

Part IIA project guide

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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).

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](#).

Project codes	Coordinator
GA, GC, SA, SC	Dr MPF Sutcliffe
GB, GF, SB, SF	Dr S Hofmann
GD, SD	Mr A McRobie
GG, GM, SG, SL	Dr HR Shercliff

Project descriptions

Project code	Project	Leader	Category	Set	Capacity
GA1	Advanced Cycle Power	Dr T Hynes	Design	P2	24

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Project code	Project	Leader	Category	Set	Capacity
	Generation				
GA2	Turbo-expander	Prof P Tucker	Design	P1	20
GA3	Heat Exchanger	Prof M Juniper	Design	P4	20
GA4	Heat Pump	Dr S Scott	Design	P3	16
GB1	Optical Fibre Link	Prof T Wilkinson	Design	P1	18
GB2	Electrical Power	Dr M Crisp	Design	P2	20
GM1	Multidisciplinary Design	Dr P Long	Design	P1	10
GC2	Light Aircraft Design	Dr J Jarrett	Design	P3	18
GC3	Mechanics of Natural Materials	Dr S Huang	Design	P1	18
GD1	Constructionarium	Dr M Elshafie	Design	P6	45
GD2	Structural Modelling	Dr FA McRobie	Design	P7	45
GD4	Civil Engineering Design Project	Dr M Overend	Design	P3	24
GD5	Engineering Geology and Surveying	Mr A Johnson	Field	P5	48
GD6	Surveying	Mr A Johnson	Field	P5	
GF1	Control Systems	Prof J Maciejowski	Design	P3	20
GF2	Software	Dr A Gee	Design	P3	27
GG1	Microfluidics	Dr T Savin	Design	P4	12
SA1	Aircraft Wing Analysis	Dr R Garcia-Mayoral	Design	P2	32
SB1	VLSI Design	Dr D Holburn	Design	P4	22
SB3	Data Logger	Dr S Hofmann	Design	P2	20
SC1	Automotive Suspension	Dr D Cole	Design	P4	20
SC2	Bicycle Design	Dr M Sutcliffe	Design	P3	18
SF1	Data Analysis	Prof S Godsill		P4	20
SF2	Image Processing	Dr J Lasenby	Design	P1	24
SL1	Intermediate French	Mr D Tual	Language	P8	20
SL2	Advanced French	Mr D Tual	Language	P8	20
SL3	Intermediate German	Mr M Kantus	Language	P8	20
SL4	Advanced German	Mr M Kantus	Language	P8	20
SL5	Spanish	Mr S Bianchi	Language	P8	20
SL6	Japanese	Dr M Ashikari	Language	P9	20
SL7	Chinese	Ms S Deng	Language	P9	20

Note: for information on the timing of projects in each set, see the sections below on [Timetable Constraints](#) and [Project Timetables](#).

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	Monday 5 October	(Michaelmas, week 0)
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browsing		
Start of input of student preferences	Monday 9 November	(Michaelmas, week 5)
Language projects information session - in the Language Unit	Wednesday 11 November, 1-2pm	
Deadline for input of student preferences	Friday 13 November	(Michaelmas, week 6)
First list of allocations	Monday 30 November	(Michaelmas, week 8)
Final list of allocations, and enrolment on Moodle	Friday 8 January	(Lent, week 0)
Preparatory sessions for selected projects	See project descriptions	(Lent, weeks 3-7)
Easter Term project period begins (Language projects: Wednesday 4 May)	Thursday 5 May	(Easter, week 3)
Each project will have interim reports or presentations. Deadlines for these vary - see the project descriptions for details		(Easter, weeks 3-6)
Hand-in date for final report: Constructionarium project	Tuesday 24 May (TBC)	(Easter, week 5)
Hand-in date for final report: Multidisciplinary Design project	Thursday 26 May	(Easter, week 6)
Latest hand-in dates for final reports: all other projects	Thursday 2 / Friday 3 June	(Easter, week 7)

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 8 June. Note that all interim reports must be resubmitted, appended to your final report.

How to choose a project

Students interested in taking a Language project should attend an information session on Wednesday 11 November from 1-2pm in the Language Unit.

Between Monday 9 November and Friday 13 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 combinations of sets are excluded for timetable reasons.
- 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 SL1-7 (Languages). Constructionarium and its associated project may only be selected as first and second preferences. Places on Constructionarium can only be guaranteed for students in 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 30 November for students to check the outcome. Any queries should be referred to [Mary Wilby](#) in the Teaching Office by Monday 7 December, at the latest. You must contact the Teaching Office promptly after the first allocation list is posted if you wish to change, giving a reason for the request. The Teaching Office will endeavour to arrange alternative projects with you, 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 (in the same places) by Monday 11 January. 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 are excluded for timetable reasons.

Constructionarium project

Constructionarium (in combination with Structural Modelling or a Language) operate to their own timetable during the 4-week period. Constructionarium will have preparatory sessions in the Lent Term, and includes a **residential week** on site in Norfolk (May 15 - May 21), and a final report deadline on Tuesday May 24. The second project must therefore be concluded in weeks 1, 3 and 4. 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 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,

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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, 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 4**, 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 11 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

Time Slots	Monday	Tuesday	Wednesday	Thursday	Friday	
09.00-11.00		P2 (GA1, GB2, SA1, SB3) Field P5 (GD5, GD6) Lang (SS option A) (SL3, SL4, SL5)	P3 (GA4, GC2, GD4, GF1, GF2, SC2) Lang (SS option B) (SL1, SL2) Lang (SS option A) (SL6, SL7)	Lang P8/9(Fixed) (SL1, SL3, SL5, SL6, SL7)	P1 (GA2, GB1, GM1, GC3, SF2) Lang (SS option D) (SL3, SL4, SL5) Lang (SS option C) (SL7)	P4 (GA3, GG1, SB1, SC1, SF1); Lang (SS option E) (SL1, SL2) Lang (SS option C) (SL6)
11.00-13.00		P1 (GA2, GB1, GM1, GC3, SF2) Field P5 (GD5, GD6) Lang (SS option A) (SL1, SL2)	P4 (GA3, GG1, SB1, SC1, SF1) Lang (SS option B) (SL3, SL4, SL5) Lang (SS option B) (SL6, SL7)	Lang P8/9(Fixed) (SL2, SL4, SL5, SL6, SL7)	P2 (GA1, GB2, SA1, SB3) Lang (SS option D) (SL1, SL2) Lang (SS option D) (SL7)	P3 (GA4, GC2, GD4, GF1, GF2, SC2) Lang (SS option E) (SL3, SL4, SL5) Lang (SS option D) (SL6)
Afternoons		P2 (GA1, GB2, SA1, SB3) Field P5 (GD5, GD6)	P3 (GA4, GC2, GD4, GF1, GF2, SC2) Lang (SS option C) (SL1, SL2, SL3, SL4, SL5)	Field P5 (GD5, GD6)	P1 (GA2, GB1, GM1, GC3, SF2) Field P5 (GD5, GD6)	P4 (GA3, GG1, SB1, SC1, SF1) Lang (SS option F) (SL1, SL2, SL3, SL4, SL5)

Organisation

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 a lab notebook and 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

Project leaders will issue each student with a lab notebook for each project. These are to be used 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 kept in parallel. Keeping a log book is essential best practice for any substantial project or research activity. 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

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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:

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Report	Length	Marks	Due
1st Interim report	2 sides	15 marks	Thursday 12 May
2nd Interim report	2 sides	15 marks	Thursday 19 May
Final report	10 sides	50 marks	Thursday 2 June

The main criterion for assessment will be the quality of the project work done, and marks will typically be awarded as follows:

Standard	Marks out of 80
Class I	56+ (70%+)
Class II.i	48+ (60%+)
Class II.ii	40+ (50%+)
Class III	32+ (40%+)
Below honours	0-31 (0-39%)

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 for illness

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 leaders and the [Director of Undergraduate Education](#) by email immediately. If the deadline for any report is missed, a [Part IIA project allowance form](#) must be submitted by the student's tutor within three working days of the report deadline (**NB:** this is not the standard form used for all other allowances.)

Following first notification of disruption of a project due to illness, if the project work isn't back on track within 2-3 days, weekly consultations involving the Director of Undergraduate Education, project leaders 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 will be awarded and the case referred to the University's Applications Committee. The **final deadline** for receipt of allowance forms is Wednesday 8 June.

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