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UNIVERSITY COLLEGE
OF ESTATE MANAGEMENT

Technology and Design 3: Design for Manufacture and Assembly (DfMA)

Module Descriptor

Module Code:	TEC6DE3
Version:	1.00
Status:	Final
Date:	28/02/2024

Technology and Design 3:
Design for Manufacture and Assembly (DfMA)

Summary Module Details

Module details

Module Title: Technology and Design 3: Design for Manufacture and Assembly

Module Leader: Marc Fleming

Module Mode: Supported online learning

Semester: Spring (UK)

Level: 6

Credits: 20

Learning Hours: 200

Contact & Study Hours

Directed Study Time: 90 hrs (45%)

Self-directed Study Time: 50 hrs (25%)

Assessment Study Time: 60 hrs (30%)

Assessment Type

Coursework: 0%

Computer Based Assessment: 0%

Portfolio: 100%

Presentation: 0%

Project: 0%

Practical: 0%

Self-directed Research: 0%

Module Summary

In this module, students will create a design proposal and transform this to a level of detail that will prepare the concept for Manufacture and Assembly. Using thematic knowledge gained from preceding modules, students will utilise a range of 2D and 3D design tools to prepare a solution that is represented with a range of technical detail and illustrations that are appropriate for RIBA Stage 4. Upon achieving this stage, students will then prepare the solution for the level of detail anticipated for RIBA Plan of Work Stage 5. Students can choose either a building component or a volumetric element to be prepared for manufacture under the premise that it can be mass produced.

In order to further demonstrate their knowledge and skills in the design to manufacture process, students may elect to manufacture the design solution through use of small scale manufacturing hardware such as a 3D printer or alternative simulation tools. In addition to the manufacturing process, this module will allow students to model sequencing of building operations where they will synthesise knowledge of logistics, planning, and quality to the context.

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Taken on which Programmes

BSc (Hons) Architectural Design Technology (C)

Core (C) or Elective (E)

Module Aims

This module aims to:

- Equip students with design development skills that are predicated on the use of manufacturing and assembly techniques.
- Develop students' knowledge of materials and manufacturing techniques to produce innovative design solutions.
- Introduce students to manufacturing processes in respect of the journey of digitised design proposals through computer aided manufacturing processes, including toolpath generation for CNC.
- Provide students with an opportunity to take a design proposal through to the manufacturing stage through either simulation or by utilising hardware that can produce an artefact.
- Develop students digital skills through using a range of software's relative to DfMA and navigate interoperability issues.
- Provide an opportunity to understand the regulations and standards applicable to DfMA.
- Give students the opportunity to understand constraints surrounding logistics and planning during design development process.
- Further develop students' abilities to present, defend and justify a design solution whilst under scrutiny and technical questioning from design professionals.

Module Learning Outcomes

LO1. Create a conceptual design proposal for a moderately complex context that is predicated on recognised production and assembly methods.

LO2. Use computational design tools to produce a working 3d model that illustrates interoperability with a manufacturing / assembly process.

LO3. Illustrate knowledge of industry standards for DfMA and parameters associated with planning, logistics and quality.

LO4. Critically reflect on the core contents of the module whilst appraising the opportunity to mainstream DfMA in the Built Environment.

Indicative Module Content

Module topics

- Conceptual Design Development for Manufacture

- DfMA Materials, technologies, and properties

- CAD modelling and simulations

- Interoperability and file handling procedures

- Industry standards (ISO and BS)

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- Design for Manufacture and Assembly principles
- Quality perceptions and procedures
- Logistics and planning

Students will be required to:

Create a conceptual design proposal for a moderately complex context that is predicated on recognised production and assembly methods for either structural, modular, panelised, or component elements.

Use computational design tools to produce a working 3d model that has detail and specification appropriate to be interoperable with a manufacturing / assembly process, aligning with stage 5 RIBA Plan of Work.

Conclude the knowledge of industry standards around Design for Manufacture and Assembly and parameters associated with planning, logistics and quality.

Undertake critical reflection on the core contents of the module whilst appraising the opportunities and constraints in the Built Environment to the mainstreaming of DfMA.

This content will be reviewed and updated regularly to reflect the legal, ethical, and financial changes in professional standards and practice.

Overview of Summative Assessment

Module learning outcomes	Assessment	Word count or equivalent	Weighting
LO1, LO2	**Assessment 1** Portfolio	3,000 words or equivalent	60%
LO3, LO4	**Assessment 2** Portfolio	2,000 words or equivalent	40%

Module Pass Mark (as a weighted average of all assessments): 40%

Key Module Learning Resources

Core Sources and Texts

The core reading resources within each module will be provided via the specific Virtual Learning Environment (VLE) module pages and within the e-Library. Additional reference material and supplementary resources to support your studies are available through the UCEM e-Library.

This is a design orientated module relative to design problem. As such, this requires dedicated design studio time to allow students to navigate the design process. Studio time will also be accompanied by dedicated, Tutor supported workshops where CAD modelling and digital presentation techniques will be hosted to support the development of student work to industry standard. Workshops and Tutorials will be supplemented periodically by lectures.

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Given the nature of the provision, dedicated Virtual Design Studios will be provided and supplementary vendor specific resources will be provided to allow students to work independently out with contact time with Tutors.

Module tools

Students will have access to study materials, dedicated academic support, student forums, and learning activities via an online learning platform (VLE).

The module page on the VLE is broken down into structured study weeks to help students plan their time, with each week containing a mixture of reading, case studies, videos/recordings, and interactive activities to go through. Online webinars/seminars led by the Module Leader can be attended in real time and provide opportunities to consolidate knowledge, ask questions, discuss topics and work through learning activities together. These sessions are recorded to support students who cannot attend and to enable students to recap the session and work through it at their own pace. Module forums on the VLE provide further opportunities to discuss topics with other students, complete collaborative work and get extra help from the module team.

Professional online resources

The e-Library provides access to trusted, quality online resources, selected by subject specialists, to support students' study. This includes journals, industry publications, magazines, academic books, and a dissertation/work-based library. For a list of the key industry specific and education resources available please visit the VLE e-Library.

Other relevant resources

Access is also provided to further information sources that include the British Library and Open University UK catalogues, as well as providing a monthly current awareness service entitled, ***Knowledge Foundations*** - a compendium of news, research and resources relating to the educational sector and the Built Environment.

The module resource list is available on the module VLE page and is updated regularly to ensure materials are relevant and current.