CE7M02: M2 – Research Methodology [10 credits]

Module Co-Ordinator(s): Assist. Prof. Bidisha Ghosh (bghosh@tcd.ie)

Module organisation
Department of Civil, Structural and Environmental Engineering

Module description, aims and contribution to programme
This module will provide an introduction to students the key aspects of research in engineering, research methods & designs, data collection and analysis, ethical and legal perspectives.

This module aims to:
- Develop a critical outlook in students regarding published research
- Support students in the development of their research project
- Expose students to the organisation, conduct & implementation of research in universities & Institutes
- Enable students to utilise the available research resources and develop a supportive research environment

Learning outcomes
On successful completion of this module, students will be able to:
1. Plan and manage a postgraduate research project
2. Critically appraise of existing research tools, methods and publications
3. Identify scope of future research and design a research proposal
4. Summarise, communicate (in written and oral from) research within and outside their own field
5. Recognise issues of plagiarism, confidentiality, data protection and other ethical issues
6. Design engineering experiments and analyse and interpret quantitative information collected
7. Identify and apply appropriate statistical software tool for experimental problem solving
8. Demonstrate understanding of GIS software and apply the same for data analysis

Module content
Research Philosophies in Engineering, Research in Academia, Research scopes & problems, Research process and design, Characteristics of good research and choice of research topic.
Components of research proposal, Literature review, Research strategies, Research ethics, Research access.
Data collection, Data analysis, Sampling analysis, Software training (Statistical & GIS), Report writing and Presentation.
Teaching strategies
Lectures provided by lecturers & researcher
Seminars given by lecturers, other academics and industrial experts
Group/Individual learning of use of statistical software
*(Lecture notes and presentation will all be available online in Blackboard)*

Assessment
Assessment is through written coursework and presentations, linked to the individual research project being completed by each student (see M3). Completion by end of semester 2.

Methods
1. A comprehensive literature review on a chosen research topic (30%) *(marked by project supervisor)* (due at the end of week 1, Semester 2) *(marked by project supervisor)*
2. Preparation & presentation of a research plan & proposal (15%) (due at the end of week 7) *(marked by project supervisor)*
3. Assignment on data analysis and interpretation using a chosen software tool (15%)
4. A short research paper appropriate for peer-reviewed publication (15%) *(marked by project supervisor)*
5. A short discussion on plagiarism, confidentiality, data protection and ethics of research related to the research topic chosen in M3 (5%) *(marked by project supervisor)*
6. Executive summaries of lunch time lectures (Any four of them will be marked) (5%)
7. Assignment using GIS software tool (15%)

Required textbook

Further information
School of Engineering weblink.