Module code	TM-4303		
Module Title	Additive Manufacturing		
Degree/Diploma	Bachelor of Engineering (Manufacturing Systems)		
Type of Module	Major Option		
Modular Credits	2	**Total student Workload**	4 hours/week
		Contact hours	2 hours/week
Prerequisite	None		
Anti-requisite	None		

Aims

To expose students to the importance of additive manufacturing (3D Printing) and its huge role in global product development and innovation. Students develop a rich knowledge of 3D printing technologies, devices, capabilities, materials and applications and will learn the trade-offs between various 3D printing processes and technologies, along with the various software tools, processes and techniques enabling personal fabrication.

Learning Outcomes

On successful completion of this module, a student will be expected to be able to:

Lower order:	30%	- describe the different types of Additive Manufacturing (AM) and understand why it has become one of the most important technology trends in decades for product development and innovation - assess the differences between the various AM processes, devices, capabilities and materials that are available
Middle order:	30%	- apply the various software tools, processes and techniques that enable advanced/additive manufacturing and personal fabrication - review the creation of physical objects that satisfy product development/prototyping requirements, using advanced/additive manufacturing devices and processes
Higher order:	40%	- justify the various trade-offs that must be made in selecting advanced/additive manufacturing processes, devices and materials to suit particular product requirements - visualise the latest trends and business opportunities in AM, distributed manufacturing and mass customisation

Module Contents

- Overview to Additive manufacturing processes
- Major Classifications of Additive Manufacturing Processes
- Thermal Energy Based AM Processes
- Melting- and sintering-based processes
- Spray-Binder Based AM Processes
- Design and fabrication processes - data sources, software tools, file formats, model repair and validation, post-processing, design practices for additive manufacturing
- Materials for AM: Metals, polymers, ceramics, and material selection
- Sustainable Additive Manufacturing
- Hybridization of Additive and Subtractive Manufacturing
- Engineering Applications of additive manufacturing
- Bio-Additive Manufacturing

Assessment	Formative assessment	Monthly online multiple choice questions will be used to test and to give feedback for their learning
	Summative assessment	Examination: 40%
		Coursework: 60% - 2 individual written assignments (10% each) - 2 class tests (20% each)