analyze and evaluate the processes and methodology required in an industrial production environment to determine if quality control standard are being met. Topics include: use of non-precision measuring tools, use of precision measuring tools, use of comparison gauges, and analysis of measurements in a CNC environment. Course Fee: \$75 Corequisites: MCH 129x

**Course Outcome Objectives:**

- Upon successful completion of this course, the student should be able to:  
Apply the following CNC concepts and functions employing the HAAS TM1 Mill:
- Demonstrate a knowledge and understanding of Precision Measurement and Quality Control Procedures.

- Accurately measure and record the outside diameters of a test piece with the Micrometer
- Accurately measure and record the outside diameters of a test piece with the Veneer Caliper
- Accurately measure and record the depth dimensions of a test piece with the Depth Micrometer
- Accurately index a part on the CNC Lathe and indicate the table and a vise on a CNC Milling Machine within .0001” with dial indicator
- Accurately index a part on the lathe and indicate the table and a vise on a CNC Milling Machine within .001” with the control console
- Define quality and the precision requirements associated with a CNC produced part
- Demonstrate quality assurance and quality management techniques.
- Describe a reporting and responsibility structure for production facility quality control
- Accurately measure the inside diameter of a test piece using inside micrometers and telescoping gages
- Accurately measure and identify threads, national coarse, national fine, acme and metric
- The student will be able to convert metric measurements to inch , and inch to metric

**Additional instructional resources needed (including library materials, special equipment, and facilities). Please note: approval does not indicate support for new faculty or additional resources.**

Updated 09/29/05

## COURSE REVISION FORM

NEW X DROPPED \_\_\_\_\_ MAJOR REVISION \_\_\_\_\_ FOR INFORMATION ONLY \_\_\_\_\_

College COTS Program Area Advanced Manufacturing Date \_\_\_\_\_  
Submitter Steven Don Dean [Signature] Date 1/29/16  
Signature Signature (indicates "college" level approval)

Please provide a brief explanation & rationale for the proposed revision(s): As a part of the course-sharing arrangement with FVCC this is a new course for the Machinist Technician AAS degree.

Please provide the following information:

College: COTS  
Program Area: Advanced Manufacturing  
Date:  
Course Prefix & No.: MCH 132x  
  
Course Title: Introduction to Engine Lathes  
Credits: 1  
  
Required by: Machinist Technician AAS

Selective in:  
Elective in:  
General Education:

Lecture:  
Lecture/Lab: X  
Gradable Lab:  
Contact hours lecture: 1  
Contact hours lab:

**Current Catalog Description (include all prerequisites):**

**Proposed or New Catalog Description (include all prerequisites):**

This course is the study of basic machine tool operations and forming processes. Topics include lathe work, drilling operations, tooling, and fixture work. Corequisites: MCH 120y, and MCH 120 & MCH 129 or Instructors Consent.

**Course Outcome Objectives:**

Upon successful completion of this course, the student should be able to:

- Properly set up and operate metal lathes
- Understand and demonstrate safety protocol associated with lathes and other equipment
- Correctly grind a lathe tool bit
- Complete projects utilizing all the machining and tooling techniques of lathes

- Demonstrate proper use and care of precision measuring equipment such as micrometers, calipers, etc.
- Make required projects utilizing facing, turning, boring, and parting-off procedures
- Identify basic thread systems and demonstrate how to make each on a metal lathe
- Demonstrate proper use and care of dial indicators
- Demonstrate grinding of turning, facing, boring, threading, and radius tool bits
- Set up and demonstrate proper use of a tool post grinder
- Demonstrate the set up and use of a steady rest

**Additional instructional resources needed (including library materials, special equipment, and facilities). Please note: approval does not indicate support for new faculty or additional resources.**

Updated 09/29/05

## COURSE REVISION FORM

NEW X DROPPED \_\_\_\_\_ MAJOR REVISION \_\_\_\_\_ FOR INFORMATION ONLY \_\_\_\_\_

College COTS Program Area Advanced Manufacturing Date \_\_\_\_\_  
Submitter Steven Don Dean [Signature] Date 1/29/16  
Signature Signature (indicates "college" level approval)

Please provide a brief explanation & rationale for the proposed revision(s): As a part of the course-sharing arrangement with FVCC this is a new course for the Machinist Technician AAS degree.

Please provide the following information:

College: COTS  
Program Area: Advanced Manufacturing  
Date:  
Course Prefix & No.: MCH 132y

Course Title: Introduction to Engine Lathes Lab  
Credits: 3

Required by: Machinist Technician AAS

Selective in:  
Elective in:  
General Education:

Lecture:  
Lecture/Lab: X  
Gradable Lab:  
Contact hours lecture:  
Contact hours lab: 6

Current Catalog Description (include all prerequisites):

Proposed or New Catalog Description (include all prerequisites):

This course is the study of basic machine tool operations and forming processes. Topics include lathe work, drilling operations, tooling, and fixture work. Course Fee: \$75 . Corequisites: MCH 120x, and MCH 120 & MCH 129 or Instructors Consent.

Course Outcome Objectives:

Upon successful completion of this course, the student should be able to:

- Properly set up and operate metal lathes
- Understand and demonstrate safety protocol associated with lathes and other equipment
- Correctly grind a lathe tool bit
- Complete projects utilizing all the machining and tooling techniques of lathes

- Demonstrate proper use and care of precision measuring equipment such as micrometers, calipers, etc.
- Make required projects utilizing facing, turning, boring, and parting-off procedures
- Identify basic thread systems and demonstrate how to make each on a metal lathe
- Demonstrate proper use and care of dial indicators
- Demonstrate grinding of turning, facing, boring, threading, and radius tool bits
- Set up and demonstrate proper use of a tool post grinder
- Demonstrate the set up and use of a steady rest

**Additional instructional resources needed (including library materials, special equipment, and facilities). Please note: approval does not indicate support for new faculty or additional resources.**

Updated 09/29/05

## COURSE REVISION FORM

NEW X DROPPED \_\_\_\_\_ MAJOR REVISION \_\_\_\_\_ FOR INFORMATION ONLY \_\_\_\_\_

College COTS Program Area Advanced Manufacturing Date \_\_\_\_\_  
Submitter Steve Don Dean [Signature] Date 1/29/16  
Signature Signature (indicates "college" level approval)

Please provide a brief explanation & rationale for the proposed revision(s): As a part of the course-sharing arrangement with FVCC this is a new course for the Machinist Technician AAS degree.

Please provide the following information:

College: COTS  
Program Area: Advanced Manufacturing  
Date:  
Course Prefix & No.: MCH 134x  
  
Course Title: Introduction to Mills  
Credits: 1  
  
Required by: Machinist Technician AAS

Selective in:  
Elective in:  
General Education:

Lecture:  
Lecture/Lab: X  
Gradable Lab:  
Contact hours lecture: 1  
Contact hours lab:

**Current Catalog Description (include all prerequisites):**

**Proposed or New Catalog Description (include all prerequisites):**

The student will perform advanced hands-on machine shop operations: set up and operation of manual milling machines, drill presses, band saws, grinders, and other equipment commonly found in manufacturing facilities. The student will use precision measuring tools and methods, utilize blueprints, and perform project process planning. Various types of steel and aluminum are used. Co-requisite: MCH 134y

**Course Outcome Objectives:**

**Upon successful completion of this course, the student should be able to:**

- Properly set up and operate horizontal and vertical mills, including use and care for all accessories
- Demonstrate the proper use of a digital read-out
- Demonstrate the basics of running a milling machine such as facing, slotting, slitting, boring, and fly cutting

- Identify and demonstrate the different styles of cutters that are used
- Describe and demonstrate correct safety procedures and maintenance of mills
- Describe and demonstrate use of precision instruments associated with mills
- Demonstrate correct use of the criterion boring head

**Additional instructional resources needed (including library materials, special equipment, and facilities). Please note: approval does not indicate support for new faculty or additional resources.**

Updated 09/29/05



## COURSE REVISION FORM

NEW X DROPPED \_\_\_\_\_ MAJOR REVISION \_\_\_\_\_ FOR INFORMATION ONLY \_\_\_\_\_

College COTS Program Area Advanced Manufacturing Date \_\_\_\_\_

Submitter Steve Don Dean [Signature] Date 2/29/12  
Signature Signature (indicates "college" level approval)

Please provide a brief explanation & rationale for the proposed revision(s): As a part of the course-sharing arrangement with FVCC this is a new course for the Machinist Technician AAS degree.

Please provide the following information:

College: COTS

Program Area: Advanced Manufacturing

Date:

Course Prefix & No.: MCH 134y

Course Title: Introduction to Mills Lab

Credits: 3

Required by: Machinist Technician AAS

Selective in:

Elective in:

General Education:

Lecture:

Lecture/Lab: X

Gradable Lab:

Contact hours lecture:

Contact hours lab: 6

**Current Catalog Description (include all prerequisites):**

**Proposed or New Catalog Description (include all prerequisites):**

The student will perform advanced hands-on machine shop operations: set up and operation of manual milling machines, drill presses, band saws, grinders, and other equipment commonly found in manufacturing facilities. The student will use precision measuring tools and methods, utilize blueprints, and perform project process planning. Various types of steel and aluminum are used. Course Fee: \$75 Co-requisite: MCH 134x

**Course Outcome Objectives:**

**Upon successful completion of this course, the student should be able to:**

- Properly set up and operate horizontal and vertical mills, including use and care for all accessories
- Demonstrate the proper use of a digital read-out
- Demonstrate the basics of running a milling machine such as facing, slotting, slitting, boring, and fly cutting

- Identify and demonstrate the different styles of cutters that are used
- Describe and demonstrate correct safety procedures and maintenance of mills
- Describe and demonstrate use of precision instruments associated with mills
- Demonstrate correct use of the criterion boring head

**Additional instructional resources needed (including library materials, special equipment, and facilities). Please note: approval does not indicate support for new faculty or additional resources.**

Updated 09/29/05

## COURSE REVISION FORM

NEW X DROPPED \_\_\_\_\_ MAJOR REVISION \_\_\_\_\_ FOR INFORMATION ONLY \_\_\_\_\_

College COTS Program Area Advanced Manufacturing Date \_\_\_\_\_  
Submitter Steve Don Dean [Signature] Date 1/29/16  
Signature Signature (indicates "college" level approval)

Please provide a brief explanation & rationale for the proposed revision(s): As a part of the course-sharing arrangement with FVCC this is a new course for the Machinist Technician AAS degree.

Please provide the following information:

College: COTS  
Program Area: Advanced Manufacturing  
Date:  
Course Prefix & No.: DDSN 135x  
Course Title: Solidworks  
Credits: .5  
Required by: Machinist Technician AAS

Selective in:  
Elective in:  
General Education:

Lecture:  
Lecture/Lab: X  
Gradable Lab:  
Contact hours lecture: .5  
Contact hours lab:

**Current Catalog Description (include all prerequisites):**

**Proposed or New Catalog Description (include all prerequisites):**

This course presents the fundamental skills and concepts to build parametric model parts and assemblies and how to make simple drawings of those parts and assemblies. This course is designed around a process-based training approach emphasizing the processes and procedures necessary to complete a particular task. By utilizing case studies to illustrate these processes, the student learns the necessary commands, options, and menus in the context of completing a design task within SOLIDWORKS. An introduction to the transferability and compatibility of SOLIDWORKS, MASTERCAM, GIBSCAM, and Pro-Engineer software is provided. Co-requisite DDSN 135y.

**Course Outcome Objectives:**

**Upon successful completion of this course, the student should be able to:**

- Explain the fundamentals and interfaces of Solidworks
- Explain the design philosophy of Solidworks

- Create and modify parts in Solidworks
- Apply dimensions and relations
- Create datum features, apply feature duplication forms, and break down feature sequences
- Create drawings and generate cross sections
- Create assemblies
- Demonstrate an understanding of the transition and interface of related CAD/CAM programs including MASTERCAM, GIBSCAM, and PRO-ENGINEER

**Additional instructional resources needed (including library materials, special equipment, and facilities). Please note: approval does not indicate support for new faculty or additional resources.**

Updated 09/29/05

## COURSE REVISION FORM

NEW X DROPPED \_\_\_\_\_ MAJOR REVISION \_\_\_\_\_ FOR INFORMATION ONLY \_\_\_\_\_

College COTS Program Area Advanced Manufacturing Date \_\_\_\_\_

Submitter Steven Don Dean [Signature] Date 1/29/16  
Signature (indicates college-level approval)

Please provide a brief explanation & rationale for the proposed revision(s): As a part of the course-sharing arrangement with FVCC this is a new course for the Machinist Technician AAS degree.

Please provide the following information:

**College:** COTS

**Program Area:** Advanced Manufacturing

**Date:**

**Course Prefix & No.:** DDSN 135y

**Course Title:** Solidworks Lab

**Credits:** 1.5

**Required by:** Machinist Technician AAS

**Selective in:**

**Elective in:**

**General Education:**

**Lecture:**

**Lecture/Lab:** X

**Gradable Lab:**

**Contact hours lecture:**

**Contact hours lab:** 3

**Current Catalog Description (include all prerequisites):**

**Proposed or New Catalog Description (include all prerequisites):**

This course presents the fundamental skills and concepts to build parametric model parts and assemblies and how to make simple drawings of those parts and assemblies. This course is designed around a process-based training approach emphasizing the processes and procedures necessary to complete a particular task. By utilizing case studies to illustrate these processes, the student learns the necessary commands, options, and menus in the context of completing a design task within SOLIDWORKS. An introduction to the transferability and compatibility of SOLIDWORKS, MASTERCAM, GIBSCAM, and Pro-Engineer software is provided. Course Fee: \$25 Co-requisite: DDSN 135x

**Course Outcome Objectives:**

**Upon successful completion of this course, the student should be able to:**

- Explain the fundamentals and interfaces of Solidworks
- Explain the design philosophy of Solidworks

- Create and modify parts in Solidworks
- Apply dimensions and relations
- Create datum features, apply feature duplication forms, and break down feature sequences
- Create drawings and generate cross sections
- Create assemblies
- Demonstrate an understanding of the transition and interface of related CAD/CAM programs including MASTERCAM, GIBSCAM, and PRO-ENGINEER

**Additional instructional resources needed (including library materials, special equipment, and facilities). Please note: approval does not indicate support for new faculty or additional resources.**

Updated 09/29/05

## COURSE REVISION FORM

NEW X DROPPED \_\_\_\_\_ MAJOR REVISION \_\_\_\_\_ FOR INFORMATION ONLY \_\_\_\_\_

College COTS Program Area Advanced Manufacturing Date \_\_\_\_\_  
Submitter Steven Don Dean [Signature] Date 1/29/16  
Signature (indicates college level approval)

Please provide a brief explanation & rationale for the proposed revision(s): As a part of the course-sharing arrangement with FVCC this is a new course for the Machinist Technician AAS degree.

Please provide the following information:

**College:** COTS

**Program Area:** Advanced Manufacturing

**Date:**

**Course Prefix & No.:** MCH 102x

**Course Title:** Introduction to Manufacturing Materials

**Credits:** 1

**Required by:** Machinist Technician AAS

**Selective in:**

**Elective in:**

**General Education:**

**Lecture:**

**Lecture/Lab:** X

**Gradable Lab:**

**Contact hours lecture:** 1

**Contact hours lab:**

**Current Catalog Description (include all prerequisites):**

**Proposed or New Catalog Description (include all prerequisites):**

This is an introductory course in the study of materials used in the manufacturing industry. Topics include selection and identification of steels, selection and identification of nonferrous metals, mechanical behavior of various plastics, hardening, case hardening, tempering, annealing, normalizing, stress relieving, and the use of the Rockwell and Brinell hardness testers. Pre-requisite: ELCT 110. Co-requisite: M 114, ELCT 102y.

**Course Outcome Objectives:**

Upon successful completion of this course, the student should be able to:

- Describe the mechanical and chemical properties of materials used in the manufacturing industry for the production of engineered and designed components or systems.
- Describe the properties of steel alloys and the effects of those properties on machining operations.

- Describe the properties and characteristics of nonferrous metals as those apply to the manufacturing environment.
- Describe the characteristics of plastics that impact machinability.
- Understand material composition in order to select appropriate materials for various applications.
- Demonstrate the proper setup and use of machine shop instrumentation for the testing of material properties including, but not limited to, hardness testing.

**Additional instructional resources needed (including library materials, special equipment, and facilities). Please note: approval does not indicate support for new faculty or additional resources.**

Updated 09/29/05



## COURSE REVISION FORM

NEW X DROPPED \_\_\_\_\_ MAJOR REVISION \_\_\_\_\_ FOR INFORMATION ONLY \_\_\_\_\_

College COTS Program Area Advanced Manufacturing Date \_\_\_\_\_

Submitter Steven Dem Dean [Signature] Date 1/29/16  
Signature (indicates "college" level approval)

Please provide a brief explanation & rationale for the proposed revision(s): As a part of the course-sharing arrangement with FVCC this is a new course for the Machinist Technician AAS degree.

Please provide the following information:

**College:** COTS  
**Program Area:** Advanced Manufacturing  
**Date:**  
**Course Prefix & No.:** MCH 102y

**Course Title:** Introduction to Manufacturing Materials Lab  
**Credits:** 1

**Required by:** Machinist Technician AAS

**Selective in:**  
**Elective in:**  
**General Education:**

**Lecture:**  
**Lecture/Lab:** X  
**Gradable Lab:**  
**Contact hours lecture:**  
**Contact hours lab:** 2

**Current Catalog Description (include all prerequisites):**

**Proposed or New Catalog Description (include all prerequisites):**

This is an introductory course in the study of materials used in the manufacturing industry. Topics include selection and identification of steels, selection and identification of nonferrous metals, mechanical behavior of various plastics, hardening, case hardening, tempering, annealing, normalizing, stress relieving, and the use of the Rockwell and Brinell hardness testers. Course Fee: \$35. Pre-requisite: ELCT 110. Co-requisite: M 114, ELCT 102x

**Course Outcome Objectives:**

Upon successful completion of this course, the student should be able to:

- Describe the mechanical and chemical properties of materials used in the manufacturing industry for the production of engineered and designed components or systems.
- Describe the properties of steel alloys and the effects of those properties on machining operations.

- Describe the properties and characteristics of nonferrous metals as those apply to the manufacturing environment.
- Describe the characteristics of plastics that impact machinability.
- Understand material composition in order to select appropriate materials for various applications.
- Demonstrate the proper setup and use of machine shop instrumentation for the testing of material properties including, but not limited to, hardness testing.

**Additional instructional resources needed (including library materials, special equipment, and facilities). Please note: approval does not indicate support for new faculty or additional resources.**

Updated 09/29/05

## COURSE REVISION FORM

NEW X DROPPED \_\_\_\_\_ MAJOR REVISION \_\_\_\_\_ FOR INFORMATION ONLY \_\_\_\_\_

College COTS Program Area Advanced Manufacturing Date \_\_\_\_\_

Submitter Steve Don Dean [Signature] Date 1/29/16  
Signature Signature (indicates "college" level approval)

Please provide a brief explanation & rationale for the proposed revision(s): As a part of the course-sharing arrangement with FVCC this is a new course for the Machinist Technician AAS degree.

Please provide the following information:

College: COTS  
Program Area: Advanced Manufacturing  
Date:  
Course Prefix & No.: MCH 122  
  
Course Title: Introduction to CAM  
Credits: 3  
  
Required by: Machinist Technician AAS

Selective in:  
Elective in:  
General Education:

Lecture:  
Lecture/Lab: X  
Gradable Lab:  
Contact hours lecture: 3  
Contact hours lab:

**Current Catalog Description (include all prerequisites):**

**Proposed or New Catalog Description (include all prerequisites):**

This course introduces CAM operational basics for both mill and lathe programming using current software. The course includes terminology relevant to PC-based CAD/CAM work, hardware familiarity, system operation and management, folders, file type and structure, menu structure and use, and 2 ½ axis (milling machines) and 2 axis (lathes) tool paths. Emphasis is placed on proper geometric creation, management, relevant utilities, C-hooks, and toolbar and menu functions. Course Fee: \$25

**Course Outcome Objectives:**

**Upon successful completion of this course, the student should be able to:**

- Design and construct 2D (wireframe) and 3D models for both mill and lathe machine tools
- Create, edit, and verify mill and lathe tool paths
- Understand tool definitions and tool libraries for both mill and lathe

- Select tools and produce tool paths with constructed and imported geometry
- Verify tool paths and create word address programs (G-code) for CNC machines  
Apply and edit G-code transfer to CNC machines

**Additional instructional resources needed (including library materials, special equipment, and facilities). Please note: approval does not indicate support for new faculty or additional resources.**

Updated 09/29/05

## COURSE REVISION FORM

NEW X DROPPED \_\_\_\_\_ MAJOR REVISION \_\_\_\_\_ FOR INFORMATION ONLY \_\_\_\_\_

College COTS Program Area Advanced Manufacturing Date \_\_\_\_\_  
Submitter Steve Don Dean [Signature] Date 1/29/16  
Signature (indicates "college" level approval)

Please provide a brief explanation & rationale for the proposed revision(s): As a part of the course-sharing arrangement with FVCC this is a new course for the Machinist Technician AAS degree.

Please provide the following information:

**College:** COTS  
**Program Area:** Advanced Manufacturing  
**Date:**  
**Course Prefix & No.:** MCH 125x  
**Course Title:** HAAS CNC TM1 Lathe Operations  
**Credits:** 1  
**Required by:** Machinist Technician AAS

**Selective in:**  
**Elective in:**  
**General Education:**

**Lecture:**  
**Lecture/Lab:** X  
**Gradable Lab:**  
**Contact hours lecture:** 1  
**Contact hours lab:**

**Current Catalog Description (include all prerequisites):**

**Proposed or New Catalog Description (include all prerequisites):**

This course provides opportunities for students to develop skills in the set-up and operation of the HAAS TL1 Metal Cutting Lathe. Topics include: safety, lathe parts and controls, lathe tooling and tool bit grinding, lathe calculations, lathe set-up and operations. This is a performance-based course that requires the production of assigned tool projects. Pre-requisite: MCH 132, or MCH 132x & MCH 132y. Co-requisite: MCH 125y.

**Course Outcome Objectives:**

**Upon successful completion of this course, the student should be able to:**  
Apply the following CNC concepts and functions employing the HAAS TM1 Lathe:

- Identify and practice safety rules
- Calculate and adjust speeds and feeds
- Identify lathe accessories
- Identify steady rest and follow rest

- Identify thread cutting procedures
- Identify knurling tools and their uses
- Calculate and adjust lathe for taper turning
- Turn between centers
- Perform steady-rest and follow-rest set-up
- Bore, counter-bore, and recess hole to size
- Perform filing and polishing operations
- Perform knurling operations
- Turn tapers
- Cut external and internal threads

**Additional instructional resources needed (including library materials, special equipment, and facilities). Please note: approval does not indicate support for new faculty or additional resources.**

Updated 09/29/05

## COURSE REVISION FORM

NEW X DROPPED \_\_\_\_\_ MAJOR REVISION \_\_\_\_\_ FOR INFORMATION ONLY \_\_\_\_\_

College: COTS Program Area: Advanced Manufacturing Date \_\_\_\_\_  
Submitter: Steve Don Dean: [Signature] Date: 1/29/16  
Signature (indicates "college" level approval)

Please provide a brief explanation & rationale for the proposed revision(s): As a part of the course-sharing arrangement with FVCC this is a new course for the Machinist Technician AAS degree.

Please provide the following information:

**College:** COTS  
**Program Area:** Advanced Manufacturing  
**Date:**  
**Course Prefix & No.:** MCH 125y  
**Course Title:** HAAS CNC TM1 Lathe Operations Lab  
**Credits:** 2  
**Required by:** Machinist Technician AAS

**Selective in:**  
**Elective in:**  
**General Education:**

**Lecture:**  
**Lecture/Lab:** X  
**Gradable Lab:**  
**Contact hours lecture:**  
**Contact hours lab:** 4

**Current Catalog Description (include all prerequisites):**

**Proposed or New Catalog Description (include all prerequisites):**

This course provides opportunities for students to develop skills in the set-up and operation of the HAAS TL1 Metal Cutting Lathe. Topics include: safety, lathe parts and controls, lathe tooling and tool bit grinding, lathe calculations, lathe set-up and operations. This is a performance-based course that requires the production of assigned tool projects. Course Fee: \$75. Pre-requisite: MCH 132 or MCH 132x & MCH 132y. Co-requisite: MCH 125x.

**Course Outcome Objectives:**

- Upon successful completion of this course, the student should be able to:**  
Apply the following CNC concepts and functions employing the HAAS TM1 Lathe:
- Identify and practice safety rules
  - Calculate and adjust speeds and feeds
  - Identify lathe accessories
  - Identify steady rest and follow rest

- Identify thread cutting procedures
- Identify knurling tools and their uses
- Calculate and adjust lathe for taper turning
- Turn between centers
- Perform steady-rest and follow-rest set-up
- Bore, counter-bore, and recess hole to size
- Perform filing and polishing operations
- Perform knurling operations
- Turn tapers
- Cut external and internal threads

**Additional instructional resources needed (including library materials, special equipment, and facilities). Please note: approval does not indicate support for new faculty or additional resources.**

Updated 09/29/05



## COURSE REVISION FORM

NEW X DROPPED \_\_\_\_\_ MAJOR REVISION \_\_\_\_\_ FOR INFORMATION ONLY \_\_\_\_\_

College COTS Program Area Advanced Manufacturing Date \_\_\_\_\_

Submitter Steve Don Signature \_\_\_\_\_ Dean [Signature] Signature (indicates college-level approval) \_\_\_\_\_ Date 1/29/16

Please provide a brief explanation & rationale for the proposed revision(s): As a part of the course-sharing arrangement with FVCC this is a new course for the Machinist Technician AAS degree.

Please provide the following information:

College: COTS

Program Area: Advanced Manufacturing

Date:

Course Prefix & No.: MCH 127x

Course Title: HAAS CNC TM1 Vertical Mill Operations

Credits: 1

Required by: Machinist Technician AAS

Selective in:

Elective in:

General Education:

Lecture:

Lecture/Lab: X

Gradable Lab:

Contact hours lecture: 1

Contact hours lab:

**Current Catalog Description (include all prerequisites):**

**Proposed or New Catalog Description (include all prerequisites):**

This course provides instruction in the set-up and operation of the HAAS TM1 Vertical Mill. Student projects include specialty tooling and multi-axis machining. Students will also gain experience in process control. Topics include: specialty tooling, EDM/ECM, multi-axis machining, process control, and laboratory exercises in part production. Pre-requisite: MCH 134, or MCH 134x & MCH 134y. Co-requisite: MCH 127y.

**Course Outcome Objectives:**

Upon successful completion of this course, the student should be able to:

Apply the following CNC concepts and functions employing the HAAS TM1 Mill:

- Identify and practice safety rules
- Calculate and adjust speeds and feeds
- Identify the uses of an indexing head

- Identify the uses of carbide and indexable carbide cutters
- Perform indexing procedures
- Perform slot cutting
- Perform indexing procedures using a dividing head
- Perform pocket milling
- Perform angular milling set-ups

**Additional instructional resources needed (including library materials, special equipment, and facilities). Please note: approval does not indicate support for new faculty or additional resources.**

Updated 09/29/05

## COURSE REVISION FORM

NEW X DROPPED \_\_\_\_\_ MAJOR REVISION \_\_\_\_\_ FOR INFORMATION ONLY \_\_\_\_\_

College COTS Program Area Advanced Manufacturing Date \_\_\_\_\_  
Submitter Steve Don Dean [Signature] Date 1/29/16  
Signature (Indicates "college" level approval)

Please provide a brief explanation & rationale for the proposed revision(s): As a part of the course-sharing arrangement with FVCC this is a new course for the Machinist Technician AAS degree.

Please provide the following information:

**College:** COTS  
**Program Area:** Advanced Manufacturing  
**Date:**  
**Course Prefix & No.:** MCH 127y

**Course Title:** HAAS CNC TM1 Vertical Mill Operations Lab  
**Credits:** 2

**Required by:** Machinist Technician AAS

**Selective in:**  
**Elective in:**  
**General Education:**

**Lecture:**  
**Lecture/Lab:** X  
**Gradable Lab:**  
**Contact hours lecture:**  
**Contact hours lab:** 4

**Current Catalog Description (include all prerequisites):**

**Proposed or New Catalog Description (include all prerequisites):**

This course provides instruction in the set-up and operation of the HAAS TM1 Vertical Mill. Student projects include specialty tooling and multi-axis machining. Students will also gain experience in process control. Topics include: specialty tooling, EDM/ECM, multi-axis machining, process control, and laboratory exercises in part production. Course Fee: \$75. Prerequisite: MCH 134, or MCH 134x and MCH 134y. Co-requisite: MCH 127x.

**Course Outcome Objectives:**

Upon successful completion of this course, the student should be able to:  
Apply the following CNC concepts and functions employing the HAAS TM1 Mill:

- Identify and practice safety rules
- Calculate and adjust speeds and feeds
- Identify the uses of an indexing head

- Identify the uses of carbide and indexable carbide cutters
- Perform indexing procedures
- Perform slot cutting
- Perform indexing procedures using a dividing head
- Perform pocket milling
- Perform angular milling set-ups

**Additional instructional resources needed (including library materials, special equipment, and facilities). Please note: approval does not indicate support for new faculty or additional resources.**

Updated 09/29/05

## COURSE REVISION FORM

NEW X DROPPED \_\_\_\_\_ MAJOR REVISION \_\_\_\_\_ FOR INFORMATION ONLY \_\_\_\_\_

College COTS Program Area Advanced Manufacturing Date \_\_\_\_\_

Submitter Steve Don Dean [Signature] Date 1/28/16  
Signature (indicates "college" level approval)

Please provide a brief explanation & rationale for the proposed revision(s): As a part of the course-sharing arrangement with FVCC this is a new course for the Machinist Technician AAS degree.

Please provide the following information:

**College:** COTS  
**Program Area:** Advanced Manufacturing  
**Date:**  
**Course Prefix & No.:** MFGT 115  
**Course Title:** Machine Shop Fundamentals  
**Credits:** 2  
**Required by:** Machinist Technician AAS

**Selective in:**  
**Elective in:**  
**General Education:**

**Lecture:**  
**Lecture/Lab:** X  
**Gradable Lab:**  
**Contact hours lecture:** 2  
**Contact hours lab:**

**Current Catalog Description (include all prerequisites):**

**Proposed or New Catalog Description (include all prerequisites):**

The content and sample programs cover a broad range of manual and CNC machining using the software and flexible internet based learning content supported by a classroom instructor to deliver an innovative learning experience. Course Fee: \$150

**Course Outcome Objectives:**

**Upon successful completion of this course, the student should be able to:**

- Understand and control machine motion
- Use the CNC panel interface
- Perform machine start-up safely
- Perform manual operations
- Perform job set-up
- Use the Edit Functions within the software

- Use the software to perform program entry
- Use the software to perform a program run
- Use G Code programming to control the machine
- Create and understand program structure
- Use and understand the Cartesian coordinate system
- Use and understand cutter compensation
- Use and understand tool nose radius compensation
- Use and understand circular interpolation

**Additional instructional resources needed (including library materials, special equipment, and facilities). Please note: approval does not indicate support for new faculty or additional resources.**

Updated 09/29/05

## COURSE REVISION FORM

NEW X DROPPED \_\_\_\_\_ MAJOR REVISION \_\_\_\_\_ FOR INFORMATION ONLY \_\_\_\_\_

College COTS Program Area Advanced Manufacturing Date \_\_\_\_\_

Submitter Steve Don Dean [Signature] Date 1/28/16  
Signature (indicates "college" level approval)

Please provide a brief explanation & rationale for the proposed revision(s): As a part of the course-sharing arrangement with FVCC this is a new course for the Machinist Technician AAS degree.

Please provide the following information:

College: COTS  
Program Area: Advanced Manufacturing  
Date:  
Course Prefix & No.: MCH 220

Course Title: Geometric Dimensioning and Tolerancing  
Credits: 3

Required by: Machinist Technician AAS

Selective in:  
Elective in:  
General Education:

Lecture:  
Lecture/Lab: X  
Gradable Lab:  
Contact hours lecture: 3  
Contact hours lab:

**Current Catalog Description (include all prerequisites):**

**Proposed or New Catalog Description (include all prerequisites):**

This course provides the basics of how to apply GD & T in metrology and CAD, including knowledge of the symbols, hands on measurement of parts, and the use of CMMs. Students will learn the types and causes of measurement error, perform measurement setups. They will also learn about flatness, straightness, circularity, parallelism, angularity, concentricity, total run outs, position tolerancing, and gauge design for both soft and hard gauges. Course Fee: \$25. Prerequisites: DDSN 135, or MCH 122, MCH 129.

**Course Outcome Objectives:**

Upon successful completion of this course, the student should be able to:

- Identify and use the common GD & T industry symbols
- Understand and use fixturing for checking parts
- Understand and use common gauges for checking parts
- Identify and use different types of gauging methods in industry

- Identify proper “Datum” usage
- Use precision measuring tools to check GD & T
- Use a CMM to check GD & T

**Additional instructional resources needed (including library materials, special equipment, and facilities). Please note: approval does not indicate support for new faculty or additional resources.**

Updated 09/29/05



## COURSE REVISION FORM

NEW X DROPPED \_\_\_\_\_ MAJOR REVISION \_\_\_\_\_ FOR INFORMATION ONLY \_\_\_\_\_

College COTS Program Area Advanced Manufacturing Date \_\_\_\_\_  
Submitter Steve Don Dean [Signature] Date 1/28/11  
Signature Signature (indicates "college" level approval)

Please provide a brief explanation & rationale for the proposed revision(s): As a part of the course-sharing arrangement with FVCC this is a new course for the Machinist Technician AAS degree.

Please provide the following information:

**College:** COTS  
**Program Area:** Advanced Manufacturing  
**Date:**  
**Course Prefix & No.:** MCH 221x  
**Course Title:** Advanced Manual Mill  
**Credits:** 1  
**Required by:** Machinist Technician AAS

**Selective in:**  
**Elective in:**  
**General Education:**

**Lecture:**  
**Lecture/Lab:** X  
**Gradable Lab:**  
**Contact hours lecture:** 1  
**Contact hours lab:**

**Current Catalog Description (include all prerequisites):**

**Proposed or New Catalog Description (include all prerequisites):**

This course will cover the use and care of rotary tables, indexing heads, tilting vices, sine bar setup, gear cutting, and line boring utilizing horizontal and vertical mills. The course will also cover various work holding methods, jig and fixture work, location methods, and process planning. Pre-requisites: MCH 134x, MCH 134y. Co-requisites: MCH 221y.

**Course Outcome Objectives:**

**Upon successful completion of this course, the student should be able to:**

- Demonstrate the safe operation of horizontal and vertical mills
- Demonstrate the proper use of various types of cutting tools and calculate their rpm and feed rate
- Describe the various uses of rotary heads and index heads
- Demonstrate the use of dial indicators, edge finders, and sine bars

- Demonstrate various types of boring operations
- Demonstrate safe work holding, and jig and fixture work

**Additional instructional resources needed (including library materials, special equipment, and facilities). Please note: approval does not indicate support for new faculty or additional resources.**

Updated 09/29/05

## COURSE REVISION FORM

NEW X DROPPED \_\_\_\_\_ MAJOR REVISION \_\_\_\_\_ FOR INFORMATION ONLY \_\_\_\_\_

College COTS Program Area Advanced Manufacturing Date \_\_\_\_\_  
Submitter Steven Don Dean \_\_\_\_\_ Date 1/28/16  
Signature Signature (indicates "college" level approval)

Please provide a brief explanation & rationale for the proposed revision(s): As a part of the course-sharing arrangement with FVCC this is a new course for the Machinist Technician AAS degree.

Please provide the following information:

College: COTS  
Program Area: Advanced Manufacturing  
Date:  
Course Prefix & No.: MCH 221y  
  
Course Title: Advanced Manual Mill Lab  
Credits: 2  
  
Required by: Machinist Technician AAS

Selective in:  
Elective in:  
General Education:

Lecture:  
Lecture/Lab: X  
Gradable Lab:  
Contact hours lecture:  
Contact hours lab: 4

**Current Catalog Description (include all prerequisites):**

**Proposed or New Catalog Description (include all prerequisites):**

This course will cover the use and care of rotary tables, indexing heads, tilting vices, sine bar setup, gear cutting, and line boring utilizing horizontal and vertical mills. The course will also cover various work holding methods, jig and fixture work, location methods, and process planning. Course Fee: \$75. Pre-requisites: MCH 134x, MCH 134y. Co-requisites: MCH 221x.

**Course Outcome Objectives:**

**Upon successful completion of this course, the student should be able to:**

- Demonstrate the safe operation of horizontal and vertical mills
- Demonstrate the proper use of various types of cutting tools and calculate their rpm and feed rate
- Describe the various uses of rotary heads and index heads
- Demonstrate the use of dial indicators, edge finders, and sine bars

- Demonstrate various types of boring operations
- Demonstrate safe work holding, and jig and fixture work

**Additional instructional resources needed (including library materials, special equipment, and facilities). Please note: approval does not indicate support for new faculty or additional resources.**

Updated 09/29/05

## COURSE REVISION FORM

NEW X DROPPED \_\_\_\_\_ MAJOR REVISION \_\_\_\_\_ FOR INFORMATION ONLY \_\_\_\_\_

College COTS Program Area Advanced Manufacturing Date \_\_\_\_\_  
Submitter Steve Dem Dean [Signature] Date 1/28/16  
Signature Signature (indicates "college" level approval)

Please provide a brief explanation & rationale for the proposed revision(s): As a part of the course-sharing arrangement with FVCC this is a new course for the Machinist Technician AAS degree.

Please provide the following information:

**College:** COTS  
**Program Area:** Advanced Manufacturing  
**Date:**  
**Course Prefix & No.:** MCH 222x  
**Course Title:** Advanced CNC Mill Operations  
**Credits:** 1  
**Required by:** Machinist Technician AAS

**Selective in:**  
**Elective in:**  
**General Education:**

**Lecture:**  
**Lecture/Lab:** X  
**Gradable Lab:**  
**Contact hours lecture:** 1  
**Contact hours lab:**

**Current Catalog Description (include all prerequisites):**

**Proposed or New Catalog Description (include all prerequisites):**

This course provides advanced instruction in the setup and operation of the HAAS TM1 mill. Projects will include specialty tooling and automatic machining. Students will gain experience in process and quality control of part production. Other topics include specialty tooling, multi-axis machining, process control, and parts production. Pre-requisites: MCH 127x, MCH 127y. Co-requisites: MCH 222y.

**Course Outcome Objectives:**

Upon successful completion of this course, the student should be able to:

- Identify and practice safety rules
- Perform advanced machine set using vises and fixturing
- Demonstrate the use of the advanced program editor on the machine controller
- Demonstrate the use of the machine controller to adjust feeds/speeds/tool offsets

- Identify and use insert type cutting tools
- Produce advanced programs using G code format
- Demonstrate the use of the IPS system
- Demonstrate the use of precision measuring tools to check all work
- Trouble shoot program or machining problems

**Additional instructional resources needed (including library materials, special equipment, and facilities). Please note: approval does not indicate support for new faculty or additional resources.**

Updated 09/29/05

## COURSE REVISION FORM

NEW X DROPPED \_\_\_\_\_ MAJOR REVISION \_\_\_\_\_ FOR INFORMATION ONLY \_\_\_\_\_

College COTS Program Area Advanced Manufacturing Date \_\_\_\_\_

Submitter Steve Don Dean \_\_\_\_\_ Date 1/28/16  
Signature Signature (indicates "college" level approval)

Please provide a brief explanation & rationale for the proposed revision(s): As a part of the course-sharing arrangement with FVCC this is a new course for the Machinist Technician AAS degree.

Please provide the following information:

College: COTS  
Program Area: Advanced Manufacturing  
Date:  
Course Prefix & No.: MCH 222y

Course Title: Advanced CNC Mill Operations Lab  
Credits: 2

Required by: Machinist Technician AAS

Selective in:

Elective in:

General Education:

Lecture:

Lecture/Lab: X

Gradable Lab:

Contact hours lecture:

Contact hours lab: 4

**Current Catalog Description (include all prerequisites):**

**Proposed or New Catalog Description (include all prerequisites):**

This course provides advanced instruction in the setup and operation of the HAAS TM1 mill. Projects will include specialty tooling and automatic machining. Students will gain experience in process and quality control of part production. Other topics include specialty tooling, multi-axis machining, process control, and parts production. Course Fee: \$75. Pre-requisites: MCH 127x, MCH 127y. Co-requisites: MCH 222x.

**Course Outcome Objectives:**

Upon successful completion of this course, the student should be able to:

- Identify and practice safety rules
- Perform advanced machine set using vises and fixturing
- Demonstrate the use of the advanced program editor on the machine controller
- Demonstrate the use of the machine controller to adjust feeds/speeds/tool offsets

- Identify and use insert type cutting tools
- Produce advanced programs using G code format
- Demonstrate the use of the IPS system
- Demonstrate the use of precision measuring tools to check all work
- Trouble shoot program or machining problems

**Additional instructional resources needed (including library materials, special equipment, and facilities). Please note: approval does not indicate support for new faculty or additional resources.**

Updated 09/29/05



## COURSE REVISION FORM

NEW  DROPPED  MAJOR REVISION  FOR INFORMATION ONLY

College COTS Program Area Advanced Manufacturing Date \_\_\_\_\_  
Submitter Steve Don Dean [Signature] Date 1/28/11  
Signature Signature (indicates "college" level approval)

Please provide a brief explanation & rationale for the proposed revision(s): As a part of the course-sharing arrangement with FVCC this is a new course for the Machinist Technician AAS degree.

Please provide the following information:

College: COTS  
Program Area: Advanced Manufacturing  
Date:  
Course Prefix & No.: MCH 225  
  
Course Title: Machinery's Handbook  
Credits: 3  
  
Required by: Machinist Technician AAS

Selective in:  
Elective in:  
General Education:

Lecture:  
Lecture/Lab: X  
Gradable Lab:  
Contact hours lecture: 3  
Contact hours lab:

**Current Catalog Description (include all prerequisites):**

**Proposed or New Catalog Description (include all prerequisites):**

This course is an introduction to the basic trade handbook: Machinery's Handbook. The subjects that are covered include solving manufacturing problems using the various charts, formulas, and calculations. This course will also educate the student about how to find information quickly in this reference book, and how to apply the information to their specific applications. Course Fee: \$15

**Course Outcome Objectives:**

**Upon successful completion of this course, the student should be able to:**

- Demonstrate the ability to quickly find information in the book and CD-ROM version
- Demonstrate how to use a trade reference book for real situation problem solving
- Recognize and describe various design principles in the manufacturing field
- Design a simple tool for a particular application

- Describe how to solve problems that relate to gears, shafts, bearings, and bushings

**Additional instructional resources needed (including library materials, special equipment, and facilities). Please note: approval does not indicate support for new faculty or additional resources.**

Updated 09/29/05

## COURSE REVISION FORM

NEW X DROPPED \_\_\_\_\_ MAJOR REVISION \_\_\_\_\_ FOR INFORMATION ONLY \_\_\_\_\_

College COTS Program Area Advanced Manufacturing Date \_\_\_\_\_  
Submitter Steven Don Dean [Signature] Date 1/28/12  
Signature Signature (indicates "college" level approval)

Please provide a brief explanation & rationale for the proposed revision(s): As a part of the course-sharing arrangement with FVCC this is a new course for the Machinist Technician AAS degree.

Please provide the following information:

College: COTS  
Program Area: Advanced Manufacturing  
Date:  
Course Prefix & No.: MCH 226x  
Course Title: Advanced CAD/CAM  
Credits: 1  
Required by: Machinist Technician AAS

Selective in:  
Elective in:  
General Education:

Lecture:  
Lecture/Lab: X  
Gradable Lab:  
Contact hours lecture: 1  
Contact hours lab:

**Current Catalog Description (include all prerequisites):**

**Proposed or New Catalog Description (include all prerequisites):**

This is an advanced course in the study of computer aided manufacturing through the implementation of computer software for the design and creation of machine codes used in operating computer numerical control systems. Topics include 3D component and surface creation, development of advanced tool paths for machining advanced 3D components and surfaces, interface with advanced manufacturing systems with 4 axis or more , as well as Swiss CNC and Mill/Turn systems, simulation of tool paths, and instruction on live tooling synchronization. This course leads to an advanced understanding in design and programming for higher level machine tools. Pre-requisites: MCH 122x, MCH 122y. Co-requisites: MCH 226y.

**Course Outcome Objectives:**

Upon successful completion of this course, the student should be able to:

- Demonstrate advanced concepts and techniques associated with MASTERCAM CAD/CAM or comparable software for 3D wireframe and solids design.

- Demonstrate advanced machining operations performed on CNC machining centers in 4-axis and higher environment, turning centers, Swiss CNC, and Mill/Turn systems.
- Describe the advanced graphics environment of a Computer Assisted Machining Software for 3D surfaces and component design
- Generate advanced tool paths for surface or complex 3D components using advanced MASTERCAM or comparable CAM software tools
- Demonstrate concepts and techniques of modifying existing geometric designs using MASTERCAM Computer Assisted Machining or comparable software
- Demonstrate the use of MASTERCAM Computer Assisted Machining software material and tool library files
- Create advanced or new tool/holder configurations
- Generate tool paths with existing geometric designs utilizing MASTERCAM Computer Assisted Machining software
- Describe concepts of live tooling synchronization and scheduling for manufacture of designed components.
- Demonstrate use of simulation tools for validation of toolpaths for creation of designed components.
- Demonstrate use of simulation tools for verification of tool collision avoidance.

**Additional instructional resources needed (including library materials, special equipment, and facilities). Please note: approval does not indicate support for new faculty or additional resources.**

Updated 09/29/05

## COURSE REVISION FORM

NEW X DROPPED \_\_\_\_\_ MAJOR REVISION \_\_\_\_\_ FOR INFORMATION ONLY \_\_\_\_\_

College COTS Program Area Advanced Manufacturing Date \_\_\_\_\_

Submitter Steve Don Dean [Signature] Date 1/28/16  
Signature (indicates "college" level approval)

Please provide a brief explanation & rationale for the proposed revision(s): As a part of the course-sharing arrangement with FVCC this is a new course for the Machinist Technician AAS degree.

Please provide the following information:

College: COTS  
Program Area: Advanced Manufacturing  
Date:  
Course Prefix & No.: MCH 226y  
  
Course Title: Advanced CAD/CAM Lab  
Credits: 3  
  
Required by: Machinist Technician AAS

Selective in:  
Elective in:  
General Education:

Lecture:  
Lecture/Lab: X  
Gradable Lab:  
Contact hours lecture:  
Contact hours lab: 6

**Current Catalog Description (include all prerequisites):**

**Proposed or New Catalog Description (include all prerequisites):**

This is an advanced course in the study of computer aided manufacturing through the implementation of computer software for the design and creation of machine codes used in operating computer numerical control systems. Topics include 3D component and surface creation, development of advanced tool paths for machining advanced 3D components and surfaces, interface with advanced manufacturing systems with 4 axis or more , as well as Swiss CNC and Mill/Turn systems, simulation of tool paths, and instruction on live tooling synchronization. This course leads to an advanced understanding in design and programming for higher level machine tools. Course Fee: \$35. Pre-requisites: MCH 122x, MCH 122y. Co-requisites: MCH 226x.

**Course Outcome Objectives:**

Upon successful completion of this course, the student should be able to:

- Demonstrate advanced concepts and techniques associated with MASTERCAM CAD/CAM or comparable software for 3D wireframe and solids design.

- Demonstrate advanced machining operations performed on CNC machining centers in 4-axis and higher environment, turning centers, Swiss CNC, and Mill/Turn systems.
- Describe the advanced graphics environment of a Computer Assisted Machining Software for 3D surfaces and component design
- Generate advanced tool paths for surface or complex 3D components using advanced MASTERCAM or comparable CAM software tools
- Demonstrate concepts and techniques of modifying existing geometric designs using MASTERCAM Computer Assisted Machining or comparable software
- Demonstrate the use of MASTERCAM Computer Assisted Machining software material and tool library files
- Create advanced or new tool/holder configurations
- Generate tool paths with existing geometric designs utilizing MASTERCAM Computer Assisted Machining software
- Describe concepts of live tooling synchronization and scheduling for manufacture of designed components.
- Demonstrate use of simulation tools for validation of toolpaths for creation of designed components.
- Demonstrate use of simulation tools for verification of tool collision avoidance.

**Additional instructional resources needed (including library materials, special equipment, and facilities). Please note: approval does not indicate support for new faculty or additional resources.**

Updated 09/29/05

## COURSE REVISION FORM

NEW X DROPPED \_\_\_\_\_ MAJOR REVISION \_\_\_\_\_ FOR INFORMATION ONLY \_\_\_\_\_

College COTS Program Area Advanced Manufacturing Date \_\_\_\_\_  
Submitter Steven Don Dean [Signature] Date 1/28/16  
Signature (indicates "college" level approval)

Please provide a brief explanation & rationale for the proposed revision(s): As a part of the course-sharing arrangement with FVCC this is a new course for the Machinist Technician AAS degree.

Please provide the following information:

College: COTS  
Program Area: Advanced Manufacturing  
Date:  
Course Prefix & No.: MCH 227  
  
Course Title: Swiss CNC and Mill-Turn Systems  
Credits: 4  
  
Required by: Machinist Technician AAS

Selective in:  
Elective in:  
General Education:

Lecture:  
Lecture/Lab: X  
Gradable Lab:  
Contact hours lecture: 4  
Contact hours lab:

**Current Catalog Description (include all prerequisites):**

**Proposed or New Catalog Description (include all prerequisites):**

This is a course for the study and hands-on operation of advanced machine tools, specifically Swiss CNC or Mill/Turn systems. Topics include set-up, "at system" programming, tooling and operation of advanced Swiss or Mill/Turn systems. The course will also emphasize system maintenance and service for these advanced machine tool categories. Course Fee: \$75. Prerequisites: MCH 286 (Advanced CAD/CAM) or MCH 226x and MCH 226y

**Course Outcome Objectives:**

**Upon successful completion of this course, the student should be able to:**

- Describe Swiss CNC and Mill/Turn system components and general operational theory.
- Demonstrate proper set-up and breakdown of Swiss CNC and Mill/Turn systems.
- Describe methods for "at system" modification of machine code.
- Demonstrate proper project set up including work piece holding and tool zeroing.

- Demonstrate how to machine a specified component to defined specifications as designed using advanced CAM tools
- Describe general maintenance and service for Swiss CNC and Mill/Turn systems.

**Additional instructional resources needed (including library materials, special equipment, and facilities). Please note: approval does not indicate support for new faculty or additional resources.**

Updated 09/29/05



## COURSE REVISION FORM

NEW X DROPPED \_\_\_\_\_ MAJOR REVISION \_\_\_\_\_ FOR INFORMATION ONLY \_\_\_\_\_

College COTS Program Area Advanced Manufacturing Date \_\_\_\_\_  
Submitter Steve Dan Dean [Signature] Date 1/28/16  
Signature (indicates "college" level approval)

Please provide a brief explanation & rationale for the proposed revision(s): As a part of the course-sharing arrangement with FVCC this is a new course for the Machinist Technician AAS degree.

Please provide the following information:

College: COTS  
Program Area: Advanced Manufacturing  
Date:  
Course Prefix & No.: MCH 223  
  
Course Title: Advanced Manual Lathe  
Credits: 3  
  
Required by: Machinist Technician AAS

Selective in:  
Elective in:  
General Education:

Lecture:  
Lecture/Lab: X  
Gradable Lab:  
Contact hours lecture: 3  
Contact hours lab:

**Current Catalog Description (include all prerequisites):**

**Proposed or New Catalog Description (include all prerequisites):**

This course will cover carbide cutters and tool holders, spindle collets and drawbars, taper attachments, and digital readouts. Students will use advanced tooling attachments. There will be set up and cutting for simple cam, acme, and buttress threads. The course will emphasize that close tolerances are required. Course Fee: \$75. Pre-requisites: MCH 132.

**Course Outcome Objectives:**

**Upon successful completion of this course, the student should be able to:**

- Identify and list types of carbide cutters and their uses
- Demonstrate set up and use of a taper attachment
- Describe and demonstrate the use of digital readouts
- Demonstrate the use of dial indicators for set up of concentric and eccentric work
- Demonstrate how to cut acme, buttress, and left hand threads

- Demonstrate boring and bushing

**Additional instructional resources needed (including library materials, special equipment, and facilities). Please note: approval does not indicate support for new faculty or additional resources.**

Updated 09/29/05

## COURSE REVISION FORM

NEW X DROPPED \_\_\_\_\_ MAJOR REVISION \_\_\_\_\_ FOR INFORMATION ONLY \_\_\_\_\_

College COTS Program Area Advanced Manufacturing Date \_\_\_\_\_  
Submitter Steve Dan Dean [Signature] Date 1/28/16  
Signature (indicates "college" level approval)

Please provide a brief explanation & rationale for the proposed revision(s): As a part of the course-sharing arrangement with FVCC this is a new course for the Machinist Technician AAS degree.

Please provide the following information:

College: COTS  
Program Area: Advanced Manufacturing  
Date:  
Course Prefix & No.: MCH 224  
Course Title: Advanced CNC Lathe Operations  
Credits: 3  
Required by: Machinist Technician AAS

Selective in:  
Elective in:  
General Education:

Lecture:  
Lecture/Lab: X  
Gradable Lab:  
Contact hours lecture: 3  
Contact hours lab:

**Current Catalog Description (include all prerequisites):**

**Proposed or New Catalog Description (include all prerequisites):**

This course provides advanced instruction in the setup and operation of the HAAS TM1 lathe. Projects will include specialty tooling and automatic machining. Students will gain experience in process and quality control of part production. Other topics include specialty tooling, process control, and parts production. Course Fee: \$75. Pre-requisites: MCH 125.

**Course Outcome Objectives:**

**Upon successful completion of this course, the student should be able to:**

- Identify and practice safety rules
- Perform advanced machine set using vises and fixturing
- Demonstrate the use of the advanced program editor on the machine controller
- Demonstrate the use of the machine controller to adjust feeds/speeds/tool offsets
- Identify and use insert type cutting tools

- Produce advanced programs using G code format
- Demonstrate the use of the IPS system
- Demonstrate the use of precision measuring tools to check all work
- Trouble shoot program or machining problems

**Additional instructional resources needed (including library materials, special equipment, and facilities). Please note: approval does not indicate support for new faculty or additional resources.**

Updated 09/29/05

## COURSE REVISION FORM

NEW X DROPPED \_\_\_\_\_ MAJOR REVISION \_\_\_\_\_ FOR INFORMATION ONLY \_\_\_\_\_

College COTS Program Area Advanced Manufacturing Date \_\_\_\_\_  
Submitter Steven Dem Dean [Signature] Date 1/28/16  
Signature (indicates "college" level approval)

Please provide a brief explanation & rationale for the proposed revision(s): As a part of the course-sharing arrangement with FVCC this is a new course for the Machinist Technician AAS degree.

Please provide the following information:

**College:** COTS  
**Program Area:** Advanced Manufacturing  
**Date:**  
**Course Prefix & No.:** MCH 299  
**Course Title:** Capstone: Machinist  
**Credits:** 3  
**Required by:** Machinist Technician AAS

**Selective in:**  
**Elective in:**  
**General Education:**

**Lecture:**  
**Lecture/Lab:** X  
**Gradable Lab:**  
**Contact hours lecture:** 3  
**Contact hours lab:**

**Current Catalog Description (include all prerequisites):**

**Proposed or New Catalog Description (include all prerequisites):**

This course provides opportunities for the student to arrange to complete special projects using knowledge gained in previous course work. All projects must be approved by the instructor. Course Fee: \$75. Enrollment in Machinist Technician Level IV.

**Course Outcome Objectives:**

**Upon successful completion of this course, the student should be able to:**

- Use knowledge gained from the program to identify an appropriate project
- Produce all necessary paperwork and documentation for the project
- Synthesize knowledge gained from the program to complete the project
- Communicate the results in a written or oral report

**Additional instructional resources needed (including library materials, special equipment, and facilities). Please note: approval does not indicate support for new faculty or additional resources.**

Updated 09/29/05