ADDITIVE ENGINEERING TECHNOLOGY (AEG)

AEG 101 (3 credit hours)

Intro to Additive Engineering Technology

Provides an orientation to the field of additive engineering technology (AEG). Emphasizes will be given to its history, terminology, range of materials used, understanding of the industry landscape, and competitive advantages of AEG. Integrates hands-on experience and observations to facilitate the introduction to basic AEG processes. Lecture: 3 credits (45 contact hours).

Attributes: Technical Components: LEC: Lecture

AEG 102 (3 credit hours) CAD for Additive Engineering

Covers essential computer-aided design (CAD) skills from basic interfaces to advanced 3D modeling and rendering. Demonstrate an understanding of 2D sketching, 3D modeling, assembly design, surface modeling, texturization, and visualization techniques. Emphasizes industry standards, best practices, additive manufacturing, and the role of artificial intelligence (AI) in CAD. Lecture: 3 credits (45 contact hours). **Pre-requisite:** MAT 126 or Higher Quantitative Reasoning Course.

Pre- or co-requisite: AEG 101. Attributes: Technical Components: LEC: Lecture

AEG 103 (3 credit hours)

Slicing and Programming Basics

Provides an in-depth exploration of 3D printing software and programming techniques, equipping students with essential skills for advanced additive engineering technology. Learn slicing software fundamentals, model manipulation, advanced slicing parameters and techniques, and advanced settings for various printers, including optimization of print quality and multi-color printing. Covers G-code basics, modification, post-processing, Al-assisted generation, and automation using scripting languages. Lecture: 3 credits (45 contact hours).

Pre- or co-requisite: AEG 101. Attributes: Technical Components: LEC: Lecture

AEG 104 (3 credit hours)

Introduction to 3D: From Capture to Creation

Offers a comprehensive deep dive into the world of 3D scanning and modeling, covering everything from fundamental principles to advanced applications across various industries. Gains hands-on experience with cutting-edge technologies and software, utilizing AI to create and optimize their designs while also diving into the ethics and safety implications to prepare them for real-world challenges in this rapidly evolving field. Lecture: 3 credits (45 contact hours).

Pre- or co-requisite: AEG 101. Attributes: Technical Components: LEC: Lecture

AEG 201 (4 credit hours)

Extrusion 3D Printing Hardware

Provides a comprehensive introduction to extrusion-based 3D printing technologies, focusing on Fused Deposition Modeling (FDM) and Fused Filament Fabrication (FFF). Applies practical knowledge of hardware components, materials, print process optimization, troubleshooting, and maintenance. Combines theoretical concepts with hands-on experience, culminating in a small group project with an industry partner. Lecture: 4 credits (60 contact hours).

Pre- or co-requisite: AEG 101. Attributes: Technical Components: LEC: Lecture

AEG 202 (4 credit hours)

UV Curing and Laser-Based Systems

Provides a foundation to the principles, applications, and advancements of UV curing and laser-based 3D printing technologies. Covers hardware components, material selection, calibration techniques, and maintenance procedures for both UV curing and laser-based systems. Emphasizes the difference placed on understanding the differences between various printing methods, troubleshooting common issues, and exploring future trends in the field. Lecture: 4 credits (60 contact hours).

Pre- or co-requisite: AEG 101. **Attributes:** Technical

Components: LEC: Lecture

AEG 203 (4 credit hours)

Advanced Additive Hardware and Post-Processing

Provides a comprehensive overview of cutting-edge additive engineering and manufacturing technologies, focusing on binder jetting, electron beam melting, friction-based methods, and bioprinting. Explores the background, advantages, applications, and the future of each technology, while gaining hands-on experience through projects. Lecture: 4 credits (60 contact hours).

Pre- or co-requisite: AEG 101.

Attributes: Technical

Components: LEC: Lecture

AEG 220 (3 credit hours)

Additive Materials: Properties, Applications, and Sustainability

Explores the diverse materials used in additive engineering, focusing on their properties, applications, and environmental impact. Covers indepth knowledge of polymers, metals, ceramics, and composites used in various processes, as well as their handling and safety considerations. Explores material selection criteria, testing methods, and characterization techniques. Introduces sustainability concepts, including life cycle assessment and the use of bio-based and recycled materials. Lecture: 3 credits (45 contact hours).

Pre- or co-requisite: AEG 101. Attributes: Technical Components: LEC: Lecture

AEG 230 (3 credit hours)

Strategic Business Applications of Additive Engineering

Explores a comprehensive overview of the dynamic business landscape of additive engineering, equipping participants with the knowledge and skills to leverage additive engineering technologies for strategic advantage. Understands how to integrate additive manufacturing into existing operations and identify marketing opportunities. Lecture: 3 credits (45 contact hours).

Pre- or co-requisite: AEG 101. **Attributes:** Technical

Components: LEC: Lecture

AEG 290 (3 credit hours)

Additive Engineering Technology Internship

Provides on-the-job experience in Additive Technology, requiring a minimum of 120 contact hours of appropriate experience approved by the faculty member (40 contact hours per credit); requires a learning contract signed by the student, faculty member, and supervisor. Co-Op: 3 credits (120 contact hours).

Pre-requisite: Consent of Instructor. Attributes: Technical Components: COP. Co-op