Module Specification

Digital Engineering for Infrastructure

Version: 2023-24, v2.0, 25 Jul 2023

Contents

Part 1: Information

Module title: Digital Engineering for Infrastructure

Module code: UBGMHW-15-M

Level: Level 7

For implementation from: 2023-24

UWE credit rating: 15

ECTS credit rating: 7.5

Faculty: Faculty of Environment & Technology

Department: FET Dept of Geography & Envrnmental Mgmt

Partner institutions: None

Field:

Module type: Module

Pre-requisites: None

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: Not applicable

Features: Not applicable

Educational aims: This module aims to develop a long-term strategy in implementing DE for infrastructure across various projects and the asset life cycle. The module will evaluate project case studies that demonstrate how DE is driving innovation, transforming business processes and achieving infrastructural project

outcomes.

Students will be able to demonstrate their ability to implement innovation and transformation using practice-based projects.

Outline syllabus: The module aims to develop student's expertise and knowledge in bringing together digital engineering tools and techniques such as BIM, data analytics, and the internet of things. The module allies traditional infrastructure designs and computational methods with new technologies that have the potential to deliver unprecedented efficiencies across the civil engineering sector and the built environment. Students will analyse and critically evaluate the potential of digital engineering systems to improve the design, delivery, management and use of infrastructure. The module aims to engage and educate engineers in practical ways of optimising and leading the way infrastructure and buildings are managed, leading to direct and indirect economic, sustainable, social and environmental benefits.

Indicative content
-Infrastructure and Building capability with BIM
-Geographical Information Systems (GIS)
-Gaining Insight with Sensors
-Data Analytics and Grappling with big data
-Intelligent construction machines
-Computer Modelling of Civil Engineering Problems
-Asset Information Management (AIM)
-Internet of Things

Part 3: Teaching and learning methods

Teaching and learning methods: The module will be delivered through lectures, case studies, practical sessions, modelling techniques with software tools and field visits.

Infrastructure projects from around the world will be used as case studies and guest speakers will be invited from industry.

Hands-on experience in inspection, testing and monitoring will be gained through field visits. The coursework will be done by group work but with individual submission.

Module Learning outcomes: On successful completion of this module students will achieve the following learning outcomes.

MO1 Apply, analyse and critically evaluate different processes of the design, construction and co-ordination of infrastructure for live industrial projects.

MO2 Analyse collected data using appropriate testing methods, whilst justifying why these methods have been used.

MO3 Critically evaluate and develop recommendations for improvement to digital engineering processes for infrastructure projects.

MO4 Critically relect on effectiveness of actions taken in response to intial requirements.

Hours to be allocated: 150

Contact hours:

Independent study/self-guided study = 115 hours

Face-to-face learning = 35 hours

Total = 150

Reading list: The reading list for this module can be accessed at readinglists.uwe.ac.uk via the following link

Part 4: Assessment

Assessment strategy: The learning outcomes are assessed using   information and test data gathered in lectures to analyse and develop solutions to complex engineering problems. Summative assessment will comprise:

Poster presentation (Controlled Conditions):
Students will be required to work in groups to identify and evaluate infrastructure

projects from around the world and propose appropriate methods of application of digital engineering using data analytics. They are required to critically evaluate the process, and to justify their conclusions and recommendations. They will showcase this through the creation of a group poster and a 20 minute group presentation . The School group work policy will be used to appropriately reflect individual student effort in this process. (Learning outcomes 3)

Portfolio:

Students will be required to submit an individual reflective portfolio demonstrating the practice and application of design choices and the strategies / operational processes required to achieve required project outcomes. As a reflective exercise, it requires detailed understanding and demonstrative ability in the topics discussed. (Learning outcomes 1, 2, 4).

Formative feedback will be given during tutorial sessions.

Resit is the same as the first sit.

Resit deliverable(s) will be scaled appropriately to group size and task complexity.

Assessment tasks:

Poster (First Sit)

Description: This is a poster presentation. (20 mins)

Weighting: 30 %

Final assessment: Yes

Group work: Yes

Learning outcomes tested: MO3

Portfolio (First Sit)

Description: Students will be required to submit an individual reflective portfolio .

(2,000 words max)

Weighting: 70 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2, MO4

Poster (Resit)

Description: This is a poster presentation. (20 mins)

Weighting: 30 %

Final assessment: No

Group work: Yes

Learning outcomes tested: MO3

Portfolio (Resit)

Description: Students will be required to submit an individual reflective portfolio .
(2,000 words max)

Weighting: 70 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2, MO4

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Engineering Competence {Apprenticeship-UWE} [Frenchay] PGDip 2023-24