

# Introduction to Optimal Transport: Exam Guidance

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This is a brief document that aims to give you some advice on what you can expect in the exam. If I am asked further questions then I will update this document.

**Examinable material:** Chapters 1-7 are examinable, no material from the last two chapters will be in the exam!

**Lecture notes:** I've now made all the changes I plan to make, as you revise you may find further mistakes, typos and parts that are not clear. Please let me have any feedback and I will revise the lecture notes when I think they can be improved. It's a good idea to keep checking that you have downloaded the latest version (the version date can be found on the first page of the notes).

**Exercise sheets:** The first three exercise sheets are an excellent source for the type of exam question you can expect. A lot of the fourth exercise sheet covers material that is not examinable, however *exercises 4.1, 4.2, and 4.14 are relevant.*

**Exercise solutions:** Rough solutions to all exercise sheets will be released at some point, and when they are can be found on my webpage. Note that these solutions are rough and there may be missing details.

**Additional material:** Any of the main references (such as Villani's two books and Santambrogio's book) may be able to provide a source of additional questions, however there are usually no solutions for these and many questions may not be relevant. I have looked over most of these books and extracted what I think are the most relevant questions. One possible source is to look at Villani's book "Optimal Transport: Old and New" which contains a much larger number of results than we covered in lectures and you may be able to use theorems and propositions from this book as practice problems.

**Exam rubric:** There will be 5 questions, each questions worth 25 marks and divided into subparts (approximately 4 subparts per question). Your mark will be the sum of your best four answers (therefore marked out of 100). I.e. if you answer 4 questions then your mark will be the sum of the marks for each question. If you answer all 5 questions then your lowest mark will be discounted. The exam is 3 hours long.

**Exam constitution:** As with all exams, questions can be broken down into the following categories: recall, seen problems, and unseen problems (see below). In this exam, very approximately you can expect around 20% of the total marks to be given for recall, 50% for seen problems, and 30% for unseen problems.

**Recall:** I will ask you to recall results and definitions from the course. In general these questions will be of the form "state ... theorem".

**Seen problems:** These are problems we have seen in class or on the exercise sheets. In class we had a number of very long proofs; I *will not ask* for a proof that will take an hour for you to write down. However, there are parts of the longer proofs I could test, for example there are sometimes easy directions in proofs (think of the times where we want to show something is equal and we do so by showing  $\leq$  and  $\geq$ ).

**Unseen problems:** This is much harder to revise for, the best you can do is to make sure you understand the material well.

*Good luck!*