This is a sample of our ILA-101 detailed study manual. This sample includes the introduction section of the detailed study manual and several initial pages of Section A to give you a sense of the format for each section of the course. The full version covers the entire syllabus and is included within the course.

Each portion of the detailed study manual is available in PDF with a clickable table of contents. Each reading (and sub-chapters if applicable) are also bookmarked in the PDF for ease of navigation in your favorite desktop, tablet, or smartphone PDF viewer.

Though not shown in the sample material, we also offer a highly condensed version of the detailed study manual (the “condensed outline” mentioned in the product description). The condensed outline is in the same format as the detailed study manual.

If you have additional questions about the detailed study manual or any aspect of the exam, please email me.

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ILA-101

Detailed Study Manual

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About This Study Manual

This detailed study manual is just one component of our ILA-101 course, which also includes comprehensive video lessons and handouts for all syllabus material, practice problems, commentary on previous SOA exams, flashcards, and much more.

This study manual is organized in exactly the same order as the online course, which is not necessarily in the same order as the official syllabus. The layout of the course reflects what we believe is the most logical order for learning the material from start to finish:

A. **Product Design.** This section is anchored by two large study notes (ILA101-100 and ILA101-101) that describe common types of life and annuity products. This section also contains readings that introduce other product types or expand on the product types in ILA101-100 and ILA101-101. Understanding the ILA product landscape is helpful for understanding concepts covered in later sections.

B. **Experience Studies and Assumptions.** This section starts with traditional experience studies for common actuarial assumptions like mortality and lapse. It also covers newer techniques involving predictive analytics. There is also a subsection devoted to term-specific assumptions since term life insurance is the single most significant life insurance product in the modern marketplace and receives much attention on the ILA-101 syllabus.

C. **Valuation and Modeling.** This section provides an introductory but comprehensive overview of life insurance valuation (reserving) and the modeling of variable annuities. You will learn about both US Statutory and US GAAP reserving practices, primarily as they apply to life insurance products. Because the source material consists of dense textbook chapters rich in quantitative concepts, the many Excel examples integrated into the video lessons are specifically designed to facilitate your learning.

D. **Reinsurance.** This section focuses on chapters from the Tiller reinsurance textbook. Although it may appear the shortest, the reinsurance material is often some of the most challenging on the syllabus. We strongly recommend completing Section C first for maximum study effiency given that the quantitative reinsurance concepts are built upon a formula-based US Statutory framework. Like the valuation topics, the quantitative concepts in this section are best understood with the aid of the Excel examples in the video lessons.

E. **Product Management.** This section explores a diverse set of factors influencing the management and design of life and annuity products, including regulatory requirements, earnings and value measurement, policyholder taxation, distribution channels, and marketing. You'll likely find this material less mentally demanding than Sections C and D, and it's generally most beneficial to approach these topics after completing the preceding sections.

F. **Asset Management and ALM.** This final, brief section includes a handful of readings that describe common insurer investments and introduce fundamental concepts of asset-liability management (ALM). While not fitting neatly into other sections, these materials complete a holistic view of a life insurance company by addressing the asset side of its balance sheet.

We recommend downloading each section's detailed study manual before going through those lessons in the Study app—especially if you are using the Today view—so that you have the detailed study manual to read/reference as you go through the scheduled lessons.

This study manual is intended to help you get through the source material faster than if you had no study manual. Some readings are very difficult to absorb on the first attempt. The study manual will help you pick out important information more quickly.

How to Use This Study Manual With the Online Course

This detailed study manual will provide you with a detailed foundation and reference guide for the rest of the online course. It's the most detailed and verbose outline we provide with the course.

Unlike condensed outlines and flashcards, which are design to aid memorization, this detailed study manual is designed with readability in mind. You will not be able to memorize everything in this guide, nor should you.

As I explain in the Introduction section of the online course, ideally you'll have 3–4 months to prepare for the exam. You'll want to spend the first half of that time reading as much as you can and trying to learn concepts. Don't worry about memorization until the last 1–2 months before the exam.

Each summary in this detailed study manual starts with a section called "Overview of This Reading." These overviews show you the contents and most testable topics in each chapter at a glance. I recommend reviewing these sections before and after you tackle the readings on your own.

After going through the detailed study manual for a given reading, it's a good idea to watch the accompanying video lesson, which will further reinforce the big picture for that reading and provide illustrative examples to reinforce quantitative concepts.

Some people, however, prefer to watch the video lessons first. There's no right or wrong way to use the detailed study manual with the rest of the course as long as you are staying on schedule and learning key concepts. Feel free to experiment and change things up as you go.

Good Luck!

It's critically important to keep a couple of things in mind as you go through the material:

1. Keep moving forward. Don't get bogged down!
2. Remember that you are not trying to become an expert in the material. You are trying to identify and master *testable* material sufficiently to pass the exam.

If you study regularly and put in the time, you will be amazed at how much material you can pack into your head by exam day—*especially if you prioritize concept learning over memorization in the early stages of studying*. That said, a good deal of memorization is needed. Use the condensed lesson handouts and flashcards as a guide for that.

And remember one of the most important features of our online course is customer support. Our course forum is a great place to post questions about any of the material because it gives other students a chance to answer and see answers. You can also email me anytime with any questions.

Your Instructor,

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Section A

Section A.1

Life Insurance Products

ILA101-100: Life Products and Features

Source Author: ILA Curriculum Committee (2020)

Introduction to ILA101-100 and ILA101-101

ILA101-100 and ILA101-101 are authored by the ILA exam committee, and they are formatted much like a textbook. These study notes (and past versions of them) have been on ILA syllabi for many years. Most of the chapters in ILA101-100 and ILA101-101 describe types of life and annuity products. The only exception is ILA101-100 Ch. 6, which looks specifically at substandard life insurance risks. These two study notes are the primary readings in Section A, but you will also see other (mostly newer) readings in Section A that cover additional ILA product designs.

Most chapters of ILA101-100 and ILA101-101 are structured into two broad parts: 1) characteristics/features of the product and 2) pricing considerations/assumptions for the product. However, the same topics often appear in both sections, and I've made every effort to consolidate similar material. Several chapters also include appendices, which I've blended with the body material where appropriate.

ILA101-100: Life and Annuity Products and Features

Source Author: ILA Curriculum Committee (2020)

Chapter 1: Term Insurance

Overview of This Reading

This chapter is split into 2 main parts: 1) characteristics of term insurance and 2) pricing considerations, but they are closely related and contain overlapping material

In this chapter, you will notice several comparisons between "permanent" insurance (e.g. whole life) and term. WL is covered briefly in chapter 2, so feel free to peek ahead at that if you want more context.

Key topics for the exam include:

- Primary **characteristics** of term insurance:
  - Coverage periods and patterns
  - Possible premium patterns and guarantees
  - Challenges of different premium schedules
  - Par vs. non-par term
  - Term and non-term riders
  - Term conversion options and pricing approaches
- Primary **pricing considerations** for term insurance:
  - Mortality
  - Persistency (lapse)
  - Underwriting
  - Compensation
  - Expenses and inflation
  - Profit objectives
  - Legal and regulatory issues

Characteristics of Term Insurance

Coverage Periods and Face Amount Patterns

Provides death benefit (DB) coverage for definite, limited period of time

If the insured does not die during the coverage period, the policy expires

1. **Level term** provides coverage for a stated number of years (e.g. 10) or to a specific age (e.g. 65)
   - Coverages of 10–30 years are the most common

2. **Decreasing term** has a DB pattern tied to the insurance need (e.g. to payoff a mortgage balance or business loan)
    - DBs usually change annually for simplicity, then levels off at some point (e.g. at 20% of original face)
3. **Increasing term** may have benefits tied to an index (e.g. CPI to cover inflation)
    - Commonly sold as supplementary 1-year term riders on whole life (permanent) products

Term insurance can be sold as a rider on other types of policies (e.g. attached to a whole life policy)

- Example: preliminary (a.k.a. interim term) allows policyholder to pay a term premium for first year, then begins paying (higher) premiums for the WL policy

Premium Patterns and Premium Guarantees

Patterns for level term insurance:

1. **Level** for entire period
2. **Modified** – one or two increases over the entire term of the policy (e.g. premium is lower for the first 3–5 years, then increases to a higher amount for remainder of term)
3. **Increasing** every n years – keeps initial cost lower to policyholder and also has lower commission
    - Reduces chance of requiring a cash surrender value (CSV), even for long terms[1]
    - Premium usually = one-year term (OYT) rate $\times$ annual DB
4. **Level for a period, then ART** (annual renewable term)

Possible premium schedules:

1. **Attained age** – everyone age x pays same premium no matter what duration the policy is in
    - Key advantage: simplest to administer
2. **Select scale** – unique schedule of future annual premiums for every issue age (vary by duration)
    - *"Select" refers to the fact that the insurer has "selected" lives based on underwriting criteria. Therefore, the insurer know more about the select life's health than a policyholder paying attained age premiums.*
3. **Select and ultimate (S&U)** – usually starts with a select scale for 5 or 10 years, then blends to an attained age scale

[1] Most term policies are exempt from having to provide cash values under US standard nonforfeiture law. However, certain designs may require CSV, but those details are beyond the scope of the current syllabus.

- *The main idea here is that the "select" status wears off the farther you get from the issue date. A select life that was healthier than average 10 years ago, may have average health today.*

Challenges of Different Premium Patterns and Schedules

- **Attained age scales** – difficult to create scales that are competitive for a wide range of ages (generally results in a higher premium than select or S&U)
  - Possible solution: Limit coverage period to a short period (e.g. 7 years)
- **Select and S&U** – have lower premiums, which encourage persistency, but mortality may worsen in the future
- **Decreasing term** – Level premiums may become high relative to DBs in later years (expect higher lapses as a result)

  Partial solutions for decreasing term (but each have problems)
  - Offer limited payment decreasing term
    - Problem: may require CSVs under law (higher premiums more likely to build a CSV)
  - Use decreasing premium scales
    - Problem: higher 1st year premiums are harder to market
  - Floor future DB at some percentage of initial DB (most common approach)
    - Problem: "isn't a perfect solution" the author says
  - Increase premiums annually (e.g. annual premium = one-year term (OYT) rate)
    - Problem: this results in the lowest initial premiums, but will result in erratic premiums if OYT rates have a different slope than DBs
    - Also has admin challenges

Participating vs. Non-Participating Term

- Both guarantee premiums over the entire term
- Par term is usually more expensive (to fund dividends)
- Par term hasn't been as popular due to cost
- To mitigate cost of par term, companies offer increasing premiums so that higher future premium are offset by dividends:
  - Modified premium plans
  - Annually increasing premium patterns

Advantages of Par Term:

- Lower deficiency reserves because of higher premiums
- Higher premiums provide cushion against adverse experience

- Insured's net outlay (premium − dividend) can fall over time
- Higher persistency due to insured's declining cost
- Increasing premium scale can minimize CSVs

Indeterminate (Non-Guaranteed) Premium Plans

- Allow company to raise premiums in the future
- Initial premiums may be guaranteed 3–5 years
- Premium changes must be done prospectively based on expected future experience (can't change premiums to recoup past losses)
- Key advantage: ability to raise future premiums allows for aggressive pricing
- Disadvantage: raising future premiums will cause the healthiest lives to lapse, leaving higher mortality risks in force

Premium Differences by Policy Size and Underwriting Class

- **Size** – premiums per 1000 usually decline as the issue face increases because of declining average costs
  - Size discounts are larger for term insurance than WL
  - Lapse rates increase with policy size and can be quite different than WL
  - The highest term bands are usually reinsured
  - Sophisticated term buyers often need large policies for brief periods ⇒ more likely to lapse early
- **Risk class**
  - Higher premiums for smokers than non-smokers
  - Lower premiums for select risks
- **Gender** – Can have separate rates for males and females or the same (unisex)

Lapse-supported design – relies on higher lapse rates to achieve higher profitability targets

- Key challenge: term product profits can be harmed by high early lapse rates (makes it hard to recoup acquisition costs)

Sometimes an insurer will have to price certain cells more aggressively to compete with other insurers

- Results in cross-subsidization of profits across pricing cells

Term Riders

Term insurance may be available as a rider on a permanent plan

Term riders can cover the base insured, spouse, or a child of the base insured (e.g. until the child is 21)

One-year term riders are sometimes available on par plans (purchased with dividends)

- Dividends can be applied to a mix of OYT coverage and other options (e.g. OYT + paid-up additions)

Non-Term Riders

These offer insurers another way to differentiate their term products

1. **Waiver of Premium (WOP) rider** – waives policyholder's premium on qualified disability
   - Disability is usually based on insured's ability to work in his/her occupation
   - Waiver terminates at specified age (e.g. 65) or on recovery from disability
   - Usually requires a minimum length of disability (e.g. 6 months)
2. **Return of Premium (ROP) rider** – refunds premiums as either a persistency bonus or on death tax-free
3. **Accelerated Death Benefit (ADB) rider** – pays a portion of the DB if the policyholder becomes terminally ill
   - Life expectancy must be less than an specified period (e.g. 12 months)
   - Premiums continue after acceleration
   - On death, the DB is reduced for any accelerated DBs death benefits already paid
4. **Guaranteed Insurability rider** – allows policyholder to buy additional coverage without additional underwriting or proof of insurability
5. **Other Living Benefits riders** – expand on the original ADB design
   - **Chronic illness benefit** – pays a portion of the DB upon chronic illness
     - Chronic illness = inability to perform certain activities of daily living ("ADL")
     - 6 common ADLs: eating, bathing, dressing, toileting, transferring, and continence
   - **Critical illness benefit** – pays a portion of the DB if the insured experiences a qualified CI
     - Common qualified CIs: heart attack, stroke, cancer, and coronary bypass surgery
   - **Disability income benefit** – pays monthly income as a % of the original face amount
     - Qualified disabilities are similar to WOP
   - **Long-term care (LTC) benefit** – provides additional coverage without reducing the original DB (unlike ADB)
     - Qualifications are usually based on inability to perform certain ADLs and expenses tied to LTC (e.g. assisted living)

Other Types of Term Products

1. Joint life – pays DB on the death of the 1st insured
2. Second-to-die (survivorship) – pays DB on death of 2nd insured (covered in Ch. 5)
3. Hybrid term – blend of term and permanent insurance
4. Deposit term – charges high early premium and pays an endowment at end of, say, 10th year (not common due to regulatory scrutiny)

The next topic that appears in the chapter is term conversions, but since there are also other sections and appendices in the chapter that cover term conversions, we've consolidated all of that in a single section on term conversions in the detailed study manual that follows the next section on pricing considerations.

Pricing Considerations for Term Insurance

Term Mortality

The net amount at risk (NAR) for a term product is higher than permanent (term reserves are lower since they don't have to fund a cash value typically)

- NAR = Face − Reserve

In aggregate, term mortality is usually lower than permanent insurance mortality

1. Term has a higher average size than permanent, (overall mortality is usually lower on large policies)
2. Term mortality exposure is weighted more to the select period (recently underwritten) when mortality is lower
    - Term has higher ultimate lapse rates than permanent, so less exposure to higher ultimate mortality
3. Less healthy lives that choose to convert will shift worst mortality experience from term business to permanent

Results from the most recent SOA High Face Amount Mortality Study:

1. Changes to reserve requirements (VM-20) will cause product design to change, which could affect mortality experience
2. Large face term experience was worse than large face permanent experience
3. Mortality improvement varies by gender and smoker status
    - Males have higher mortality improvement rates than females and smokers[2]
4. Large policy mortality was more favorable than for "all amounts"

[2] The exact sentence in the reading on p. 13 is very difficult to parse and says "Mortality improvement varies by gender and smoker status with higher mortality improvement rates among males than females and smokers with overall low mortality improvement rates."

5. Female experience was higher in aggregate for large-amount than for all policies
6. Experience varied by amount band, with the best experience in the $1M+ category (likely due to stricter underwriting)

Healthy lives tend to lapse term policies when the need for insurance goes away

- Creates a challenge for increasing premiums (e.g. ART)
- Mortality can deteriorate quickly in the post-level period as healthy lives shock lapse, leaving only the highest mortality risks in force
  - Can be modeled with the Dukes-MacDonald selective lapsation model, which is based on the conservation of deaths principle
  - Conservation of deaths assumes the weighted average of the mortality across multiple groups is equal to the normal mortality

The study note shows a brief example of the Dukes-MacDonald method with very little explanation of each key term. This method is covered in more detail in later readings, so we'll solve it using the actual D-M framework. I think this will allow the mortality ratio shown in the reading to make more sense (hopefully). I wouldn't get bogged down here, however.

Assume:

- Base lapse rate = 10%
- Total lapse rate = 85%
- 80% effectiveness – reflecting percent of lapsers that are fully select
- Select mortality rate = 0.01
- Point-in-scale mortality (PISM) rate = 0.03

From this we can calculate:

- Excess lapse rate = $0.85 - 0.10 = 0.75$ (*aka shock lapse rate*)
- Select excess lapses = $0.80 \times 0.75 = 0.60$
- Non-select excess lapses = $0.75 - 0.60 = 0.15$

Using the conservation of deaths principle (not presented in this reading), we can express total PISM in terms of 3 mortality rates weighted by their respective lapse rates:

$$\begin{aligned} 0.03 &= \text{Mortality of select lapsers + mortality of all other lapses + mortality of persisters} \\ &= 0.010(0.60) + 0.03(0.15 + 0.10) + q^{\text{pers}}(1 - 0.85) \\ q^{\text{pers}} &= 0.11 = \text{mortality rate of remaining inforce} \\ \frac{q^{\text{pers}}}{\text{PISM}} &= \frac{0.11}{0.03} = 367\% \end{aligned}$$

Key point: higher mortality lives tend to remain inforce, which results in a much higher mortality multiple for the inforce population after healthy lives leave.

