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|  **School of Civil & Environmental Engineering, AAiT, AAU**  |
| Course Code  | CEng7901  |
| Course Name  | Scientific Research Methods  |
| Program  | MSc. in Geotechnical Engineering  |
| Course Instructor | Samuel Taddesse (PhD), Henok Fikre (PhD) |
| ECTS Credits  | 5  |
| Target Group  | Regular 2012 Entry Geotechnical Engineering Major  |
| Objectives  | * To provide an opportunity for students to establish or advance their understanding of research through critical exploration of research language, ethics, and approaches in the context of Geotechnical Engineering.
* To introduce the language of research, ethical principles and challenges, and the elements of the research process within quantitative, qualitative, and mixed method approaches.
* To allow students begin to critically review literature relevant to their theses and determine how research findings are useful in forming the understanding of their work, social, local and global environment.
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| General Competency  | **Knowledge** * Demonstrate fundamental knowledge of the essence of research.
* Understand research terminologies
* Be aware of the ethical principles of research, ethical challenges and approval processes
* Describe quantitative, qualitative and mixed methods approaches to research
* Identify the components of a literature review process
* Be able to critically analyze published research

**Skills** * Grasp elementary capacity of statistical data handling tools.
* Develop and sharpen technical writing skills.

**Attitude** * Demonstrate individual and team work ethics, professionalism and respectful interaction with both instructor and students during the course work & projects.
* Reflect upon the geotechnical engineering sub-discipline and its central position in the world of civil engineering.
* Realize the cycle of research and become motivated to publish.
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| Evaluation  | **Evaluation technic**  | **Weight**  | **Due**  |
| Assignments  | 40%  | Each week  |
| Attendance  | MANDATORY  | Minimum of 85%  |
| Mini-research(s)  | 20%  | One week after class end  |
| Mini-project  | 10%  | One week after class end  |
| Final exam  | 30%  | End of course  |
| Reference Literature  | Abiy Z., Alemayehu W., Daniel T., Melese G., Yilma S., Introduction to Research Methods, Preparatory Module for Addis Ababa University graduate programs, 2000. Kothari C.R., Research Methodology: Methods and Techniques, 2nd Revised Edition, New Age International Publisher, 2004.  |

**Content**

**Unit 1: The Concept of Research**

Lesson 1: Sources of Knowledge

Lesson 2: Definition and Purposes of Research

Lesson 3: Philosophy of Research

**Unit 2: Types of Research**

Lesson 1: Classification of Research

Lesson 2: Basic and Applied Research

Lesson 3: Descriptive, Explanatory and Exploratory Research

Lesson 4: Qualitative and Quantitative Research

**Unit 3: Process in Research Proposal Development**

Lesson 1: What is the Research Proposal?

Lesson 2: Components of Research Proposal

**Unit 4: Process in Conducting Research**

Lesson 1: Conceptualization

Lesson 2: Contextualization

**Unit 5: Research Ethics**

Lesson 1: The Basics

Lesson 2: Research Ethics Explained

Lesson 3: Codes and Policies for Research Ethics

**Unit 6: Reporting Research Findings**

Lesson 1: Writing a Scientific Report

Lesson 2: Oral Presentation