Subject CT5

CMP Upgrade 2014/15

CMP Upgrade

ActEd often produces a free CMP Upgrade, which provides details of changes to the syllabus, Core Reading and ActEd materials. This year, however, due to the large number of changes to the Core Reading, Course Notes, Q&A Bank and X Assignments, it is not practical to produce a full upgrade.

We offer a full replacement set of up-to-date Course Notes/CMP at a discounted price if you have previously bought the full-price Course Notes/CMP respectively in this subject. The prices are given in Section 0 below.

Section 1 of this document provides a summary of the major changes so that you are aware of the main “themes” of these changes and the chapters that have been subject to the greatest change.

0 Retaker discounts

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Students have the choice of purchasing the full CMP (printed or eBook) or just the Course Notes (printed).

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1 **Summary of the changes**

1.1 **Changes to the syllabus objectives**

(i).1. *Critical illness assurance* has been removed, and *guaranteed level annuity* has been added to the list of terms.

(iii).8. This objective, covering *Thiele’s differential equation*, has been removed.

(iii).9. (now (iii).8). For the calculation of *mortality profit*, the types of contract that can be involved have been explicitly set out. In particular, the syllabus now mentions policies that have benefits payable *immediately on death*, not just at the end of the year of death. The full additional wording is:

...for policies with death benefits payable immediately on death or at the end of the year of death; for policies paying annuity benefits at the start of the year or on survival to the end of the year; and for policies where single or annual premiums are payable.

(iv).2. For *increasing assurances and annuities*, the syllabus now explicitly includes *assurances payable immediately on death*, and *annuities payable continuously*.

(iv). A new objective has been added to cover *Accumulating with-profits contracts*. The full additional wording is as follows:

*Describe the operation of accumulating with-profits contracts, in which benefits take the form of an accumulating fund of premiums, where either:*

- the fund is defined in monetary terms, has no explicit charges, and is increased by the addition of regular guaranteed and bonus interest payments plus a terminal bonus; or

- the fund is defined in terms of the value of a unit fund, is subject to explicit charges, and is increased by regular bonus additions plus a terminal bonus ("Unitised with-profits")

*In the case of unitised with-profits, the regular additions can take the form of (a) unit price increases (guaranteed and/or discretionary), or (b) allocations of additional units.*

*In either case a guaranteed minimum monetary death benefit may be applied.*
The calculation of gross premiums and reserves that satisfy probabilities involving the future loss random variable has been explicitly included in the syllabus.

The use of a recursive relation to calculate the profit earned from a contract during a year has been explicitly included in the syllabus.

These two objectives have been made into three objectives (vii) – (ix), they have been extensively reworded, and include some material changes to the syllabus.

There are now two objectives referring explicitly to competing risks, including multiple state modelling (vii) and multiple decrement modelling (viii). The main change to these topics is that construction of multiple state and multiple decrement models, including the relationships between single and multiple decrement functions, are to be based solely on the assumption that forces of decrement are constant over each year of age.

Additional sub-objectives, relating to health insurance and defined contribution pension schemes, have been added.

These objectives are reproduced in full as follows:

(vii)
Describe and illustrate methods of valuing cashflows that are contingent upon multiple transition events.

1. Define health insurance, and describe simple health insurance premium and benefit structures.
2. Explain how a cashflow, contingent upon multiple transition events, may be valued using a multiple-state Markov Model, in terms of the forces and probabilities of transition.
3. Construct formulae for the expected present values of cashflows that are contingent upon multiple transition events, including simple health insurance premiums and benefits, and calculate these in simple cases. Regular premiums and sickness benefits are payable continuously and assurance benefits are payable immediately on transition.

(viii)
Describe and use methods of projecting and valuing expected cashflows that are contingent upon multiple decrement events.

1. Define a multiple decrement model as a special case of multiple-state Markov model.
2. Derive dependent probabilities for a multiple decrement model in terms of given forces of transition, assuming forces of transition are constant over single years of age.

3. Derive forces of transition from given dependent probabilities, assuming forces of transition are constant over single years of age.

4. Describe the construction and use of multiple decrement tables.

5. Describe the typical benefit and contribution structures of pension schemes, including:
   - defined contribution schemes
   - defined benefit (final salary) schemes

6. Use multiple decrement tables to evaluate expected present values of cashflows dependent upon more than one decrement, including those of pension schemes.

The objectives relating to profit testing are now all listed in objective (ix). The main change is that profit testing of unitised with-profits contracts is now included in the syllabus.

(ix) (now (x)) – heterogeneity, selection, and related topics.
These objectives have been re-ordered. In addition, sub-objective 7 (the impact of the availability of genetic information on risk classification) has been removed, and a new sub-objective has been added on mortality convergence, which reads:

Explain the concept of mortality convergence.

There have also been many minor changes to the wording throughout the syllabus objectives, which do not materially affect what you need to know for the exam.

1.2 Changes to the Core Reading and ActEd Course Notes

We recommend that you read the whole of the new version of the Course Notes and Study Guide to ensure that you are familiar with the course. There have been a large number of changes to the Core Reading and ActEd text and we do not attempt to list all of these changes here. However, in order to help you focus your preparation we summarise the main changes to the structure and content of the Course Notes.

Chapter 1

- The section on critical illness assurance has been removed.
Chapter 2

- Two new sections, 8 and 9, have been added, covering guaranteed annuities.

Chapter 3

- Most of the graphs depicting the pattern of human mortality have been moved to the last chapter of the course (which is now Chapter 14).

Chapter 5

- The section on Thiele’s differential equations has been removed.
- Additional material has been added to the section on mortality profit, covering the case where benefits are payable immediately on death (Section 9.6).

Chapter 6

- The section dealing with net premiums of with-profits policies has been clarified to refer to without-profits policies with guaranteed increasing payments (this includes changes to Core Reading).
- A new Section 6, covering accumulating with-profits contracts, has been added.

Chapter 7

- A new Section 3.1 (including Core Reading) has been added dealing with calculating premiums and reserves that satisfy probabilities.
- Section 6.4 has been extended slightly to show how the recursive relation for gross premium reserves can be used to calculate the profit over a year.

Parts 3 and 4

These parts have been restructured, with profit testing now in Part 4, while competing risks, multiple decrements and pension funds are covered in Part 3. The two old chapters on competing risks and multiple decrements have also been combined into one (Chapter 10). The 2015 study guide shows full details.

Chapter 10 (previously Chapters 12 and 13)

- This chapter, on competing risks, has been completely rewritten, to cover the syllabus and core reading changes.


**Chapter 11 (previously Chapter 14)**

- The old Section 5, on projecting expected cashflows for pension schemes, has been removed from the course. The chapter has been restructured to reflect this.

**Chapter 12 (previously Chapter 10)**

- In Section 2.3, the profit testing example for disability insurance has been deleted, and a new example illustrating profit testing of unitised with-profits contracts, has been added.

**Chapter 14 (previously Chapter 15)**

- The general pattern of mortality is now covered in Section 1 (moved from Chapter 3).

### 1.3 Changes to the Q&A Bank

We have updated the questions and solutions for the changes in the Core Reading and ActEd Course Notes. In addition, we have moved questions between Parts 3 and 4 to reflect the new course structure. The individual changes are too numerous to give details of them here.

### 1.4 Changes to the X Assignments

As with the Q&A Bank, we have updated questions and solutions for the changes in the Core Reading and ActEd text.

*We only accept the current version of assignments for marking, ie those published for the sessions leading to the 2015 exams. If you wish to submit your script for marking but have only an old version of the assignment questions, then you can order the current assignments free of charge if you have purchased the same assignments in the same subject the previous year (ie sessions leading to the 2014 exams), and have purchased marking for the 2015 session.*