IA|BE Syllabus for Actuarial Training (2021)

Approved by the IA|BE Education Committee

Approved by the IA|BE Board on 15 November 2021

Introduction

The first Syllabus for Actuarial Training in Belgium had been developed by the Education Committee and approved by the Board of the Koninklijke Vereniging van Belgische Actuarissn (KVBA) / Association Royale des Actuaires Belges in 2004.

This IA|BE Syllabus for Actuarial Training is an update of the previous version and is intended to be in line with the 2019 version of the Core Syllabus for Actuarial Training of the Actuarial Association of Europe (AAE) which is in accordance with the Education Syllabus of the International Actuarial Association (IAA).

Pursuant to Article 4 of the Bylaws of IA|BE, to become member of the Institute, evidence of a thorough theoretical knowledge of actuarial sciences at the time of application for membership must be provided.

Furthermore IA|BE must comply with the minimum education standards taken up in the Core Syllabus for Actuarial Training of the AAE in order to ensure that members who are deemed to be eligible for recognition under the Mutual Recognition Agreement of the AAE have completed IA|BE's education and qualification requirements and, in doing so, have as a minimum fulfilled the requirements of the AAE Core Syllabus for Actuarial Training.

The purpose of the IA|BE Syllabus is to set out the minimum framework for the formation of a professionally recognized actuary.

The IA|BE Syllabus for Actuarial Training, of which the structure and content has been based on the AAE Core Syllabus for Actuarial Training, consists of four sections:

- Section 1: Necessary prerequisites

- Section 2: Basic Actuarial Education

- Section 3: Advanced Skills

- Section 4: Continuous Professional Development (CPD)

Those who wish to become members of the Institute must fulfil the requirements set out in the first three sections.

Those wishing to become or remain IA|BE Qualified Actuary must on top meet the requirements set out in the fourth section.

IA|BE commits itself to keep this syllabus under review and to update it as appropriate on a regular basis.

On a regular basis, a mapping of the education programmes of the universities to the syllabus will be performed.

The topics included in the first three sections are largely covered in close cooperation with the universities organizing the Master in Actuarial Sciences programme. The missing topics of these three sections will be organized by IA|BE, as are the items in the fourth section.

IA|BE Syllabus for Actuarial Training

Section 1: Necessary prerequisites

The topics listed below are a prerequisite for success in the Bachelor programmes (such as Mathematics, Economics, Applied Science, …) that give access to the Master programme in Actuarial Sciences.

Although they are not unique to give access to the education in Actuarial Sciences, they are to be regarded as an absolute minimum of mathematical education and constitute an important background for a further successful actuarial qualification route.

The knowledge of these subjects is (normally) acquired during the preliminary Secondary Education programme and is often refreshed in the Bachelor's programme.

1. Functions
2. Differentiation
3. Integration
4. Sequences and series
5. Differential equations
6. Real and complex numbers
7. Matrices and Systems of Linear Equations
8. Vectors, vector spaces and inner product spaces
9. Probability

Section 2: Basic Actuarial Education

The second section consists of nine learning areas, each divided into various topics.

However, some of the topics included in these learning areas will already have been covered, in whole or in part, in the preceding Bachelor's programme.
As a consequence, they will not be included again in the Master's programme.

The learning areas with the topics mentioned hereunder need to be covered mainly by the programmes organised by the universities.

1. **Statistics**
1.1 Random Variables
1.2 Statistical Inference
1.3 Graduation and statistical tests
1.4 Regression

1.5 Bayesian statistics and credibility theory
1.6 Stochastic processes and time series
1.7 Simulation

2. Economics
2.1 Microeconomics
2.2 Macroeconomics
2.3 Financial economics

3. Finance
3.1 Financial reporting and taxation
3.2 Securities and other forms of corporate finance
3.3 Financial mathematics
3.4 Corporate finance
3.5 Fuller understanding of relevant, country specific legislation

4. Financial systems
4.1 Role and structure of financial systems
4.2 Participants in financial systems
4.3 Financial products and benefits
4.4 Factors effecting financial system development and stability
4.5 Fuller understanding of relevant, country specific legislation

5. Assets
5.1 Investments and markets
5.2 Asset valuation
5.3 Portfolio management
5.4 Investment strategy and performance measurement

6. Data and systems
6.1 Data as a resource for problem solving
6.2 Data analysis
6.3 Statistical learning
6.4 Professional and risk management issues
6.5 Visualizing data and reporting

7. Actuarial models
7.1 Principles and actuarial modelling
7.2 Fundamentals of severity models
7.3 Fundamentals of frequency models
7.4 Fundamentals of aggregate models
7.5 Survival models
7.6 Actuarial applications

8. Actuarial risk management
8.1 The risk environment
8.2 Risk identification
8.3 Risk measurement and modelling

8.4 Risk mitigation and management
8.5 Risk monitoring and communication

The topics of the following basic learning area are covered either by the programmes organised by the universities either by sessions organized by IA|BE.

9. Personal and actuarial professional practice
9.1 Effective communications
9.2 Problem solving and decision making
9.3 Professional standards
9.4 Professionalism in practice
9.5 International and institutional awareness of professional standards

Section 3: Advanced Skills

Members will be required to deepen their knowledge and skills in at least one area of actuarial practice. They should demonstrate the ability to develop higher order skills of analysis, evaluation and creation.

Advanced skills could be obtained via deeper studies, studies of European and country specific topics, research, practical application of actuarial principles

Possible areas of actuarial practice:

1. Life
2. Pensions
3. Non-Life
4. Enterprise Risk Management
5. Investments
6. Health care
7. Banking
8. Social Security
9. Reinsurance
10. Data Science

Section 4: Continuous Professional Development (CPD)

As skills and knowledge required by actuaries are likely to change over time, as well as being impacted by changes to a specific actuary's job and role, continuing learning is required.

In the current rapidly changing environment, it is the personal responsibility of actuaries to ensure they remain competent in their area of work.

The expansion of the profession into new areas of practice means that actuaries need to develop their (technical) knowledge, personal and professional skills, and competencies in wider fields.

Members who want to obtain or keep the title of IA|BE Qualified Actuary are subject to comply with the requirements set out in Chapter 3 and Chapter 9 of the House rules.