Part IIA project guide

Introduction

During the Easter term following the IIA examinations, all Part IIA students undertake 2 projects from a choice of around 30. A few projects will have some preparatory sessions during the Lent Term (counting towards the same total workload); Constractionarium starts at the end of Michaelmas.

Some projects have pre-requisite modules (‘useful’ or ‘essential’) and will assume certain background knowledge. NB. It is the students’ responsibility to check these pre-requisites, and to choose projects (and modules) appropriately - this will NOT be checked via COMET.

Details of schedules and pre-requisites are provided in the project descriptions.

Projects are of two types, “Group” and “Standard”, and you must take at least one Group project. Group-based projects involve working in groups of at least 3, with some degree of inter-dependence and shared effort. Some Standard projects also involve working in pairs and pooling results.

Most projects are also classified as Design, Field or Language, and you must take at least one Design project. Projects are in timetable sets, and there are a few other constraints on allowable combinations (details below).

Project codes (e.g. GA1, SB1) indicate Group (G) or Standard (S), and the associated subject area (A-G, as for IIA modules, plus L for Languages, and M for Multidisciplinary). Projects may be chosen from ANY subject area (taking due account of any pre-requisites).

Each project has a project leader, but groups of projects also have a coordinator that you are welcome to contact to discuss any general matters throughout your project. You can also contact the Teaching Office, or the overall project coordinator, Dr HR Shercliff.

<table>
<thead>
<tr>
<th>Project codes</th>
<th>Coordinator</th>
</tr>
</thead>
<tbody>
<tr>
<td>GA, GC, SA, SC</td>
<td>Dr A White</td>
</tr>
<tr>
<td>GB, GF, SB, SF</td>
<td>Dr I Lestas</td>
</tr>
<tr>
<td>GD, SD</td>
<td>Mr A Johnson</td>
</tr>
<tr>
<td>GG, GM, SG, SL</td>
<td>Dr H Shercliff</td>
</tr>
</tbody>
</table>

Project descriptions

<table>
<thead>
<tr>
<th>Project code</th>
<th>Project</th>
<th>Leader</th>
<th>Category</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>GA1</td>
<td>Advanced Cycle Power Generation</td>
<td>Dr T Hynes</td>
<td>Design</td>
<td>Group</td>
</tr>
<tr>
<td>GA2</td>
<td>Turbo-expander</td>
<td>Dr L Xu</td>
<td>Design</td>
<td>Group</td>
</tr>
</tbody>
</table>
### Key dates

Projects run over a 4-week period after the Part IIA examinations, so that undergraduates have no other scheduled activities. Important dates and deadlines are:

- **Project descriptions available for browsing**: Monday 9 October (Michaelmas, week 1)
- **Start of input of student preferences**: Monday 30 October (Michaelmas, week 4)
- **Language projects information session - in the Language Unit**: Wednesday 1 November, 1-2pm (Michaelmas, week 5)
- **Deadline for input of student preferences**: Friday 3 November (Michaelmas, week 5)
- **First list of allocations**: Monday 27 November (Michaelmas, week 8)
- **Final list of allocations, and enrolment on Moodle**: Friday 12 January (Lent, week 0)
- **Preparatory sessions for selected projects**: See project descriptions (Lent, weeks 3-7)
- **Easter Term project period begins (Language projects: Wednesday 9 May)**: Thursday 10 May (Easter, week 3)
- **Each project will have interim reports**: (Easter, weeks 3-6)
or presentations. Deadlines for these vary - see the project descriptions for details.

<table>
<thead>
<tr>
<th>Hand-in date for final report:</th>
<th>Hand-in date for final report:</th>
<th>Latest hand-in dates for final reports:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constructionarium project</td>
<td>Multidisciplinary Design project</td>
<td>all other projects</td>
</tr>
<tr>
<td>Friday 1 June</td>
<td>Friday 1 June</td>
<td>Thursday 7 / Friday 8 June</td>
</tr>
<tr>
<td>(Easter, week 6)</td>
<td>(Easter, week 6)</td>
<td>(Easter, week 7)</td>
</tr>
</tbody>
</table>

Some project leaders may set earlier final report deadlines. Final project reports must be handed in by **4pm** on the relevant days. Students should aim to submit ahead of the deadline, and ensure that they allow for significant congestion on DPO printers.

**NB:** final reports will not be accepted after the deadlines, unless there has been agreement in advance for a short extension, due to illness or other grave cause. Project leaders are required to complete all marking by Wednesday 13 June. Note that all interim reports must be resubmitted, appended to your final report.

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### How to choose a project

Students interested in taking a Language project should attend an information session on Wednesday 1 November from 1-2pm in the Language Unit.

Between Monday 30 October and Friday 3 November, you should enter online your preference, in order, for exactly five projects, satisfying the following rules:

- Your 1st and 2nd preferences must include at least one Group project, and one Design project (many are both). Your preferences overall must include at least 3 Group and at least 3 Design projects.
- Projects are in sets (P1, P2 etc) with each set having a fixed timetable; projects must be taken from different sets. Certain other combinations of sets are also excluded for timetable reasons.
- GF2 (Software) and GM2 (Technology for the poorest billion) have previously been very over-subscribed.
  You are only permitted to include these projects as your first preference, and therefore cannot include both projects in your selection.
- Some projects have **pre-requisites** (e.g. useful or essential IIA modules): it is your responsibility to check the project descriptions, and only to select projects for which you have taken the pre-requisites. Your module history is NOT checked automatically on COMET by the project allocation programme.
- Project GD1 (Constructionarium) may only be combined with GD2 (Structural Modelling) or with one of SL1-5 (European Languages). Constructionarium and its associated project may only be selected as first and second preferences. Places on Constructionarium are only available for students who qualify for the Civil, Structural and Environmental Engineering Area.
- Field projects (set P5): these projects cannot be combined with sets P1 and P2 (due to timetable clashes). Project GD5 (Engineering Geology and Surveying) is only available for students in the Civil, Structural and Environmental Engineering Area; Project GD6 (Surveying) is only open to students in other Engineering Areas.
- Apart from these restrictions, projects may be chosen from any subject area, regardless of your Engineering Area(s).

### How projects are allocated

Each project has a maximum capacity, due to limits on staff, space and equipment. Some projects may not run if very few students opt for it.

Before making your selection, you should study the timetable, noting the project sets, and the combinations of sets that are not permitted. In the online selection page, the sets are colour-coded to guide you. Before you can submit your preferences, the software will:
1. check that your 1st and 2nd preferences form a valid combination;
2. tell you how many of the combinations of your 1st to 4th preferences are valid (at least 2 must work to give yourself a fair chance of obtaining your 1st to 4th preferences).

You will be prompted to reconsider if either of these checks fails.

The computer programme allocates a “score” of 1 to your 1st preference, 2 to your 2nd and so on. The allocation algorithm makes the average total score per student as close to 3 as possible. In recent years most students have been allocated at least one of their first 2 preference projects, and very rarely a 5th choice – but you should still consider all five of your choices seriously, as you may be assigned to any of them.

The Teaching Office will post a first list of project allocations online by Monday of Michaelmas week 8. Any queries or requests for changes should be referred to the Teaching Office by the first Monday after the end of the Michaelmas Term, at the latest, giving a reason for any request to change. The Teaching Office will endeavour to arrange alternative projects, but there is no guarantee that this can be achieved as many projects are over-subscribed, and Group projects must run with multiples of a specified group size.

A final list will be published online by Monday of week 1 in the Lent Term. Changes after this date are only permitted in exceptional circumstances. (Exceptional does not include students being inefficient or indecisive).

**Timetable constraints**

Projects are in sets (P1, P2 etc) with each set having a fixed timetable (see Table below); projects must be taken from different sets. Certain combinations of sets and projects are excluded for timetable reasons.

**Multidisciplinary design projects (GM1, GM2)**

Students may not be allocated both projects, even though they do not clash on the timetable. Both may be included in student preferences, provided that the overall preferences produce enough valid combinations.

**Over-subscribed projects (GF2, GM2)**

Previous experience shows that these projects tend to be very over-subscribed. You are only permitted to include these projects as your first preference, and therefore cannot include both in your selection.

**Constructionarium project (GD1)**

Constructionarium (in combination with Structural Modelling or a European Language) operate to their own timetable during the 4-week period. Constructionarium will have preparatory sessions at the end of Michaelmas and in the Lent Term, and includes a residential week on site in Norfolk (for dates, see the project description), and an earlier final report deadline. The second project must therefore be concluded in the other project weeks. These projects all have the same credit as other projects, but Constructionarium necessarily requires a greater commitment of time (due to the residential week, and associated safety training).

**Civil Engineering design project (GD4)**

This project usually includes a field visit on the Tuesday of project week 1 (TBC), clashing with set P4 projects (which may not therefore be selected with GD4).

**Field projects (set P5)**

Students must attend timetabled sessions all day on Mondays, and all afternoon on Wednesdays and Thursdays, thereby clashing with sets P1 and P2. For field projects, the timetabled sessions add up to approximately 16 hours per week, and the time which a student is expected to work independently is correspondingly reduced.
Language projects (sets P8/9)

Language projects can be combined with any other project, including Constructionarium (European languages only), but excluding Structural Modelling.

The timetabled sessions consist of 2 or 4 fixed hours (on Wednesdays) with the project leader, plus a choice of supported self-study (SS) sessions, which enable you to avoid clashes with your other project. Students should normally expect to attend during 4-6 hours of the self-study sessions (depending on the number of fixed hours on Wednesday). The project leader and/or a demonstrator will arrange supervisions during the SS sessions.

The Table below shows the options for SS sessions for each project – not all of these will run: the schedule for each project will be determined to fit with the 2nd projects chosen by students.

NB. Language projects will start with a 2 or 4 hour session on Wednesday May 9, one day ahead of the other projects.

If you are interested in taking a foreign language project, you are encouraged to attend an information session on Wednesday 1 November from 1-2pm in the Language Unit, where all the language project leaders will be on hand to answer any questions you may have.

Project timetables for Easter Term

<table>
<thead>
<tr>
<th>Time Slots</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>09.00-11.00</td>
<td>P2 (GA1, GB2, GM2, SA1, SB3, SG1)</td>
<td>P3 (GA4, GC2, GD4, GF1, GF2, SC2)</td>
<td><strong>Lang P8/9 (Fixed)</strong> (SL1, SL3, SL5, SL6, SL7)</td>
<td>P1 (GA2, GB1, GM1, GC3, GG2, SF2)</td>
<td>P4 (GA3, GG1, SC1, SF1); <strong>Lang (SS option B)</strong> (SL1, SL2)</td>
</tr>
<tr>
<td></td>
<td>Field P5 (GD5, GD6)</td>
<td><strong>Lang (SS option A)</strong> (SL3, SL4, SL5)</td>
<td><strong>Lang (SS option D)</strong> (SL1, SL2)</td>
<td><strong>Lang (SS option C)</strong> (SL7)</td>
<td><strong>Lang (SS option C)</strong> (SL6)</td>
</tr>
<tr>
<td>11.00-13.00</td>
<td>P1 (GA2, GB1, GM1, GG3, GG2, SF2)</td>
<td>P4 (GA3, GG1, SC1, SF1)</td>
<td><strong>Lang P8/9 (Fixed)</strong> (SL2, SL4, SL5, SL6, SL7)</td>
<td>P2 (GA1, GB2, GM2, SA1, SB3, SG1)</td>
<td>P3 (GA4, GC2, GD4, GF1, GF2, SC2)</td>
</tr>
<tr>
<td></td>
<td>Field P5 (GD5, GD6)</td>
<td><strong>Lang (SS option B)</strong> (SL3, SL4, SL5)</td>
<td><strong>Lang (SS option D)</strong> (SL1, SL2)</td>
<td><strong>Lang (SS option E)</strong> (SL3, SL4, SL5)</td>
<td><strong>Lang (SS option D)</strong> (SL6)</td>
</tr>
<tr>
<td></td>
<td><strong>Lang (SS option A)</strong> (SL1, SL2)</td>
<td><strong>Lang (SS option B)</strong> (SL6, SL7)</td>
<td><strong>Lang (SS option C)</strong> (SL7)</td>
<td><strong>Lang (SS option C)</strong> (SL6)</td>
<td><strong>Lang (SS option D)</strong> (SL1, SL2)</td>
</tr>
<tr>
<td>Afternoons</td>
<td>P2 (GA1, GB2, GM2, SA1, SB3, SG1)</td>
<td>P3 (GA4, GC2, GD4, GF1, GF2, SC2)</td>
<td><strong>Field P5 (GD5, GD6)</strong></td>
<td>P1 (GA2, GB1, GM1, GC3, GG2, SF2)</td>
<td>P4 (GA3, GG1, SC1, SF1)</td>
</tr>
<tr>
<td></td>
<td>Field P5 (GD5, GD6)</td>
<td><strong>Lang (SS option C)</strong> (SL1, SL2, SL3, SL4, SL5)</td>
<td><strong>Field P5 (GD5, GD6)</strong></td>
<td><strong>Field P5 (GD5, GD6)</strong></td>
<td><strong>Lang (SS option F)</strong> (SL1, SL2, SL3, SL4, SL5)</td>
</tr>
</tbody>
</table>
Each project has a project leader who is responsible for its organisation, running and assessment. Any queries about a project should be addressed to the project leader in the first instance.

At the first session, the project leader will issue any handouts needed for the project.

Availability of computers and other equipment may be restricted at times outside your scheduled sessions, so you should allocate your unscheduled time flexibly between your two projects. Chief technicians can advise you on the hours of access to their laboratories.

**Timetabled sessions and project workload**

During the project period, approximately 8 hours per project per week are timetabled. During these sessions:

1. Students can expect priority access to laboratories, equipment and computers allocated to that project.
2. Students can expect to have access to supervision from the project leader and/or other demonstrators.
3. Project leaders can expect to have access to all of the students on their project, as required.

You are expected to be available for all timetabled sessions (unless prevented from doing so by illness or other grave cause). At the first (compulsory) session, project leaders will provide a detailed schedule indicating when you must attend. A record of attendance will be kept for these compulsory sessions, and penalties applied for absence.

It is expected that students will typically spend around 20 hours per project per week, either in timetabled sessions or working on their own (including report writing).

**Project reports**

**Lab notebooks**

Students must provide themselves with a lab notebook for their projects. It is essential best practice in project management to use a lab notebook to record all day-to-day activities, as a sketch book for conceptual design work, to record calculations and experimental results etc, dating every entry. For some types of project, such as software projects, electronic records and documentation may be more appropriate. Project leaders may ask for notebooks to be produced at meetings or submitted with reports to check that the books are used correctly, with entries properly laid out and dated.

**Interim and final reports**

Most projects require 3 reports to be submitted, i.e. 2 interim reports and a final report. All interim reports must be appended to your final report when you hand it in. The maximum total length of all reports taken together (typed or handwritten on A4 pages) must not exceed 14 sides, plus calculations and drawings. Students must adhere to the page limit, and keep the volume of appendices to a minimum.

Some project leaders may ask for reports to be submitted electronically (via Moodle).

Virtually all reports will be produced electronically, and students MUST take responsibility for retaining their own electronic copies as backup.

**Format of reports**

The format of reports will vary from project to project, and the project leader will tell you what is required. Some general guidelines for design projects are as follows:

**Interim reports (2 sides each, excluding appendices)**
Introduction: overview of project and aims
Project specification
Summary of preliminary design work
Conclusions and programme of future work
Appendices (include important sketches, drawings, computer listings, etc)

Final report (not greater than 10 sides of A4, excluding appendices)

Suggested section headings plus guide lengths are:

- Introduction (1 side)
- Summary of overall design decisions and outline of project management (1 side, possible team material)
- Description of design/computer code (2-3 sides)
- Problems encountered in development and their technical solutions (1 side)
- Test procedure/software implementation (2 sides)
- Conclusions and recommendations for improvements (1-2 sides)
- Appendices (possible team material):
  - Important design details, including mechanical drawings, circuit diagrams, software code
  - Interim reports 1 and 2 (where applicable)

See the report writing guide for further guidance.

Report cover sheets

At the front of each report (interim and final), every student must include a signed coversheet - pdf / word (to be downloaded and printed from this link, as required). The sheet contains:

- A declaration stating that the student is submitting his or her own work. (Work which has not been done by the author must be identified clearly. It is recognised that there will be some common elements between the work of students in a pair or group, for example in drawings and diagrams.)
- Space for markers to provide written feedback (but not marks) on your reports.
- Space for you to indicate suggestions for improvements to the project.

The online survey should be completed at the end of the project period.

Return of reports

Reports, drawings, etc. will be kept until after the Tripos results have been published. The work of IIA project prizewinners will be retained until the Departmental Prize Day next year. Winners will be contacted by email. Project work will NOT automatically be returned to students. Some project leaders may recover reports from the Teaching Office.

Assessment

For each project, there are 80 marks available. In order to spread the workload for both students and staff, continuous assessment will take place for the duration of the project period, with a number of staged reports. Some projects include individual or group presentations as part of the assessment. Each project has its own mark distributions and submission dates, and these are stated in the online project descriptions. A typical allocation is:

<table>
<thead>
<tr>
<th>Report</th>
<th>Length</th>
<th>Marks</th>
<th>Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Interim report</td>
<td>2-3 sides</td>
<td>15 marks</td>
<td>Thursday, project week 2</td>
</tr>
</tbody>
</table>
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Published on CUED undergraduate teaching (http://teaching.eng.cam.ac.uk)

<table>
<thead>
<tr>
<th>Report</th>
<th>Length</th>
<th>Marks</th>
<th>Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>2nd Interim report</td>
<td>2-3 sides</td>
<td>15 marks</td>
<td>Thursday, project week 3</td>
</tr>
<tr>
<td>Final report</td>
<td>10 sides</td>
<td>50 marks</td>
<td>Thursday, project week 5</td>
</tr>
</tbody>
</table>

The main criteria for assessment will be the quality of the project work done, and the quality of the technical report writing. Marks will typically be awarded as follows:

<table>
<thead>
<tr>
<th>Standard</th>
<th>Marks out of 80</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class I</td>
<td>56+ (70%+)</td>
</tr>
<tr>
<td>Class II.i</td>
<td>48+ (60%+)</td>
</tr>
<tr>
<td>Class II.ii</td>
<td>40+ (50%+)</td>
</tr>
<tr>
<td>Class III</td>
<td>32+ (40%+)</td>
</tr>
<tr>
<td>Below honours</td>
<td>0-31 (0-39%)</td>
</tr>
</tbody>
</table>

Notes

- **No report, no marks.** Half marks will not be awarded.
- For non-attendance at compulsory timetabled sessions, the penalty is 1 mark per hour or part hour missed.
- For late submission of interim reports, the penalty is 3 marks per weekday.
- No reports will be accepted after the submission date for the final report.
- Feedback will be given on each report, but the marks will not be disclosed.
- The marks for different projects may be moderated after the conclusion of the project to even out any significant differences in mark distributions.

Allowances

Overview

During the Michaelmas and Lent terms, Part IIA undergraduates submit a minimum of 8 reports/essays associated with modules, and 2 full technical reports (FTR), and complete an Extension Activity (ExA). During the Easter term, students undertake 2 projects. Students are expected to make all reasonable efforts to complete missed experiments, FTRs and ExAs at a later date, and should contact the member of staff in charge of the activity concerned as soon as possible.

An allowance of marks will not normally be made for more than the coursework for 4 modules and an ExA. Applications should be made at the time rearrangement proves not to be possible, and at latest by the end of the relevant term. Allowance forms can be downloaded [here](#).

Part IIA projects

Students are expected to complete as much as possible of the work associated with their two projects, but the four week timetable imposes tight constraints. If there is any significant disruption to your project work (whether or not a report deadline is missed), you must notify your Tutor, project leader(s) and the Director of Undergraduate Education by email immediately, and the Tutor should submit a IIA project allowance form (NB: this is not the standard form used for all other allowances). If the deadline for any report is missed, a form must be submitted by the student’s Tutor within three working days of the report deadline.

Following first notification of disruption of a project due to illness, weekly consultations involving the Director of Undergraduate Education, project leader(s) and Director of Studies will be required until the project is back on track. This is in order to determine reasonable extensions to deadlines, or to agree a reduced or alternative submission of project work if appropriate.

Extensions for interim reports may be made until the final project deadline. Extensions for final reports are limited to a maximum of four days, and only in exceptional circumstances, since the Examiners must publish the final class lists two weeks after the submission date. An allowance of marks may be made only if a substantial part of the project work has been submitted, with the total mark being extrapolated in suitable proportion. Note that allowances are considered separately for each project, i.e. marks awarded for one project will not be used as a
basis for awarding marks on the other project. Failure to submit any reports on a project will be treated in the same way as a missed examination: zero marks awarded and the case referred to the University’s Applications Committee. The **final deadline** for receipt of allowance forms is **4pm on Wednesday 13 June**.

### Summary

Application deadline: Applications for coursework in Michaelmas and Lent Terms must be made on an Allowance form and received by one week after the end of the relevant Full Term. All other applications must be received by the Wednesday of the last week of Easter Full Term.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Deadline extension</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lab experiments and management exercises</td>
<td>Yes</td>
<td>Yes, but not if it is possible to reschedule. Allowance will not normally be made for more than four experiments/exercises</td>
</tr>
<tr>
<td>Full technical reports</td>
<td>Yes</td>
<td>Not normally</td>
</tr>
<tr>
<td>Extension Activity</td>
<td>Yes</td>
<td>Yes, but not if student can join another group</td>
</tr>
<tr>
<td>Easter term projects: - Interim reports - Final reports</td>
<td>Yes No (or up to 4 days in exceptional circumstances)</td>
<td>Not normally, and only if a substantial part of the project work is submitted</td>
</tr>
</tbody>
</table>

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