

1. EM434 Additive Manufacturing
2. Credit Hours (3) / Contact Hours (3)
3. Course Director – CAPT Brad Baker
4. Course Textbook: There is no required textbook for this class.
5. Specific course information
  - a. EM434 is a course in current Additive Manufacturing (AM) technologies and their applications in the Department of Defense and industry. Practical hands-on use of AM, engineering design for AM, and modern topics in AM are core areas emphasized in a project-based learning environment with potential for tangible contributions to the operating forces of the Navy and Marine Corps. All AM methods are reviewed with emphasis on Fused Deposition Modeling (FDM), Stereolithography (SLA), and Selective Laser Sintering (SLS).
  - b. Prereq: EM217, EM221, EA222, or EN222, or approval of the Mech-E Department Chair.
  - c. Senior engineering elective course

6. Educational objectives
  - a. Describe all common AM processes for metals and polymers including their capabilities, limitations, and common uses.
  - b. Employ fused deposition modeling, stereolithography, and other common AM processes to produce practical parts and assemblies to solve design problems
  - c. Understand principles behind hand-drawn orthographic and isometric sketches of simple parts.
  - d. Draw complex parts and assemblies to produce engineering drawings using a computer-aided design program.
  - e. Understand when AM is or is not an appropriate manufacturing technique, and understand the concepts of design for AM.
  - f. Understand the history and uses of AM in military and industry applications.

7. Specific program outcomes addressed by this course

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Reinforced		X					
Mastered	X						X

8. Brief list of topics to be covered
  - a. AM Terms and Methods
  - b. FDM/FFF Methods
    - i. Materials
    - ii. Mechanical Considerations
    - iii. Printing Methods

- c. SLA/VAT Methods
  - i. Materials
  - ii. Printing Methods
- d. 3-D Scanning
- e. Drafting and Orthographic/Isometric Sketching
- f. PBF Methods
- g. Metal AM Methods
- h. Editing STL Files
- i. Bound Metal Deposition
- j. Pressure Forming
- k. Engraving