Grant Title: **Accelerated Pathways in Advanced Manufacturing (APAM)**
Author: **Community College of Rhode Island**
Link: http://www.ccri.edu/

Document: Number10 Strategy3 Activity1 Deliverable14f - 05-ETCN-1000-Mechanical Industrial Design-rev.03

DOL Disclaimer Statement:

COURSE PROPOSAL APPROVAL TRACKING FORM

Name of Proposal: Mechanical Industrial Design

SIGNATURES REQUIRED PRIOR TO SUBMISSION

Academic Department

Proposal Originator(s): _____ _____
Signature **Date**

_____ _____
Signature **Date**

Department Vote for Approval: **# Yes** 10 **# No** _____ **# Not Voting** _____
(Department members voting "no" may submit a separate report)

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** 10 **# No** _____ **# Abstentions** _____

Curriculum Committee Chair: _____ _____
Signature **Date**

☐ **Forward to VPAA and President** ☐ **Return to Department**

V.P. for Academic Affairs: _____ _____
Signature **Date**

READY FOR IMPLEMENTATION

President: _____ _____
Signature **Date**

File: Office of Vice President for Academic Affairs

Community College of Rhode Island

Course Proposal:

x	**New Course**
	Revised Course

Please attach a course syllabus with course topics, textbook titles and evaluation methods.

Date Submitted: **03/ 16/ 2016**

DEPARTMENT: **Engineering and Technology Raymond Ankrom**

DEVELOPED BY: **Raymond Ankrom**

COURSE TITLE: Mechanical Industrial Design

COURSE NUMBER: **ETCN-1000**

CREDITS: 3

CONTACT HOURS PER WEEK		
Lecture hours: 2	**Lab hours:** 2	**Other:** (Clinical hrs., Practicum, etc.)

ACTUAL COURSE MEETING TIME -- HOURS / MINUTES PER WEEK		
Lecture hours / minutes:	**Lab hours / minutes:**	**Other:** (Clinical hrs., Practicum, etc.)

Please circle: **this is a 1st year course** **this is a 2nd year course**

If this course will be required in a specific academic program(s), indicate below:

A.S. Manufacturing Technology

If this course will replace another course in a specific academic program, indicate below:

No

If this course ran on an experimental basis, indicate the course number: _____

Rationale:

In order for the Advanced Manufacturing technician to perform their job to an expected skill level there must be a firm grasp of understanding and being able to analyze machine mechanical design used in the manufacturing environment. The ability to be able to understand simple and complex mechanical machine components are skills these technicians will need. The interpretation of mechanical drawings, application of ANSI standards, basic knowledge of how mechanical machine components work. In addition to basic skills of being able to interpret blueprints the Advanced Manufacturing technician also must be able to use the Machinery's Handbook, Engineering Handbook, Internet search engines to find answers that fit their design. These skills learned in other related courses will be taken out of the box and put to use in basic machine mechanical design in a classroom and lab environment. What makes it move, what makes it return, what makes it repeat? What are springs, screws, bearings, sleeves, gears, levers, drive belts, pulleys and clutches, and more? There is no class currently, which covers these topics in a way that students can see how these components fit into their design. Mechanical Industrial Design ETCN-1000 will be that course.

CATALOG DESCRIPTION (include old and new):

OLD:

NEW:

This course is designed to familiarize the student with components used in mechanical systems. The student will learn how to select components based on system requirements and how to implement the component into the system. Attention is given to currently manufactured components and the use of the manufacturers sizing and mounting procedures. More specifically the sizing and fitting of these elements based on function, power requirements, life and cost.

PREREQUISITE: ENGR 1030 Engineering Graphics

List course number, title and reading level

CO-REQUISITE: ETCN 1100 Blueprint Reading and Machinery's Handbook

List course number, title and reading level

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

☐ RIC ☐ URI ☐ Other, please specify _____

How does the course align with existing transfer agreements? Please list the specific course(s) at sister institution this proposed course will match.

<u>Student Learning Outcomes/Educated Person</u>:

The learning outcomes of specific courses foster multiple perspectives which contribute to the acquisition of desired graduate outcomes as well as to inform and deliver discipline related content.

✓ ***On the next page entitled "Student Learning Outcomes"***

- **Please delineate the major learning outcomes for the proposed course. Each learning outcome should be written in a format that follows the statement "as a result of this course, a student will be able to:"**
- **Indicate what techniques/methods will be used to achieve these student learning outcomes?**
- **List how will the student learning outcomes be assessed?**

Community College of Rhode Island

Student Learning Outcomes

Course Title: Mechanical Industrial Design

The learning outcomes of specific courses are to foster multiple perspectives that contribute to the acquisition of desired graduate outcomes as well as to inform and deliver discipline related content.

Please delineate below the major learning outcomes for the proposed course. Learning Outcomes should be written in a format that follows the statement: "as a result of this course, a student will be able to…"

Item #	STUDENT LEARNING OUTCOMES	TECHNIQUES/METHODS USED TO ACHIEVE OUTCOMES	TYPE(S) OF ASSESSMENT USED TO DETERMINE THE DEGREE TO WHICH THE OUTCOMES ARE ACHIEVED
1	As a result of this course the student will be able to make practical choices of mechanical machine components and mechanisms that meet their mechanical design requirements.	Class lectures, team work, class demonstrations, lab exercises, textbook exercises, training videos PowerPoint and web support material.	Class presentations on provided topics, presentation grading rubrics, hands on lab assignments, class exams and quizzes.
2	As a result of this class the student will be able to identify screws, fasteners, washers, spacers, sleeves and the charts graphs and formulas based on ANSI standards needed to make good selection for use in mechanical designs.	Class lectures, team work, class demonstrations, lab exercises, textbook exercises, training videos PowerPoint and web support material.	Class presentations on provided topics, presentation grading rubrics, hands on lab assignments, class exams and quizzes.
3	As a result of this class the student will be able to identify the gearing, pulley systems, belts, chains, and power transfer systems needed to make good selection for use in mechanical designs.	Class lectures, team work, class demonstrations, lab exercises, textbook exercises, training videos PowerPoint and web support material.	Class presentations on provided topics, presentation grading rubrics, hands on lab assignments, class exams and quizzes.
4	As a result of this class the student will understand the process of building material selection; steels, alloys, non-ferrous metals, heat treatment, and tempering	Class lectures, team work, class demonstrations, lab exercises, textbook exercises, training videos PowerPoint and web support material.	Class presentations on provided topics, presentation grading rubrics, hands on lab assignments, class exams and quizzes.
5	As a result of this course the student will be able to understand thread forms and thread nomenclature found on industrial blueprints and needed on their own designs.	Class lectures, team work, class demonstrations, lab exercises, textbook exercises, training videos PowerPoint and web support material.	Class presentations on provided topics, presentation grading rubrics, hands on lab assignments, class exams and quizzes.
6	As a result of this class the student will understand assemblies; fastening and joining, design hints, mechanisms, linkage, fabrication tips, innovative valves and regulators, pumps, and creative assemblies.	Class lectures, team work, class demonstrations, lab exercises, textbook exercises, training videos PowerPoint and web support material.	Class presentations on provided topics, presentation grading rubrics, hands on lab assignments, class exams and quizzes.

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CCRI Definition of an Educated Person: Four Abilities

The Community College of Rhode Island recognizes four critical areas that define the learning outcomes of a CCRI graduate. These four abilities can be applied in many contexts and are critical skills that must be developed not only at CCRI, but over the course of a lifetime. These core abilities guide students, faculty and staff in establishing educational goals and assessing learning within and across the primary domains of knowledge: arts and humanities, science and mathematics, and the social sciences.

Since individual courses provide the opportunity to gain knowledge in these four critical areas, it is essential to understand which areas are to be covered in each course. In each of the four areas below, please indicate in the Item(s) # box next to each critical element, the Item #(s) from the previous page (Student Learning Outcomes) which supports the Educated Person Ability that is covered.

		Item(s) #
1.	**Effective Communication**	
a.	**Use standard English grammar and mechanics**	**x**
b.	**Create work that addresses a given purpose and context and responds to the target audience**	
c.	**Present a central idea, supported by concrete, relevant details**	**x**
d.	**Establish a clear and consistent sequence of ideas**	
2.	**Critical Thinking**	
a.	**Identify and analyze complex ideas**	**x**
b.	**Determine a research focus and the nature and scope of information needed**	
c.	**Locate, evaluate, and use information effectively**	**x**
d.	**Draw logical conclusions from information**	**x**
e.	**Express well-reasoned or innovative perspectives**	
3.	**Quantitative, Mathematical and Scientific Reasoning**	
a.	**Demonstrate an understanding of mathematical, quantitative or scientific principles.**	
b.	**Apply a scientific approach in asking questions**	**x**
	Apply mathematical, quantitative, or scientific principles in solving problems	**x**
d.	**Interpret numeric information in graphical forms**	**x**
4.	**Social Interaction**	
a.	**Evaluate ethical dimensions of decisions**	
b.	**Use teamwork to accomplish tasks in groups**	**x**
c.	**Demonstrate an understanding of global, cultural and historical perspectives.**	

Note: With respect to the four abilities listed above, the level of attainment achieved should reflect the needs of the specific program. **It is not necessary that individual courses address each outcome, yet, in total, all courses required by a program of study must together meet these goals.**

ADMINISTRATIVE PLANNING

Indicate the campus(es) where the course will be offered: Knight X Flanagan ____ Liston X Newport ____

Indicate: Days X Evenings X TV ____ Internet ____ Satellites ____ Specify: ____

Indicate semester(s) the course will be offered: Fall X Spring X Summer X

Indicate the course scheduling format: 15 weeks ____ 5 week module ____ Other ____

Requested start date: 08 / 30 / 2016

FINANCIAL:

Will this course necessitate purchasing new capital equipment? Yes [ ] No [X]

If yes, type and source of funding for purchase:

Specify amount and type of additional operating funds required to support this course, including any software:

Will students be required to use a lab as part of the course? Yes [x] No [ ]

If yes, specify lab characteristics and lab preference (e.g., public computer lab, electronic classrooms, specific science lab, etc.):

CAD labs on the ground floor on the Knight and Liston campuses

Will course require a lab fee? Yes [x] No [ ]

Explain the reasons for requesting a lab fee. List specific items requiring replacement each semester/year.

Lab fees on the only way that the Department of engineering and technology will be able to maintain perishable supplies used by students in the Advanced Manufacturing lab.

ADMINISTRATIVE PLANNING continued:

Do current full-time or adjunct faculty possess requisite education/experience? Specify additional/unique training that may be required.

Yes

Will additional staff hiring be required to implement this course proposal? **Yes** [ ] **No** [x]

If yes, specify requirements/skills:

N/A

What *additional* books, periodicals, data bases or other resources are needed in the Library to support the course?

The newest edition of the Machinery's Handbook (Industrial Press)

If another department(s) will be impacted by this course offering, indicate the department(s) involved, the potential impact, and the principals involved in these discussions.

N/A

Mechanical Industrial Design

Syllabus

Instructor: TBA

E-mail

Office: Room 0100 or 0076 and 0100

Office Hour:

Textbook: **Illustrated Sourcebook of Mechanical Components 1st Edition** ISBN: 978-0070486171

Reference Textbook: Machinery's Handbook, Industrial Press, 29th edition. (reference, other editions permissible)

Instructor will be using CCRI's Blackboard, accessed through CCRI website for weekly class information and assignments

Type of Class: this is a lecture, lab formatted course the class will use will use PowerPoint presentations, video and Internet research

Required Material: Flash Drive and an active CCRI e-mail account. This is the only e-mail account that this class will use during the semester.

Class Cell Phone and other Electronics Devices Policy: All cell phones, headphones, text messaging equipment, CD players, MP3 players or other music file players; GPS equipment, Blackberries, Palm Pilots and/ or any other electronic device not listed here must be turned off and put away for the entire class. Failure to comply with this policy could result in dismissal from the class

Class Computers Policy: Using the class computers for Web surfing , social networking or any non-academic work will not be permitted during the scheduled class time, regardless if the student is using the computers provided to them in class or a personal computer a student may bring to class. Any student abusing this class policy will be asked to leave for the remainder of that class, resulting in a grade of zero for any work that was due for that day and or a lab grade. If this behavior continues, the student will be asked to leave for the remainder of the class and will not be permitted to return for the next scheduled class meeting. He/she will receive a grade of zero for any work missed or not turned in and / or two lab grades entered as zero and will be dropped one full letter grade. If the behavior continues after the second incident, the student will be given two choices: 1) Withdraw from the class that day which will result in a grade of (W). 2) Receive a failing grade for the course.

Class Structure: this is a lecture, lab formatted course the class will use PowerPoint presentations, video, and Solidworks 2015 3D modeling software, installed on classroom computers. Students will have access to a home version.

Assignment Completion Dates: All projects and assignments will have due dates. The completed work will be expected on that day by the end of the section class time. This

Includes printed documents and / or electronic files, such as Power Point or Excel files. No work will be accepted after the due date unless arrangements have been made in advanced of that day's class. This completion date policy also includes class presentations and projects, and will be is at my discretion.

Class Attendance: The Department of Engineering and Technology has instituted an attendance policy for all classes. Two unexcused absences will result in a one letter grade drop deducted from the class average. Three unexcused absences will result in a second letter grade being deducted from your class average. Four unexcused absences will result in another letter grade deducted from the class average. After five unexcused absences, a final grade of F will be entered as a final grade unless you dropped the class.

An unexcused absence on the day of an individual presentation will result in a two letter grade penalty being deducted from the final score of the project or presentation. In addition, the topic must be presented the next time the class meets. A grade of zero will be entered if the project is not presented or completed on that makeup date.

Cheating, plagiarism, unsafe lab practices, foul language, destruction of other person or college property, and intimidation of other students will not be tolerated any time. Anyone engaging in this type of behavior will be dealt with using the appropriate administrative procedures explained in the student handbook by the Dean of Students Office.

Grading procedure

class presentations equal 20%

class quizzes equal 10%

exams equals 20%

midterm exam equals 25%

final exam equals 25%

Course Description:

In order for the Advanced Manufacturing technician to perform their job to an expected skill level there must be a firm grasp of understanding and being able to analyze machine mechanical design used in the manufacturing environment. The ability to be able to understand simple and complex mechanical machine components are skills these technicians will need. The interpretation of mechanical drawings, application of ANSI standards, basic knowledge of how mechanical machine components work will be used and developed. In addition to basic skills of being able to interpret blueprints the Advanced Manufacturing technician also must be able to use the Machinery's Handbook, Engineering Handbook, Internet search engines to find answers that fit their design. These skills learned in other related courses will be taken out of the box and put to use in basic machine mechanical design in a classroom and lab environment. What makes it move, what makes it return, what makes it repeat? What are springs, screws, bearings, sleeves, gears, levers, drive belts, pulleys and clutches, and more? There is no class currently, which covers these topics in a way that students can see how these components fit into their design. Mechanical Industrial Design ETCN-1000 will be that course.

Class objective:

This course is designed to familiarize the student with components used in mechanical systems. The student will learn how to select components based on system requirements and how to implement the component into the system. Attention is given to currently manufactured components and the use of the manufacturers sizing

and mounting procedures. More specifically the sizing and fitting of these elements based on function, power requirements, life and cost.

Course Outcome:
at the end of this course, the student will be better equipped to develop his / her own machine design

Course topics

Gears and Gearing
Chains, Sprockets, and Ratchets
belts and belting
shafts and couplings
clutches and connections
seals and packings
tube and pipe connections
bushings and bearings
locking and clamping
washers and retaining rings
o-rings and grommets
spacers and inserts...
balls, springs and pins
cams
threaded components , fastening and joining
others…