

OAN Number:
OAN Date:

Board of Trustees Date: 06/19/14
Effective Date: 08/25/14

CUYAHOGA COMMUNITY COLLEGE
OFFICIAL COURSE OUTLINE
Mapped

SUBJECT AREA TITLE

Mechanical Engineering Technology/Manufacturing Industrial Engineering Technology

COURSE TITLE

Product Ideation and Design

SUBJECT AREA CODE-COURSE NUMBER

MET - 1260

COURSE CREDIT HOURS

3.00

I. DESCRIPTION OF COURSE:

A. CATALOG DESCRIPTION: Provides knowledge of the theory of Rapid Prototyping, the enabling critical thinking in new product development, process building, sustainability, and innovation theories. Advantages of using Lean Manufacturing and (6) Sigma are studied.

B. LECTURE HOURS: 3.00

C. LAB HOURS: None

D. OTHER REQUIRED HOURS: 00

E. PREREQUISITE(S):
MATH-0950 Beginning Algebra I

II. GENERAL EDUCATION OUTCOMES:

Upon satisfactory completion of MET 1260 - Product Ideation and Design, the student should be able to perform the following outcomes and supporting objectives:

A. Outcome: Critical Thinking: Analyze and synthesize ideas to make evidence-based decisions and find rational solutions to problems.

Supporting Outcomes:

1. Explain the key elements of Product Development for AM.

B. Outcome: Global Awareness: Describe the interconnected global systems—economic, social, cultural, environmental, technological, political—that affect students’ everyday lives, and articulate the importance of adapting to and participating in a rapidly-changing global society.

Supporting Outcomes:

1. Relate to the advantages of using Lean Manufacturing and Six Sigma concepts.

C. Outcome: Written Communication: Produce writing for an intended audience that is clear and concise, uses standard rules for written language, and effectively organizes language, images and other symbols.

Supporting Outcomes:

1. Explain the key elements of Product Development for AM.
2. Explain and demonstrate the knowledge of the guidelines for a process flow chart.

III. OUTCOMES/OBJECTIVES:

Upon satisfactory completion of MET 1260 - Product Ideation and Design, the student should be able to perform the following outcomes and supporting objectives:

A. Outcome: Explain the key elements of Product Development for AM.

Supporting Objectives:

1. Demonstrate a good knowledge of manufacturing processes and convert a process flow concept into a process flow chart.
2. Explain AM products Designs Motivation.
3. Explain Core DFAM Concepts and Objectives.
4. Interpret complex geometry.
5. Customize Geometries for AM.
6. Describe steps in product development for AM.
7. Discuss and demonstrate critical thinking concepts, and the new product development stages.

B. Outcome: Relate to the advantages of using Lean Manufacturing and Six Sigma concepts.

Supporting Objectives:

1. Discuss the use and importance of using Lean Manufacturing and Six Sigma concepts.
2. Explain Lean Manufacturing 5S.
3. Explain Quality Assurance and its uses.
4. Discuss concepts that are used to ensure that products meet quality and efficient manufacturing.

C. Outcome: Explain and demonstrate the knowledge of the guidelines for a process flow chart.

Supporting Objectives:

1. Explain Additive Manufacturing and its applications.
2. Explain Decision Theory.
3. Explain the approaches to Determining Feasibility.
4. Discuss Process Planning and Control for AM.
5. Communicate new ideas to various audiences using varying media.

IV. COURSE CONTENT:

- A. Paradigm Shifting
- B. New Product Innovation
- C. Critical Thinking Concepts
- D. New product development Stages
- E. Presentation of Ideas
- F. Manufacturing Processes
- G. Process Building
- H. Quality Assurance
- I. Lean Manufacturing
 1. Lean Six Sigma Origins
 2. Leadership For Process Improvement
 3. Strategic Planning For Process Improvement
 4. Creating a Customer Focus

5. Process Improvement Teams
 6. COSTS: Defining Opportunities for Process Improvement
 7. Costs of Quality
 8. Process Performance Measures
 9. Managing Process Improvement Projects
 10. Problem-solving using Design, Measure, Analyze, Improve, Control
 11. PRODUCTIVITY: Process Improvement Opportunities
 12. Value Stream Process Mapping
 13. Just-in-Time and KANBAN
 14. Five S
 15. Kaizen and Error Proofing
 16. Work Optimization
 17. Productive Maintenance
 18. Supply Chain Management
 19. QUALITY: Variation Reduction Opportunities
 20. Statistics
 21. Variables Control Charts
 22. Process Capability
 23. Reliability
 24. Design of Experiments
 25. Failure Modes and Effects Analysis
- J. Team Activities

V. METHODS OF STUDENT EVALUATION MAY INCLUDE ANY OF THE FOLLOWING:

- A. Problem assignments
- B. Quizzes and/or midterm
- C. Final examination

VI. RESOURCES MAY INCLUDE ANY OF THE FOLLOWING:

- A. Donna C. Summers. *Lean Six Sigma*. University of Dayton, 2011.
- B. Gibson, Rosen, Stucker. *Additive Manufacturing Technologies, Rapid Prototyping to Direct Digital Manufacturing*. Springer Science + Business Media, LLC , 2010.
- C. Hopkinson, Hague, Dickens. *Rapid Prototyping, an Industrial Revolution for the Digital Age*. John Wiley & Sons, NJ, 2006.

VII. ADDITIONAL RESOURCES:

Handouts specified by instructor