
Guide to the Engineering Tripos Part IIB, 2011/12

This document is also available on the 'Fourth Year' section of the Undergraduate Teaching Homepages, as are the documents referred to. Where appropriate, supplementary information will be issued in the Lent and Easter terms, and in the termly Briefing Notes.

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1. STRUCTURE

1.1 Aims

The aims of Part II of the Engineering Tripos are to encourage and enable you:

- * to specialise in considerable depth in a chosen area of engineering;
- * to acquire up-to-date knowledge and understanding of theory and practice in a chosen area of engineering, in an atmosphere informed by research;
- * to continue to develop skills in modelling, analysis and problem-solving;
- * to continue to develop creativity, synthesis and design skills, and the ability to create engineering design solutions;
- * to design and evaluate experiments and computer software;
- * to continue to develop communication, teamwork, management and leadership skills;
- * to develop an awareness of the international role of the engineer;
- * to develop the facility for independent learning, open-mindedness, and the spirit of critical enquiry;
- * to develop the ability to tackle unforeseen technical and management demands, and to apply new technologies in novel situations with confidence and competence;
- * to develop your full potential as innovators and future leaders in industry, the professions, public service, academic teaching and research.

You are required to achieve class II.2 or above in either your second- or third-year examinations in order to be accepted for Part IIB of the Engineering Tripos, and hence qualify for the MEng degree.

In order to be of standing to take Part IIB, students must have taken Part IIA.

1.2 Balance of Work

The fourth year is based around a flexible modular scheme, in which strong specialisation is possible. About 75 modules are available, from which you choose eight. Most opt for four in each of the Michaelmas and Lent Terms, but this is *not* a requirement. If you do wish to take an unbalanced selection, it is usually preferable to undertake the greater share in Michaelmas (e.g. 5:3), since past experience shows that project pressure tends to be higher in the Lent Term. The decision is also influenced by the coursework load of your modules (see Section 1.3). You are advised to discuss your choice with your Director of Studies, particularly if it is not a balanced selection of 4 in each term.

Module assessment is of three types: (a) 100% exam; (b) 75% exam + 25% coursework; (c) 100% coursework. Each module has 16 timetabled slots. Exam-only and coursework-only modules use all 16, including Examples classes/coursework briefings. This is reduced to 12-14 slots for 25% coursework modules. The nominal workload for a module is 40 hours in total (including revision, exams and coursework, as applicable). Lectures run throughout the Michaelmas and Lent terms and examinations are held early in the Easter term.

NB There are no supervisions for fourth year modules, only Examples classes.

You also undertake an individual design, research and/or computer project at a high technological level on a topic of practical relevance. A member of staff in the Engineering Department will act as your project supervisor. You should have determined your project topic during the Easter term of your third year, and carried out preliminary reading or work in industry during the Long Vacation.

Weeks	Michaelmas term								Lent term								Easter Term							
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	0	1	2	3	4	5	6	7
Lectures																								
Coursework																								
Project work																								
Examinations																								

1.3 Examinations and Coursework

Examinations for fourth-year modules begin on Tuesday of week 0 in the Easter term and end not later than Friday of week 3. The examination timetables will be posted on the Examinations noticeboard in the Inglis Corridor during the Lent Term. Each module is marked out of 60, and your total out of the 480 marks available is added to the marks for your project, for which 360 marks are available. All coursework for Part IIB of the Engineering Tripos is for *positive credit*.

All written examinations are of 1.5 hours' duration, whether they count for 100% or 75% of the module credit. With regard to coursework, see Section 4.3 for important information on co-operation / cheating. ***Make sure that you KEEP YOUR COMPLETE SET of Coursework Reports for submission to the External Examiners in the Easter term*** (Section 4.1). Further details will be given in the Easter Term Briefing Notes.

Module leaders will provide instructions for each piece of coursework, including hand-in and collection arrangements (usually via a single administrator for each Subject Group – see section 4.1). **All module coursework is set with a deadline for submission. The penalty for handing in a report late is 20% of the marks available for that report for each week or part week (in or out of term) that the work is late.** See Section 4.2 on procedures for rearranging coursework or applying for extensions to deadlines due to illness.

Students who obtain clear first-class marks for both their project and their modules will be awarded a distinction. Students who obtain clear upper second class marks for both their project and their modules will be awarded a merit grade. In other respects the examination will not be classed. Students who obtain a mark of at least II.2 standard on their project, at least III class standard on their module aggregate, and at least II.2 standard overall will normally graduate with the MEng degree for Part IIB simultaneously with the BA degree for Part IIA.

2. MODULE SELECTION AND ADMINISTRATION

The Part IIB modules offered in 2011/12 are listed in Appendix A, including the balance of assessment (exam only, exam+coursework, or coursework only). The 'Options' document you received in the Lent term of your second year (available on the Web, or from the Teaching Office) explains the criteria for choosing your fourth year modules. You will have already made a provisional choice via COMET, and can update your selection at the start of the Michaelmas and Lent Terms – you will be contacted by email at the start of term (see Briefing Notes). Your selection must be finalised each term by midnight on the Wednesday of week one (12 October and 24 January). After each deadline, your selection is binding and may not subsequently be changed or discounted. Ballots may occasionally be held in a few over-subscribed modules – these will be announced in the Briefing Notes or at the first lecture.

In summary: You choose *eight* modules from Groups A-G and Groups I, M and R.
At least *four* must fall within one of the following **Engineering Areas**:

1. Mechanical Engineering
2. Energy, Sustainability and the Environment
3. Aerospace and Aerothermal Engineering
4. Civil, Structural and Environmental Engineering
5. Electrical and Electronic Engineering
6. Information and Computer Engineering
7. Electrical and Information Sciences
8. Instrumentation and Control
9. Engineering for the Life Sciences

COMET will notify you if your module choices do not fit into your chosen Engineering Area, in which case you must revise your selection. Lists of which modules count in each Engineering Area can be found on COMET. Your Engineering Area may differ from that chosen in Part IIA.

Groups and Sets: Part II modules are grouped according to the CUED Subject Group that is offering them:

- Group A: Energy, Fluid Mechanics and Turbomachinery
- Group B: Electrical Engineering
- Group C: Mechanics, Materials and Design
- Group D: Civil, Structural and Environmental Engineering
- Group E: Management and Manufacturing
- Group F: Information Engineering
- Group G: Engineering for the Life Sciences

Additional topics offered are classified as follows:

- Group I: modules imported from outside CUED;
- Group M: modules which are multidisciplinary (including Language modules);
- Group R: research modules available to certain undergraduates.

NB: In Part IIB you may take no more than three modules from the following list:
4D16 (when offered), all 4Ex modules, 4I1, 4I7, 4M1-4.

All modules offered are subdivided into **sets**. The lectures for modules in each set are normally timetabled and examined at the same time, and you are not permitted to choose more than one module from any one set (even if the lectures do not clash). Sets for 2011/12 are listed in Appendix A. A small number of additional modules are not assigned to sets and you should check the timetable for clashes. When selecting your Michaelmas term modules, you must give some thought to the Lent term modules you are likely to take, to ensure that any requirements on module type and number for the year are fulfilled. You are not permitted to drop a Michaelmas module once you have registered as taking it.

Subject Group Centres

Part II Subject Groups each have a designated centre where either racks or filing cabinets are provided in which lecturers can deposit spare copies of lecture handouts, examples papers and cribs. Course material may also be deposited on the Web (e.g. using CamTools). The locations of Subject Group centres are as follows (if documents are not there, please contact the relevant Module Leader directly):

- Group A (modules 4A*): Some in the Hopkinson Lab; others available from lecturers
- Group B (modules 4B*): EIETL: filing cabinet
- Group C (modules 4C*): Racks in the Centre Wing Mechanics Lab
- Group D (modules 4D* and 5R5): Racks in the Inglis Mezzanine area
- Group E (modules 4E*): Inglis Corridor: filing cabinet
- Group F (modules 4F*): EIETL: filing cabinet
- Group G (modules 4G*): EIETL: filing cabinet
- Group I (modules 4I*): Inglis Corridor: filing cabinet
- Group M (modules 4M* and 5R1): Inglis Corridor: filing cabinet

Dissertation

You may choose to submit a dissertation of 4,000 – 5,000 words in length, in place of one of the modules. The Module Leader will advise on whether a proposed subject, which must be in the general field of the module, is suitable for a dissertation. You must then seek approval from the Faculty Board by submitting a written statement to Madeline McKerchar, Secretary of the Faculty Board, Teaching Office, CUED, giving the title of the dissertation, the seven other modules being taken and the title of your project. This must be sent to the Secretary of the Faculty Board by Wednesday of Week 3 of the Michaelmas Term. The dissertation may be written at any time during the academic year. The deadline for handing it in to Madeline McKerchar is Monday of Week 1 of the Easter term.

3. PROJECTS

You are expected to work on your project for 15 or more hours a week throughout the Michaelmas and Lent terms, and for most of the Easter term. It is important to work steadily, as marks are awarded by your supervisor for **Progress and Industry**, following four formal Progress Reviews, and at the end of the year when the report is submitted. Progress Reviews must be arranged **by you** to be held on or before the Fridays of Weeks 5 and 9 in the Michaelmas and Lent terms. Project work must be planned to take account of your other workload (e.g. module coursework). You may need to spend several weeks in each vacation on project work, catching up on experiments/design/computing and drafting your reports. Experimental work and any substantial computing should be completed before the beginning of the Easter term, leaving the Easter term for consolidation and writing up.

During Week 7 or 8 of the Michaelmas term, you are required to give a short **oral presentation** to staff and other students working on projects in the same general subject area. In this presentation you should demonstrate that you have formulated clear aims, understand the background to the project and are making progress.

At the beginning of the Lent term you are required to submit a brief **Technical Milestone Report** of no more than six A4 sides outlining the scope of the project, the progress made so far and the plans for the result of the work. This report should be completed during the Christmas vacation.

A **Technical Abstract** and main **Final Project Report** are submitted at the end of Week 5 of the Easter term. You make a **final presentation** of your project work in week 6 or 7 of the Easter term. These usually take the form of 'mini-conferences' with all presentations in a Subject Group taking place on the same day, with all staff and students in that Group in attendance, and in some cases external guests (e.g. from industry).

Project work is marked out of a total of 360: 20 marks for the Michaelmas term presentation, 20 for Progress and Industry in each term, 40 for the Technical Milestone Report, 200 for the Final Report, and 40 for the Easter term presentation.

Full details are given in the document *Second Notice about Fourth-year Projects*, which you should receive from your DoS with these notes (also available in the 'Fourth Year' section of the Undergraduate Teaching Webpages). You should also refer to Section 4.4 for important information on cooperation / cheating.

4. GENERAL INSTRUCTIONS

4.1 Module Coursework: planning, anonymous marking and feedback

In Part IIB, there is a much greater degree of self-study and flexibility in your work schedule than in previous years of the Tripos. You must therefore take responsibility for managing your time to complete examples papers, Tripos practice, project work and module coursework. Coursework deadlines tend to pile up around the end of term (including the first week of the vacation). Given the breadth of choice in Part IIB it is impossible to avoid some conflict of deadlines. **Planning ahead is essential – put your coursework and project deadlines in your diaries at the first opportunity.**

Coursework counts for either 25% or 100% of the module credit, which translates into a nominal 10 or 40 hours of work. It is inadvisable to spend substantially more time on coursework than these nominal times, since other module and project work invariably suffers.

Coursework must all be submitted to the relevant Group Administrator, as follows:

- 4A: Ms S Ball – post box outside Room BE2-03, 2nd Floor Baker Building
- 4B/4G & 4M (non-language): Mr D P Gautrey (dpg@eng), EIETL, 2nd Floor, Inglis Building
- 4C: Mrs A Walczyk (aw571@eng), Room BE3-39, 3rd Floor Baker Building
- 4D: Mr M R Touhey (mrt10@eng), Structures Lab, Ground Floor, Inglis Building
- 4E/4I: Teaching Office (melw2@eng), Room BEO-06, Office Floor, Baker Building
- 4F/5R: Mrs R F Fogg (rff22@eng), Room BNO-37, Office Floor, Baker Building
- 4M (Language): Mrs L Morrow (lmm43) Language Unit, Baker South Wing 2nd Floor

As far as is practical, all coursework in Part IIB will be marked anonymously. The coversheet for coursework is in two parts. Group Administrators will be provided with a Coursework Candidate Number (CCN) for all students on a module that includes coursework. They will transfer this CCN onto your coversheet, removing the part of the form containing your name and crsID before forwarding the work to the marker. After marking, coursework should be collected from the Group Administrators, who retain the mapping between names and CCN. Note that you do not need to know your CCN – it is *not* your examinations candidate number.

Coursework will be marked as soon as possible after submission, but be aware that this is a considerable burden on teaching staff, and the normal turnaround of 15 days does *not* apply in Part IIB. Module leaders are asked, as far as possible, to return marked work and feedback as follows: (i) for work submitted before the end of Week 5, return by end of Full Term; (ii) for work submitted in Weeks 6-10, return by end of Week 2 in the following term; (iii) for work submitted at the start of the following term, return by end of Week 4 (Lent) or Week 3 (Easter).

Markers are required to provide feedback, either directly on the report and/or cover sheet, or via CamCORS. Marks are not disclosed, and may be subject to moderation, but the quality of the work is indicated as Excellent, Good, Satisfactory or Poor. Group Administrators are expected to notify colleges via CamCORS of any student whose work receives a 'Poor' mark.

4.2 Rearranging Coursework and Allowances for Illness

Occasionally it may be necessary to rearrange scheduled coursework activities – acceptable reasons to request a change in arrangements are summarised in the [Guidelines for Rearranging Coursework](#) on the Teaching Webpages. You must contact the relevant member of staff *as soon as possible*. If coursework or project activities or deadlines are missed due to illness or other grave cause, you are expected to make all reasonable efforts to complete missed sessions or to submit work at a later date. Extensions to deadlines are expected to cater for most circumstances in Part IIB.

For **coursework**, notify the relevant Group Administrator of your intention to submit work late, explaining the cause. Extensions *may not* be negotiated ad-hoc with the Group Administrator or Module Leader. Lateness penalties will be recorded, and you must apply for an extension to the Director of Undergraduate Education on the Allowance for Illness forms. If approved, lateness penalties will be removed by the Examiners. Extensions will not normally be permitted beyond the start of the term following that of the module.

If it is impossible to complete a piece of coursework, an allowance of marks may be made, if it is possible to base a fair mark on a partial submission or an alternative exercise arranged with the Module Leader. Failure to submit any coursework for assessment on a 100% coursework module will be treated in the same way as a missed examination: zero marks awarded and referral to the University Applications Committee.

Work on the **final-year project** proceeds over the whole of the year, and extensions to deadlines are expected to cater for most disruption due to illness or other grave cause. Students unable to give their presentations at the scheduled times should notify their Project Supervisor as soon as possible. Students will be asked to join another group, or a one-off presentation may be arranged. Similarly, Progress Reviews may be rearranged due to illness. In either case, an extension must be applied for through the Teaching Office. If rescheduling proves impossible, an application may be made for an allowance of marks.

Extensions to deadlines will be permitted for good cause for the Technical Milestone Report and the Final Report (limited to two weeks for the Final Report). Allowances of marks will not normally be awarded, and only for cases in which a substantial partial submission has been made. Failure to submit any project reports for assessment will be treated in the same way as a missed examination: zero marks awarded and referral to the University Applications Committee.

Details are provided in the [Allowances for Illness](#) notes (on the Teaching Webpages, or available from the Teaching Office). All requests for allowances must be made to the Director of Undergraduate Education at the first opportunity after the work is disrupted. Applications must be made by students via their college Tutors on the [Allowances for Illness form](#) (available from the Web or the Teaching Office).

4.3 Submission of Coursework to the Examiners

For examination purposes, your Module Coursework Report booklets will have to be handed in to the examiners at the end of the Easter term, together with your Project Technical Milestone Report. You are to submit these, tied together in a single bundle, with the submission form (available from the Teaching Webpages) completed as a cover sheet. Project Final Reports are also submitted during the Easter Term. Full instructions will be given in the Easter term Briefing Notes.

4.4 Cooperation / Cheating / Turnitin software

Laboratory and coursework marks may contribute significantly to your overall examination mark, and the individual project counts for over 40% of the total credit. Because this work is not carried out under examination conditions, the distinction between beneficial co-operation and deliberate cheating should be clearly understood.

Module Coursework

Co-operation: It is perfectly acceptable to discuss continuously-assessed work with other students, or with demonstrators and supervisors. Such discussions are beneficial and are to be encouraged. It is right that effective use of such discussions can lead to higher marks, always provided that the student has made the main contribution to the work submitted and understands all of it.

Cheating: Co-operation can go too far, however, especially if one student is effectively carried by another or by the demonstrators. Thus, while it may well be beneficial for students to discuss a problem in computing, it is unacceptable for two students to submit effectively identical programs. The named author must have made the main contribution to the work submitted and the report must be in his or her own words.

Any deliberate attempt to pass off the work of others as being produced by the named author is cheating. Students suspected to have cheated will be reported to the Director of Undergraduate Education, and interviewed by an appropriate member of staff. For each coursework submission found to have been copied in part or in whole a mark penalty will be imposed and the students' Director of Studies informed. Any appeal at this stage must be referred to the Head of the Department. The Examiners may be informed and might take further action. Serious cheating will be referred to the University Proctors, after which the Department has limited influence.

NB The University publishes a clear policy on Plagiarism on the Web (linked from all Teaching Webpages). It is assumed that you will have read and understood this policy, and ignorance of the seriousness of plagiarism will not be an acceptable defence. The range of penalties for cheating in University examinations and coursework includes disqualification from the BA and MEng degrees.

Projects

In the context of projects, it is self-evident that research-based project work requires extensive discussion and cooperation with your Supervisor and others. However, all reports and presentations must document the individual work of the author, with specific reference being made to any material taken from another source (including concepts, theories, equations, figures, or computer code, whether published in the open literature or on Websites, or unpublished work obtained by other means). Failure to reference the work of others is cheating and will be penalised.

It is important that you have read the notes on Plagiarism in the *Second Notice about Fourth Year Projects*.

Turnitin software

In Part IIB, all coursework and project work submitted electronically may be subjected to checking for plagiarism using the Turnitin software. You are required to read the terms and conditions of use for this software (Appendix B, attached), and to complete and submit a consent form (Appendix C, attached). Please submit your completed consent form to the Safety Office (Office Floor), at the same time as your project Risk Assessment (see *Second Notice about Fourth Year Projects*). **The deadline for form submission is 5pm on Wednesday 12th October.**

5. ACCREDITATION

You are encouraged to become Student or Affiliate members of one or more of the Institutions. The Cambridge MEng degree is fully accredited by all of the principal Engineering Institutions subject to the condition that at least two management modules are included in your Part II portfolio (ie those in Group E: Management and Manufacturing plus 4I1 Strategic Valuation). For ICE, IStructE and IHT module 4D16 may be counted as one of the two management modules.

Accrediting Body

Institution of Civil Engineers (ICE)
 Institution of Structural Engineers (IStructE)
 Institution of Highways and Transportation (IHT)
 Institution of Mechanical Engineers (IMechE)
 Institution of Engineering and Technology (IET)
 Royal Aeronautical Society (RAeS)
 Institution of Measurement and Control (InstMC)
 Institute of Physics and Engineering in Medicine (IPEM)

Engineering Area to be offered

1-9. ANY AREA
 1-9. ANY AREA
 1-9. ANY AREA
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 1-9. ANY AREA OR MET
 1-9. ANY AREA
 8. Instrumentation and Control Engineering (+ other Engineering Areas) are also accredited provided that at least two of the following modules are taken in Part II:
 3F1 Signals and systems
 3F2 Systems and control
 4F1 Control systems design
 4F2 Robust multivariable control
 4F3 Nonlinear and hybrid control
 9. Engineering for Life Sciences (in both IIA and IIB)