

Optional online course

Learning outcomes

The aim of the course is to make the students to be able to:

- be aware of the academic expectations for an MSc student and more generally for a researcher;
- Formulate and evaluate a research question and research aim(s);
- Consider the ethical implications of research;
- Collect and analyze qualitative and quantitative research data. Select appropriate statistical methods to analyze research data;
- Set up a research plan based on literature survey for their MSc thesis. Critically assess research findings as reported in primary literature;
- Write a literature review based on the research plan with a view to select appropriate methodologies for a research-based project and for their MSc thesis.

Content

- Research Foundation: What is Research?
- Research Methods : Stages of Research, Research Aims, Research Questions;
- Data Analysis : Acquiring and Analyzing your data using Quantitative & Qualitative methods;
- Validation & Verification: How to Validate & Verify your work? How to Compare it with similar works?
- Project Management: How to Manage project(s) and your thesis? How to manage your project and thesis Progress? Project plan peer review.
- Planning: How to plan, expectations, Gant Charts.
- Literature Review, Scientific Reporting & Presenting: Literature Review assignment discussion, Academic standards and expectations, Reproducibility, Reporting styles.

Modes of study

Online Lectures, assignments and project work.

Teaching methods

- Lectures: 12 hours
- 4 Practical works (assignments): 16 hours

Study materials

There is no recommended text for this course.

There are a number of resources that are relevant to this course. Where applicable, they will be referenced in the course material for further reading. They include:

- Daellenbach, HG 1994, *Systems and Decision Making - A Management Science Approach*, John Wiley & Sons, Chichester.
- Dandy, GC, Walker, DJ, Daniell, TM & Warner, RF 2008, *Planning and Design of Engineering Systems. Second Edition*, Taylor and Francis, Abingdon, UK, ISBN 978-0-415-40552-2. This text is available online through the Barr Smith Library.
- Dowling, DG, Carew, A & Hadgraft, RG 2013, *Engineering your future: an Australasian guide, 2nd ed*, John Wiley & Sons Australia, Milton, Queensland.

- Project Management Institute 2008, *A Guide to the Project Management Body of Knowledge (PMBOK® Guide), Fourth Edition, ANSI/PMI 99-001-2008*, Project Management Institute, Pennsylvania.
- <https://ocw.tudelft.nl/courses/research-methodologies/>
- <https://openarchive.cbs.dk/bitstream/handle/10398/6308/wp32000.pdf?sequence=1>
- http://www.esparama.lt/es_parama_pletra/failai/ESFproduktai/2014_Research_and_Development_Project_Management.pdf.pdf
- https://link.springer.com/chapter/10.1007/978-981-10-7605-3_177

Evaluation criteria

1. A critical literature review that summarises the major approaches that have been used to date to address a given research issue (20%);
2. A quantitative analysis of a dataset using appropriate statistical methods (20%);
3. A 20-minute presentation critically evaluating an original research paper, the presentation will be done at distance using screen capture technology (20%)
4. Research-based project. Each participant will be given the task to solve a specific problem. Each participant will prepare a report that describes: (i) the nature and background of the research problem; (ii) proposed research to address problem with justification; (iii) implementation plan and resource requirements. (40%)