

Grant Title: **Accelerated Pathways in Advanced Manufacturing (APAM)**

Author: **Community College of Rhode Island**

Link: <http://www.ccri.edu/>

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DOL Disclaimer Statement:



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PROGRAM PROPOSAL APPROVAL TRACKING FORM

Name of Proposal: A.S. Degree – Advanced Manufacturing Technology

SIGNATURES REQUIRED PRIOR TO SUBMISSION

Academic Department		
Proposal Originator(s):	_____ Signature	_____ Date
	_____ Signature	_____ Date
Department Vote for Approval: # Yes <u>10</u> # No _____ # Not Voting _____ <i>(Department members voting "no" may submit a separate report)</i>		
Department Chair:	_____ Signature	_____ Date
Academic Dean:	_____ Signature	_____ Date

Note: All sections of this form must be completed and submitted with all required attachments to the Chair of the Curriculum Committee according to published distribution schedule. Should you have any questions, call the Office of the Dean of Business, Science and Technology, 825-2147.

CURRICULUM REVIEW COMMITTEE MEETING FOLLOW UP		
Meeting Date: _____	Committee Vote: # Yes <input type="checkbox"/> # No <input type="checkbox"/> # Abstentions <input type="checkbox"/>	
Curriculum Committee Chair:	_____ Signature	_____ Date
<div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <input type="checkbox"/> Forward to VPAA and President </div> <div style="text-align: center;"> <input type="checkbox"/> Return to Department </div> </div>		
V.P. for Academic Affairs:		
	_____ Signature	_____ Date
President:		
	_____ Signature	_____ Date
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <div style="margin-bottom: 5px;"><input type="checkbox"/> To PEEC for Certificates of 18 or less</div> <div style="margin-bottom: 5px;"><input type="checkbox"/> To ASAC / BOG</div> <div style="margin-bottom: 5px;"><input type="checkbox"/> READY FOR IMPLEMENTATION</div> </div> <div style="width: 45%;"> <div style="margin-bottom: 5px;">Date of Approval: _____</div> <div style="margin-bottom: 5px;">Date of Approval: _____</div> </div> </div>		

File: Office of Vice President for Academic Affairs

Community College of Rhode Island

Program Proposal:

<input checked="" type="checkbox"/>	New Program
<input type="checkbox"/>	Revised Program

Date Submitted: 3 / 10 / 16

DEPARTMENT: Engineering and Technology

DEVELOPED BY: Jerry Bernardini, Ray Ankrom, Ed Hanrahan, Phil Miller

PROGRAM TITLE: Advanced Manufacturing Technology

TOTAL PROGRAM CREDITS: 63

Will program require the creation of any new courses?

Yes ☒ No ☐

ETCN 1000: Industrial Design
ETCN 2000: Advanced Machining Skills
ETCN 2250: Lean Manufacturing
ETCN 2350: Automated Machining Technology
ETCN 2360: Manufacturing Quality Control
ETCN 2400: Industry and OSHA-10 Seminars

Will program replace another program of study?
If yes, list course and program of study:

Yes ☐ No ☒

Will program be an Associate Degree Program?

☒

If yes, specify degree type:

AS

No ☐

Will program be a Certificate Program?

☐

If yes, specify total credit hours:

No ☐

RATIONALE FOR THE PROGRAM:

Modern advanced manufacturing has been revolutionized by the use of computers for design, machining and automation. Today the design of almost all products and components is accomplished with the use computer-aided design (CAD) and computer-aided manufacturing (CAM) programs. The manufacturing process utilizes computer to control all aspects of subtractive and additive manufacturing (3D printing). Computer numerical control (CNC) machining is at the heart of advanced manufacturing and the production of complex components accurately and efficiently. Advanced manufacturing also uses computers to control the supply of materials, the inspection and distribution of finished products. This program has been designed to provide the student with extensive hands-on laboratory experience while addressing three possible advanced manufacturing tracks, design and rapid prototyping, advanced machining skills, and automation and quality. The degree can be approached from three possible certificates or directly as a degree path.

CATALOG DESCRIPTION:

A.S. Degree – Advanced Manufacturing Technology (ETMA) --- 63 credits

Modern advanced manufacturing has been revolutionized by the use of computers for design, machining and automation. Today the design of almost all products and components is accomplished with the use computer-aided design (CAD) and computer-aided manufacturing (CAM) programs. The manufacturing process utilizes computer to control all aspects of subtractive and additive manufacturing (3D printing). Computer numerical control (CNC) machining is at the heart of advanced manufacturing and the production of complex components accurately and efficiently. Advanced manufacturing also uses computers to control the supply of materials, the inspection, the quality assurance and distribution of finished products. This program will provide students with extensive hands-on laboratory experience to build the basic skills and knowledge for employment opportunities in a variety of advanced manufacturing positions. The program will covers areas of science and mathematics and their applications to machining practices, CNC programming, and places emphasis on both theoretical and practical phases of the design, cost, quality and production of machined parts. This A.S. degree is linked to three certificates or tracks; Manufacturing Design and Rapid Prototyping (ETMD), Advanced Machining Skills (ETMM), Manufacturing Automation and Quality (ETMQ). Students can start their studies with one or more of the certificates or directly with the degree and have all credits apply to the A.S. Degree. The degree path requires a prerequisite of MATH 0600 and ENGL 1001. Fulltime students can expect to complete this program in five semesters.

Program Courses Hours

CCRI A.S. Manufacturing Technology ETMA

Courses		Credits	Lec hrs.	Lab hrs	CERTIFICATE COURSES		
					ETMD	ETMM	ETMQ
					Design & Rapid Prototyping	Manufacturing Machining	Automation & Quality
					Credits	Credits	Credits
A.S. ETMA DEGREE SUMMARY					19	19	19
General Education		22	19	4			
Required Courses and Internship		29	14	21			
Electives Courses (Average hrs)		12	1.6	2.8			
A.S. Degree Totals		63	34.6	27.8			
A.S. Contact Hour Totals (15-week semesters)			775	1135			
GEN EDS							
ENGL 1010 Composition I	ENGL 1010	3	3				
Applied Technical Math I	MATH 1750	3	3				
Applied Technical Math II	MATH 1760	3	3				
Physics for technology	PHYS 1050	4	2	2			
Intro. to Renewable Energy	PHYS 1070	3	2	2			
Psychology in the WorkPlace	PSYC 1050	3	3				
Oral Communications I	COMM 1100	3	3				
Gen Ed Totals		22	19	4			
GenEd Contact Hour Totals (15-week semesters)			285	60			
A.S. DEGREE REQUIRED COURSES							
Engineering Graphics (Solidworks)	ENGR 1030	3	1	4	3		
Intro to Manufacturing Process	ETME 1020	3	1	4	3	3	
Blue Print Reading and Machine Handbook	ETCN 1100	3	2	2	3	3	
Precision Measurement & Geometric Dim. Tol.	ETCN 1200	3	2	2			3
CNC Manufacturing I	ETCN 1300	3	1	4		3	
*Advanced Solid Modeling	ENGT 2090	3	1	3	2		
Introduction to Digital systems (PLCs)	ETEE 1800	3	2	2			3
Introduction to Robotics and Control	ETME 1010	3	2	2			3
** Lean Manufacturing	ETCN 2250	1	1	2			1
OSHA-10 and Industry Seminars	ETCN 2400	1		4		1	1
Manufacturing Capstone (140 hr Internship)	ETCN 2500	3	1	140			
A.S. Degree Require Totals		29	14	169	11	10	11
A.S. Degree Require Contact Hour Totals			210	575			
ELECTIVES -12 Credits Minimum		12					
Introduction to AutoCad	ENGT 1060	2	1	3	2		
** Mechanical Industrial Design	ETCN 1000	3	2	2	3		
3D Modeling and Prototyping	ETCN 2300	3	2	2	3		
**Advanced Machining Skills	ETCN 2000	3	1	4		3	
Computer Aided Manufacturing (Master Cam)	ETCN 2100	3	1	4		3	
CNC Manufacturing II	ETCN 2200	3	1	4		3	
**Automated Machining Technolgy	ETCN 2350	3	2	2			3
Automation Systems	ETME 2150	3	2	2			3
**Manufacturing Quality Control	ETCN 2360	2	2	2			2
Minimum Elective AverageTotals		12	18.7	33.3	8	9	8

Advisory Board

Paul Cary; Quick Fitting

Thomas Hutchinson, Davol

Scot Jones, Groov-Pin

Tony Maneca, ArtVac

Dona Vincent, TEDCO

David Chenevert, Swissline

John Lombardi, RI Carbide

Karen Paoluchi, Yushin America +1

Antony Picone, Mahr Federal

Michelle Desaulniers, Taco

Peter McLaughlin, Rice Mfg.

Tom Kowalczyk, KMRM, LLC

Greg Silva, Parkinson Tech.

Andrew Cortez, Building Futures

William McCourt. RIMA

Larry Lefebvre, Chemart

ADVANCED MANUFACTURING TECHNOLOGY (ETMA) "I" = Introduces the concept "R" = Reinforces or contributes additional information "E" = Emphasis (assumes level of mastery)		General Education Courses										ETMA Core Courses										ETMA Electives						
Program Student Learning Outcomes Students will be able to:		ENGL 1010 Composition I	Applied Technical Math I	Applied Technical Math II	Physics for technology	Intro. to Renewable Energy	Psychology in Work Place	Oral Communications	Engineering Graphics	Intro to Manufacturing Process	Intr. to Robotics and control	Introduction to Digital systems	Advanced Solid Modeling	Blue Print Reading and Machinery's Handbook	Precision Measurement and Geometric Tolerancing	CNC Manufacturing I	Lean Manufacturing	OSHA-10 and Industry Seminars	CNC Manufacturing Capstone	Automation Systems	Computer Aided Manufacturing (MasterCam)	CNC Manufacturing II	3D Modeling and Prototyping	Introduction to AutoCAD	Industrial Design	Advanced Machining Skills	Automated Machining Technology	Manufacturing Quality Control
General Education, Core and Electives		ENGL 1010	MATH 1750	MATH 1760	PHYS 1050	PHYS 1070	PSYC 1050	COMM 1100	ENGR 1090	ETME 1020	ETME 1010	ETEE 1800	ENGT 2090	ETCN 1100	ETCN 1200	ETCN 1300	ETCN 2250	ETCN 2400	ETCN 2500	ETME 2310	ETCN 2100	ETCN 2200	ENGT 2300	ENGT 1060	ETCN 1000	ETCN 2000	ETCN 2350	ETCN 2360
1	Analyze technical problems, propose solutions and document with written and oral reports	I	I	I	I	I	I	I	R	R	R	R	R	R	R	R	R	R	E	E	R	R	R	R	R	R	R	R
2	Employ technology for communications, data collection, analysis, simulation and control.	I	I	I	I	I	I	I	R	R	R	R	R	I	R	R	R	R	E	R	R	R	R	R	R	R	R	R
3	Use basic project management skills, project team work and ethical behavior	R					R	R	I	I	R	R	R	I			E	R	E	R	R	E			R	R	E	R
4	Machine a variety materials using a conversational and CNC lathe, milling machine and grinder.		I	I	I				I	E			I	I	I	R	R		E	R	R	E		I		E	E	R
5	Use the basic manufacturing methods, measurements, automation and quality control		R	R	R	R			I	I	R	R	R	I	R	R	E	I	E	R	R	E				R		E
6	Code PLCs and micro controllers for networking and system control applications		R	R							R	E								R								
7	Apply engineering design and project management principles						R	R	R	I	R	R							E	R				I				E
8	Use CAD/CAM and apply it to engineering graphics and mechanical design								I	R			E	R	R	R			E		E		I	I				
9	Apply the basics of engineering materials, structures and to mechanical design		R	R	R				I	R	R						R		E					I				
10	Read blue prints, perform component measurements and utilize the Machinery's Handbook		R	R					I	R	R		R	I	I		R		E		R	R	E		I			E
11	G-code program, setup CNC machines, select appropriate tooling and fixtures		R	R	R				I	R	R	R	R	R	R	I			E		R	R	E				R	
12	Apply subtractive and additive (3D-printing) manufacturing for rapid prototyping		R	R	R				I	R	R	R	R	R	R	R		E		R	R	E						

Did an Advisory Committee assist in the development of this program?

Yes ☒

No ☐

If yes, please attach a list of the names and affiliations of committee members.

See Advisory board list

Are any arrangements with external organizations essential to offering this program?

Yes ☒

No ☐

If yes, please include a list of the names and affiliations of committee members:

Industry partners and advisor board members will provide internship opportunities and regular industry speakers. See advisory board list.

TRANSFERABILITY: Is this program intended for transfer to the following institutions:

☐ RIC

☐ URI

☒ Other, please specify Discussions with RIC have started

How does the program align with existing transfer agreements? For each course in the program, please list how the CCRI course aligns with sister institution. For example:

CCRI Course Title and Number -- RIC/URI Course Title and Number

ADMINISTRATIVE PLANNING

Please comment on the effects and requirements of the proposal in relationship to the following:

PHYSICAL: On which campuses will the program be offered?

Knight X Flanagan Liston X Newport

Days X Evenings X TV Internet Satellites Specify:

Requested start
date: 8 / 31 / 2016

FINANCIAL: Will this program necessitate any budgetary modifications? Please provide a brief summary under each budget as is appropriate:

Operating

Supplies, consumables and maintenance for this program is estimated at \$15,000 per year

Equipment

TACCT-3 grant monies will provide approximately \$200,000 in additional equipment

Faculty

Raymond Ankrom
Edward Hanrahan
Vern Mace
Jody Robinson
Phil Miller

Staff

60% of a fulltime technician will be required for equipment maintenance and faculty support

OTHER DEPARTMENTS/AREAS

What other departments will be affected? How? Have they been contacted?

This program will not affect other departments.