

# ***2021 Study Guide***

## ***Subject F101***

### ***Introduction***



This Study Guide contains all the information that you will need before starting to study Subject F101 for the 2021 exams. **Please read this Study Guide carefully before reading the Course Notes**, even if you have studied for some actuarial exams before.

Note that the Course Notes for the 2021 exams are identical to the 2018, 2019 and 2020 course. However, this Study Guide has been updated for the 2021 session.

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## 1 The Subject F101 course structure

There are six parts to the Subject F101 course. The parts cover related topics although some parts are longer than others. The parts are broken down into chapters. The following table shows how the parts, the chapters and the syllabus items relate to each other. This table should help you plan your progress across the study session.

<b>Part</b>	<b>Chapter</b>	<b>Title</b>	<b>No of pages</b>	<b>Syllabus objectives</b>
0	0	Introduction to health and care	30	
1	1	H&C insurance products – PMI & other related products	52	(b)
	2	H&C insurance products – CI	26	(b)
	3	H&C insurance products – LTCI	36	(b)
	4	H&C insurance products – group products	18	(b), (c)
	5	Healthcare	29	(f), (g)
	6	Product design and stakeholder interests (1)	43	(c)
2	7	Product design and stakeholder interests (2)	35	(c)
	8	Distribution channels	41	(d)
	9	The general business environment	29	(d)
	10	Risk adjustment	33	(i), (l)
	11	State healthcare provision	33	(e)
3	12	Modelling	48	(h), (l), (o)
	13	Data	28	(h)
	14	Assumptions (1) – General considerations	28	(h), (m), (n), (o)
	15	Assumptions (2) – Demographic assumptions	29	(m)
	16	Assumptions (3) – Financial assumptions	41	(m)
	17	Assumptions (4) – Other assumptions	15	(m)
	18	Generalised linear modelling	63	(l)
4	19	Pricing (1) – Individual business	46	(h), (l)
	20	Pricing (2) – Group business	18	(h)
	21	Pricing (3) – Other considerations	27	(h), (l)
	22	Pricing (4) – Options and guarantees	26	(h)
	23	Reserves and Solvency Capital Requirements	71	(l), (n), (o)
5	24	Nature of risks (1)	34	(i)
	25	Nature of risks (2)	26	(i)
	26	Nature of risks (3)	16	(i)
	27	Managed care	12	(k)
	28	Reinsurance	58	(j)
	29	Other risk management techniques	66	(k)
6	30	Investment	34	(l), (p)
	31	Monitoring and feedback into the control cycle	56	(q)
	32	Glossary	30	(a)

## 2 *The Course and the Profession*

The Course consists of Course Notes, the Question and Answer Bank and the Series X Assignments. Collectively, these are referred to as the Combined Materials Pack (CMP).

### *Course Notes*

The Syllabus for Subject F101 has been written by the Actuarial Society of South Africa (ASSA) and states the requirements of the examiners. In doing this, the ASSA has based the Subject F101 syllabus very closely upon the syllabus of the UK Profession's Subject SP1 (previously called Subject ST1). The relevant individual Syllabus Objectives are included at the start of each course chapter and a complete copy of the Syllabus is included in Section 6 of this Study Guide. We recommend that you use the Syllabus as an important part of your study.

The Subject F101 Course Notes were originally based on the UK course Subject ST1 (now Subject SP1). They include the majority of the UK Profession's Core Reading from Subject ST1 (plus a small amount from Subject ST8, now Subject SP8) at that time. Some additional material has also been added that is specific to the Subject F101 syllabus objectives.

The UK Core Reading appears in **bold Arial font**. The remaining text has been written either by:

- ActEd, to enhance it by giving examples and further explanation of key points
- the ASSA to cover ideas specific to Subject F101.

Note that both the UK Core Reading and the additional text form part of the tuition material and are examinable for the Subject F101 exam.

### *Question and Answer Bank*

The Question and Answer Bank provides a comprehensive bank of questions (including some past Subject ST1 exam questions) with full solutions and comments.

The Question and Answer Bank is divided into seven parts. The first six parts include a range of short and long questions to test your understanding of the corresponding part of the Course Notes. Part seven consists of 100 marks of exam-style questions.

## **Assignments**

The six Series X Assignments (X1 to X6) cover the material in Parts 1 to 6 respectively. Assignments X1, X2 and X3 are 80-mark tests and should take you two and a half hours to complete. Assignments X4, X5 and X6 are 100-mark tests and should take you three hours to complete. The actual Subject F101 examination will have a total of 100 marks.

The F101 Combined Materials Pack includes both the assignment questions and solutions. It may be tempting to take a peek at the solutions first, but you will learn much more by attempting the assignments under exam conditions before checking your answers.

We are not able to offer marking for the Subject F101 assignments. Marking is available for the similar Subject SP1 assignments, however, it is important to bear in mind that Subject SP1 includes questions on income protection (IP) products, which are not covered by the Subject F101 syllabus.

## **Core Reading accreditation**

The Institute and Faculty of Actuaries would like to thank the numerous people who have helped in the development of this material and in the previous versions of Core Reading.

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### ***Past exam papers***

You can download the past papers and reports for Subject F101 from the Actuarial Society's website at **[www.actuarialsociety.org.za](http://www.actuarialsociety.org.za)**.

Past papers and reports for UK Subject SP1/ST1, which covers similar material to Subject F101, are available at **[www.actuaries.org.uk](http://www.actuaries.org.uk)**.

### ***Recommended reading***

The exam will be based on the relevant Syllabus and Core Reading and the course material will be the main source of tuition for students.

### ***Calculators***

Please refer to the profession's website for the latest advice on which calculators are permitted in the exams.

### 3 **Further study support**

#### **Queries and feedback**

From time to time you may come across something in the study material that is unclear to you. The easiest way to solve such problems is often through discussion with friends, colleagues and peers – they will probably have had similar experiences whilst studying. If there's no-one at work to talk to then use ActEd's discussion forum at [www.ActEd.co.uk/forums](http://www.ActEd.co.uk/forums) (or use the link from our home page at [www.ActEd.co.uk](http://www.ActEd.co.uk)). You might find the Subject SP1 forum useful, along with the forum for students studying in South Africa.

Our online forum is dedicated to actuarial students so that you can get help from fellow students on any aspect of your studies from technical issues to study advice. You could also use it to get ideas for revision or for further reading around the subject that you are studying.

If you have any comments or concerns about the Syllabus or Core Reading, these can be passed on via ActEd by emailing [SP1@bpp.com](mailto:SP1@bpp.com). Alternatively, you can send these comments to:

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#### **The ActEd website**

The ActEd website at [www.ActEd.co.uk](http://www.ActEd.co.uk) contains much useful information on all aspects of ActEd's products and services, including:

- copies of the Study Guide in every subject
- the current *Student Brochure* and application forms
- a link to ActEd's online store
- a link to the ActEd discussion forum
- details of any minor corrections to the study material.

## **4 How to study to pass the exams**

### **The F100 Subject exams**

It is important to recognise that the F100 subject exams are very different from the earlier exams in both the nature of the material covered and the skills being examined.

Both the Core Reading and the exam papers themselves are generally less numerical and more “wordy”. The exam will primarily require you to explain a particular point in words and sentences, rather than to manipulate formulae. If you haven’t sat this type of exam for some time, you need to start practising again now. Many students find that it takes time to adjust to the different style of the F100 subject exam questions. As ever, practice is the key to success.

The aim of the exams is to test your ability to apply your knowledge and understanding of the key principles described in the Course to specific situations presented to you in the form of exam questions. Therefore your aim should be to identify and understand the key principles, and then to practise applying them. You will also need a good knowledge of the Course to score well and quickly on any bookwork questions.

We recommend that you prepare for the exam by practising a large number of exam-style questions under exam conditions. This will:

- help you to develop the necessary knowledge and understanding of the key principles described in the course
- highlight exactly which are the key principles that crop up time and time again in many different contexts and questions
- help you to practise the specific skills that you will need to pass the exam.

There are many sources of exam-style questions. You can use past exam papers, the Question and Answer Bank (which includes many past exam questions) and X Assignments.

### **Overall study plan**

We suggest that you develop a realistic study plan, building in time for relaxation and allowing some time for contingencies. Be aware of busy times at work, when you may not be able to take as much study leave as you would like. Once you have set your plan, be determined to stick to it. You don’t have to be too prescriptive at this stage about what precisely you do on each study day. The main thing is to be clear that you will cover all the important activities in an appropriate manner and leave plenty of time for revision and question practice.

Aim to manage your study so as to allow plenty of time for the concepts you meet in this course to “bed down” in your mind. Most successful students will probably aim to complete the course at least a month before the exam, thereby leaving a sufficient amount of time for revision. By finishing the course as quickly as possible, you will have a much clearer view of the big picture. It will also allow you to structure your revision so that you can concentrate on the important and difficult areas of the course.

## **Study sessions**

Only do activities that will increase your chance of passing. Try to avoid including activities for the sake of it and don't spend time reviewing material that you already understand. You will only improve your chances of passing the exam by getting on top of the material that you currently find difficult.

Ideally, each study session should have a specific purpose and be based on a specific task, eg “*Finish reading Chapter 3 and attempt Questions 1.4, 1.7 and 1.12 from the Question and Answer Bank*”, as opposed to a specific amount of time, eg “*Three hours studying the material in Chapter 3*”.

Try to study somewhere quiet and free from distractions (eg a library or a desk at home dedicated to study). Find out when you operate at your peak, and endeavour to study at those times of the day. This might be between 8am and 10am or could be in the evening. Take short breaks during your study to remain focused – it's definitely time for a short break if you find that your brain is tired and that your concentration has started to drift from the information in front of you.

## **Order of study**

We suggest that you work through each of the chapters in turn. To get the maximum benefit from each chapter you should proceed in the following order:

1. Read the Syllabus Objectives. These are set out in the box on page 1 of each chapter.
2. Read the Chapter Summary at the end of each chapter. This will give you a useful overview of the material that you are about to study and help you to appreciate the context of the ideas that you meet.
3. Study the Course Notes in detail, annotating them and possibly making your own notes. Try the self-assessment questions as you come to them. Our suggested solutions are at the end of each chapter. As you study, pay particular attention to the listing of the Syllabus Objectives.

4. Read the Chapter Summary again carefully. If there are any ideas that you can't remember covering in the Course Notes, read the relevant section of the notes again to refresh your memory.

It's a fact that people are more likely to remember something if they review it several times. So, do look over the chapters you have studied so far from time to time. It is useful to re-read the Chapter Summaries or to try the self-assessment questions again a few days after reading the chapter itself.

You may like to attempt some questions from the Question and Answer Bank when you have completed a part of the course. It's a good idea to annotate the questions with details of when you attempted each one. This makes it easier to ensure that you try all of the questions as part of your revision without repeating any that you got right first time.

Once you've read the relevant part of the notes and tried a selection of questions from the Question and Answer Bank, you should attempt the corresponding assignment.

To be really prepared for the exam, you should not only know and understand the Course, but also be aware of what the examiners will expect. Your revision programme should include plenty of question practice so that you are aware of the typical style, content and marking structure of exam questions. You should attempt as many questions as you can from the Question and Answer Bank and past exam papers.

### ***Active study***

Here are some techniques that may help you to study actively.

1. Don't believe everything you read! Good students tend to question everything that they read. They will ask "why, how, what for, when?" when confronted with a new concept, and they will apply their own judgement. This contrasts with those who unquestioningly believe what they are told, learn it thoroughly, and reproduce it (unquestioningly?) in response to exam questions.
2. Another useful technique as you read the Course Notes is to think of possible questions that the examiners could ask. This will help you to understand the examiners' point of view and should mean that there are fewer nasty surprises in the exam room! Use the Syllabus to help you make up questions.
3. Annotate your notes with your own ideas and questions. This will make you study more actively and will help when you come to review and revise the material. Do not simply copy out the notes without thinking about the issues.

4. Attempt the questions in the notes as you work through the course. Write down your answer before you refer to the solution.
5. Attempt other questions and assignments on a similar basis, *ie* write down your answer before looking at the solution provided. Attempting the assignments under exam conditions has some particular benefits:
  - It forces you to think and act in a way that is similar to how you will behave in the exam.
  - It is also quicker than trying to write perfect answers.
6. Sit a mock exam four to six weeks before the real exam to identify your weaknesses and work to improve them.

## 5 **Frequently asked questions**

**Q: *Has Subject F101 changed since last year?***

A: The Syllabus for Subject F101 is unchanged from last year. So the F101 Course Notes for the 2021 exams are identical to the Course Notes from 2018, 2019 and 2020.

**Q: *What knowledge of earlier subjects should I have?***

A: The Course Notes have been written assuming that you have already studied, or been exempted from, the foundation technical and intermediate technical subjects.

The key area that you will need in studying Subject F101 is:

- a basic knowledge and understanding of stochastic models, survival models and multi-state models and their financial applications as described in Subjects A212 and A213 (or equivalently the UK Subjects CS2 and **CS1**).

It will also be useful to have a knowledge and understanding of:

- some of the statistical methods covered in Subject A214 (or equivalently the UK Subject CM2)
- investment management and the characteristics of the major asset types, and basic modelling concepts as covered (mainly) in Subject A311 (or equivalently the UK Subject CP1).

**Q: *What are the equivalent subjects in the UK syllabus?***

A: Subject F101 contains a lot of the same material as the UK Subject SP1 (formerly Subject ST1, which covers insurance products contingent on human health). Subject F102 also contains some material covered by the UK Subject SP1.

**Q: *Do you have any revision products for F101?***

A: Not explicitly, but the revision products for the UK Subject SP1 would give good coverage of the Subject F101 syllabus for insurance products contingent on human health. Revision products for Subject SP1 include Revision Notes, Flashcards and Mock Exams.

**Q:** *What calculators am I allowed to use in the exam?*

**A:** Please refer to the Profession's website for the latest advice.

## 6 **Syllabus**

The full Syllabus for Subject F101 is given here. To the right of each objective are the chapter numbers in which the objective is covered in the ActEd course.

### **Aim**

The aim of the Health and Care Principles subject is to instil in successful candidates the ability to apply, in simple situations, the principles of actuarial planning and control needed in health and care matters on sound financial lines.

### **Links to other subjects**

Subject A111 (previously Subject CT3, now Subject CS1) –Actuarial Statistics: provides a basic grounding in statistics.

Subject A212 (previously Subject CT4, now part of Subject CS2) – Risk Modelling and Survival Analysis: covers some stochastic models used in health and care.

Subject A214 (previously Subject CT6, now part of Subject CM2) – Loss Reserving and Financial Engineering: covers some of the mathematical methods relevant for this subject.

Subject A311 (previously Subject CA1, now Subject CP1) – Actuarial Risk Management: covers the general underlying principles affecting all specialisms.

Subject F201 – Health and Care Specialist Applications will use the principles developed in this subject to develop a deeper understanding of health and care insurance business and South African practice.

## Objectives

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

- (a) Describe the principal terms in health and care and health economics. (Chapter 32)
- (b) Describe the main types of health and care insurance contracts: (Chapters 1 to 4)
- private medical insurance
  - health cash plans
  - critical illness insurance
  - long-term care insurance
  - group and individual covers
  - main example variations of contracts issued.
- (c) Outline the principles by which health and care insurance contracts are designed and the interests of the various stakeholders in the process. (Chapters 4, 6 and 7)
- (d) Discuss the operating environments in which health and care insurance products and services are traded: (Chapters 8 and 9)
- distribution channels
  - regulatory and taxation regimes
  - professional guidance
  - economic and political influences.
- (e) Explain the likely role of the State in the provision of alternative or complementary health and care protection: (Chapter 11)
- objectives of State healthcare provision
  - methods of State healthcare provision
  - funding approaches
  - impact of different sectors of society.
- (f) Explain the components of a well-functioning healthcare system: (Chapter 5)
- classification of primary, secondary and tertiary care
  - key supply-side providers
  - main funders of healthcare and main funding models.

- (g) Analyse the mechanics between the funding and supply of healthcare: (Chapter 5)
- risks and risk sharing between funders and providers
  - role and functions of managed care organisations
  - reimbursement methods of suppliers.
- (h) Understand and apply the techniques used in pricing health and care insurance products in terms of: (Chapters 12 to 14, 19 to 22)
- data availability
  - assumptions used
  - equation of value and formula approach
  - cashflow techniques
  - group risk assessments
  - options
  - guarantees
  - external influences.
- (i) Evaluate the nature of the risks facing the insurer: (Chapters 10, 24 to 26)
- data
  - claim rates
  - claim amounts
  - investment performance
  - expenses and inflation
  - persistency
  - mix of new business
  - volume of new business
  - guarantees and options
  - competition
  - actions of management
  - counterparties
  - legal, regulatory and tax developments
  - reputation
  - internal audit failures / fraud
  - physical risks
  - aggregation and concentration of risk
  - catastrophes
  - non-disclosure and anti-selection.

- (j) Understand how insurers use reinsurance to manage their risks and the reinsurance products involved: (Chapter 28)
- reasons for reinsurance
  - types of reinsurance
  - determination of the retention level
  - individual vs accumulated risks.
- (k) Describe how insurers manage their risks: (Chapters 27, 29)
- underwriting
  - claims management
  - data checks
  - product design
  - managing the distribution process and customer relationships
  - managed care
  - managing other counterparties
  - other internal processes.
- (l) Describe the principal modelling techniques appropriate to health and care insurance: (Chapters 10, 12, 18, 19, 21, 23, 30)
- asset-liability modelling
  - objectives and basic features of a health insurance model
  - uses of models
  - multi-state modelling
  - comparison of formula and cashflow approach
  - sensitivity analysis
  - deterministic and stochastic models
  - outstanding claim provision
  - generalised linear models
  - risk mechanics.

- (m) Describe the assumptions that are crucial to pricing and valuation:  
(Chapters 14 to 17)
- morbidity
  - mortality
  - persistency
  - claim amount
  - expenses
  - inflation
  - investment return
  - taxes
  - solvency margins
  - profit requirements.
- (n) Describe the purposes of reserves, solvency capital requirements and embedded values, and the methodologies by which they are calculated for a health and care insurer, including:  
(Chapter 14, 23)
- the role of statistical and individual case estimates
  - setting assumptions, including a comparison with those used in pricing
  - market consistent valuation
  - the interplay between the strength of the supervisory reserves and the level of solvency capital required
  - Value at Risk (VaR) capital assessment
  - comparison of passive and active valuation approaches.
- (o) Explain the purposes and practices of supervisory reporting:  
(Chapters 12, 14, 23)
- principles of setting statutory reserves
  - difference in assumptions from pricing
  - sensitivity analysis
  - strength of basis
  - valuation of assets and consistency
  - solvency margins and solvency assessment
  - risk-based capital.
- (p) Describe the principles of investment underpinning health and care insurance.  
(Chapter 30)

(q) Describe the principles by which the experience from a health insurance operation is used to refocus business planning: (Chapter 31)

- reasons for monitoring experience
- data required
- analysis of mortality, morbidity, claim amount, and persistency rates
- analysis of expenses, new business and investment experience
- reason for analysis of surplus and analysis of embedded value profit
- use of results to revise the models used and assumptions used.