Optimization Algorithms (ACM 41030) – Introduction

Dr Lennon Ó Náraigh

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1 Overview

In this brief document, I explain the format of ACM 41030 in the Spring Trimester 2024/2025, starting in Week 1, Monday January 20th 2025.

Version history:

- First version, 19th September 2024
- Second version, 19th Decmeber 2024

2 Mode of Delivery

The instruction in this module is planned to be primarily face-to-face.

Format of module

The module will be taught by Dr Lennon Ó Náraigh. In the first seven weeks, we will look at the theory of unconstrained optimization – both local and global. Week 7 is a natural break-point in the module, after which we will have the first class test. Then, for the remainder of the module, we will look at constrained optimization. At the end of the 12 weeks, there will be a second class test. The format throughout the module will be as follows:

- Three face-to-face lectures per week:
  - Tuesdays at 09:00 (possibly to be replaced with a recorded lecture, subject to student demand)
  - Thursdays at 15:00 (two hours).

VLE

Very little information will be posted on Brightspace for for this module Instead, during those weeks, the module website will be the main point of contact for students, and all materials relevant to those weeks will be posted there:

`https://maths.ucd.ie/~onaraigh/optimization.html`

Already, there is a complete set of **typed notes** available there. These typed notes are pertinent to the whole module (12 weeks).

3 Assessment

The assessment structure is as follows:

- One hour-long written exam, which will assess the materials from the first seven weeks of the module. The exam will take place during the trimester, probably just after the midterm break. This will be worth **50%** of the final grade.
- A second hour-long written exam will assess the materials from the remaining five weeks of the module. The exam will take place at the end of the teaching period of the trimester, that is, during the exam period. This will also be worth **50%**.

4 How to succeed in this module

The Lecturer will give out six sets of exercises: four before the midterm break, and two afterwards. These are not for credit. Model answers will be provided. We will work though some of the model answers in class. These exercises are a bit like training, if you can do all of the exercises you will really understand the module. With that in mind, some of the questions in the two written exams will be drawn from the exercises. To be more precise, the written exams will be based on the following topics:

- A selection of questions drawn from Exercises 1–4 (Exam 1) and Exercises 5–6 (Exam 2).
- A selection of theorems from the lecture notes (the list will be provided in due course).

Integrity in assessment

The usual rules around plagiarism and copying apply to all elements of assessment in the module. There is a university plagiarism policy; students are encouraged to familiarize themselves with it. The School of Mathematics and Statistics has developed a protocol to give effect to this policy. Both documents will be made available to students at the start of the module.

Please don't fail the module!

If you do, there will be a resit exam in the Summer Trimester.

5 Grading

The university percentage-to-grades conversion scheme applies:

`https://maths.ucd.ie/tl/grading/en02`

6 Textbooks

The typed lecture notes are self-contained. For extra reading, students may refer to the following recommended textbook:

Nocedal, J. and Wright, S.J. eds., 1999. *Numerical Optimization*. New York, NY: Springer New York.