apts.ac.uk
Academy for PhD Training in Statistics

APTS Module Specifications

APTS Executive Committee
with help from the APTS Module Leaders

Revised 2009-09-14

1 Introduction

The APTS programme is for first-year PhD students in statistics and applied probability. The programme comprises 8 taught-course modules, to be delivered intensively in four pairs. This document concerns the specification of the 8 modules.

The aims of APTS modules differ from those of typical undergraduate-level or MSc-level lecture courses. Broadly, the aims are to equip first-year doctoral students with a clear 'mental map' of some areas of work that are important in current statistical research, and to help them gain confidence and resources (e.g., analytical tools, computing tools, literature entry-points) to find out more for themselves, as and when needed. The backgrounds of APTS students will vary widely, and it will be crucial to make APTS material accessible to all of those taking part; the APTS modules are intended primarily as *preparation* for more advanced study, and they should not themselves have ambitions which are too advanced.

We have aimed at a consistent format:

(a) **aims, learning outcomes and prerequisites** to specify the core of the module;

(b) an **indicative list of topics**;

(c) an indication of the sort of **assessment** that might be offered.

Here are more comments about each of these in turn.

(a) Aims, learning outcomes and prerequisites

The aims, learning outcomes and prerequisites are written to help specify how each module fits in with the other 7 APTS modules, and to help achieve a general similarity of level. In particular it should be noted:

(i) Module teaching time will be limited. The time allocated to each of the two modules delivered in a 5-day 'APTS week' is 10.5 hours in total. The precise balance within this — between lectures, classes, practicals etc. — is at the discretion of module leaders. A suggested norm is 1.5 hours of lecture per day on each module, with the remaining time being devoted to practical/exercise classes.

(ii) Students' prior knowledge will be uneven (APTS will draw from a wide range of UK universities and student backgrounds). Associated with each module will be a couple of preliminary web-lectures (format to be determined: e.g., some module leaders may want to use video etc, others will not), and module leaders will supply relevant material to help students get up to speed; but over-loading students with such material should be avoided. We have tried therefore to keep aims and learning outcomes at a manageably small size. The 'prerequisites' stated in the module specifications below are of three main types:

  (a) background expected from undergraduate or MSc education, or from preliminary PhD training in students' home departments;

  (b) topics from other APTS modules;

(c) other preliminary material specific to the module concerned.

The preliminary web-lectures for each module will review briefly what is needed from students under (a) and (b), and will provide students with, or point them towards, self-study materials (lecture notes, exercises, reading) to enable them to get to grips with (c). The amount of work that students will need to do themselves prior to an APTS week will vary widely, depending for example on the courses they have taken as undergraduates. In the spirit of the APTS aims as stated in the introductory paragraphs, in some cases the best plan may be for a student to take an undergraduate or MSc-level course, or to undertake a course of directed reading. (An example of this might be a student who has not met the notions of Markov chain or autoregression, and who will later need to acquire expertise for their research.) The preliminary web-lectures and associated material will provide such students with a minimal acquaintance with the topic, sufficient for the student to acquire the relevant mental map through participation in the module, bearing in mind that supplementary courses/reading may be undertaken *after* the APTS module. Module leaders are encouraged to exercise their own judgement in determining what can reasonably be expected of students prior to the APTS week, and which of the 'prerequisites' will need to be reinforced during the APTS week itself.

(b) List of topics

Given the above, these lists are intended to indicate possibilities rather than to stipulate requirements. The ethos of APTS modules is:

- to provide tools and material to gain basic understanding of the relevant area;

- to indicate difficulties and sketch solutions;

- to point authoritatively to the relevant literature;

- to emphasise applications, wherever relevant;

- to give a taste for further study.

Our subject is huge and growing rapidly; it will be of great value for students to acquire perspectives by listening to authoritative experts on these various subjects. For example, a module leader may choose to give a brief overview of what is involved in the area, and select a few examples or special cases to discuss properly rather than attempt an account which aspires to be encyclopaedic but ends up merely being indigestible.

(c) Assessment

APTS is resourced (not lavishly) to supply PhD training through APTS modules, but has not been resourced at all to conduct assessment of students. Module leaders are therefore asked only to supply material for light-touch assessment, which should be in a form useable by a generalist in a student's home department to gain a modest appraisal of student learning via the module. The assessment tasks provide the opportunity for each department to fit APTS training into its own framework for monitoring student progress.

In the module specifications below, the sentences under this heading specify examples varying per module, mainly in order to communicate a sense of what would suffice. Ideally the assessment task should be constructed in such a way that it adds to what has been learned by students during the APTS intensive week. It should enhance both the students' interest in the area of the module and their ability to find out more for themselves.

2   The full module specifications

These are now maintained online, at `http://go.warwick.ac.uk/apts/programme`:

Statistical Computing	Statistical Inference
Statistical Modelling	Statistical Asymptotics
Applied Stochastic Processes	Computer Intensive Statistics
Spatial and Longitudinal Data Analysis	Nonparametric Smoothing