Optimization Algorithms (ACM 41030) – Introduction

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1 Overview

In this brief document, I explain the format of ACM 41030 in the Spring Trimester 2023, starting in Week 1, Monday January 22rd 2024.

Version history:

- First version, 1st December 2023

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. The first seven weeks are shared with another cohort, ACM 40990. During these weeks, we will all together look at the theory of unconstrained optimization – both local and global. After the midterm break, the class splits in two: Dr Marco Viola will continue to take the ACM 40990 students, while Dr Lennon Ó Náraigh will continue to take the ACM 41030 students. During these remaining five weeks, we will look at nonlinear least squres, SVD, and constrained optimization.

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 seven sets of exercises: four before the midterm break, and three 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 5–7 (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:

`https://www.ucd.ie/governance/resources/policypage-plagiarismpolicy/`

Please don't fail the module!

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

5 Grading

The 'maths' 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.