

# ES2F2-15 Construction Materials

**22/23**

**Department**

School of Engineering

**Level**

Undergraduate Level 1

**Module leader**

Justin Russell

**Credit value**

15

**Module duration**

24 weeks

**Assessment**

100% coursework

**Study location**

University of Warwick main campus, Coventry

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## Description

### Introductory description

ES2F2-15 Construction Materials

[Module web page](#)

### Module aims

The aims of the module are to introduce students to a range of materials (concrete, steel, timber, masonry, asphalt and fibre reinforced polymers) in terms of structural behaviour, analysis and design. Especially for concrete the module will provide knowledge and understanding on its constituent materials, their properties and those of fresh and hardened concrete. Variables that affect these properties in the short and long term will be identified.

### Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

- o Introduction to construction materials (with links to durability, sustainability, H&S, construction)
- o Portland Cement: Manufacture, Composition and Hydration
- o Other Cements: Classification, Modified PC, CRMs, non-Portland cements

- o Aggregates and admixtures
- o Fresh Concrete and Curing
- o Hardened concrete: Strength, testing and variation
- o Durability of Concrete
- o Sustainability and Concrete
- o Introduction to Steel, Timber, Glass, Masonry and Fibre Reinforced Polymers

## **Learning outcomes**

By the end of the module, students should be able to:

- Appreciate the sustainability issues and latest regulatory framework surrounding the manufacture and use of cement and concrete.
- Critically evaluate the structural behaviour of a range of civil engineering materials such as concrete, timber, masonry and fibre reinforced polymers.
- Analyse the effects of material and process variables on the mechanical properties and durability of concrete.
- Cast, de-mould, cure and test concrete samples to assess the property and quality of concrete.
- Reflect on engagement upon practice to provide insight that enhances own work-based learning.

## **Indicative reading list**

Domone, P. and Illston J. (Eds.), Construction Materials: Their Nature and Behaviour, 4th Ed., Spon Press, Abingdon, Oxon, New York, 2010.

Neville, A. M., Concrete Technology, 2nd Ed., Prentice Hall, 2010.

Internet based sites (such as MPA and UK government) for up-to-date sources on sustainable cements and concretes.

## **Subject specific skills**

Knowledge and understanding of the need for a high level of professional and ethical conduct in engineering and the use of technical literature, other information sources including appropriate codes of practice and industry standards

Ability to apply relevant practical and laboratory skills

## **Transferable skills**

Communicate (written and oral; to technical and non-technical audiences) and work with others

Appreciation of the global dimensions of engineering, commerce and communication

Plan self-learning and improve performance, as the foundation for lifelong learning/CPD

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## **Study**

## Study time

Type	Required
Lectures	17 sessions of 1 hour (11%)
Seminars	3 sessions of 1 hour (2%)
Demonstrations	4 sessions of 1 hour (3%)
Other activity	12 hours (8%)
Private study	114 hours (76%)
Total	150 hours

## Private study description

114 hours of guided independent learning (including VLE use and support from Employer)

## Other activity description

10 hours of webinars

## Costs

No further costs have been identified for this module.

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## Assessment

You must pass all assessment components to pass the module.

## Assessment group A3

	Weighting	Study time
Written Lab Report	30%	
Laboratory report (6 pages length)		
Written Reflective Report	70%	
Reflective report upon practice (maximum 15 pages length)		

## Feedback on assessment

Laboratory report and reflective report: Individual oral and written comments.

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## Availability

## **Courses**

This module is Core for:

- Year 2 of DESA-H221 Undergraduate Civil and Infrastructure Engineering (Non-integrated Degree Apprenticeship)