Understanding Cambridge Academics

Cambridge – need to start early

- Very quirky organization by subject – decentralized and can be hard to find class descriptions as some are behind firewalls.
- START EARLY, e.g., NOW if you want to apply to Cambridge. You really need to dig into the subject/tripos and understand the system!
- Complete regular Study Abroad Application & you need a non-Cambridge alternative. You will not be considered for Cambridge without one.

Cambridge –
Is this a good option for you?

- You need to have a strong academic record – grades count in all the programs, but especially so at Cambridge.
- A **minimum** of 3.6 cum is required but **3.7 GPA & up in your option really needed.**
- Is the academic fit a good one for you? Don't apply to Cambridge solely because of social reasons! You need a strong academic fit.
- Do you have strong ref letters from instructors in your option? This is particularly important.

Cambridge –
Is this a good option for you?

- Supervisions – ***are you willing to speak up and engage in lively intellectual conversation with the supervisor?***
- ***Supervisions*** involve 1 supervisor to 2 or 4 students. **You need to be someone who speaks up and does not worry about whether you are "getting the answer correct!" And can work on their on sets, essays, projects independently!**

Cambridge –

Is this a good option for you?

- Are you socially confident?
- Are you articulate?
- **Do you keep up with the world news and like discussing world events?**
- Can you relate well to students majoring in non-science/engineering disciplines such as literature, philosophy, history, etc.?
- Are you fussy about what you eat as you will often eat in the "Hogwarts" dining hall of your college?
- Can you obey rules? Lots of traditions & lots of rules!
- No travel outside of the UK. Max of 2 weekend trips.

Cambridge GPA Advisory

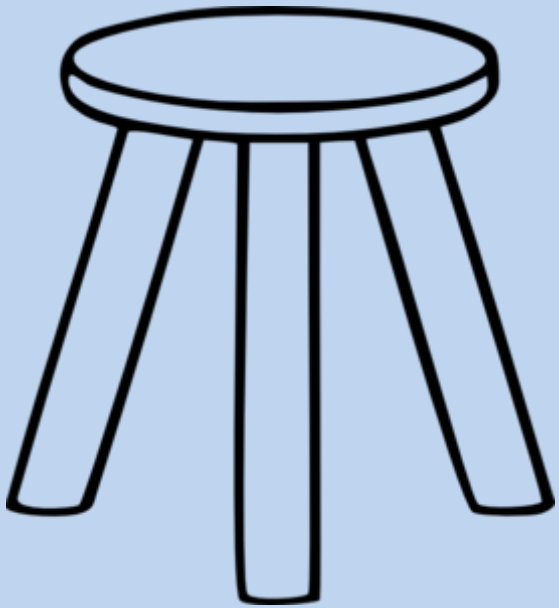
- Cambridge: 3.7 & up in option classes related to tripos classes & min 3.6 cum
- Math at Cambridge 3.8+. Best to have taken Analysis for Part II
- Chemistry Part III – need 3.8+. These are master's level classes – need Part II background. Best for seniors who have taken junior level chem classes.

How Actual Cambridge Students Are Admitted

- **Regular degree undergrads are NOT admitted by a central university committee as at US universities —students are admitted by a college in a specific tripos/subject area!**
- Students apply to a college. College faculty (fellows) select applicants to interview and test. Interviews are academic – **not about personal fit. This is about academic fit.**
- Students are selected based on A level & college test scores, references, & the interview – faculty run process.

Tripos/Subject

Chemical Engineering
Computer Science and Technology
Engineering
Natural Sciences*
Mathematics



*Natural Sciences Tripos contains multiple ***subjects…***

You can only take courses in your tripos/subject.

One exception: **In the Natural Sciences Tripos there are interdisciplinary classes for Physics, Earth Sciences, & Chemistry for Lent Term only**

Typically, parts are split up as follows:

Part 1A –	1st year
Part 1B –	2nd year
Part II	3rd year
Part IIA	
Part IIB	4th year
Part III	

You can mix parts, just beware of 'schedule clashes'.

Limited Tripos & Subject

- At Cambridge you **CANNOT TAKE CLASSES IN SOCIAL SCIENCE OR HUMANITIES** Departments! No exceptions – Cambridge rule! A few tripos subjects offer electives, e.g., Engineering, that have language or BEM/Econ classes.

Tripos Info

- In some tripos areas, the subject is the same as the tripos, e.g., ChemE or CS.
- In NatSci or Engineering, there are subsets of subjects.
- In the Natural Sciences you choose ONE subject, e.g., PDN, Neuroscience, Earth Science, Chemistry, Physics, Math, etc., with exception of max of 1 interdisciplinary class in Lent. ***Cannot do Material Science or Biochemistry***

Cambridge Colleges

- Each of the thirty-one Colleges is an autonomous corporation & is self-governed.
- 16 "old" colleges, founded between 1284 and 1596, and
- 15 "new" colleges, founded between 1800 and 1977.
- Two are for women only & **Darwin** only admits only postgraduates

U. Cambridge Colleges

- We partner with 4 of the old colleges:
- Pembroke — founded 1347
- Corpus Christi — 1352
- St. Catharine's — 1473
- St. John's — founded 1511
- You cannot pick your college.

Role of the Colleges

- The elected or appointed Head of a College may be termed Master, President, Principal, Mistress, Provost, or Warden.

- The Governing Body is made up of the Head and some or all of the Fellows - the elected senior members of the College whose primary duty is teaching, administration or research.

The Role of the Colleges (cont.)

- Residential system – member only of your college.
- Lots of rules & traditions!
- Exeat Rule example.
- Much more scrutiny of your behavior and high standard expected.
- More dressing up!

You must have a 2nd choice program

- Michaelmas (fall) – 6 places
- Lent (winter) – 4 places
- **Apply to both, to maximize selection to Cambridge, BUT you still need to apply to a program other than Cambridge! No exceptions.**
- If you don't get Cambridge, you don't have to study abroad, but you'd be missing out!

University & Departments

- 100 academic departments organized into six schools.
- Arts and Humanities (Not open to Caltech students)
- Biological Sciences
- Clinical Medicine (Not open to Caltech students)
- Physical Sciences
- Technology
- https://www.governance.cam.ac.uk/structure/schools/Pages/Arts-and-Humanities.aspx

Michaelmas Term

Or Lent Term?

Winter Becomes Spring in Lent!

Apply for both terms if you are serious about Cambridge

- Look at classes for best match.
- Both Michaelmas and Lent have their charms!

2nd Choice Options

- Copenhagen: DTU & KU
  - DTU works for engineering and most natural sciences & applied math.
  - KU for physics, biology, CS and math. But note that UCPH does not guarantee housing. DTU does!

2nd Choice Options

- **Edinburgh** has the same feel to it as Cambridge – ancient university in a beautiful, walkable, small city, great academics that work for most options, i.e., CS, ME, EE, Physics/Astrophysics, GPS options, Biology, Chemistry, ChemE, Math, etc.
- You can take HSS classes – 1 or 2

2nd Choice Options

Want Old: Edinburgh –Founded 1583

TEVIOT
UNION
FOUNDED
1889

2nd Choice Options

If UCL is your 2nd choice look carefully at the admitting department 1st and 2nd year classes so you meet prerequisites.

- **UCL:** only an hour away from Cambridge!
  - Only allow fall students in biological sciences, chemistry, computer science, geology, mech eng and neuroscience.
  - Can take HSS courses (up to 50% of classes)
- No Math/ACM, Astronomy, EE, Physics, or BioE or Chem E

2nd Choice Options

- People also list the University of Chicago
- Live in residential college
- But can take 2 classes in other STEM or HSS areas with 2 required classes in your option subject

2nd Choice Issues

- All Edinburgh & UCL programs have a supervision-like system (tutorials)
- DTU and UCPH have recitation sessions as part of block system

All Bachelors Degrees are 3 Years Long in England

All Engineering and some Science degrees have an optional 4th year (coursework masters), which is equivalent to a class at the 100 level.

Cambridge like all British Universities has two taught terms and a third term devoted to review and taking final examinations.

Natural Science (NatSci) Tripos

- Physics & Astronomy - Parts II or III
  - Math is its own tripos, and includes Applied Math
  - Experimental and Theoretical Physics or DAMTP: Physics & Math overlap (Physics students may be able to take some Maths Part II classes)
  - Astronomy students may take physics classes & vice versa

You can ONLY do one Physics Experiment per term. Will not fulfill Physics lab requirement!

- Chemistry – Part III only & very challenging for jrs
  - ChemE is a separate tripos (you can't mix them)
  - No biochemistry – no exceptions No work assigned – just lectures.
- Geological Sciences - Parts II or III (classes alternate by year)
  - Ok to take field courses for field credit if available.
- Interdisciplinary Classes - Part III
  - Limited to Chemistry, Geological Sciences, or Physics. You can propose up to 2 of these- but check schedule carefully for time conflicts with your subject.

Natural Science (NatSci) Tripos

- Natural Sciences Overview – go to specific subjects via Cambridge Program Page: https://www.natsci.tripos.cam.ac.uk
- Biological Subjects - Part Ib and II only

Biological Sciences

- Natural Sciences Tripos
  - Biology: Part II preferred. Some IB allowed.
    - Psychology, Neuroscience & Behavior (PNB);
    - Physiology, Development, & Neuroscience (PDN), Plant Sciences, Zoology. Can choose only 1 Part II
    - Writing more than 1 well researched & well written essay per week
    - Choose 4 modules (classes)
    - Must be excellent time manager - student arranges supervisions
    - NOT ALLOWED: anatomy, biochemistry, clinical or veterinary medicine, genetics, pathology, or pharmacology.

PDN versus PNB

- The modules that make up the courses (PDN/PNB) are mostly shared and most are from PDN, but if a student wants to do cognitive related classes then they should take PNB.
- In addition to the lectures, there are some 'workshops', slightly different for PDN and PNB, but with the same general purpose, mainly based on skills rather than factual content. It would be problematic, however, for a student to undertake a project as they are for 2 terms and places are highly competitive. This means modules only and no projects. Still essay based meaning you write essays, two for each class and that is a lot of writing over 8 weeks.

PDN & PNB Websites

- PBN: Psychology, Neuroscience, Behaviour https://www.psychol.cam.ac.uk/study/ug/nst-ii

- PDN: Physiology, Development, Neuroscience https://www.pdn.cam.ac.uk/undergraduate/supervisors/part-ii-courses

Chemistry Part III

- Students cannot take Part II because classes are taught on a 6 week schedule and the second part of the second group of classes runs 2 weeks in one term and 4 weeks in the next.
- Part III classes are taught for 4 weeks. Students choose 3 classes for 6 units per class for the first half of the term and 3 classes for 6 units per class in the second half of the term.
- Overview & Course Guides:
- https://www.ch.cam.ac.uk/teaching/introduction-chemistry-courses-cambridge https://www.ch.cam.ac.uk/teaching/course-guides
- & For Chemistry Part III go to: https://www.ch.cam.ac.uk/teaching/files/guides/Handbook%20%26%20timetable%2023-24/Part%20III%20Handbook%202023-24.pdf

Earth Sciences Part IIA or IIB

- Go to this link and the use the dropdown menu for Undergraduates to see the various Parts and classes. Click on Undergraduates from the dropdown menu to see the parts and classes for this year.
- https://www.esc.cam.ac.uk

Mathematics Tripos Includes Applied Math

- The Brits say "Maths", not "Math"

https://www.maths.cam.ac.uk/undergrad/course

- Take classes from Part II, but can take Part IB. NOTE THAT PART II & IB taught in CS building AND PART IA are taught in buildings 20 minutes walk from each other.

You cannot take Part III classes that is a graduate program.

Mathematics – Part IA, IB, or II only. Have C & D level classes. D are harder! (There is no separate applied math dept. Applied math is in math.)

NO PART III CLASSES ALLOWED in Maths! (Can audit for fun)

- There are some interesting lectures you can attend on the history of mathematics, but will not get credit because these are not formal classes and are now organized as a society:

  Cambridge University History of Maths Society (CUHoMS). Click here to see their information and become a member on arrival: https://www.cambridgesu.co.uk/organisation/19573/

  - Must have at least 16 lectures = 6 CIT units & 24=9

Physics – Part II and III

- Only seniors or very advanced juniors should take Part III classes. You need to have covered standard Caltech junior year classes to take Part III. Part III classes have very difficult hour exams taken at Caltech in January. All Part II classes work best as these have supervisions. Max of 1 Part III class!
- TP 1 (Michaelmas) and TP2 (Lent) are equivalents of Physics 125 ab.
- https://www.phy.cam.ac.uk/students/teaching. Page 22 has Part II classes & page 31 has Part III.

Chem Eng versus Engineering

- Most Chem Eng students have opted for the Engineering tripos. Some have selected Chemistry Part III – depends on your track in the Chemical Engineering option. Go to https://www.undergraduate.study.cam.ac.uk/courses/chemical-engineering
- and
- https://www.ceb.cam.ac.uk/undergraduates/current-students

- Best to check classes in both the Chemical Engineering Tripos and the Engineering Tripos.

- NOTE that the Engineering Tripos has Information Engineering, Materials & Bioengineering ”Groups.”

Chemical Engineering

- You can take courses in Part IIA or Part IIB – senior electives and specialization
- Some classes split into 2 sections, meaning some finish after winter break. You cannot take these.
- Has themes such as:
  - process applications and systems
  - mathematical methods
- The syllabus is available by going to the FASA Cambridge Page:
- Many ChemE's select the Engineering Tripos or can opt for Chemistry Part III

Engineering Tripos

- You can take courses in Part IIA or Part IIB (3rd or 4th year), but must take at least 2 in IIA (IIB has no supervisions & max of two IIB). Classes are called MODULES.
- Has sub-groups such as:
  - Group A: Energy, Fluid Mechanics and Turbomachinery
  - Group B: Electrical Engineering
  - Group C: Mechanics Materials and Design
  - Group D: Civil & Structural Engineering
  - Group E: Management and Manufacturing
  - Group F: Information Engineering
  - Group G: Bioengineering

Engineering Tripos

- You can take 4-5 classes, but at least 2 out of 4 or 3 out of 5 must be "real" engineering courses (not management, languages, etc. and Part IIA NOT IIB. And the two Part IIa classes must be in the group equivalent to your Caltech primary STEM option!

IIB classes do not have supervisions! And you need to check Part IA, IB and IIA to see if you have the background for IIB classes. Also true for IIA-check Part IA and IB.

- Has BEM type classes & language classes.
- Required to do one Michaelmas Lab and Technical Report Writeup (takes 2 to 3 hours for lab & 2 to 3 hours to do the writeup. https://teaching.eng.cam.ac.uk/content/part-iia-coursework-labs-overview

Examples of Part IIB Engineering elective classes

Module		Term (set)	Prerequisites	On-line resources	Leader	Lab Leader
Code	Title (linked to syllabus)		Assumed			
3E1	Business economics	M(9)		Moodle	Dr A Rosato	Dr A Rosato
3E2	Marketing	M(9)		Moodle	Dr V. Mak	Dr V. Mak
3E3	Modelling Risk	L(8)		Moodle	Dr F Erhan-Oguz	Dr R. Zanjirani-Farahani
3E6	Organisational behaviour	L(8)		Moodle	Dr J Stollberger	Dr J Stollberger
3E10	Operations management for engineers	L(8)		Moodle	Dr F Erhan-Oguz	Rev R McKenzie
3E11	Environmental sustainability & business	M (9)		Moodle	Prof J A Howard-Grenville	Prof J A Howard-Grenville

IIB Group M Modules

Group M: Multidisciplinary Modules

Module		Term (set)	Form of assessment	Prerequisites		On-line resources	Leader
Code	Title (linked to syllabus)			Assumed	Useful		
4M1	French	L(10)	Coursework			Moodle	Mr D. Tual
4M2	German	L(10)	Coursework			Moodle	Mr A Bleistein
4M3	Spanish	M(10)	Coursework			Moodle	Mr S. Bianchi

IIB Group E Mgmt & Manufacturing

Group E: Management and Manufacturing

Module		Term (set)	Form of assessment	Prerequisites	
Code	Title (linked to syllabus)			Assumed	
4E1	Innovation and strategic management of intellectual property	M(9)	Coursework		
4E3	Business innovation in a digital age	M(9)	Coursework		
4E4	Management of technology	M(9)	Coursework		
4E5	International Business	L(9)	Coursework		
4E6	Accounting and finance	M(9)	Coursework		
4E11	Strategic management	L(9)	Coursework		
4E12	Project management	L(9)	Coursework		

Engineering Continued

- Go to this link and click on the Parts from the menu at the top of the page:
- http://teaching.eng.cam.ac.uk

- Engineering Lecture Timetable: http://teaching.eng.cam.ac.uk/node/4112
- Click on each Engineering Area for Part IIA Modules: http://teaching.eng.cam.ac.uk/node/4133#hdr-1
- And for a better overview go to: https://teaching.eng.cam.ac.uk/content/part-iia-syllabuses-links-online-resources

- IIB Modules: https://teaching.eng.cam.ac.uk/node/489
- http://teaching.eng.cam.ac.uk/node/3003

  Students can take 4 to 5 classes in engineering. Two must be in their option equivalent department. Max of 2 IIB but best to take only 1 or all IIA. Part IIB classes DO NOT have SUPERVISIONS. Max of 2 non STEM classes.
- All classrooms in same area. No time transition conflict between Parts.
- **LOOK VERY CAREFULLY AT ENGINEERING – COULD BE BETTER FIT FOR some CS, BioEng, CHEM ENG STUDENTS than the tripos that seems to match option. BUT, you must have the background for Part IIA or IIB.**

Computer Science and Technology

- Is a 3 year program. LOOK AT INFORMATION ENGINEERING in Eng Tripos. Could be better fit.
- You can take classes from any part, as long as there are no time conflicts
- Part II is the 3rd year- equivalent to junior/senior

  Part IA is ok, but likely too easy

  Part IB is sophomore/junior level
- Must have at least 16 lectures to equal 9 CIT units
- Classes are taught for various #'s of weeks.
- Part Ib & II classes are taught in the CS Bldg.

CompSci Tripos Info

- Computer Science – CompSci is its own subject. Has lots of issues as classes are taught for as few as two weeks to as many as 8. You must have at least 3 classes taught at any time in the term – no clustering at the start, middle or end of term.
- Note: CS students should also look at Info Science Track in Engineering Tripos-but can't "mix" with CompSci. One tripos ONLY!

All classes CST (Computer Science Tripos)

- Part II Classes – have supervisions
- All Parts select Part II or IB. Can take Part IA https://www.cst.cam.ac.uk/teaching (dropdown menu for Current Students)
- Part II: https://www.cst.cam.ac.uk/teaching/part-ii
- Note that Part II classes are taught in a building a 20 minute walk from Part IA or IB
- This can cause a time conflict due to the transition. No classes of different parts that immediately follow one another for "mixed" Parts.
- Famous day-by-day CS Timetable: https://www.cst.cam.ac.uk/files/portrait.pdf

CompSci Tripos Info

- Modules of Assessment Classes – students can ONLY choose 1 max of these classes. They have twice the workload of a regular class, have a final exam at the end of term & often a project taken during the term.
- Go to this link to see the CompSci classes including the Modules of Assessment type classes:
- Part II Modules of Assessment — have a term exam and no supervisions. List only ONE of these classes per term:
- https://www.cst.cam.ac.uk/teaching/part-ii/part-ii-modules
- Limited Enrollment in Modules of Assessment due to exam spots! Grad students often in these classes.

More on Modules of Assessment Classes

- Part II Modules of Assessment-exams and no supervisions. List only ONE of these classes per term:
- Supervised classes and module classes:
- https://www.cl.cam.ac.uk/teaching/2425/part2.html
- Click on the individual class: https://www.cl.cam.ac.uk/teaching/2425/ADS/

Modules of Assessment Michaelmas Term

- Advanced Graphics and Image Processing
- Category Theory
- Data Science: principles and practice
- Digital Signal Processing
- Multicore Semantics and Programming
- Natural Language Processing

Modules of Assessment Lent Term

- Advanced Operating Systems
- Cloud Computing
- Computer Systems Modelling
- Cybercrime
- Deep Neural Networks
- Interaction with Machine Learning
- Mobile Robot Systems

Example of CS Schedule – need to submit with course list

Michaelmas Term

Course	Times	Units	Hrs	Part	Week							
					1	2	3	4	5	6	7	8
Concurrent and Distributed Systems	TTh 9/13*	9	16	1B								
Programming in C and C++	MWF 12	6	12	1B								
Data Science	MWF 11	9	16	1B								
Semantics of Programming Languages	MWF 12	6	12	1B								
Business Studies	MW 11	6	8	II								

*Meets at 9 for weeks 1-4 and 13 for weeks 5-8

Total Units: 36

Course by correspondence/units: N/A

Cambridge Caveats

- You can only take classes in one tripos/subject with exception of Engineering (2 in option equivalent track) and NatSci Lent only interdisciplinary classes (propose 2, take only 1).
- Mixing parts can cause shedule conflicts because classes can be taught in buildings 20 minutes walk apart.
- **You MUST look at classes in previous Parts of the tripos as it is assumed you have the background from Part IA, IB for Part IIA or IIB or II.**
- Cambridge has a shorter term than other study abroad programs (good and bad)
- Some timetables/syllabi are listed on CamCORS/Raven, a locked system, so you'll have to write to the department for info or see if the FASA Office has a copy or has a copy posted online.
- **No travel outside the UK proper.** Max of 2 weekend trips in the UK. But lots of time to travel before the Michaelmas or Lent Terms start and after Michaelmas ends.
- **You need good social skills and be someone who enjoys knowing about world events to get the most out of Cambridge. You can be an introvert, but you need to be able to speak up during supervisions, feel comfortable talking to students not in STEM.**

Cambridge Advantages

- The supervision system – but you need to be willing to engage!
- No Exams with a few **exceptions like Part III physics and Comp Sci modules – but you still must learn and integrate material to be able to engage properly in supervisions where hard questions can be asked.** Units of Assessment have exams as do a few other classes such as Theoretical Physics & all Part III Physics except Part III Math allowed classes.
- Has fall or winter option (Michaelmas or Lent)
- It is a shorter term than other study abroad programs, both positive & negative & has residency requirements – no travel out of UK & limited to weekend daytrips or weekend trips. **But plenty of time to travel in the UK or Europe before the term begins and for Michaelmas in Dec. after the term ends**

Cambridge Handout Page

- Go to Cambridge Handout page first to get to specific departments and class lists:
- https://fasa.caltech.edu/documents/29306/Cambridge_Scholars_Study_Abroad_Program_2025_-26_2.22.16PM.pdf

- Direct links to classes by subject/tripos area: https://fasa.caltech.edu/studyabroad/cambridge

Course Info – getting complete info & understanding your prospective tripos and subject/part is time consuming!

Cambridge Timetable

https://www.timetable.cam.ac.uk/

The Timetable does **not** include all subjects & there is a RAVEN firewall for some subjects! Always check FASA Cambridge Handout for subject links.

- The Cambridge Handout:
- www.fasa.caltech.edu is your best source for specific class info – use the links provided.

Reference Letters – Cambridge prefers professors/instructors!

- Who can write for you?
  - Need at least one prof/instructor in your STEM option or highly related field for your 1st letter. (No Hum or SS letters.) Best to have letters from profs/instructors in your option.

  2nd Letter:
  - Another Prof/Instructor in your option
  - Graduate TA's in your option or related field who have taught you
  - Post-Docs you have done research with you
  - Employers in STEM related areas-research related only
  - Research supervisors at Caltech or other universities
  - Your advisor or option rep – OK if that professor has not taught you as long as they know you

  Don't know who to ask? Come talk to us.

Lots to see in the Cambridge area

- Within an hour: St. Alban's-original Roman settlement with large swaths of Roman walls, Roman theater & a museum.
- Bury St. Edmunds-ancient abbey
- Ely-Ely Cathedral & Oliver Cromwell's house
- Lavenham-Guildhall, center of medieval wool trade
- London

Weekend trips from Cambridge

- Bath-train 3 hours
- Bristol-train 3 hours and 10 minutes west of Bath
- Oxford-train 2 hours
- Canterbury-train 2.5 hours
- Edinburgh-1 hour flight

Punting on the Cam

Questions?