**Learning Module Outline**

| **Short Description** | |
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| Description of the module | **Digital Manufacturing and 3D Printing**<br><br>This module introduces the fundamentals of digital manufacturing and 3D printing, with a focus on applications in the aerospace sector. It addresses the principles of process digitalization, main software tools used in additive manufacturing workflows, process modelling and simulation, and design methodologies specific to 3D printing (e.g., Design for Additive Manufacturing – DfAM). The module also explores the integration of additive manufacturing into digitally driven and sustainable production systems, preparing learners to meet the challenges posed by digital transformation in additive manufacturing for aerospace applications. The content of the module is given below.<br><br>1. Introduction<br>2. Digital Tools for Additive Manufacturing<br>3. Modelling, Simulation, and Print Preparation<br>4. Digital Design Methodologies<br>5. Integration of 3D Printing in Digital Production Systems<br>6. Conclusions |

| **Target Groups** | |
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| Targets | • Engineering students (Aerospace, Aeronautical, Materials and Mechanical Engineering)<br>• Engineers and technical staff in Aerospace and Aeronautical Industries |

| **Learning Objectives** | |
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| Learning Objectives for this module | Upon completion of this module, attendees will be able to:<br>• Understand the fundamental concepts of digital manufacturing and 3D printing.<br>• Recognize and apply digital tools (CAD/CAM/CAE) in additive manufacturing workflows.<br>• Recognize digital design strategies to optimize 3D printed components.<br>• Understand the influence of process parameters and their control on the printing quality of components for the aerospace industry.<br>• Understand the complete digital workflow required to prepare parts for additive manufacturing.<br>• Understand the integration of 3D printing into digitally enabled and sustainable production systems in the context of aerospace applications. |

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| Learning Resources | |
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| Resources | • Scientific articles<br>• Industrial reports<br>• Books<br>• Thesis<br>• Tutorials<br>• Instructional videos |

| Self-assessment and Learning Activities | |
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| Self-assessment and Learning Activities to be created | • Textbook<br>• Lesson presentations<br>• Lesson reviews<br>• Quizzes |

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