



Institute of Actuaries of India

Subject
CP2 – Modelling Practice
Core Practices
For 2020 Examinations

CP2 – Modelling Practice

Aim

The aim of the Modelling Practice subject is to ensure that the successful candidate can model data, document the work (including maintaining an audit trail for a fellow student and senior actuary), analyse the methods used and outputs generated and communicate to a senior actuary the approach, results and conclusions.

Competences

On the successful completion of this subject, the candidate will be able to:

- 1 prepare and summarise data, and undertake exploratory data analysis and visualisation.
- 2 construct an actuarial model to solve a realistic problem.
- 3 document the model by constructing an audit trail.
- 4 analyse the methods used and outputs generated.
- 5 communicate the results.

Links to other subjects

This subject builds upon concepts introduced in CM1 – Actuarial Mathematics 1 and CM2 – Financial Engineering and Loss Reserving. It can also use material from CS1 – Actuarial Statistics 1 and CS2 – Risk Modelling and Survival Analysis.

This subject also uses the principles in CP1 – Actuarial Practice and some features of the communications development in CP3 – Communication Practices.

Syllabus topics

- 1 Preparation and exploratory analysis of data
- 2 Development of a model with clear documentation.
- 3 Analysis of methods and model outputs.
- 4 Application and interpretation of results.
- 5 Communication of results and conclusions.

The mean weightings are indicative of the approximate balance of the assessment of this subject between the main syllabus topics, averaged over a number of examination sessions, and taking into account of how the subject is to be examined in future.

In addition to the mean weightings a range for the weightings has been provided to indicate how the typical weightings of main syllabus topics may vary in a given examination session. This reflects the variation resulting in the underlying models used and the questions asked in a given examination session.

The weightings also have a correspondence with the amount of learning material underlying each syllabus topic. However, this will also reflect aspects such as:

- the relative complexity of each topic, and hence the amount of explanation and support required for it.
- the need to provide thorough foundation understanding on which to build the other objectives.
- the extent of prior knowledge which is expected.
- the degree to which each topic area is more knowledge or application based.

Skill levels

The use of a specific command verb within a syllabus objective does not indicate that this is the only form of question which can be asked on the topic covered by that objective. The Examiners may ask a question on any syllabus topic using any of the agreed command verbs, as are defined in the document "Command verbs used in the Associate and Fellowship written examinations".

Questions may be set at any skill level: **Knowledge** (demonstration of a detailed knowledge and understanding of the topic), **Application** (demonstration of an ability to apply the principles underlying the topic within a given context) and **Higher Order** (demonstration of an ability to perform deeper analysis and assessment of situations, including forming judgements, taking into account different points of view, comparing and contrasting situations, suggesting possible solutions and actions, and making recommendations).

In the CP2 subject, the approximate split of assessment across the three skill types is 20% Knowledge, 50% Application and 30% Higher Order skills.

Detailed syllabus objectives

1 Preparation and analysis of data (10%)

- 1.1 Use appropriate tools for cleaning, restructuring and transforming data to make it suitable for analysis.
- 1.2 Summarise data using appropriate analysis, descriptive statistics and graphical representation .
- 1.3 Select and carry out appropriate statistical tests of reasonableness.
- 1.4 Make appropriate assumptions about the data provided.
- 1.5 Repair corrupt or missing data.

2 Development of a model with clear documentation (30%)

- 2.1 Plan and produce a spreadsheet model to solve a specified problem.
- 2.2 Document the results of the model including justification of key assumptions, detailing the methodology adopted, an appropriate level of reasonableness checks, sensitivities and limitations.
- 2.3 Produce and audit trail enabling detailed checking and high-level scrutiny of the model by a fellow student and a senior actuary.

3 Analysis of methods used and model outputs (15%)

- 3.1 Perform checks on the results of a model, including applying sensitivity and/or scenario tests.
- 3.2 Comment on the reasonableness of the results under different scenarios

4 Application and interpretation of results (20%)

- 4.1 Apply the results to the problem set, suggesting solutions.
- 4.2. Summarise the results using appropriate charts and tables.
- 4.3. Consider possible next steps.

5 Communication of results and conclusions (25%)

- 5.1 Plan and draft a summary document to cover the data, approach, assumptions, results, conclusions and suggested next steps for presentation to a senior actuary.
- 5.2 Create appropriate data visualisations to communicate the key conclusions of an analysis.

Assessment

Two three hour fifteen minute computer based modelling assignments.

END