<table>
<thead>
<tr>
<th><strong>Module Code</strong></th>
<th>CE7E03</th>
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<tbody>
<tr>
<td><strong>Module Name</strong></td>
<td>E3: Air Pollution: Impacts, Assessment and Mitigation</td>
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<tr>
<td><strong>ECTS Weighting</strong></td>
<td>5 ECTS</td>
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<tr>
<td><strong>Semester taught</strong></td>
<td>Semester 1</td>
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</table>
| **Module Coordinator/s** | Asst. Prof. John Gallagher [j.gallagher@tcd.ie]  
Lecturer(s): Asst. Prof. John Gallagher [j.gallagher@tcd.ie]  
Dr. Saniul Alam [alamms@tcd.ie] |

**Module Learning Outcomes with reference to the Graduate Attributes and how they are developed in discipline**

On successful completion of this module, students should be able to:

- **LO1.** Demonstrate an understanding of air pollution science and its application to environmental engineering.
- **LO2.** Assess, apply and evaluate differing forms of air pollution models for the prediction of concentrations in the atmosphere.
- **LO3.** Appraise differing approaches to the control of air pollution for indoor and outdoor setting and in urban and industrial settings.
- **LO4.** Demonstrate an understanding of the development of national emissions inventories and projections, and to apply and critically review these methodologies in practice.
- **LO5.** Measure air pollution concentrations in practice and demonstrate an understanding of the advantages and limitations of differing monitoring approaches.
- **LO6.** Conduct an environmental impact assessment of new infrastructure developments from an air pollution perspective.

**Graduate Attributes: levels of attainment**

- To act responsibly - Enhanced
- To think independently - Attained
- To develop continuously - Attained
- To communicate effectively - Enhanced
Module Content

This module aims to enable students to gain an understanding of the theory and practice of Environmental Engineering in relation to air pollution.

The module commences with an introduction to the field of air pollution science, identifying the current challenges in the field and key background knowledge in the provision of clean air for society and the environment.

The module explores the use of air pollution modelling to predict concentrations in various settings and to assess the impacts of policy changes, new technology or developments. The module also explores the control of air pollution in outdoor and indoor conditions from an environmental engineering perspective with a particular focus on sustainable approaches.

We examine the development of national emissions inventories and the projection of pollution into the future using forecasting techniques. We examine the physical measurement of air pollutants using field equipment.

The module deals with the development of environmental impact assessment in relation to air pollution in infrastructure developments, using several case studies (e.g. incineration, construction projects, roads, etc).

Teaching and Learning Methods

Lectures and blended with flipped classroom components, combining traditional lecture formats and student tasks and peer-learning. Field practical’s provides hands-on experience of air quality science to ground fundamentals and context for some coursework and lecture materials. Coursework provides opportunity to demonstrate independent learning through developing new skills (reviewing literature) and using new tools (air quality modelling software). Feedback provides further opportunity to learn.

Assessment Details

Please include the following:

- Assessment Component
- Assessment description
- Learning Outcome(s) addressed
- % of total
- Assessment due date

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<thead>
<tr>
<th>Assessment Component</th>
<th>Assessment Description</th>
<th>LO Addressed</th>
<th>% of total</th>
<th>Week due</th>
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<tbody>
<tr>
<td>Examination (3 hours)</td>
<td></td>
<td></td>
<td>60%</td>
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<tr>
<td>Assignments</td>
<td>3 assignments covering the module syllabus: Personal Exposure Monitoring, Assessment &amp; Modelling (20%); Background &amp; Regional Air Quality (10%); Literature Review (10%).</td>
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<td>40%</td>
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Reassessment Requirements

None
| Contact Hours and Indicative Student Workload^2 | Contact hours: 30  
Lectures – 3 hours per week  
Tutorials – 3 hours  
| Independent Study (preparation for course and review of materials):  
| Independent Study (preparation for assessment, incl. completion of assessment):  
|  |
| **Recommended Reading List** | Environmental Engineering, G. Kiely (Chapter 8)  
Air Pollution: from a local to a global perspective. Fenger & Tjell  
Air Pollution Control Engineering. De Nevers. 2nd Ed.  
An Introduction to Air Pollution. Vallero. 4th Ed.  
|  |
| **Module Pre-requisite** |  
| **Module Co-requisite** |  
| **Module Website** |  
| **Are other Schools/Departments involved in the delivery of this module? If yes, please provide details.** |  
| **Module Approval Date** | 1st September 2019  
| **Approved by** |  
| **Academic Start Year** | 2019/2020  
| **Academic Year of Date** |  
|  |  