

NORCO COLLEGE ANNUAL INSTRUCTIONAL PROGRAM REVIEW

Unit: Manufacturing and Electronics

Please give the full title of the discipline or department. You may submit as a discipline or department as is easiest for your unit

Contact Person: Paul Van Hulle and Glen Graham

Due in draft: March 15, 2015

Final drafts due: April 29, 2015

Please send an electronic copy to the Vice President; Academic Affairs

Norco: Diane.Dieckmeyer@norcollege.edu

If you are CTE: Kevin.Fleming@norcollege.edu



Form Last Revised: December 2014

Norco College

Web Resources: <http://www.rccd.edu/administration/educationalservices/ieffectiveness/Pages/ProgramReview.aspx>

Annual Instructional Program Review Update

Instructions

***Please retain this information for your discipline's/department's use (or forward to your chair).**

The Annual Self-Study is conducted by each unit on each college and consists of an analysis of changes within the unit as well as significant new resource needs for staff, resources, facilities, and equipment. It should be **submitted in draft every year by March 15th** (or the first working day following the 15th), with final drafts due on **April 29th**, in anticipation of budget planning for the fiscal year, which begins July 1 of the *following* calendar year.

For Program Review data, please go to the following link:

<http://www.norcocollege.edu/about/president/strategic-planning/programreview/Pages/index.aspx>

The questions on the subsequent pages are intended to assist you in planning for your unit.

The forms that follow are separated into pages for ease of distribution to relevant subcommittees. **Please keep the pages separated** if possible (though part of the same electronic file), **with the headers as they appear**, and be sure to include your unit, contact person (this may change from topic to topic) and date on each page submitted. Don't let formatting concerns slow you down. If you have difficulty with formatting, Nicole C. Ramirez can adjust the document for you. Simply add responses to those questions that apply and forward the document to nicole.ramirez@norcocollege.edu with a request to format it appropriately.

If you cannot identify in which category your requests belong or if you have complex-funding requests please schedule an appointment with your college's Vice President for Business Services right away. They will assist you with estimating the cost of your requests. For simple requests such as the cost of a staff member, please e-mail your Vice President. It is vital to include cost estimates in your request forms. Each college uses its own prioritization system. Inquiries regarding that process should be directed to your Vice President.

Norco: VP Business Services 951-372-7157

Mission

Norco College serves our students, our community, and its workforce by providing educational opportunities, celebrating diversity, and promoting collaboration. We encourage an inclusive, innovative approach to learning and the creative application of emerging technologies. We provide foundational skills and pathways to transfer, career and technical education, certificates and degrees.

Vision

Norco – creating opportunities to transform our students and community for the dynamic challenges of tomorrow.

Goals and Strategies 2013-2018

Goal 1: Increase Student Achievement and Success

Objectives:

1. Improve transfer preparedness (completes 60 transferable units with a 2.0 GPA or higher).
2. Improve transfer rate by 10% over 5 years.
3. Increase the percentage of basic skills students who complete the basic skills pipeline by supporting the development of alternatives to traditional basic skills curriculum.
4. Improve persistence rates by 5% over 5 years (fall-spring; fall-fall).
5. Increase completion rate of degrees and certificates over 6 years.
6. Increase success and retention rates.
7. Increase percentage of students who complete 15 units, 30 units, 60 units.
8. Increase the percentage of students who begin addressing basic skills needs in their first year.
9. Decrease the success gap of students in online courses as compared to face-to-face instruction.
10. Increase course completion, certificate and degree completion, and transfer rates of underrepresented students.

Goal 2: Improve the Quality of Student Life

Objectives:

1. Increase student engagement (faculty and student interaction, active learning, student effort, support for learners).
2. Increase frequency of student participation in co-curricular activities.
3. Increase student satisfaction and importance ratings for student support services.
4. Increase the percentage of students who consider the college environment to be inclusive.
5. Decrease the percentage of students who experience unfair treatment based on diversity-related characteristics.
6. Increase current students' awareness about college resources dedicated to student success.

Goal 3: Increase Student Access

Objectives:

1. Increase percentage of students who declare an educational goal.
2. Increase percentage of new students who develop an educational plan.
3. Increase percentage of continuing students who develop an educational plan.
4. Ensure the distribution of our student population is reflective of the communities we serve.
5. Reduce scheduling conflicts that negatively impact student completion of degrees and programs.

Goal 4: Create Effective Community Partnerships

Objectives:

1. Increase the number of students who participate in summer bridge programs or boot camps.
2. Increase the number of industry partners who participate in industry advisory council activities.
3. Increase the number of dollars available through scholarships for Norco College students.
4. Increase institutional awareness of partnerships, internships, and job opportunities established with business and industry.
5. Continue the success of Kennedy Partnership (percent of students 2.5 GPA+, number of students in co-curricular activities, number of students who are able to access courses; number of college units taken).
6. Increase community partnerships.
7. Increase institutional awareness of community partnerships.
8. Increase external funding sources which support college programs and initiatives.

Goal 5: Strengthen Student Learning

Objectives:

1. 100% of units (disciplines, Student Support Service areas, administrative units) will conduct systematic program reviews.
2. Increase the percentage of student learning and service area outcomes assessments that utilize authentic methods.
3. Increase the percentage of programs that conduct program level outcomes assessment that closes the loop.
4. Increase assessment of student learning in online courses to ensure that it is consistent with student learning in face-to-face courses.
5. Increase the number of faculty development workshops focusing on pedagogy each academic year.

Goal 6: Demonstrate Effective Planning Processes

Objectives:

1. Increase the use of data to enhance effective enrollment management strategies.
2. Systematically assess the effectiveness of strategic planning committees and councils.
3. Ensure that resource allocation is tied to planning.
4. Institutionalize the current Technology Plan.
5. Revise the Facilities Master Plan.

Goal 7: Strengthen Our Commitment To Our Employees

Objectives:

1. Provide professional development activities for all employees.
2. Increase the percentage of employees who consider the college environment to be inclusive.
3. Decrease the percentage of employees who experience unfair treatment based on diversity-related characteristics.
4. Increase participation in events and celebrations related to inclusiveness.
5. Implement programs that support the safety, health, and wellness of our college community.

I. Norco College Annual Instructional Program Review Update

Unit: Manufacturing and Electronics
Contact Person: Paul Van Hulle and Glen Graham
Date: March 1, 2015

Trends and Relevant Data

1. Have there been any changes in the status of your unit? (if not, please indicate with an “N/A”)

a. Has your unit shifted departments?

No

b. Have any new certificates or complete programs been created by your unit?

Yes,

The following certificates have been updated:

- Automated Systems Technician
- Computer Aided Production Technology
- Computer numerical control programming
- Supply chain technology

The following certificates were created

- Electrician Apprenticeship
- Partnership with the International Brotherhood of Electrical Workers.

c. Have activities in other units impacted your unit? For example, a new Multi Media Grant could cause greater demand for Art courses.

Yes! Our college got a TAA grant, led by Chaffey College, through which we are buying a lot of instructional equipment and hiring a categorically-funded, non tenure track, faculty member in Automated Systems Technology. Also, the CTE Enhancement Funds and Prop 39 grant funds have allowed us to purchase two new CNC machines and other \$100,000 in necessary electronics and electrician equipment. In addition, our NSF National Center for Supply Chain Technology Education has assisted our department greatly in the curriculum revisions for our SCT program, purchasing tab trainers and other instructional equipment, and securing SCT as an approved discipline in the state of California through the Academic Senate.

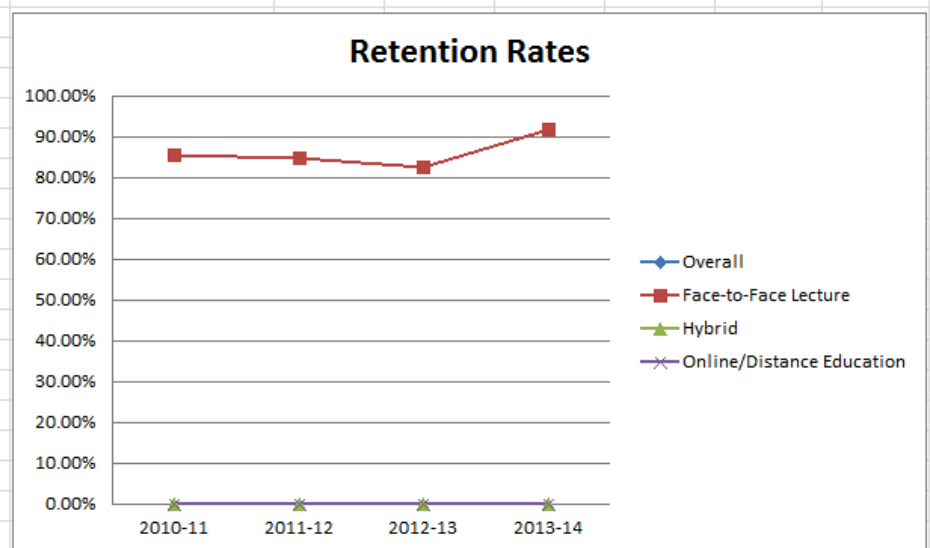
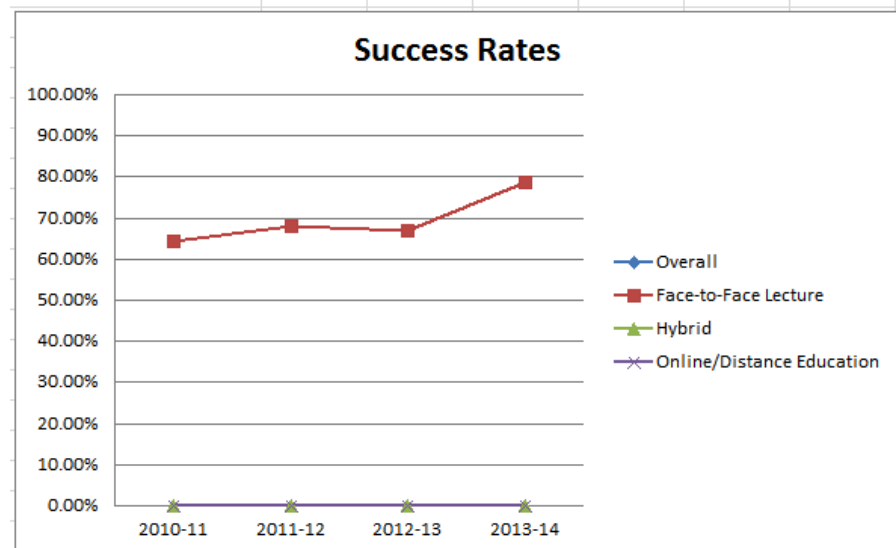
2. List your retention and success rates as well as your efficiency. Have there been any changes or significant trends in the data? If so, to what do you attribute these changes? Please list Distance Education, retention, success and efficiency separately.

To download a copy of your data, click on the FILE menu above and select "Download a Snapshot"

Discipline									
ACC	ADJ	AML	AMY	ANT	ARA	ARE	ART	BIO	BUS
CAT	CHE	CIS	COM	CON	CSC	DAN	EAR	ECO	EDU
ELE	ENE	ENG	ESL	FIT	FRE	GAM	GEG	GUI	HES
HIS	HUM	ILA	JOU	JPN	KIN	LIB	MAC	MAG	MAN
MAT	MIC	MKT	MUC	MUS	PHI	PHO	PHP	PHS	PHY
POL	PSY	REA	RLE	SCE	SCT	SOC	SPA	SPE	THE
WKX									

Success Rate NORCO	2010-11	2011-12	2012-13	2013-14
Overall	64.41%	68.14%	67.01%	78.79%
Face-to-Face Lecture	64.41%	68.14%	67.01%	78.79%
Hybrid	0.00%	0.00%	0.00%	0.00%
Online/Distance Education	0.00%	0.00%	0.00%	0.00%

Retention Rate NORCO	2010-11	2011-12	2012-13	2013-14
Overall	85.59%	84.96%	82.47%	91.92%
Face-to-Face Lecture	85.59%	84.96%	82.47%	91.92%
Hybrid	0.00%	0.00%	0.00%	0.00%
Online/Distance Education	0.00%	0.00%	0.00%	0.00%



Manufacturing has seen a significant raise in success and retention rates over a four-year period. I feel this is due to the fact that we now have machines that keep the students in the class and are more applicable to what they would be using in industry. More needs to be done to ensure that the equipment in the classroom is what the students would be using in industry. Further, the instructors in the program have made great strides to make sure that the students understand the content and to keep their interest in the program.

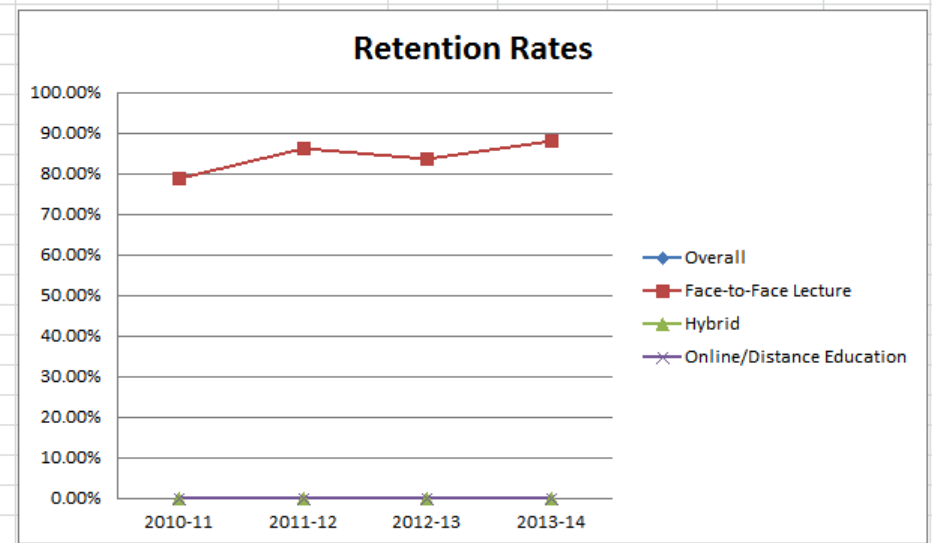
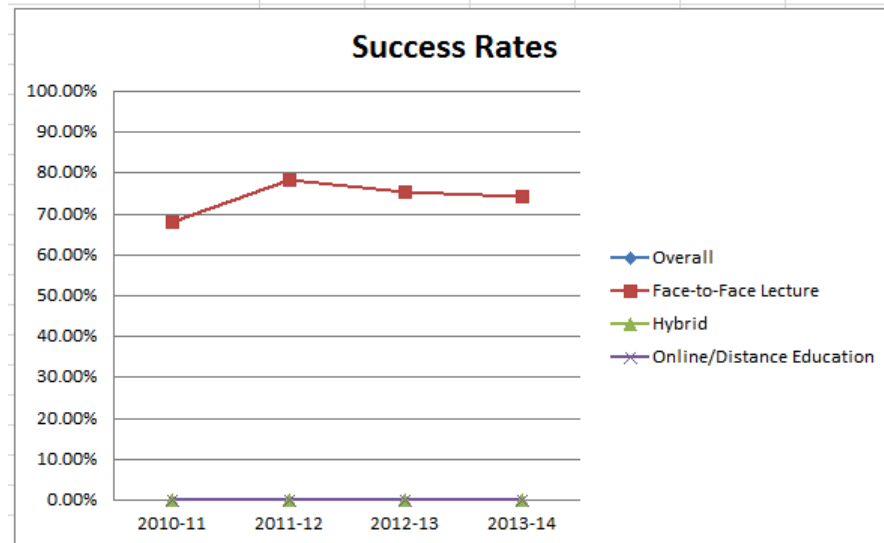
2015

To download a copy of your data, click on the FILE menu above and select "Download a Snapshot"

Discipline									
ACC	ADJ	AML	AMY	ANT	ARA	ARE	ART	BIO	BUS
CAT	CHE	CIS	COM	CON	CSC	DAN	EAR	ECO	EDU
ELE	ENE	ENG	ESL	FIT	FRE	GAM	GEG	GUI	HES
HIS	HUM	ILA	JOU	JPN	KIN	LIB	MAC	MAG	MAN
MAT	MIC	MKT	MUC	MUS	PHI	PHO	PHP	PHS	PHY
POL	PSY	REA	RLE	SCE	SCT	SOC	SPA	SPE	THE
WKX									

Success Rate NORCO	2010-11	2011-12	2012-13	2013-14
Overall	68.11%	78.14%	75.29%	74.29%
Face-to-Face Lecture	68.11%	78.14%	75.29%	74.29%
Hybrid	0.00%	0.00%	0.00%	0.00%
Online/Distance Education	0.00%	0.00%	0.00%	0.00%

Retention Rate NORCO	2010-11	2011-12	2012-13	2013-14
Overall	78.92%	86.34%	83.53%	88.16%
Face-to-Face Lecture	78.92%	86.34%	83.53%	88.16%
Hybrid	0.00%	0.00%	0.00%	0.00%
Online/Distance Education	0.00%	0.00%	0.00%	0.00%



3. What annual goals does your unit have for 2014-2015 (please list the most important first)? Please indicate if a goal is directly linked to goals in your comprehensive. How do your goals support the college mission and the goals of the [Educational Master Plan](#)?

List the goals of your unit for 2014-2015	List activity(s) linked to the goal	Relationship of goal to mission and master plan	Indicate if goal is limited to Distance Education
Growth of the machining, manufacturing and electronics programs.	<p>Various tours by the students at Norco College's Engineering of CACT and IT 124 classroom</p> <p>Attend and staff a table for the career fair at Norco College next fall and spring semesters.</p> <p>I am currently working with Kevin Fleming to implement a two-semester program that will allow Workforce investment act students and regular students to complete the program in two semesters. We plan on implementing this two-semester system during the summer and fall semester of 2015. Further, we plan on presenting the MAN 56 course during a 3-week period during the summer time. This should peek the interest of high school students and unemployed students.</p>	<p>Goal 1 #7</p> <p>Goal 1 #10</p> <p>Goal 3 #2</p> <p>Goal 4 #8</p>	No
Strengthen the supply chain	Update the supply chain	Goal 1 #7	No

<p>technology program</p>	<p>technology program to apply to the requirements of industry and this new program has a new focus of training students to become technicians in automation and robotics instead of vehicle routing.</p> <p>Glen recently presented the SCT 1 course. This course was a great success but the course was grant funded and had less than 10 students. We need to do more work to gain more interest in the program.</p> <p>I am currently working with Kevin Fleming to implement a two-semester program that will allow Workforce investment act students and regular students to complete the program in two semesters. We plan on implementing this two-semester system during the summer and fall semester of 2015.</p>		
<p>Last program review we stated that we should present the MAN 55 course online. This was presented with great success.</p>	<ul style="list-style-type: none"> • 37 students signed up for the course. • 6 students were no shows • 9 students dropped • 22 students continued with the course • 8 students gained their OSHA 30 hour card • 13 students gained their OSHA 10 hour card. 	<p>Goal 1 #7</p>	<p>Yes</p>

Improve the automated systems program. Much of the required improvement of the automated system program also has an effect on the supply chain technology program	We have updated both programs and will discuss this later in the document.	Goal 7	No
Hired many different lab techs to assist teachers in the classroom.		Goal 1 #6	No
We have created a grant to be able to hire a temporary instructor specializing in automation.	This will let me (the head machining instructor) focus on improving the CNC program.	Goal 7	No
Improve pathways between high schools and the college	Work with high school teachers to make pathways with their programs with our program.	Goal 1 #1 and 2 Goal 4	No
This past summer I attended leadership training delivered by the boy scouts known as Woodbadge training. I will use this as this year's Flex training requirement.			
This past weekend I worked in getting the Siemens PLC operational. Very successful at getting the 1200 model PLC operational.			

**Your unit may need assistance to reach its goals. Financial resources should be listed on the subsequent forms. In addition you may need help from other units or Administrators. Please list that on the appropriate form below, or on the form for "other needs."*

Norco College Annual Instructional Program Review Update

Unit: Manufacturing and Electronics
 Contact Person: Paul Van Hulle and Glen Graham
 Date: March 1, 2015

Current Human Resource Status

4. Complete the Faculty and Staff Employment Grid below. Please list full and part time faculty numbers in separate rows. Please list classified staff who are full and part time separately:

Faculty Employed in the Unit			
Teaching Assignment (e.g. Math, English)	Full-time faculty or staff (give number) 1 full time instructor Fall+Winter+Spring	Part-time faculty or staff (give number) 5 part time instructors in the fall 2014 in electronics 1 part time instructor in fall 2014 in manufacturing 1 part time instructor in fall 2014 in SCT 3 part time instructors in spring 2015 in Electronics 1 part time instructors in spring 2015 in manufacturing	Distance Education
Electronics		1.3999 FTEs amongst five part time faculty in fall 2014 1.1 FTEs amongst three part time faculty in spring 2015	0
Manufacturing	.524 FTEs+.1333 FTEs+.8944 FTEs	.6324 FTEs for one part time faculty in fall 2014 .1333 FTEs for one part time faculty in spring 2015	.1333 FTEs of the full-time instructor's load was spent teaching online during winter 2015
Supply chain technologies		.2834 FTEs for one part time faculty in fall 2014	0
Engineering	.25 FTEs+0 FTEs+.35		0

	FTEs		
Department chair	.2 FTEs+0 FTEs+.2 FTEs		

Classified Staff Employed in the Unit			
Staff Title	Full-time staff (give number)	Part-time staff (give number)	Distance Education
None			

5. Staff Needs

NEW OR REPLACEMENT STAFF (Administrator, Faculty or Classified)¹

<p>List Staff Positions Needed for Academic Year 2015-2016 Please justify and explain each faculty request as they pertain to the goals listed in item #3. Place titles on list in order (rank) or importance.</p>	<p>Indicate (N) = New or (R) = Replacement</p>	<p>Annual TCP*</p>	<p>Distanced Education</p>
<p>1. Lab Technician for the CACT and IT 124 classrooms, manufacturing and electronics labs</p> <p>Reason: Lab aide for the CACT building. The machines in the CACT and the classroom need a person to maintain the machinery and to organize the tools and consumables. Currently, we are using student workers to replace the tasks that the previous technician used to do. Since this is a student worker I am now required to come to the campus at 10:00am and I end my day at 9:30pm. This student worker has class while I am teaching and cannot do the tasks that the previous technician used to do. In addition, recently the Naval Base asked Norco College to help them fabricate and machine some gauges for their lab. We currently do not have adequate staff support to complete these community requests. A part-time Lab Technician could help in this regard.</p>	<p>R</p>	<p>Part-time \$28,000 plus fringe benefits</p>	
<p>2. Full time electronics and electrical engineering instructor</p> <p>Reason: Recently, the electronics program has shown a significant rise in success rates (from 76.43 to 84.23%). This program has a high potential of growth as we grow our STEM programs at the college that would be best served by hiring a full time Electronics and Electrical Engineering instructor. Also, the program is a major part of the STEM grant (ELE courses are embedded in a number of our pre-engineering CTE programs), which funded recent changes to the certificate. The current part time instructor has put through many changes to the electronics certificate and curriculum including streamlining of the</p>	<p>N</p>	<p>\$55,000 & office space</p>	

¹ If your SLO assessment results make clear that particular resources are needed to more effectively serve students please be sure to note that in the “reason” section of this form.

<p>certificate/associates degree programs into two certificates known as the “digital electronics” and the “Green technology” certificate/associates degrees. Classes are embedded not only in the electronics certificate but also in the Green technology program, automated systems, supply chain technologies, engineering and drafting. Many of the courses in the program articulate with Cal Poly Pomona so not only does the program help students with work preparation it also transfers well with Universities in our area. Depending on which person we hire this program could also evolve into an electrical program, which would help students planning on going into construction engineering at Cal Poly. Our HSI-STEM grant also will be building 4 additional pre-engineering degrees that will be directly or indirectly reliant upon our electronics courses.</p> <p>Looking more closely at the statistics of how much the electronics department uses part time instructors (reference the “Current Human Resource Status” on the previous page):</p> <p>We currently use five part time instructors teaching 1.3999 FTEs for fall 2014 and used three part time faculty teaching 1.1 FTEs in spring 2015. Our head part time instructor in electronics also taught .2834 FTEs of SCT course during the fall semester. This shows that we have a great need for one instructor to take care of the FTEs that are taught in the electronics department. Students will be given a better experience if they have one instructor take up the charge of managing the program. The program must have an instructor that will work hard to drum up business and will be there for the students during office hours.</p> <p>Further, four part time instructors taught an astounding 1.95 FTEs during the spring 2014 semester.</p>			
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* TCP = “Total Cost of Position” for one year is the cost of an average salary plus benefits for an individual. New positions (not replacement positions) also require space and equipment. Please speak with your college Business Officer to obtain accurate cost estimates. Please be sure to add related office space, equipment and other needs for new positions to the appropriate form and mention the link to the position. Please complete this form for “New” Classified Staff only. All replacement staff must be filled per Article I, Section C of the California School Employees Association (CSEA) contract.

Requests for staff and administrators will be sent to the [Business and Facilities Planning Council](#). Requests for faculty will be sent to the [Academic Planning Council](#).

6. Equipment (including technology) Not Covered by Current Budget²

List Equipment or Equipment Repair Needed for Academic Year 2015-2016 Please list/summarize the needs of your unit on your college below. Please be as specific and as brief as possible. Place items on list in order (rank) or importance.	*Indicate whether Equipment is for (I) = Instructional or (N) = Non-Instructional purposes	Annual TCO*				
		Cost per item	Number Requested	Total Cost of Request	EMP GOALS	Distance Education
1. Laser engraver needs to be moved <u>Reason:</u> When the walls were put up in the CACT the design did not account for the size and placement of the laser engraver. Currently, the chiller for the engraver sits in front of the electrical panel. This is a safety concern and is against OSHA regulations. I have contacted the company that made the laser and asked them if we can increase the length of the hoses going from the laser to the chiller. They stated that we cannot increase the length. In order to move the laser we will need to re-pipe the exhaust system. I would suggest that we take down the walls in order to make more space in the area. Taking down the walls would make more space in order to teach in. since the program is growing and since the offices are no longer being used, I would suggest that the walls be taken down and the classroom area be put back to how it was 6 years ago. It also should be noted that the STEM program offices have been moved to the early childhood center. Removing the offices will allow the machining program to grow and would provide students with more space to work in.	Instructional					
2. Computers for IT 124 <u>Reason:</u> The computers in IT 124 are now seven years old and are obsolete. They really need to be replaced and are very slow. Kevin Fleming and I have been talking about adding larger tables into IT	Instructional	\$2,000	30	\$60,000	Goal 6 #4	

² If your SLO assessment results make clear that particular resources are needed to more effectively serve students please be sure to note that in the “reason” section of this form.

124 which would allow for more students to work in the middle of the classroom.						
3. Allocations encase a machine breaks down in the CACT center <u>Reason:</u> Previously, we had the support of the CACT grant incase of machine break downs. Machine break downs are a constant concern. I have had one machine break during the Spring 2011 semester and then the same part break down again during the fall semester. Luckily the part was only \$500.00 and it was something that my students could replace. I have now replaced the part with a new design that another company came up with that will only break one section of the part at a time. I am also making a better effort to make sure that the students keep the pull-tabs on the machines well greased so that we don't have the same problem. I would suggest that the college plan on having at least \$20-\$40,000 every year available in case of machine failure or replacement parts needed	Instructional	\$20,000-40,000				
4. 5th Axis attachment for CNC milling machine <u>Reason:</u> Recently, the machining program wrote a new course known as MAN 35. This course combines previously presented MAN 52 and 53 into one course. MAN 35 requires that the students learn 5 th axis machining. We have had many industry advisory council meetings in which the industry advisors suggested that we have students work on a 5 th axis machine.	Instructional	\$35,000	1	\$35,000	Goal #4 6	
5. Develop and offer our ELE 71-77 courses. <u>Reason:</u> Our industry advisory demands that we develop and offer our ELE 70-77 courses. Within this includes a motors theory and operations class. The equipment for the ELE 73 course cost about \$120K.	Instructional	\$180,000	1	\$180,000	Goal #4 6	
6. <u>Reason:</u>						

* Instructional Equipment is defined as equipment purchased for instructional activities involving presentation and/or hands-on experience to enhance student learning and skills development (i.e. desk for student or faculty use).

Non-Instructional Equipment is defined as tangible district property of a more or less permanent nature that cannot be easily lost, stolen or destroyed; but which

replaces, modernizes, or expands an existing instructional program. Furniture and computer software, which is an integral and necessary component for the use of other specific instructional equipment, may be included (i.e. desk for office staff).

** These requests are sent to the [Business and Facilities Planning Council](#).

Unit Name: _____

7. Professional or Organizational Development Needs Not Covered by Current Budget*³

Year _____ . Reasons might include in response to assessment findings or the need to update skills to comply with state, federal, professional organization requirements or the need to update skills/competencies. Please be as specific and as brief as possible. Some items may not have a cost per se, but reflect the need to spend current staff time differently. Place items on list in order (rank) or importance. Examples include local college workshops, state/national conferences.	Annual TCO*				
	Cost per item	Number Requested	Total Cost of Request	EMP Goals	Distance Education
1. <u>Reason:</u>					
2. <u>Reason:</u>					
3. <u>Reason:</u>					
4. <u>Reason:</u>					
5. <u>Reason:</u>					
6. <u>Reason:</u>					

*It is recommended that you speak with the Faculty Development Coordinator to see if your request can be met with current budget.

³ If your SLO assessment results make clear that particular resources are needed to more effectively serve students please be sure to note that in the “reason” section of this form.

** These requests are sent to the [Professional Development Committee](#) for review.

2015

8. Student Support Services, Library, and Learning Resource Center (see definition below*) Services needed by your unit over and above what is currently provided by student services at your college. Requests for Books, Periodicals, DVDs, and Databases must include specific titles/authors/ISBNs when applicable. Do not include textbook requests. These needs will be communicated to Student Services at your college⁴

<p align="center">List Student Support Services Needs for Academic Year 2015-2016</p> <p align="center">Please list/summarize the needs of your unit on your college below. Please be as specific and as brief as possible. Not all needs will have a cost, but may require a reallocation of current staff time.</p>	<p align="center">EMP GOALS</p>	<p align="center">Distance Education</p>
<p>1. Machine guarding and conveyors video, SafetyVideoDirect.com \$600.00 for three videos</p> <p>Reason: The OSHA (MAN 55 course) and programmable logic controls (MAN 64) do not have access to videos for teaching many of the safety topics that are supposed to be taught in the course.</p>	<p>Goal 5 #2 Goal 7 #5</p>	
<p>2. Manufacturing and machine tool technology is requesting a lab aide for assisting with organization of the lab and assisting students during classes.</p> <p>Reason: During class the lab aide will be used to assist the instructor watch for unsafe actions be neophyte students and to help students practice machine setup procedures. Outside of class the lab aide will be used to organize tool placement within the tool boxes and cabinets. The cost of these lab aides will be \$10.00/hour and he/she will be used for all classes during the entire class period. I recommend that the same amount be allocated for lab aides as was allocated last year.</p>	<p>Goal 5 #2 Goal 7 #2 and 3</p>	
<p>3. Electronics is also requesting a lab aide for assisting during classes</p> <p>Reason: During classes the lab aide will be used to assist the instructor. The cost of this lab aide will be \$10.00/hour and he/she will be used for all classes during the entire class period. Electronics department</p>	<p>Goal 5 #2 Goal 7 #2 and 3</p>	

⁴ If your SLO assessment results make clear that particular resources are needed to more effectively serve students please be sure to note that in the “reason” section of this form.

recommends 20 hours/week at a cost of \$200.00 per a week and \$12,800 per a year		
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*Student Support Services include for example: tutoring, counseling, international students, EOPS, job placement, admissions and records, student assessment (placement), health services, student activities, college safety and police, food services, student financial aid, and matriculation.

** These requests are sent to the [Student Services Planning Council](#) and the [Library Advisory Committee](#).

Unit Name: _____

9. OTHER NEEDS AND LONG TERM SAFETY CONCERNS not covered by current budget⁵

**** For immediate hazards, contact your supervisor ****

List Other Needs that do not fit elsewhere. Please be as specific and as brief as possible. Not all needs will have a cost, but may require a reallocation of current staff time. Place items on list in order (rank) or importance.	Annual TCO*				
	Cost per item	Number Requested	Total Cost of Request	EMP Goals	Distance Education
1. None Reason:					

These requests are sent to the [Business and Facilities Planning Council](#), but are not ranked. They are further reviewed as funding becomes available.

⁵ If your SLO assessment results make clear that particular resources are needed to more effectively serve students please be sure to note that in the “reason” section of this form.

Rubric for Annual Instructional Program Review - Part I only

Discipline: Manufacturing/Electronics

Contact Person: Paul Van Hulle/Glen Graham

Reviewer:

Average Score:

Area of Assessment	0 No attempt	1 some attempt	2 good attempt	3 outstanding attempt
1. Retention, success, and efficiency rates have been identified and reflected upon	No attempt to list retention, success, or efficiency data	Limited attempt to identify or discuss identified data	Clear attempt to identify and discuss identified data	Substantial attempt to identify and discuss/interpret identified data
2. There are annual goals for refining and improving program practices.	No annual goals stated	Limited/generic statement made regarding goal(s), lacks clarity or details	Clear statement made regarding goal(s), includes details	Well-defined statement made regarding goal(s), includes details, reasoning
3. Activities identified that support annual goals; connections made between goals/activities and Retention, Success, Enrollment, and Efficiency data	No attempt made to identify activities	Limited/generic statement about activities; very limited attempt to connect to data from question 2 (where logical)	Clearly stated activities that support the goal(s); clear connection made to data from question 2 (where logical)	Well-defined activities that logically support the goal(s); definitive connections made to data from question 2 (where logical)
4. The annual goals are linked to the Mission and Educational Master Plan (EMP) of NC.	No link between the annual goals and the Mission or EMP	Limited attempt to link goals to Mission and EMP	Clear attempt to link goals to Mission and EMP	Well defined connection made between goals and Mission and EMP
5. Resource requests have reasons identified and completed data fields, including estimated dollar amount.	No reasons identified and incomplete data fields; or reasons identified, but incomplete or empty data field	Limited/generic/basic reasons provided, data fields completed	Clear requests for resources, all data fields fully completed	Well defined reasons for resources, all data fields fully completed
6. Linkages made between EMP/Strategic Plan Goals (SPG) with reasons for resource requests	No linkage made between resource requests and EMP/SPG	Limited/generic/basic connection made between resource requests and EMP/SPG	Clear connection made between resource requests and EMP/SPG	Strong connection made between resource requests and EMP/SPG
7. The document is complete	No; there are incomplete sections	/	/	Yes; all sections are completed
Column scores				

Additional comments:

II. Norco College - Annual Assessment Update

Purpose – The purpose for completing an annual review is to provide an opportunity for reflection on all that has been accomplished and learned from your efforts in assessment. Assessments conducted in isolation from each other will yield interesting, important, or neutral information in and of themselves, but taking a holistic look back on the unit’s accomplishment over the past year might also yield some insight. The annual review is a time to take stock of which courses and programs have undergone some scrutiny, and subsequently should help with planning for the upcoming year. This planning might include considering which other courses are ready for an initial assessment, or which might need a loop-closing assessment. Things we might learn in one cycle of assessment might actually help us to plan assessments in the next cycle, or might facilitate changes in other courses that weren’t even included in the initial assessment. To this end, please complete the following with as much detail as possible. If you have any questions, please contact either Sarah Burnett at sarah.burnett@norcollege.edu, or Greg Aycock at greg.aycock@norcollege.edu.

1. Identify where you are in the cycle of SLO assessment for each course you assessed over the past year (*fall 2013 - spring 2014*). Each response will be individualized; this means each completed column might look a little different due to the nature of the cycle of assessment in which we engage. For example, you may have a course in which you are implementing improvements to close the loop on an initial assessment that was completed in a different year. You might also have a course that only has an initial assessment with report and you haven’t yet completed any follow-up or improvement activities. Below you will see an example of how to fill in this section, and then a blank chart for your own responses.

Course number and name	SLO <i>Initial Assessments</i> and completed Reports (State each SLO e.g., SLO 1)	SLOs with <i>Improvements identified</i> (Identify the SLO with # of improvements in () e.g., SLO 1(1), or SLO 3(0))	SLOs not needing improvement (assumed loop-closed), with clear reasoning as to why	SLOs involved in <i>Loop-Closing</i> assessment (state SLO and effect)
EAR 20 Child Development	SLO 1, SLO 3 <i>(Indicates the discipline assessed and wrote a report for both SLO 1 and 3 in the past year for this course)</i>	SLO 1(2) <i>(Indicates 2 adjustments were made to the course e.g., in materials, assignment, test questions, pedagogy, curriculum etc. Notice, nothing is stated for SLO 3 – suggesting no concerns were identified...see the next column...)</i>	SLO 3 – results meet discipline set standards of 75% success <i>(If no improvement is needed please state why in this column)</i>	SLO 1 – data indicate increased success after improvements were made <i>(This means a closing the loop assessment was completed on SLO 2 for EAR 20)</i>

Course number and name	SLO <i>Initial Assessments</i> and completed Reports (State each SLO e.g., SLO 1)	SLOs with <i>Improvements identified</i> (Identify the SLO with # of improvements e.g., SLO 1(1), or SLO 3(0))	SLOs not needing improvement (assumed loop-closed), with clear reasoning as to why	SLOs involved in <i>Loop-Closing</i> assessment (state SLO and effect)
MAN-35	<p>See appendix A within this program review document for the assessment of 2 of the SLOs of this course.</p> <ul style="list-style-type: none"> • SLO 2; Program milling machine operations at a beginning and advanced level using MasterCam Computer Machining (CAM) software. • SLO 3; Create simple two-dimensional and advanced three-dimensional parts using Mastercam software. 	No need to improve any of the SLOs for this class.	The SLOs for this class are so general that they can be meet and evaluated very easily. Say that the student will demonstrate both on the beginning and advanced levels may be too general and may need to be reconsidered. The problem may come up depending on the level of the instructor as to what their definition of “advanced” level. This type of instructor should look at the course outline of record to gain a better understanding of what is meant by advanced level. Also, I am still trying to determine how long the class should be. I will need more time decide but half way through the course I am feeling rushed.	No need to improve the SLOs for this course
MAN-52	<p>See appendix A within this program review document for the assessment of 2 of the SLOs of this course.</p> <ul style="list-style-type: none"> • SLO 2; Program milling machine operations at a beginning and advanced level using MasterCam Computer Machining (CAM) software. 	No need to improve any of the SLOs for this class.	The SLOs for this class are so general that they can be meet and evaluated very easily	No need to improve the SLOs for this course

	<ul style="list-style-type: none"> SLO 3; Create simple two-dimensional and advanced three-dimensional parts using Mastercam software. 			
MAN-53				
MAN/ELE-55	<p>In the 2011 program review, Course offered Winter 2012</p> <ul style="list-style-type: none"> SLO-3; Identify common violations of OSHA standards and propose abatement actions. Slo-1; Locate and apply OSHA safety and health standards, policies and procedures for general industry. <p>In the 2013 program review, course offered winter 2013</p> <ul style="list-style-type: none"> Slo-4; Analyze the common causes of accidents and fatalities in hazardous areas of general industry SLO-3; Identify common violations of OSHA standards and propose abatement actions. Slo-1; Locate and apply OSHA safety and health standards, policies and procedures for general industry SLO-2; Utilize OSHA standards and regulations to supplement an ongoing safety and health programs. 	<p>The SLOs for this class represent well what the class is about. They are easy to assess by looking at the papers that they turn in or by looking at how the students do on exams.</p>		<p>No need to improve the SLOs for this course</p>
MAN-56	<p>In the 2011 program review, Course offered Fall 2011</p> <ul style="list-style-type: none"> SLO-3; Recognize NC machine codes and terminology for computerized machining and manufacturing <p>In the 2013 program review, course offered fall 2012</p> <ul style="list-style-type: none"> SLO-3; Recognize NC machine codes and terminology for computerized 	<p>The only SLO that I would like to change would be SLO 1; Analyze engineering drawings for content necessary for the set-up and operation of CNC</p>	<p>SLO 1; will be hard to assess because it is often inferred during the class and students are not actually tested on this topic during the class.</p>	

	machining and manufacturing	machine tools.		
MAN-57	<p>In the 2014; program review, course offered spring 2013</p> <ul style="list-style-type: none"> • SLO-1; perform calculations necessary to develop coordinate charts for part geometry. • SLO-2; use canned cycles correctly in programs for CNC machine tools • SLO-3; use subroutine techniques correctly in programs for CNC machine tools. 	All of these SLOs can be assessed easily.	I would like to change SLO 3 to “use manual programming to program CNC machines” because it is more general.	
MAN-59	This class has never been offered			
MAN-60				
MAN-61	<p>In the 2011 program review, Course offered Fall 2011</p> <ul style="list-style-type: none"> • There are way too many SLOs for this class and many of the SLOs were written for when the class was in the CACT. We have different equipment and many of these SLOs are hard to measure. During the fall 2012 semester I plan on presenting a complete update of all of the student learning outcomes of the MAN/ELE 61 course. Though I have not done this as of 2015 we may not offer this class again. • SLO-6: Describe how computers, electronics and machining are used in manufacturing to control and construct robotic machinery. • SLO-5: Perform basic measurements using a multi-meter including: Voltage, Resistance, and Amp. • SLO-2: Use proper circuit board soldering techniques. 	<p>Too many SLOs course may need to be deleted from the catalog because it is not in any of the certificates. However, industry is asking for people trained in industrial robotics so we should consider adding it to the Automated Systems certificate or to have it be a branch of the automated systems certificate once we recreate the certificate.</p>	This needs work at a later time and we need to decide if we are going to keep the class.	

	<ul style="list-style-type: none"> • SLO-?: Apply critical thinking skills to establish the crucial importance of crosscutting issues in the management of operations technology and the role of technology and operations as the ultimate competitive weapons of a business enterprise Innovation. • SLO: Discuss the technologies and standards for collaborative commerce in supply chain management. SLO: Identify strategic decision choices, operations strategies and their relevance to global competitiveness. 			
MAN/ELE-63				
MAN/ELE-64	<p>In the 2011 program review, Course offered Fall 2011</p> <ul style="list-style-type: none"> • SLO-1: Discuss history of PLCs, advantages and disadvantages, functions of 5 major parts of PLC system. • SLO-2: Describe PLC parts interconnections, analyze typical problems, create programs and test for correct ops. • SLO-3: Write programs in industry standard format, properly use keyboards and procedures, safely install, maintain and troubleshoot. <p>In the 2013 program review, course offered in fall 2012</p> <ul style="list-style-type: none"> • SLO 3; Describe and demonstrate how the parts of the PLC system are connected electrically. • SLO 5; Create ladder logic programs 		<p>In regards to SLO 1; Students do have a discussion about the history of PLCs but are not tested on it. We do have some activities that students use relays but it is not a major part of the class. I think Glen puts more focus on this than I do. Either way, I would like to see the SLO removed and it placed in the course content only.</p>	

	<p>using popular programming software and test for correct operation</p> <ul style="list-style-type: none"> • SLO 4; Analyze problems representative of control system environments using PLC 			
ELE-71	This course has not been offered.			
MAN/ELE-72	This course has not been offered			
MAN/ELE-73	This course has not been offered			
MAN/ELE-74	This course has not been offered			
ELE-10				
ELE-11				
ELE-13				
ELE-21	This course will not be offered again.			
ELE-22				
ELE-23	<p>In the 2013 program review, course offered fall 2013</p> <ul style="list-style-type: none"> • All 6 SLOs were analyzed. 			
ELE-24				
ELE-25	<p>In the 2011 program review, Course offered Fall 2011</p> <ul style="list-style-type: none"> • SLO 1-Convert between binary and decimal and recognize binary codes • SLO 3-Identify, discuss characteristics and ops of integrated circuits. • SLO 4-Use Boolean algebra to express ops and simplify logic circuit design. 			
ELE-26	<p>In the 2014 program review, course offered fall 2013</p> <ul style="list-style-type: none"> • SLO 1; Explain the basic operation of a microprocessors/microcontroller • SLO 2; Describe and control input and output operations 			

	<ul style="list-style-type: none"> • SLO 3; Develop a flowchart to define a problem • SLO 4; Develop a flowchart to solve a problem • SLO 5; Write a program that implements a flow chart for a microprocessor/microcontroller 			
ELE/ENE-27	<p>In the 2014 program review, course offered winter 2014</p> <ul style="list-style-type: none"> • SLO 1; Define technical communications • SLO 2; Recognize and identify characteristics of technical communications • SLO 3; Identify the needs of a given audience • SLO 4; Collect and organize information • SLO 5; create technical documents in accordance with conventional formats. 			
ELE-28	<p>In the 2014 program review, course offered fall 2013</p> <ul style="list-style-type: none"> • SLO 1; Describe the physical nature and electrical characteristics of materials which are classified as semiconductors • SLO 2; Explain the operation and biasing requirements of diodes, bipolar transistors, field effect transistors, thyristors, and optoelectronic devices. • SLO 3; discuss the construction and uses of analog and digital integrated circuits. 			
ELE-75				
ELE-76				
ELE-77				

2. a) How many Program Level Outcome *initial* assessments were you involved in fall 2013 - spring 2014? Indicate a total number per column. Please provide copies of any reports or documents related to these assessments as attachments to this Annual Review, or embed at the end of the document as an Appendix.

AOE (Area of Emphasis)	ADT (Associate for Transfer)	GE (General Education)	Certificate
<p>Computer Aided production technology</p> <ul style="list-style-type: none"> • Appendix F located in 2014 program review; PLO known as: Create a compressed air or stirling engine that involves parts using both the mill and the lathe. • Refer to MAN_ELE IPR document 2014 for assessment of the program learning outcome (PLO) known as Compose written assignments on occupational safety in general industry, three student learning outcomes relate to this PLO. Students need to be able to perform the following SLO before they can complete the PLO. • Refer to MAN_ELE IPR 	NO	NO	Yes

<p>document for 2014 for an assessment of “create a portfolio which may include printouts of Mastercam or other computer aided manufacturing programs part file drawings, numerical code files and operation sheets on a basic and/or advanced level.”</p> <ul style="list-style-type: none"> • Refer to MAN_ELE IPR document for 2014 for an assessment of “compose written assignments on occupational safety in general industry.” • See appendix a for an assessment of PLO 2; create five-axis part drawing files using computer aided manufacturing programs such as mastercam, numerical code files and solid works. 			
Computer numerical control programming	NO	NO	Yes

<ul style="list-style-type: none"> • Appendix F located in 2014 program review; PLO known as: Create a compressed air or stirling engine that involves parts using both the mill and the lathe. • Refer to MAN_ELE IPR document 2014 for assessment of the program learning outcome (PLO) known as Compose written assignments on occupational safety in general industry, three student learning outcomes relate to this PLO. Students need to be able to perform the following SLO before they can complete the PLO. • Refer to MAN_ELE IPR document for 2014 for an assessment of “create a portfolio which may include printouts of Mastercam or other computer aided manufacturing programs part file drawings, numerical code files and 			
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<p>operation sheets on a basic and/or advanced level.”</p> <ul style="list-style-type: none"> • Refer to MAN_ELE IPR document for 2014 for an assessment of “compose written assignments on occupational safety in general industry.” • See appendix a for an assessment of PLO 2; create five-axis part drawing files using computer aided manufacturing programs such as mastercam, numerical code files and solid works. 			
<p>Automated systems technician AS/CE degrees</p> <ul style="list-style-type: none"> • Refer to MAN_ELE IPR document for 2014 for an assessment of “compose written assignments on occupational safety in general industry.” 			

b) How many Program Level Outcome *loop-closing* assessments were you involved in fall 2013 - spring 2014? Indicate a total number per column. Please provide copies of any reports or documents related to these assessments as attachments to this Annual Review, or embed at the end of the document as an Appendix.

AOE (Area of Emphasis)	ADT (Associate for Transfer)	GE (General Education)	Certificate

3. Please describe any changes you made in a course or a program as a response to an assessment. Please indicate the impact the changes had on student learning, student engagement, and/or your teaching.

None at this time.

4. Can you identify any assessments that have prompted a change in perspective in the manner in which your discipline should modify the Course Outlines of Record (COR) or the Student Learning Outcomes (SLO)? Please expand on what you think should be modified.

Yes, need to make less outcomes within a course and make them more general.

5. Have you shared your assessments, outcomes, improvements etc. with your discipline? How? If not, how do you plan to do so in the future?

I have shared all of these outcome with Glen Graham.

6. Did any of your assessments indicate that your discipline or program needs additional resources to support student learning? If so, please explain.

Currently working on making the CNC course more closely aligned with the National Institute of Metal Working skills. NIMs is a type of industry standard organization in the field of machining.

7. What additional support, training, etc. do you need in the coming year regarding assessment?

Time

Scoring Rubric for Annual Program Review of Assessment (Part II only)

Assessment Unit Name: _____

Average score _____

	0	1	2	3
On-going SLO assessment and Loop-closing activity	No evidence provided 0	Limited evidence of on-going SLO assessment (1 initial assessment, no loop-closing) 1	Clear evidence of on-going SLO assessment (at least 1 initial and or 1 loop-closing) 2	Clear and robust evidence provided of on-going SLO assessment (2 initial, and one loop-closing) 3
Attempts to improve student learning	No indication of any changes made to any courses, and no clarification provided	No indication of any changes made to any courses and limited clarification	Evidence of an attempt to implement a change in a course provided, or simple	Multiple attempts made to implement changes to courses, discipline,

	0	regarding discipline standards 1	clarifying statement regarding why no specific improvement is needed 2	institution, or state specific standards, or clear clarification why no improvement is needed 3
Dialogue across the discipline	No dialogue or attempt to communicate results 0	Limited demonstration of dialogue or communication within the discipline or department 1	Clear demonstration of dialogue and sharing of assessment within discipline or department 2	Robust and systematic dialogue and communication demonstrated within discipline 3
Participation in PLO assessment (bonus points averaged into total score)		Engagement in at least 1 initial PLO assessment and/or Engagement in at least 1 PLO closing-the-loop assessment fall '13-spr '14 1		

Appendix A; Student learning outcome and program level assessment for MAN 35

Course student learning outcome and program level assessment for MAN 35 and MAN 52.

April 15, 2015

Spring 2015 semester.

Please see the last page for a description of how student preformed on the test along with the PLOs and SLOs that the student meet during the exam.

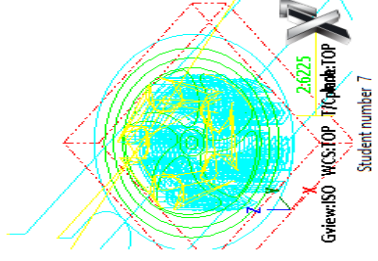
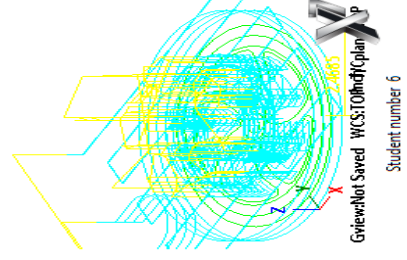
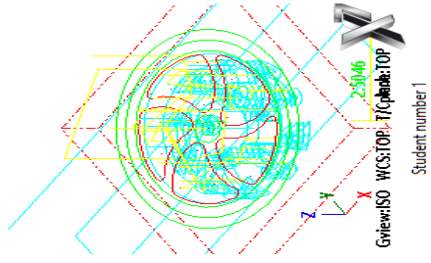
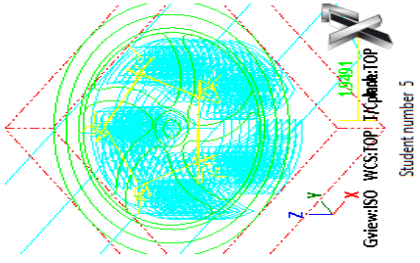
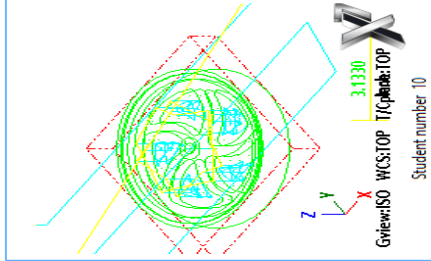
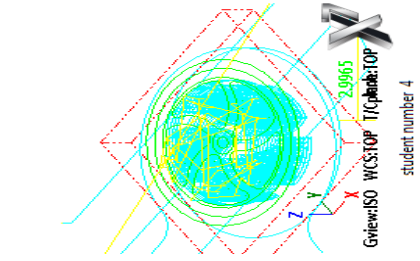
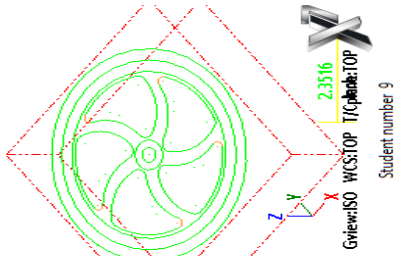
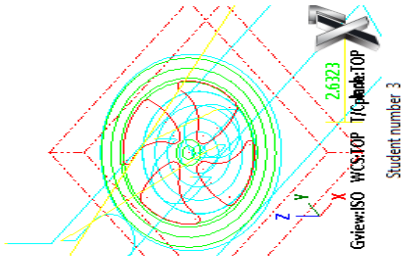
If this was a MAN 52 course students would most likely be given an exam such as was given here at about 75% of course completion. If this is a MAN 35 course students should actually be given this course at about 40% of the course completion. So I admit that I am a bit behind on giving the course but I really wanted to provide the students with more time to practice for the exam. Many of the students took advantage of being given more time and a few did not as one can see in the description located on the last page.

Page 2; shows pictures of each of the students work.

Pages 3-12; provides a rubric for grading the students on the exam and was given to the students before the exam so that they would know what they would be graded on. These also shows how successful each students were and what grade they received for the exam.

Page 13; a chart of the grade distribution.

Page 14; provides a written review of my thoughts on how the course can be improved to make sure students are more successful and the SLOs and PLOs completed during the test.



TS

2015

Feed rate for drills 6-12

Student number 1

Make sure to check that your feedrates and spindle speeds are correct for aluminum and that the operation is efficient and that the tool is kept lubricated.

Operation 1; Face the part

The thickness of the part is $\frac{3}{4}$ so you will need to use a 3" cutter to face the part

Operation 2; Cut ledge

$\frac{3}{64}$ deep

Ramp into the cut

$\frac{3}{4}$ " cutter

Operation 3; Cut large pocket

$.21875 + \frac{3}{64}$ deep (is this correct? Think about it before doing it)

$\frac{3}{4}$ cutter

spiral into the cut

Do you need depth cuts?

Operation 4; Make spokes

Through the part

$\frac{3}{4}$ cutter

Spiral into the cut

Do you need depth cuts?

Operation 5; Re-machine spokes

Through the part

$\frac{1}{4}$ cutter

do you need depth cuts

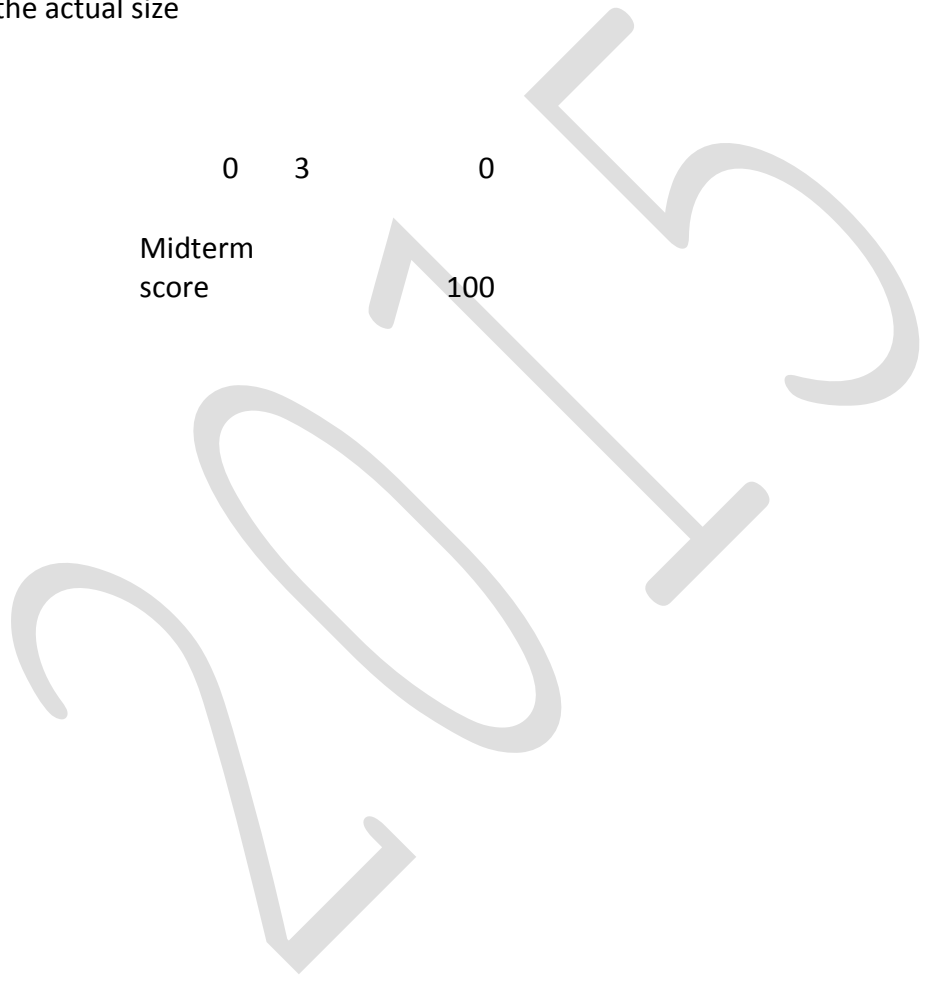
Operation 6; Centerdrill hole

$-.0625$ deep

Operation 7; Drill hole slightly less than the reamer

Ltr U drill
Through the part
Do you need pecks?
Operation 8; ream the hole to the actual size
Through the part
No pecking (G81)
Feedrate of 6-12
the best one yet

0 3 0
Midterm
score 100



Feed rate for drills 6-12

Student number 2

Make sure to check that your feedrates and spindle speeds are correct for aluminum and that the operation is efficient and that the tool is kept lubricated.

Operation 1; Face the part

The thickness of the part is 3/4 so you will need to use a 3" cutter to face the part

Stock to leave on floors is set to
0.05 why?

1

Operation 2; ledge

3/64 deep

Ramp into the cut

3/4" cutter

check depth, you took off .0625 on
the first op
no

2

3

Operation 3; Cut large
pocket

.21875+3/64 deep (is this correct? Think about it before doing it)

3/4 cutter

spiral into the cut

Do you need depth cuts?

Operation 4; Make spokes

Through the part

3/4 cutter

Spiral into the cut

Do you need depth cuts?

rapid retract

4

Operation 5; Re-machine spokes

Through the part

1/4 cutter

do you need depth cuts

Operation 6; Centerdrill hole

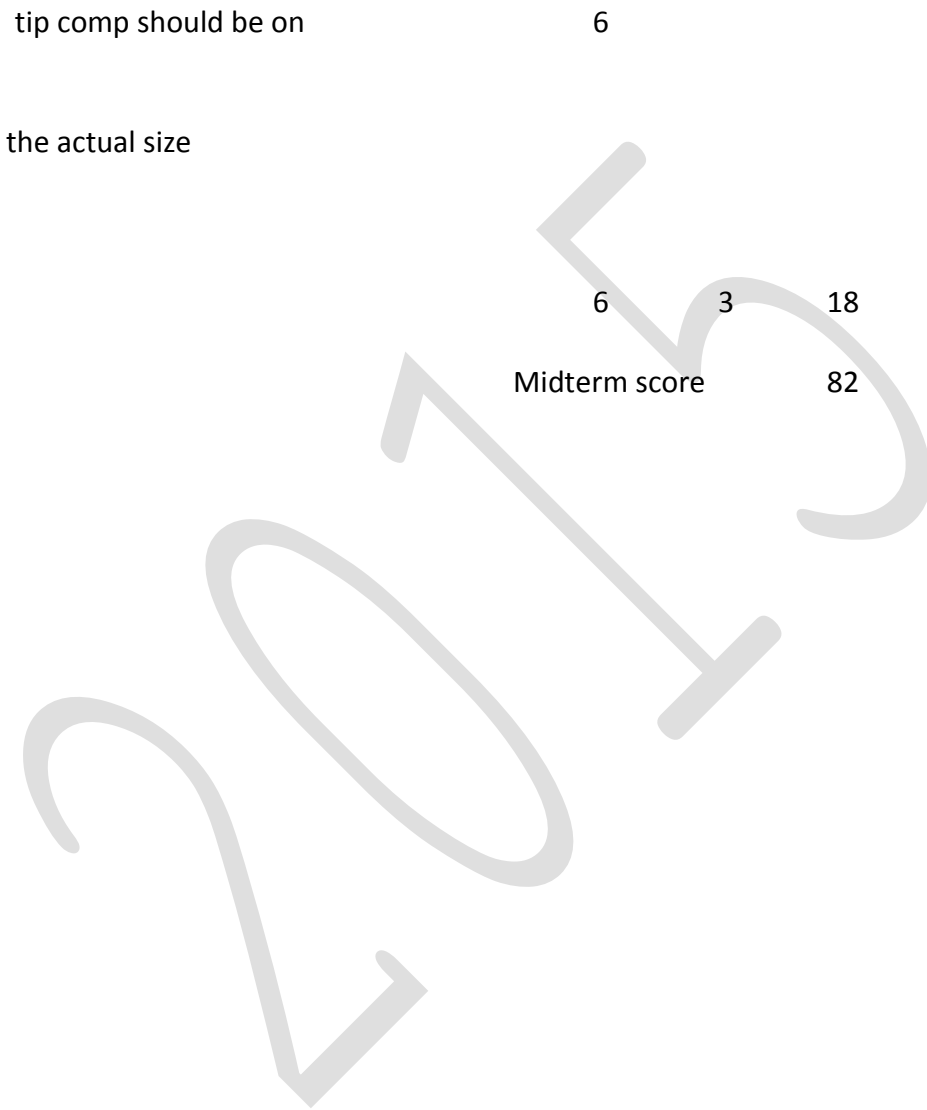
-.0625 deep

check feed rate

5

Operation 7; Drill hole slightly less than the reamer

Ltr U drill
Through the part
Do you need pecks?
Operation 8; ream the hole to the actual size
Through the part
No pecking (G81)
Feedrate of 6-12



Student
number 3

Feed rate for drills 6-12

Make sure to check that your feedrates and spindle speeds are correct for aluminum and that the operation is efficient and that the tool is kept lubricated.

Operation 1; Face the part

The thickness of the part is $3/4$ so you will need to use a 3" cutter to face the part
check depth

Operation 2; Cut ledge

$3/64$ deep

Ramp into the cut

$3/4$ " cutter

Operation 3; Cut large pocket

$.21875 + 3/64$ deep (is this correct? Think about it before doing it)

$3/4$ cutter

spiral into the cut

Do you need depth cuts?

there should be two chains here

Operation 4; Make spokes

Through the part

$3/4$ cutter

Spiral into the cut

Do you need depth cuts?

missing

missing

missing

missing

missing

Operation 5; Re-machine spokes

Through the part

$1/4$ cutter

do you need depth cuts

missing

missing

missing

missing

Operation 6; Centerdrill hole	missing	
-.0625 deep	missing	
Operation 7; Drill hole slightly less than the reamer	missing	
Ltr U drill	missing	
Through the part	missing	
Do you need pecks?	missing	
Operation 8; ream the hole to the actual size	missing	
Through the part	missing	
No pecking (G81)	missing	
Feedrate of 6-12	missing	
	check geometry of pockets	
	3	0
Midterm score		60

Feed rate for drills 6-12

Student number 4

Make sure to check that your feedrates and spindle speeds are correct for aluminum and that the operation is efficient and that the tool is kept lubricated.

Operation 1; Face the part

The thickness of the part is 3/4 so you will need to use a 3" cutter to face the part

Operation 2; Cut ledge

3/64 deep

Ramp into the cut

3/4" cutter

Operation 3; Cut large pocket

3/4 cutter

spiral into the cut

Do you need depth cuts?

Operation 4; Make spokes

Through the part

3/4 cutter

Spiral into the cut

Do you need depth cuts?

Operation 5; Re-machine spokes

Through the part

1/4 cutter

do you need depth cuts

Operation 6; Centerdrill hole

-.0625 deep

wrong depth,
you have already
taken off .0625 1

rapid
retract 2

Operation 7; Drill hole slightly less than the reamer

Ltr U drill

Through the part

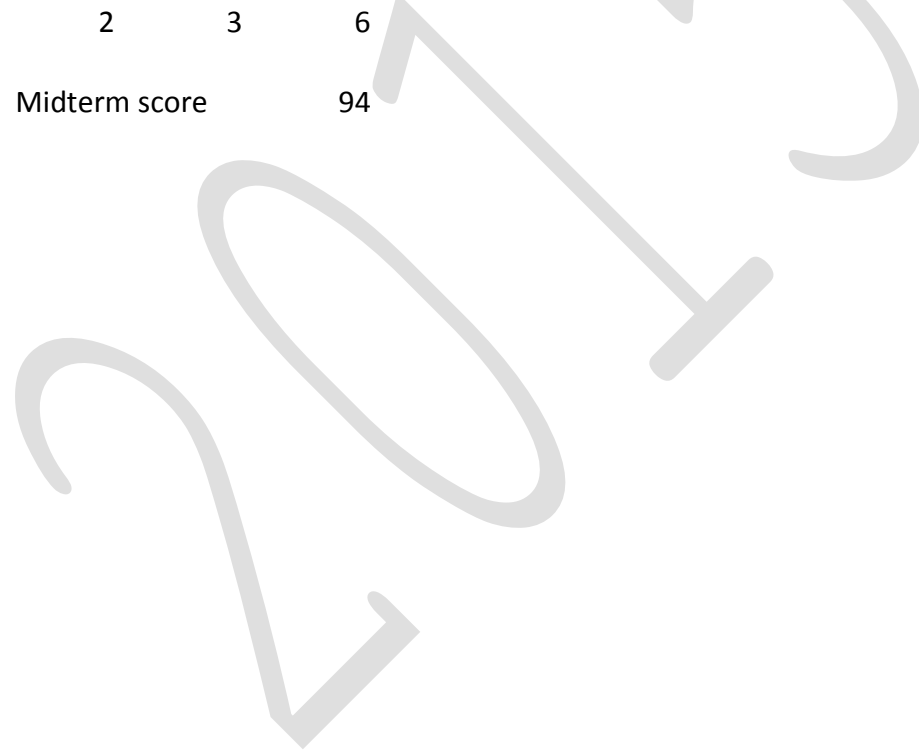
Do you need pecks?

Operation 8; ream the hole to the actual size

Through the part

No pecking (G81)

Feedrate of 6-12



		Student number
Feed rate for drills 6-12	Not correct	5
Make sure to check that your feedrates and spindle speeds are correct for aluminum and that the operation is efficient and that the tool is kept lubricated.		
Operation 1; Face the part	check feed rate for 3" face mill. It is too fast	1
	Missing comment	2
The thickness of the part is 3/4 so you will need to use a 3" cutter to face the part		
Operation 2; Cut ledge	Missing comment	
	Check feed rate	3
	Rapid retract	4
	check len and dia offset	5
3/64 deep	0.046875	
Ramp into the cut	Not on	6
3/4" cutter		
Operation 3; Cut large pocket		
.21875+3/64 deep (is this correct? Think about it before doing it)	check depth, you have already taken off .0625	7
3/4 cutter		
spiral into the cut		
Do you need depth cuts?		
Operation 4; Make spokes		
Through the part		
3/4 cutter		
Spiral into the cut		
Do you need depth cuts?		

Operation 5; Re-machine spokes

Through the part

1/4 cutter

do you need depth cuts

Operation 6; Centerdrill hole

-.0625 deep

Operation 7; Drill hole slightly less than the reamer

Ltr U drill

Through the part

Do you need pecks?

Operation 8; ream the hole to the actual size

Through the part

No pecking (G81)

Feedrate of 6-12

the large cutter already took off .0625 so this
did not work

8

Turn on tip comp

9

9

3

27

Midterm score

73

Feed rate for drills 6-12

Student number

6

Make sure to check that your feedrates and spindle speeds are correct for aluminum and that the operation is efficient and that the tool is kept lubricated.

Operation 1; Face the part

check spindle speed

1

The thickness of the part is $\frac{3}{4}$ so you will need to use a $\frac{3}{4}$ " cutter to face the part

Operation 2; Cut large pocket

$\frac{3}{64}$ deep

Ramp into the cut

$\frac{3}{4}$ " cutter

Operation 3; Cut large pocket

$.21875 + \frac{3}{64}$ deep (is this correct? Think about it before doing it)

$\frac{3}{4}$ cutter

spiral into the cut

Do you need depth cuts?

Operation 4; Make spokes

Through the part

$\frac{3}{4}$ cutter

Spiral into the cut

Do you need depth cuts?

Operation 5; Re-machine spokes

Through the part

$\frac{1}{4}$ cutter

do you need depth cuts

Operation 6; Centerdrill hole

$-.0625$ deep

Operation 7; Drill hole slightly less than the

reamer

Check tool
number

2

Ltr U drill

Through the part

Do you need pecks?

Operation 8; ream the hole to the actual size

check tool
number

Through the part

No pecking (G81)

Feedrate of 6-12

2

3

6

Midterm score

94

	Student number	
Feed rate for drills 6-12	7	
Make sure to check that your feedrates and spindle speeds are correct for aluminum and that the operation is efficient and that the tool is kept lubricated.		
Operation 1; Face the part		
The thickness of the part is 3/4 so you will need to use a 3" cutter to face the part		
	check spindle speed	1
	check depth	2
	selected the wrong geometry	3
Operation 2; cut ledge		
3/64 deep		
Ramp into the cut	no ramping	4
3/4" cutter		
Operation 3; Cut large pocket		
.21875+3/64 deep (is this correct? Think about it before doing it)		
3/4 cutter		
spiral into the cut		
Do you need depth cuts?		
Operation 4; Make spokes		
Through the part		
3/4 cutter		
Spiral into the cut		
Do you need depth cuts?		
Operation 5; Re-machine spokes		
Through the part		
1/4 cutter		
do you need depth cuts		
Operation 6; Centerdrill hole		
	the large cutter already took off .0625	5
-.0625 deep		

so this did not work

Operation 7; Drill hole slightly less than the reamer

Ltr U drill

Through the part

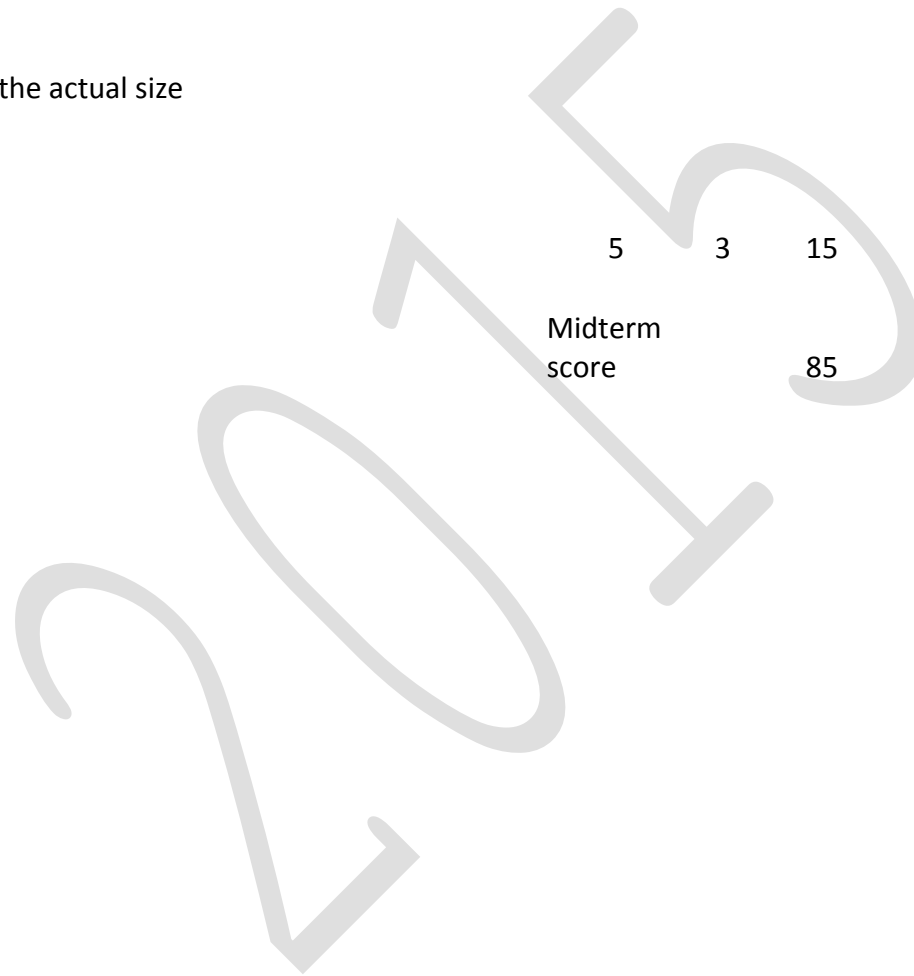
Do you need pecks?

Operation 8; ream the hole to the actual size

Through the part

No pecking (G81)

Feedrate of 6-12



Feed rate for drills 6-12

Student number

8

Make sure to check that your feedrates and spindle speeds are correct for aluminum and that the operation is efficient and that the tool is kept lubricated.

Operation 1; Face the part

The thickness of the part is $3/4$ so you will need to use a $3/4$ " cutter to face the part

Operation 2; Cut ledge	check depth	1
$3/64$ deep	Part geometry is not correct	2
Ramp into the cut		
$3/4$ " cutter		
Operation 3; Cut large pocket		
$.21875 + 3/64$ deep (is this correct? Think about it before doing it)	check depth, you have already taken off $.0625$	3
$3/4$ cutter		
spiral into the cut		
Do you need depth cuts?		
Operation 4; Make spokes		
Through the part		
$3/4$ cutter		
Spiral into the cut		
Do you need depth cuts?		
Operation 5; Re-machine spokes		
Through the part		
$1/4$ cutter		
do you need depth cuts		
Operation 6; Centerdrill hole		
$-.0625$ deep		

Operation 7; Drill hole slightly less than the reamer

Ltr U drill

Through the part

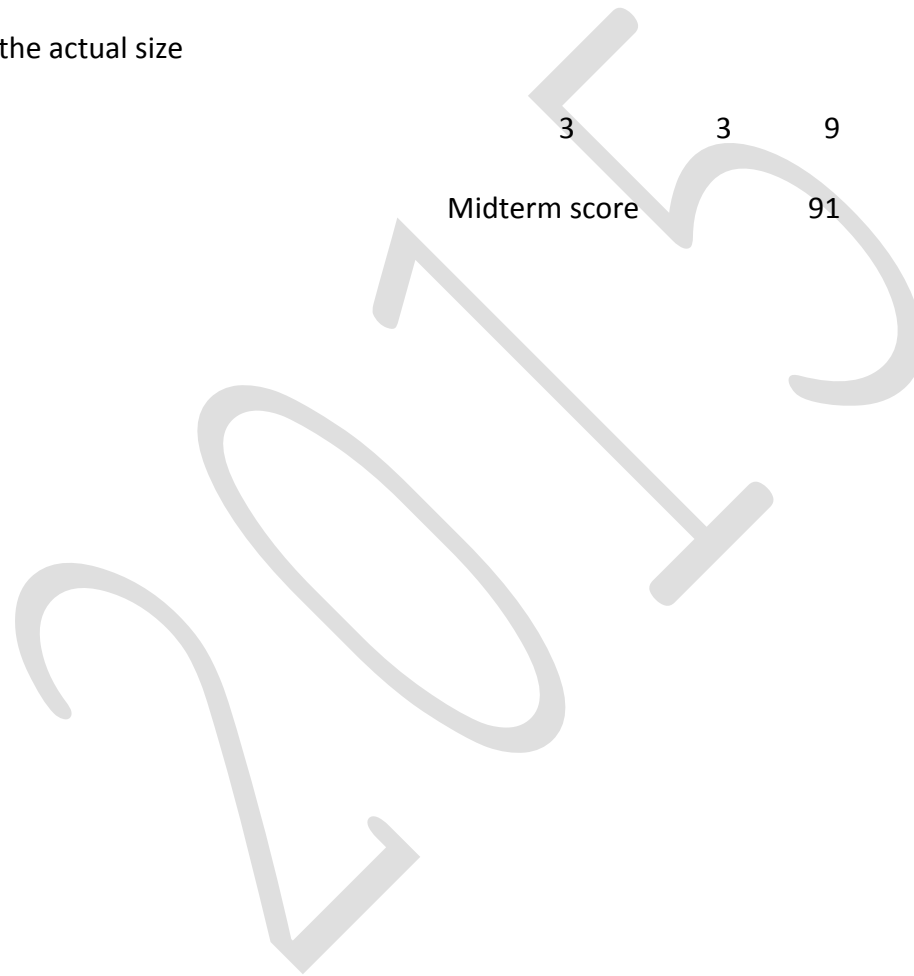
Do you need pecks?

Operation 8; ream the hole to the actual size

Through the part

No pecking (G81)

Feedrate of 6-12



Feed rate for drills 6-12

missing tool path???????

Student number

9

Make sure to check that your feedrates and spindle speeds are correct for aluminum and that the operation is efficient and that the tool is kept lubricated.

Operation 1; Face the part

The thickness of the part is $\frac{3}{4}$ so you will need to use a 3" cutter to face the part

Operation 2; Cut large pocket

$\frac{3}{64}$ deep

Ramp into the cut

$\frac{3}{4}$ " cutter

Operation 3; Cut large pocket

$.21875 + \frac{3}{64}$ deep (is this correct? Think about it before doing it)

$\frac{3}{4}$ cutter

spiral into the cut

Do you need depth cuts?

Operation 4; Make spokes

Through the part

$\frac{3}{4}$ cutter

Spiral into the cut

Do you need depth cuts?

Operation 5; Re-machine spokes

Through the part

$\frac{1}{4}$ cutter

do you need depth cuts

Operation 6; Centerdrill hole

$-.0625$ deep

Operation 7; Drill hole slightly less than the reamer

Ltr U drill

Through the part

Do you need pecks?
Operation 8; ream the hole to the actual size
Through the part
No pecking (G81)
Feedrate of 6-12

Midterm score 50

2015

Feed rate for drills 6-12

	Student number	10
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Make sure to check that your feedrates and spindle speeds are correct for aluminum and that the operation is efficient and that the tool is kept lubricated.

Operation 1; Face the part

The thickness of the part is 3/4 so you will need to use a 3" cutter to face the part

Operation 2; Cut ledge

3/64 deep

Ramp into the cut

3/4" cutter

position of the ledge is not correct

1

Operation 3; Cut large pocket

.21875+3/64 deep (is this correct?)

Think about it before doing it)

3/4 cutter

spiral into the cut

Do you need depth cuts?

wrong depth you have already taken off .0625

2

Operation 4; Make spokes

Through the part

3/4 cutter

Spiral into the cut

Do you need depth cuts?

this should be a remachining process

3

Operation 5; Re-machine spokes

Through the part

1/4 cutter

do you need depth cuts

wrong size cutter

4

Operation 6; Centerdrill hole

-.0625 deep

check depth you only
went down .03

5

Operation 7; Drill hole slightly less than the reamer

Ltr U drill

Through the part

Do you need pecks?

Operation 8; ream the hole to the actual size

Through the part

No pecking (G81)

Feedrate of 6-12

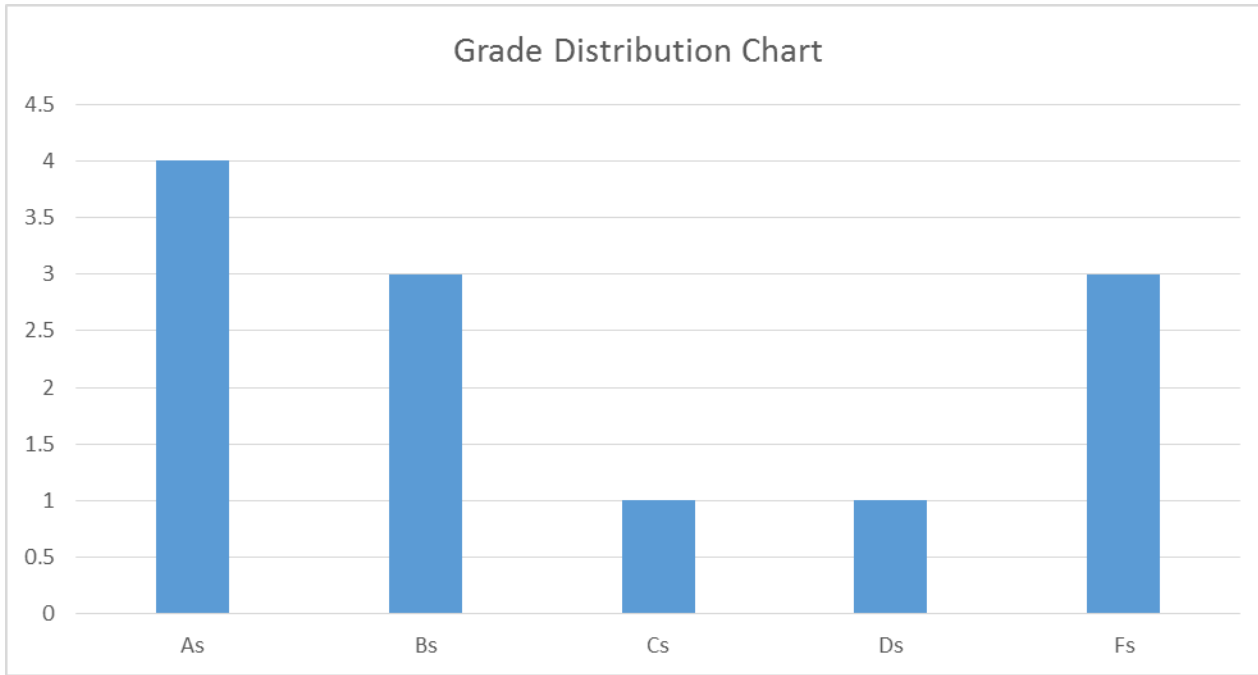
5

3

15

Midterm
score

85



The first page of this document shows pictures of each of the student's drawings along with their toolpaths. From the pictures and the grade sheets, one can see that each student had different levels of completion. At the beginning of the test students were given description of what they will be graded on and how to complete the exam. This description is shown on pages 2-12 along with the student's results. A few weeks before the exam students, were given a somewhat simpler flywheel that the students could use to practice for the exam. Students were encouraged to practice for the exam using lab time and their computers at home. A student version of Mastercam can be downloaded from the Caminstructor website that they can use at home. They also have access to the program in the STEM center.

Most of the students did very well on this midterm exam and were successful at completing two student learning outcomes and one programing learning outcomes. Since this is a midterm exam, students will have many other opportunities to further practice the student learning outcomes. The students are well on the way to understanding each of the above SLOs and PLOs for the class.

The student learning outcomes in particular are:

- **SLO 2; Program milling machine operations at a beginning and advanced level using MasterCam Computer Machining (CAM) software.**
- **SLO 3; Create simple two-dimensional and advanced three-dimensional parts using Mastercam software.**
- **PLO 2; Create five-axis part drawing files using Computer Aided Manufacturing program such as Mastercam, numerical code files and Solid Works.**

The above midterm project that the students created are directly related to the student learning/program learning outcomes shown below. It shows the toolpaths that the students created along with the geometry that the toolpaths create. Once the students have created the geometry and applied toolpaths to them the next step is for the student to generate the code that drives the steps that the machine will take. This is done simply by click on one button. Mistakes at the level of creating the geometry and the toolpaths can make for major problems during the machining operations. As everyone in the industry knows and often repeats when such mistakes are made is: "dumb machine does exactly what you tell it". Tell the machine to do something wrong when creating geometry and toolpaths will cause machine cashes which could cost a company/school to lose a lot of money.

Four students were not as successful as I would have liked them to be. Two of these four are not even represented on the above chart or grade sheets. One of the two struggled so much during the exam that I let him work on it at home. I am sure that he will comeback with something done but not sure of how it will look. He has problems with keeping up with lectures and does not spend enough time at home working on homework and the other student shows up almost every day but has to step out of class often due to work concerns. He also needs to work harder at keeping up with lectures and needs to practice more at home. He is not willing to spend enough time practicing and is basically lost because of it.

Out of the two students which got a 50 (student number 9) and or 60 (student number 3) on the exam, both of these students surprised me that they struggled so much on the test. I think student 9 just mistakenly turned in the wrong file. The file that he turned in does not contain any toolpaths. I have emailed him asking him to turn in the correct file. He does very well in the class and I do recall that he did more than just creating geometry when I walked around the classroom during the exam. As for student number 3 he only did 3 out of the 8 of the required operations during the exam, what a disappointment. I will talk to him some more soon about what happened and how he can improve on future test.

The other students where very successful. One issue I will address is the math involved with figuring out what to

do if you have made the first cut at .0625 what are the next depths to cut at. Most of the students were not able to figure this out. The only changes I might make on future midterms is to give them the harder part to practice and the simpler part to for the exam.

2015