

MODULE CODE: M3X8752
TITLE: Civil Engineering Technology 3
DATED: 25/09/2017

LEVEL: 6
CREDITS: 20

JACS CODE: K290
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AIM(S)

“To critically explore more demanding and complex civil engineering design projects, their technology and production management.”

LEARNING OUTCOMES

Upon the successful completion of this module, the student should be able to demonstrate the ability to:

1. Evaluate the factors influencing the choice of a range of construction technology challenges
2. Appraise the issues that affect decisions relating to environmental, functional and economic matters relating to construction technology
3. Appraise the environmental impact of design and production solutions

INDICATIVE CONTENT

The responsibilities of the civil engineer within a design team is to deliver a design and construction solution meeting the defined objectives of the project. To this end, the student should understand the concepts of;

- Design solutions: drawn information (conceptual, scheme, production); specifications; schedules; work methods; quality assurance documents and procedures;
- Projects: types, e.g. roads, services, sewers, civil engineering structures (such as stadia, towers, airports, bridges, tunnels, railways); communication networks
- Scheme constraints; new materials; innovation; existing materials; sustainable use
- Structural problems relating to temporary works: enabling work; groundworks; temporary structures; structural requirements; stability; primary load paths; secondary support elements; fatigue
- Soil investigations and testing regimes; geomatics; contamination surveys; geographical information systems (GIS); remediation; environmental protection, groundworks, enabling works, utilities; structures (temporary, permanent); demolition and deconstruction; project appraisal (pre-construction processes, construction)
- Technical appraisal; constraints; stakeholder input; analysis; synthesis and testing processes; design iterations; cost planning; calculations; drawings; specifications; late amendments; changes and variations
- Production information: drawings; specifications; work schedules; regulatory approvals; procurement information; contracts (standard and bespoke); Building

- Information Modelling (BIM) systems; value engineering; standard details; quality definition; contract documentation; contract administration
- Legislation and approved codes of practice: current legislation relevant to the home country; UK legislation to include the Health and Safety at Work etc Act (1974); UK regulations to include the Construction (Design and Management) Regulations (2015), the Management of Health and Safety at Work Regulations (1999); UK codes of practice and guidance notes
- Understand the environmental impact of design solutions
- Buildability of design solution: appraisal; embodied energy; benchmarking for sustainability potential; constraints; stakeholder input; cost planning; adaptability; flexibility; value for money; late amendments; changes and variations
- Environmental protocols: future proofing construction; change of use; demolition and deconstruction; maintenance; facilities management; embodied energy; carbon reduction; impact on environment (natural and built)

LEARNING AND TEACHING STRATEGY

Students will be taught through lectures, tutorials and field work.

The allocation of teaching to deliver the module is:

Activity type	Hours	Percentage
Scheduled learning	60	30%
Independent learning	140	70%
Placement learning	0	0%
TOTAL	200	100%

ASSESSMENT

Assessment Component 1 – 50%

Coursework Exemplar

The client for a proposed reinforced concrete frame building development, to be used as a factory, an office and a laboratory, has requested further information regarding the structure and finishes. As part of a design and build construction team you are responsible for the preparation of a report on requested information, to be submitted to the client.

Further information has been requested on two elements of the construction:

- (i) The cladding to the office area.
- (ii) The roof to the factory area.

The cladding to the office has now been considered and the details of the panels are attached with the outline scheme for the project.

Requirements

Prepare a report for consideration by the team, to be sent to the client, that details the proposed solution for the roof structure and the cladding.

Each of the following will need to be investigated:

- (i) The proposed roof structure including any roof lighting considered necessary.
- (ii) A statement of the proposed production sequence, resource requirements and site organisational aspects for the installation of the roof.
- (ii) Details clearly showing the connection between the roof and the office structure/cladding.

The completed report (3000 words) will contain all three of the above requirements.

Assessment Component 2 – 50%

Students will sit a 2hour written test.

Assessment Summary

Activity type	Percentage
Written	50%
Coursework	50%
Practical	0%
TOTAL	100%

BIBLIOGRAPHY

Essential

Choi, Y., (2004), "*Principles of Applied Civil Engineering Design*", ASCE, ISBN:978-0784407127

Kennard, M., (2009), "*Civil Engineering Procedure*", ICE Publishing, ISBN:978-0727735249

Recommended

Twort, A. & Rees, G. (2003), "*Civil Engineering Project Management: Project Management*", Taylor and Francis, ISBN:978-0750657310

Background

Glasson, J., Therivel, R. & Chadwick, A., (2005), "*Introduction to Environmental Impact Assessment*", Taylor and Francis, ISBN:978-0415338370

Roberts, J., Gulvanessian, H., Davison, B., Bond, A. & Watt, P., (1990), "*Extracts from the Structural Eurocodes for Students of Structural Design*", British Standards Institute, BSI, ISBN:978-0580694547

Journals

The New Civil Engineer (EMAP)

Proceedings of the Institution of Civil Engineers (ICE Publishing)

The Structural Engineer (Institution of Structural Engineers)

Websites

Web-sites of the Concrete Society, Tata Steel and HIS etc.