Cambridge University Engineering Department Tripos Exam Skills

Alexandre Kabla

Director of Undergraduate Education

CUED

Introduction

We will go through some ***facts*** about CUED exams and assessment: when, what, where, who, how…

We will talk about ***strategy*** for revision and during the exams.

Everyone has their own ways of revising: use the bits of this which work for you.

And remember: you wouldn't be here if you couldn't do exams, so don't despair!

Why do we examine students?

To make sure that students have grasped the relevant material to progress to the next year,

To place candidates in the correct *order of merit*, based on an equitable procedure that gives the best information about relative abilities,

This is not a way to get detailed feedback on how well you understand certain topics.

Approximate class boundaries and proportions in each class

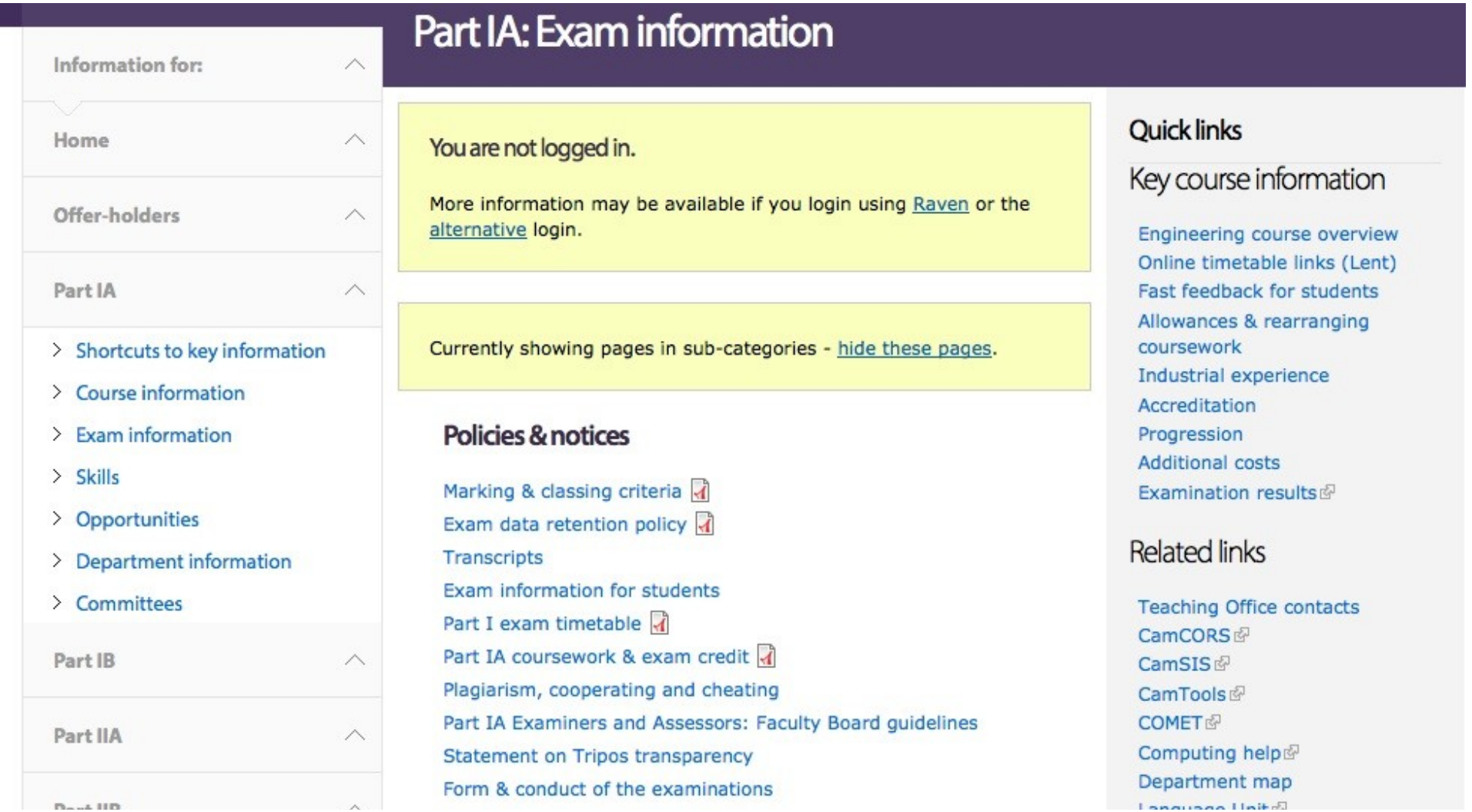
Class	% on exams*	% of cohort
1st	>70%	30%
II.1	60-70%	50%
II.2	50-60%	(10-15%)
III	40-50%	(5-10%)
Fail	<40%	(<2%)

(approximate percentages for distribution between classes for II.2 and below)

* i.e. not including coursework marks

Important preliminaries

There's loads of administrative information on the web!



How to find out and who to ask?

Exams, coursework, rules, guidance:

- On CUED Undergraduate Teaching website
- Read the Easter Term supplement to the briefing notes
- Ask DoS

And for questions such as

‘Is this bit examinable?’

‘Am I doing enough work/am I in danger of failing?’

Discuss with supervisor or DoS

Logistics

Timetables are on-line

Your candidate number is sent to you at College: make sure you know it.

A few days before the exams, check the Baker Building noticeboards for locations of exams (should be on website too). Check in advance that you know where to go!

Candidates will be admitted to the exam room 15 minutes before the scheduled start time and be given 10 mins reading time

Calculators and Databooks

Make sure you have an authorised calculator

And can use it! If you're not already doing so, use it for everything from now on

You get all Data Books in all exams

Lots of useful stuff! Look through them, so you know what is there (and what *isn't* there)

Take with you

Pens, rulers etc

Exam structure Part 1A

3 hour papers

No choice of questions

200 marks per paper

So aim to cover about 1 mark per minute

Exam structure

Paper 4

MATHEMATICAL METHODS

*Answer **all** questions.*

*The **approximate** number of marks allocated to each part of a question is indicated in the right margin.*

Answers to questions in each section should be tied together and handed in separately.

There are no attachments.

STATIONERY
Single-sided script paper

SPECIAL REQUIREMENTS
Engineering Data Book
CUED approved calculated allowed

Question structure: Short questions

10 marks

May be a series of linked steps

Statement of principle, derivation of equation

Straightforward application

3 (**short**)

(a) Find the distance from the point P = (l,m,n) to the plane whose equation is given by

$$Ax + By + Cz = D \qquad [5]$$

(b) What is the distance from $(2, -1, 3)$ to the plane $2x - 2y - z = 9$? [5]

Question structure: long questions

7 **(long)**

A function f is given by

$$f(t) = \begin{cases} 0 & -\pi \le t \le -\frac{\pi}{2} \\ \cos t & -\frac{\pi}{2} \le t \le \frac{\pi}{2} \\ 0 & \frac{\pi}{2} \le t \le \pi \end{cases}$$

and is periodic with period 2π.

(a) Using one of the series in the Maths Databook, find the corresponding Fourier Series for $f(t)$. [4]

(b) Derive using integration the coefficient of $\cos 6t$, and show that the answer you derive agrees with that found when answering part (a) [10]

(c) Explain:

(i) why there are no sine terms in the Fourier Series for $f(t)$; [3]

(ii) what properties of the function $f(t)$ determine the rate at which the Fourier Series converges. [6]

(d) By considering $g(t) = f(t) - \frac{1}{2}\cos t$, or otherwise, explain carefully why the Fourier Series for $f(t)$ is missing the frequencies that it is. [7]

30 marks

Statement of principle, derivation of equation

Straightforward application

And: Probe some aspects in more depth

Exam technique:
Reading time

10 mins reading time

You aren't allowed to write anything

Look through the whole paper

Don't panic!

Decide which order to attempt questions

Choose which questions to tackle first: start with your strongest topics

You can do the questions in any order: don't necessarily start at the beginning of the paper

Exam technique:

Managing your time

Attempt all the questions

Exams are ‘against the clock’: you have to work fast

Most people run out of time

Time management is vital

Remember: a bit less than than 1 minute per mark

The first few marks on any question are the easiest

It’s really hard to get 100%

If you don’t attempt a question you can’t get any marks for it

So: keep an *eye on the clock*, make a *note* of when you should be starting the next question and *obey your own notes*!

Exam technique:
Getting marks

Most marks are for *method*, *understanding* and *insight* rather than just getting the right answer

You're usually not penalised badly for calculator errors

Explain what you're doing

If you get stuck/run out of time: explain what you're *trying* to do

Hand in *everything*, even crossed-out answers that you think may be wrong

(In future years where there is choice: if you attempt more questions than required, hand them all in. They should be marked and the best marks used)

Exam technique:

Getting marks

The most important thing of all:

Answer the question

Examiners can only give marks for answers to the exact questions set. Read the question carefully and do all parts of it

Don't just do a brain dump of things which might be relevant: link them to the question on the paper

Don't answer the question you wish the examiner had set

Don't answer the question the examiner set last year which looks vaguely similar

Exam technique:

Keeping the examiner happy!

- Write **legibly**
- Lay your answer out **clearly**, highlight answers
- New question, new sheet of paper
- Whenever possible, provide **diagrams** (big enough to read) and **equations**
- Use **bullets** rather than lots of text
- **Take time after the end of the exam** to check your script:

  tie your answers together *in correct numerical order*

  Fill in cover sheets correctly

  Check none of your answers are mixed with the spare paper

Revision strategy: How

All revision must be ‘active’ – don’t just read notes

- Make brief ‘revision notes’ from lecture material
- Test your understanding by revisiting examples paper questions and Tripos questions
- Do Tripos questions from past papers:
  Revise a topic
  See how far you can get without looking at notes
  If you get stuck, look at notes
  Only look at the crib when you’re really tried and can’t do more
- Then attempt questions against the clock, without notes

Revision strategy: When

Next term, you have 4 weeks of labs/lectures.
Exams start less then 2 weeks after that.

You need to start preparation for exams well in advance

Make lists early on (now!) of what you need to cover

Timetable: when do you plan to do it? Do some early in the vacation; don't plan to work all the time, but take some proper holiday.

Learning is cumulative: revisit topics at regular, frequent time intervals

Revision strategy: Routines

Look after yourself physically: eat, drink, exercise and sleep

Aim for steady work rate

Strict division: Work time; relaxation time

Don’t give up social/sporting/other activities, but don’t over-do them

When?

NOT late at night and sleeping in. You’ll need to be alert for 9am exams

Where?

‘Go out to work’ e.g. library, so you can ‘switch off’ when you’re in your room

Things going pear-shaped?

Stress levels can get high; students wind each other up…

It's not just you!

Don't suffer in silence and alone. Talk to:

Tutor (or another College contact, e.g. nurse, chaplain, JCR welfare officer)

DoS, Supervisor

Friends and family

If you become ill, see your doctor immediately

Lots of great advice at:

http://www.counselling.cam.ac.uk/selfhelp/leaflets

Checklist

- ✓ Data books are your friends: get to know them
- ✓ Draw up a revision timetable
- ✓ Active revision
- ✓ Work steadily and sensibly, look after yourself
- ✓ Put time aside for relaxation
- ✓ Do Tripos questions against the clock next term
- ✓ Make sure you know where your exams are
- ✓ Arrive ***at least*** 15mins before the start of the exam
- ✓ Read the paper and answer the exact questions set
- ✓ Don’t panic

Questions?