

Graduate Certificate in Additive Manufacturing

Class Timetable

Day	Start Time	Finish Time	Module Code	Module Title	Module Lecturer	Locations	Duration
Monday	18:00	21:00	ME5608A	ME5608A Principles and Processes of Additive Manufacturing	Prof Jerry Fuh	EA-02-11	13 Aug 2018 - 17 Sept 2018
Monday	18:00	21:00	ME5608B	ME5608B: Hybrid Manufacturing	A/Prof Senthil Kumar	EA-02-11	1 Oct 2018 - 12 Nov 2018

** Information correct as June 2018; may subject to changes in future.*

Module Description

ME5513A: Fatigue Analysis for Additive Manufacturing

The objective is to expose students to various methods to tackle practical problems related to fatigue of materials and structures additive manufacturing processes, so that students can apply them to real situations. Particular emphasis is placed on fatigue properties of materials and structures. Major topics include: high and low cycle fatigue, factors affecting fatigue properties of materials and structures, conventional and fracture mechanic fatigue design, fatigue crack propagation, fatigue life prediction and monitoring, fatigue mechanisms and control, and fatigue surface analysis. This module is useful for students in a career related to service failure analysis and/or materials applications.

ME5608A Principles and Processes of Additive Manufacturing

This introductory module emphasizes additive manufacturing processes. Topics include 3D printing processes/materials, metal printing, etc. Students are expected to carry out an independent study by project or term paper on the related topics. A structured programme of lectures, term papers, and a final examination are included in this module.

ME5608B: Hybrid Manufacturing

This introductory module emphasizes on hybrid manufacturing techniques. This will focus on how to use two or more non-conventional material additive and removal processes in macro, micro and nano-scale to machine features. Topics include: bio-micro printing, chemical-mechanical polishing (CMP), electrical-chemical machining (ECM), ultra-precision diamond turning (UPDG), Electrolytic in-process dressing (ELID) grinding, laser-based machining, Ultrasonic Machining, Abrasive Machining Processes, etc. Students are expected to carry out an independent study by project or term paper on the related topics. A structured programme of lectures, term papers, and a final examination are included in this module.

ME5614A: Special Project in Additive Manufacturing

This module introduces applications and practices for additive manufacturing in terms of special project. The project is intended to integrate pre-processing, additive manufacturing processes, and post-processing for additive manufacturing processes. Topics include additive manufacturing practices and applications in engineering, design, healthcare, etc. Students are expected to carry out hand-on studies of additive manufacturing machines in project on the related topics. A structured programme of lectures and projects is included in this module.

ME5615A: Design and Pre-Processing for Additive Manufacturing

This module introduces design and pre-processing for additive manufacturing. Topics include design analysis and guidelines for parts in additive manufacturing, and procedure for pre-processing before additive manufacturing processes. Students are expected to carry out an independent study by project or term paper on the related topics. A structured programme of lectures, project/term papers, and a final examination is included in this module.

ME5615B: Post-processing for Additive Manufacturing

Post-processing is an indispensable step to improve the final quality of the additively manufactured metal parts. This module exposes the students to a series of key machining and finishing methods as well as their applications in AM post-processing. This module covers the major topics about post-processing of the additively manufactured metal parts including surface integrity and material characterisation of AM, heat treatment for 3DPed metal parts, post machining technology, magnetic assisted finishing technology, conventional and non-conventional post-processing methods, etc. This module provides the knowledge and practical expertise to the students who are and will be engaged in a career related to additive manufacturing.

MLE5301: Metallic & Ceramic Materials in Additive Manufacturing

The objective is to expose students to different metallic and ceramic materials used in additive manufacturing (AM) and their applications. Major topics include: a brief overview of metallic materials, their applications & market and conventional fabrication techniques; AM techniques suitable for metals and technical challenges; Metals used in additive manufacturing including steels, aluminium alloys, titanium alloys and superalloys; current status of additive manufacturing of ceramic materials.

MLE5302: Polymer Materials in Additive Manufacturing

The objective is to expose students to different polymer materials used in additive manufacturing (AM) and their applications. Major topics include: a brief overview of thermoplastics, thermoset and composites materials, their applications & market and conventional fabrication techniques; AM techniques used for thermoplastic, thermoset and composites materials such as extrusion deposit 3D printing and vat photopolymerisation 3-D printing. The advantage and challenges of AM.