Build your Module

Instructions

Welcome to the last stage of your exploration of discrete mathematics (at least for the trimester). By now, you should have completed the Distinction tasks, which places your work well above the minimum standard expected in mathematics at this level. While it would be presumptuous to call you an expert in discrete mathematics (realistically you won't be until you complete a PhD on the subject), you have now acquired a good background that will serve you well in your future units and career.

For this last task, you are required to acquire and demonstrate further expertise on a specific topic. You are encouraged to select the topic you chose for the Distinction task, but you do not have to. Being an expert in this topic means that you can act as a reference to others: you are able to **explain** and **synthesize** the main concepts, relate them to each-other and to other parts of mathematics. You should be able to **evaluate** and **assess** answers. Importantly in mathematics you should also be able to provide **explanations** (ie proofs, or at least logical steps) of the results. In short, from "learner" you are now becoming "teachers".

We are not *really* asking you to build a complete module – you **do not** have to produce your own resources, record lectures, write lecture notes or come up with practice problems. Instead you should, as much as possible, refer and/or reuse external resources (properly referenced), organised in a way that builds up your peers' expertise.

Your submission should contain two parts. The first part is an annotated and curated review of resources, and the second part is the analysis/synthesis part.

Part 1

Please provide an annotated list of resources that you (as an expert) believe provide a good coverage of the topic.

1. Two or three well defined learning objectives. The learning objectives should be specific and assessable: one should be able to check whether one has reached the objective or not.
2. Resources that enable students to reach these objectives. These resources should include explanations on each objective, such as video explanations (lectures), notes, textbooks, etc. The resources should also give students an opportunity to *practice* and *apply* the acquired knowledge, to reinforce their meaning.
3. Resources that enable students to evaluate themselves, and decide whether they have acquired the relevant learning objectives.

The resources you suggest should not be restricted to the learning objectives themselves, but should include necessary knowledge to build on (unless that necessary knowledge is expected to be known, for example from existing modules.)

A significant part of this task will consist in selecting, curating, and organising resources. This will require significantly more expertise from you on the topic you select, as you are not only expected to understand it, but you should know it well enough that you can assess resources about it. This ability to assess work on a topic is what distinguishes experts from good practitioners, and why this is the High Distinction task.

Please note that we do not expect you to write your own lecture notes, nor record any videos. The purpose of this task is not to produce any learning resources, but to demonstrate your expertise. You may have to write/adapt self-assessment problems, to make sure you address the learning objective properly, but you do not need to go overboard on this.

Part 2

For this part, write a short document explaining how the module has been designed. The document should provide a good mathematical justification for this design. More specifically, it needs to contain:

1. Mathematical knowledge that is assumed to be known. In particular, explain which core and advanced modules (and which part of their content) are used in your selected resources.
2. Which mathematical content each resource covers. This should be already apparent in your first part, but you should expand on this, and provide an explicit link to your learning objectives.
3. How the mathematical content of the resources fit together. For example, how one resource builds on the knowledge from another one.

4. Include some reflection of what additional resources should be developed (*you do not need to develop them, just explain clearly what they would contain*.)

Non-mathematical justifications are fine if they explain some decisions, but are generally less relevant. For example, "I left this topic for the end, because it is more difficult" is not as good a design decision as "the last resource builds on all the previous topics, that is topics A, B and C, and shows how they can be combined to solve a particular problem."

Your discussion should go in sufficient technical depth to show that you understand the topic well. It can contain discussions and reflections that do not necessarily need to be apparent to the people following your program, but do require some planning. For example, you can start by including a list of sub-topics for each learning objective, and classify and order them.

There is no word count requirement for this part because you are encouraged to use **diagrams**, **tables** and **figures**, which deserve as much credit as long paragraphs. As a rule, you should realistically aim at having about 4-5 pages of explanations for this part.

Submitting your work

Please submit a report containing the following sections:

1. A brief introduction to the topic
2. Learning objectives
3. Theoretical and Practical Resources
4. An extended summary/discussion of the module.
5. Conclusions

Marking Guide

The marking guide is available in the list of resources on onTrack.

- To receive a mark of high HD, your report needs to be assessed at least at the "Good" level for every criteria and be assessed at the level "Very Good" in at least two criteria. Non-minor mathematical mistakes are not allowed at this level.
- To reveive a mark of low HD, your report needs to fit one of the following requirements:

- be assesed at least at the “Meh” level for every criterion and be assessed at level “Very Good” in at least one criterion; or
- be assesed at least at the “Meh” level for every criterion and be assessed at level “Good” in at least two criteria; or
- be assessed at least at the “Good” level for three criteria (no requirement for the last criterion).