



Canadian Institute  
of Actuaries  
EDUCATION

Institut canadien  
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# FCIA SYLLABUS

## Property and casualty track

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# Fellow exams syllabuses

## FCIA exams syllabuses overview

### Background

In June 2021, the CIA Board approved [new qualification pathways](#) to ACIA (Associate, CIA) and FCIA (Fellow, CIA) designations, including CIA-drafted examinations and modules. Five FCIA-level education tracks are available to candidates. All FCIA tracks include three exams and two modules. This document outlines the group benefits (GB) track exams and modules syllabuses.

Exams are administered as an open-book, four-hour exam requiring analysis in the context of a problem and submission of written responses to specific questions. Candidates will complete the exam through the CIA's learning management system. The ranges of weights (expressed in parentheses) attached to the examination topics further below apply to most of exams administered. Candidates should also recognize that questions often cover multiple learning objectives, including communication.

### Education tracks

For information, the table below outlines the Fellow level exams applicable to each track:

Track	Exams
Individual life and annuities (ILA)	F1ILA: Finance and Valuation F2ILA: Product Design F3ILA: Risk Management
Property and casualty (PC)	F1PC: Pricing F2PC: Estimating unpaid claims and financial reporting under IFRS 17 – <i>Insurance Contracts</i> F3PC: ERM, Economic Capital Modeling and Stress and Scenario Testing
Group benefits (GB)	F1GB: Product Design and Group Benefits Environment F2GB: Group Benefits Product Pricing F3GB: Group Benefits Reserving
Finance, investments and ERM (FIE) with option in banking	F1FIE: Financial Products F2FIE: Valuation and Financial Considerations F3FIE: Risk Management or F3BNK: Banking Applications
Retirement benefits (RET)	F1RET: Pension Funding and Regulation F2RET: Financial Reporting F3RET: Pension Risk Management

## Bloom's taxonomy description

The CIA exam syllabuses set out the depth of knowledge and application required, using revised Bloom's taxonomy of education objectives. For comparison purposes, the development of the IAA Education Syllabus is also based on the revised Bloom's taxonomy. This model reflects two dimensions: the knowledge dimension and the cognitive process dimension. This framework is widely used and respected by educators worldwide.

Revised Bloom's Taxonomy (RBT)  
Cognitive Process Dimension

Verbs	1	2	3	4	5	6
Objects	REMEMBER Recognize, Recall	UNDERSTAND Interpret, Exemplify, Classify, Summarize, Infer, Compare, Explain	APPLY Execute, Implement	ANALYZE Differentiate, Organize, Attribute	EVALUATE Check, Critique	CREATE Generate, Plan, Produce
A. Factual Knowledge	A1	A2	A3	A4	A5	A6
B. Conceptual Knowledge	B1	B2	B3	B4	B5	B6
C. Procedural Knowledge	C1	C2	C3	C4	C5	C6
D. Metacognitive Knowledge	D1	D2	D3	D4	D5	D6

**Factual knowledge:** Basic information; includes relevant information such as terminology and knowledge of applicable details of the subject matter.

**Conceptual knowledge:** The relationships between topics of a broader structure that make them function together. Consists of systems of information, such as classifications and categories.

**Procedural knowledge:** How to apply knowledge; includes algorithms, heuristics (rules of thumb), techniques, and methods, as well as knowledge about when to use these procedures.

**Metacognitive knowledge:** Knowledge of thinking in general and in particular. Refers to knowledge of thinking processes and information about how to manipulate these processes effectively.

Given the open book nature of the exams, it was established that the exams syllabuses would reflect higher levels learning, according to the following guidelines. Basic knowledge serves to lay the foundation of the exam questions.

	Remember	Understand	Apply	Analyze	Evaluate	Create
<b>Factual</b>	A1	A2	A3	A4	A5	A6
<b>Conceptual</b>	B1	B2	B3	B4	B5	B6
<b>Procedural</b>	C1	C2	C3	C4	C5	C6
<b>Metacognitive</b>	D1	D2	D3	D4	D5	D6

First level	A1, A2, B1, B2
Second level	A3, A4, B3, B4, C1, C2, C3, D1, D2, D3
Third level	A5, A6, B5, B6, C4, C5, C6, D4, D5, D6

# Property and casualty track exams

## Exam F1PC: Pricing

The aim of this exam is for candidates to develop the following skills:

Understand the main principles and techniques of pricing that are relevant to P&C insurance (including reinsurance), including techniques to estimate the key components of a technical price.

Apply these principles and techniques within the context of P&C insurance.

Understand how pricing links to wider business processes (e.g., business planning, estimating unpaid claims, and capital setting).

Create and evaluate hypothetical scenarios, including using judgement to assess the implications of possible actions and to develop appropriate proposals or recommendations relating to pricing P&C insurance products.

### 1. Principal terms

1. Define the principal terms used in pricing P&C insurance products. (A1)

### 2. Regulations and applicable standards (15%)

1. Apply relevant legislation and regulations applicable to actuarial pricing, including automobile insurance legislation in Ontario and Alberta, rate filing requirements, and residual market mechanisms. (A3)
2. Apply actuarial professionalism requirements applicable to pricing analyses. (B3)

### 3. Data (10%)

1. Differentiate the types of data (including claims and expenses) and information required for pricing (including analyses of aggregate rate level, classification, and large account), their sources, and main uses. (A4)
2. Apply the concepts of homogeneity and credibility in selecting data for pricing analyses. (B3)
3. Understand the implications to data requirements of different characteristics of insurance (e.g., long tail vs. short tail, low frequency/high severity vs. high frequency/low severity lines of business). (B2)
4. Evaluate the influence of the insurer's internal environment (such as changes in operations or information technology) on data used for pricing analyses. (B5)
5. Evaluate the influence of external environments (such as economic and judicial decisions and environmental changes) on data used for pricing analyses. (B5)
6. Understand the possible causes of data errors and the effects of inadequate data and information. (B2)
7. Create appropriate data-validation processes. (C6)

#### 4. Catastrophe modelling (5%)

1. Describe the practical considerations involved in catastrophe modelling. (C2)
2. Describe a catastrophe model, including the basic structure, key perils modelled, components (including event hazard, exposure, vulnerability, and financial analysis) and outputs (including event distributions and simulations), and their uses. (B2)
3. Apply outputs from the catastrophe-modelling process to the overall rate level indication. (C3)

#### 5. Pricing – overall rate level indication (25%)

1. Calculate and evaluate the overall rate level indication using the following techniques: (C5)
  - a. Loss ratio;
  - b. Pure premium;
  - c. Burning cost;
  - d. Frequency severity; and
  - e. Loss curve.
2. For each of the above techniques:
  - a. Understand the assumptions and mechanics, including the application of credibility. (C2)
  - b. Analyze assumption changes and determine their influence on the results of the overall rate level indication. (C4)
  - c. Evaluate the technique with varying data quality and completeness, and in different situations. (D5)
  - d. Describe the strengths and limitations of each technique and the impact of these limitations on results. (D2)
  - e. Select the appropriate technique and assumptions given a specific use case. (D5)
3. Define and calculate various components of a technical premium, including: (C3)
  - a. Expected claims and adjustment expenses;
  - b. Expense loading(s);
  - c. Reinsurance costs and benefits;
  - d. Profit margin;
  - e. Investment return; and
  - f. Capital requirements and return on capital.
4. Create experience investigations and evaluate the results considering: (D6)
  - a. Data inaccuracy, scarcity, or incompleteness;
  - b. Varied exposure measures;
  - c. Risk relativities;
  - d. Seasonality of claims;
  - e. Net margin changes;
  - f. Large losses and catastrophe events; and
  - g. Analysis by peril or type of claim.
5. Adapt pricing techniques to allow for frequency and severity distributions. (C3)
  - a. Reflect the differences between short-tail vs. long-tail business and occurrence vs. claims-made coverages in pricing analyses (C3).
6. Respond to practical considerations, including operational and regulatory constraints, that influence insurance pricing. (C5)
7. Evaluate how the pricing of competitor products influences price setting. (B5)

## 6. Pricing – segmentation (25%)

1. Understand how the concepts of segmentation, adverse selection, product hierarchy, and regulations influence pricing. (B2)
2. Demonstrate the need to price for different levels of risk and the consequences for portfolio performance if no risk-based pricing is employed. (C3)
3. Apply and evaluate different pricing techniques for segmentation analysis, including: (C5)
  - a. Simple tabular analysis.
  - b. Generalized linear models (GLMs); and
  - c. Machine-learning models and neural networks.
4. Describe data mining and non-parametric approaches. (C2)
5. For each of the techniques in 6.3:
  - a. Understand the assumptions and mechanics of the technique, including the application of credibility and off-balance considerations. (C2)
  - b. Validate the underlying data and the output of the model or technique. (C5)
  - c. Evaluate the appropriateness and limitations of various segmentation techniques for a given use case, including the application of a credibility-weighting technique. (D5)
6. For GLMs and multivariate modelling:
  - a. Apply GLMs to the rating of personal-lines business and small commercial risks; (C3)
  - b. Understand the different types of multivariate models; (C2)
  - c. Apply multivariate models in pricing; (C3)
  - d. Select the appropriate error structures and link functions; (C4)
  - e. Analyze residual charts, parameter estimates, and other GLM and multivariate model output; and (C4)
  - f. Analyze and correct errors for given GLM and multivariate model outputs. (C4)
7. Apply calculations relating to a range of pricing matters, including:
  - a. Allowance for excesses and deductibles; (C3)
  - b. Treatment of granular rating factors such as geography, vehicle characteristics, and occupations; and (C3)
  - c. Treatment of natural hazards and catastrophes. (C3)
8. Adopt a pricing technique to allow for government-mandated or monitored rates. (C3)
9. Recognize and allow for the key features that relate to long-tail business pricing, including:
  - a. Linkage with outstanding claims analysis; (C3)
  - b. Exposure analysis; (C3)
  - c. Setting and application of economic assumptions; and (C3)
  - d. Other product-specific features. (C3)

## 7. Pricing – large account pricing (5%)

1. Describe the particular considerations when pricing large commercial risks, including considerations related to credibility. (B2)
2. Describe alternative approaches to pricing large commercial risks. (A2)
3. Apply appropriate pricing techniques for large accounts. (C3)
4. Evaluate the appropriateness and limitations of various pricing techniques for a given scenario, product, or set of data. (D5)
5. Perform and evaluate calculations relating to a range of pricing matters, including:
  - a. Allowance for aggregate deductibles and limits; (C5)
  - b. Allowance for loss-responsive policy conditions; (C5)
  - c. Treatment of self-insured retentions; (C5)
  - d. Claims-sharing arrangements; and (C5)
  - e. Incorporation of underwriting views in a rigorous pricing framework. (C5)

## 8. Pricing – reinsurance (10%)

1. Describe the similarities and differences between pricing direct and reinsurance business. (B2)
2. Calculate appropriate premiums for each of the following types of reinsurance:
  - a. Proportional reinsurance; (C3)
  - b. Non-proportional reinsurance; (C3)
  - c. Property catastrophe reinsurance; and (C3)
  - d. Stop loss. (C3)
3. Describe the data required to determine appropriate premiums for each of the above types of reinsurance. (A2)

## 9. Portfolio analytics (5%)

1. Create a portfolio analytics framework for a P&C insurer. (C6)
2. Create framework(s) to monitor: (C6)
  - a. Exposures (e.g., retention, closing, mix of business).
  - b. Pricing actions (e.g., product and underwriting initiatives).
  - c. Claims experience; and
  - d. Compliance.
3. Understand the rationale and practical considerations that apply in measuring price elasticity and cross-selling opportunities. (B2)
4. Understand the rationale and practical considerations that apply in exposure management. (B2)



# Exam F2PC: Estimating Unpaid Claims and Financial Reporting under IFRS 17 - Insurance Contracts

The aim of this exam is for candidates to develop the following skills:

1. Understand the main principles and techniques for estimating unpaid claims and claims-related expenses (hereafter referred to simply as “claims”) that are relevant to P&C insurance (including reinsurance).
2. Apply these principles and techniques within the context of P&C insurance.
3. Evaluate the considerations involved in selecting a best estimate of unpaid claims.
4. Understand how estimating unpaid claims links to wider business processes (e.g., business planning, pricing, financial reporting, and capital setting).
5. Describe IFRS 17 - *Insurance Contracts* (hereafter referred to as “IFRS 17”) and calculate actuarial values for financial reporting under IFRS 17.
6. Create appropriate proposals and recommendations related to estimates of unpaid claims and IFRS 17 financial reporting in P&C insurance business.
7. Evaluate hypothetical scenarios, including using judgement to assess the implications of possible actions.

## 1. Principal terms

1. Define principal terms used in the estimation of unpaid claims and IFRS 17 financial reporting for P&C insurers. (A1)

## 2. Regulations and applicable standards (15%)

1. Apply legislation (e.g., the *Insurance Companies Act*) and regulations (e.g., Office of the Superintendent of Financial Institutions guidelines) relevant to the Appointed Actuary’s valuation for financial reporting purposes. (A3)
2. Apply actuarial professionalism requirements applicable to the estimation of unpaid claims and IFRS 17 financial reporting. (B3)

## 3. Data (10%)

1. Differentiate the types of data (including claims and exposures) and information required for estimating unpaid claims, their sources, and main uses. (A4)
2. Build development triangles. (C3)
3. Differentiate the types of data and information required for IFRS 17 financial reporting, their sources, and main uses. (A4)
4. Apply the concepts of homogeneity and credibility of data in estimating unpaid claims and for IFRS 17 financial reporting. (B3)
5. Understand the implications to data requirements of different characteristics of insurance (e.g., long tail vs. short tail, low frequency/high severity vs. high frequency/low severity lines of business). (B2)
6. Organize data by calendar year, accident year, policy year, underwriting year, and report year, and understand when each is appropriate. (C3)
7. Evaluate the influence of the insurer’s internal environment (such as changes in operations or information technology) on data used for estimation of unpaid claims and IFRS 17. (B5)
8. Evaluate the influence of external environments (such as economic and judicial decisions) on data used for estimation of unpaid claims and IFRS 17. (B5)

9. Understand the possible causes of data errors and the effects of inadequate data and information. (B2)
10. Create appropriate data-validation processes. (C6)

#### 4. Estimating unpaid claims – basic topics (25%)

1. Describe the purpose of estimating unpaid claims for P&C insurers, including:
  - a. The reasons for calculating estimates of unpaid claims and how these might influence the approach (such as financial reporting, financial planning and analysis, and pricing) (A2); and
  - b. The key stakeholders and their interests in the results of estimates of unpaid claims. (A2)
2. Use development triangles (including claims, allocated loss-adjustment expense, counts, ratios, and average values) as a diagnostic tool. (D4)
3. Analyze the range of general issues that can affect estimation of unpaid claims using triangle-based techniques and identify how to deal with such issues. (D4)
4. Calculate and evaluate estimates of unpaid claims using the following techniques: (C5)
  - a. Development;
  - b. Expected claim;
  - c. Bornhuetter-Ferguson;
  - d. Cape Cod;
  - e. Benktander;
  - f. Frequency severity; and
  - g. Berquist-Sherman.
5. For each of the above techniques:
  - a. Understand the assumptions and mechanics. (C2)
  - b. Analyze assumption changes and determine their influence on the results of estimates of unpaid claims. (C4)
  - c. Evaluate the technique when used with varying data quality and completeness and in different situations. (D5)
  - d. Describe the strengths and limitations of each technique and the impact of limitations on results. (D2)
  - e. Select the appropriate technique and assumptions given specific circumstances. (D5)
6. Apply processes to integrate more complex factors potentially relevant for the estimation of unpaid claims of a given claims portfolio.
  - a. Reflect the circumstances under which claims periods defined by underwriting period, accident period, and reporting period approaches may be used. (C3)
  - b. Distinguish between incurred but not yet reported (IBNYR) and incurred but not enough reported (IBNER) components of an estimate of unpaid claims. (C3)
  - c. Apply and evaluate the earned premium concept in various contexts of the estimation of unpaid claims. (C5)
  - d. Understand the drivers of exposure changes for claims portfolios (such as shifts in types of exposures or seasonality) and adjust projection techniques to allow for such changes in estimating unpaid claims. (D4)
  - e. Apply an allowance for claims inflation in the estimation of unpaid claims. (C3)
  - f. Measure and respond appropriately to changes in the internal environment (such as changes in claims-processing systems or the mix of business) and the external environment (such as judicial decisions). (D4)
  - g. Execute on the concepts of a best estimate and a risk adjustment. (D6)
7. Determine whether to discount for investment income and adjust for adverse deviation and calculate such adjustments to a best estimate of unpaid claims. (D5)

## 5. Estimation of unpaid claims – advanced topics (20%)

1. Describe, calculate, and evaluate approaches to allow for various other items in an actuary's estimation of unpaid claims, including:
  - a. Salvage and subrogation recovery items; (C5)
  - b. Claims-management expenses (including allocated and unallocated loss-adjustment expenses) and other costs; (C5)
  - c. Latent claims and potential claims features that have not manifested in the reported claims data; and (C5)
  - d. Discounted cash flows such as no-fault automobile accident benefits and other recurring benefits. (C5)
2. Calculate estimates of unpaid claims for reinsurance.
  - a. Understand reinsurance cover considerations when differentiating losses-occurring basis and a risks-attaching basis and considerations for catastrophe covers. (B2)
  - b. Evaluate the approaches to estimating unpaid claims for reinsurance contracts held by analyzing claims gross and net of reinsurance held vs. claims gross of reinsurance held and claims ceded to reinsurance. (C5)
  - c. Calculate and evaluate estimates of unpaid claims for reinsurance held using appropriate techniques and assumptions that reflect the characteristics of reinsurance contracts held (e.g., contract terms and conditions, data availability). (C5)
  - d. Determine the effect on relevant earnings patterns and estimation of unpaid claims of non-annual covers, non-uniform risks, common renewal dates, unclosed business, adjustment premiums, risks attaching at future dates, reinstatement premiums, and other loss-responsive mechanisms. (C3)
  - e. Calculate and evaluate estimates of unpaid claims for various layers of claims. (C5)
3. Develop estimates of unpaid claims using credibility models (C3), including:
  - a. Testing the results for reasonableness; and (C4)
  - b. Describing the strengths and weaknesses of such methods. (B2)
4. Evaluate stochastic processes for estimating unpaid claims.
  - a. Describe the likely sources of uncertainty in estimates of unpaid claims. (B2)
  - b. Describe the uses of stochastic techniques for estimating unpaid claims. (B2)
  - c. Describe the following types of stochastic techniques, including data required, key assumptions, and mechanics: (B2)
    - i. Analytic; and
    - ii. Simulation-based.
  - d. Differentiate Mack, bootstrapping, and Markov chain Monte Carlo approaches for estimating unpaid claims and quantifying uncertainty in such estimates. (C4)
  - e. Describe the features of aggregate claims distributions, as well as the inherent risk correlations and diversification that apply. (C2)
  - f. Extend a frequency-severity technique to include stochasticity. (C3)
  - g. Describe the issues, advantages, and disadvantages of each of the techniques, including sensitivity to assumptions. (C2)
  - h. Describe the approach to aggregating the results of stochastic estimates of unpaid claims across multiple lines of business and discuss methods of correlation. (C2)
5. Describe machine-learning approaches with individual claim case reserves, including the advantages and challenges with such approaches. (C2)
6. Evaluate the results of estimates of unpaid claims for adequacy and reasonableness. (D5)
  - a. Understand how alternative estimates of unpaid claims can arise and highlight some of the professional issues in resolving them. (D2)
  - b. Describe the factors an actuary should consider and evaluate the typical diagnostics used in assessing the reasonableness of the results of estimates of unpaid claims. (D4)

- c. Describe the factors an actuary should consider in assessing the reasonableness of changes in the results of estimates of unpaid claims over time. (D2)
  - d. Analyze current experience to monitor performance and recommend estimates of unpaid claims for interim valuations. (D4)
7. Communicate an estimate of unpaid claims.
- a. Describe what is meant by a “best-estimate reserve.” (A2)
  - b. Describe the uses, advantages, and disadvantages of estimating ranges of unpaid claims using the following approaches: (B2)
    - i. Stochastic models;
    - ii. Scenario tests; and
    - iii. Use of alternative sets of assumptions.
  - c. Defend the issues to be considered when communicating ranges in estimates of unpaid claims and uncertainties. (D5)

## 6. IFRS17 financial reporting (30%)

1. Describe IFRS 17 – Accounting for Insurance Contracts including its purpose, scope, classification of contracts, and contract boundaries. (A2)
2. Apply both IFRS 17 measurement approaches: (C3)
  - a. General measurement approach; and
  - b. Premium allocation approach.
3. Reflect considerations related to the level of aggregation when accounting for business under IFRS 17 including determination of the unit of account and setting of portfolios and groups of contracts. (C3)
4. Estimate future cash flows for the liability for remaining coverage and the liability for incurred claims under both the general measurement approach and the premium allocation approach. (C4)
5. Determine discount rates using the top down and bottom-up approaches referred to in IFRS 17. (C3)
6. Determine risk adjustment for non-financial risk, including:
  - a. Reflect the criteria for and measurement of the risk adjustment under the general measurement approach and the premium allocation approach. (C4)
  - b. Apply multiple methods, including: (C4)
    - i. Quantile;
    - ii. Cost of capital; and
    - iii. Margin.
  - c. Adjust for the role of diversification and allocation in the determination and the application of the risk adjustment. (C4)
  - d. Determine the risk adjustment for reinsurance contracts held. (C4)
7. Determine key actuarial components of IFRS 17 financial statements, including:
  - a. Contractual service margin; (C4)
  - b. Liability for remaining coverage; (C4)
  - c. Liability for incurred claims; (C4)
  - d. Risk adjustment for non-financial risk; (C4)
  - e. Discounting; (C4)
  - f. Onerous contracts (C4); and
  - g. Loss component (C4);
8. Describe the components (financial statements, key exhibits, and schedules) of the Canadian regulatory return (P&C-1 and P&C-2) and how they interrelate. (B2)
9. Calculate key financial metrics and evaluate an insurer’s financial performance and strength based on such ratios. (D5)
10. Describe the Appointed Actuary’s role with respect to IFRS 17 financial reporting. (B2)

## Exam F3PC: ERM, Economic Capital Modelling, and Stress and Scenario Testing

The aim of this exam is for candidates to develop the following skills:

1. Understand the main principles and techniques of enterprise risk management (ERM) and economic capital modelling that are relevant to P&C insurance.
2. Apply these principles and techniques within the context of P&C insurance.
3. Understand how ERM and economic capital modelling links to wider business processes (e.g., business planning, pricing, estimating unpaid claims, and capital setting).
4. Create and evaluate hypothetical scenarios, including using judgement to assess the implications of possible actions and to develop appropriate proposals or recommendations for P&C insurers.

### 1. Principal terms

1. Define principal terms used in ERM, economic capital modelling, and stress and scenario testing. (A1)

### 2. ERM concept, framework, and process (10%)

1. Apply the concept of ERM. (D3)
2. Apply the framework for risk management and control within an insurer. (D3)
3. Describe regulatory requirements related to ERM, including own-risk and solvency assessment (ORSA). (A2)
4. Describe the perspectives of credit-rating agencies. (B2)
5. Reflect data issues in general and special considerations with respect to ERM. (C3)
6. Demonstrate how to determine and articulate: (C3)
  - a. Risk appetite
  - b. Risk identification.
  - c. Risk assessment.
  - d. Risk monitoring.
  - e. Risk limits.
  - f. Risk mitigation.
  - g. Risk capacity.
  - h. Risk tolerances.
  - i. Desired risk profile.
  - j. Risk objectives.
  - k. Risk reporting.
7. Assess the implications of financial and other risks and opportunities for strategic planning. (C4)
8. Describe the risk management control cycle, including the relevance of external influences and emerging risks. (C2)
9. Utilize methods to identify risks and their causes and implications. (D4)

### 3. Risk categories and risk identification (10%)

1. Explain what is meant by risk and uncertainty, including different definitions and concepts of risk. (B2)
2. Describe risk taxonomy, including an awareness of how individual risks might be categorized in different ways. (B1)
3. Describe common risks faced by P&C insurers, including: (B2)
  - a. Insurance risk (e.g., pricing, catastrophe, and reserving).
  - b. Credit risk.
  - c. Market risk.
  - d. Liquidity risk.
  - e. Operational risk.
  - f. ESG and climate-related risks.
  - g. Foreign exchange risk.
  - h. Regulatory risk.
  - i. Political risk.
  - j. Reputational risk.
  - k. Strategic risk.
4. Analyze the relationship between systemic risk vs. non-systemic and specific risk vs. concentration of risk. (B4)

### 4. Economic capital modelling and aggregation of risks (25%)

1. Describe the extent to which each of the risks in 3.3 can be amenable to quantitative analysis. (B2)
2. Demonstrate an understanding of the use of correlation measures.
  - a. Describe enterprise-wide risk-aggregation techniques that incorporate the use of correlation. (C5)
  - b. Apply different correlation measures based on their relative merits and implications. (C4)
3. Apply copulas as part of the process of modelling multivariate risks and evaluate different types of copulas for a given situation. (C5)
4. Reflect the importance of the tails of distributions, tail correlations, and low frequency/high severity events. (C4)
5. Describe how extreme-value theory can be used to help model risks that have a low probability. (C2)
6. Demonstrate how model and parameter risk can be incorporated into an economic capital model. (C4)
7. Use economic capital models in the overall ERM decision-making process. (C4)
  - a. Describe the development and use of models for decision-making purposes in ERM. (B2)
  - b. Demonstrate how the decision-making process considers the organization's risk appetite and corporate governance and builds on the results of stochastic modelling, scenario analysis, stress testing, and analysis of model and parameter risk. (D4)
  - c. Evaluate different types of models for a given purpose. (D5)

## 5. Risk measurement and assessment (30%)

1. Using common risk measures (such as VAR, TVAR, and probability of ruin), determine risk exposures and tolerances using these measures. (C3)
2. Understand the key considerations in deriving and applying economic capital modelling techniques using deterministic and stochastic models. (D2)
3. Recommend a specific choice of model based on the results of both quantitative and qualitative analysis of financial and insurance data. (D5)
4. Describe approaches, including parameterization and validation, for the assessment of capital requirements for the following risk types: (C2)
  - a. Catastrophe.
  - b. Underwriting and pricing.
  - c. Reserving.
  - d. Credit.
  - e. Climate related.
  - f. Liquidity.
  - g. Operational.
5. Describe the practical considerations (including data availability, parameterization, and validation procedures) that should be borne in mind when undertaking capital modelling. (D2)
6. Calculate regulatory capital requirement (P&C-4). (C4)
7. Demonstrate an understanding of regulators' guidance and context for different approaches to responsible investment and, specifically, the integration of environmental, social, and governance (ESG) factors in the investment process. (C3)
8. Demonstrate an understanding of the underlying issues that constitute factors within each of the ESG areas. (C3)
9. Demonstrate an understanding of the ESG market: relevance, size, scope, key drivers and challenges, and risks and opportunities. (C3)

## 6. Stress and scenario testing (10%)

1. Describe the use of scenario analysis and stress testing (including reverse stress testing) in the risk-measurement process, including the advantages and disadvantages of each. (B2)
2. Describe the Appointed Actuary's responsibilities related to financial condition testing (FCT). (A2)
3. Explain the primary categories of risk associated with climate change from a P&C insurer's perspective, including:
  - a. Transition risk; (A2)
  - b. Physical risk and environmental risks; and (A2)
  - c. Liability risk. (A2)
4. Describe the actuary's role with respect to climate-change risk. (B2)

## 7. Capital management (15%)

1. Apply key elements of ORSA and FCT, specifically risk identification and assessment, quantification of risk to capital requirements, the Appointed Actuary's role, board oversight and senior management responsibility, monitoring, reporting, and internal controls. (D4)
2. Demonstrate an understanding of capital calculations.
  - a. Utilize the concept of economic measures of value and capital and their uses in corporate decision-making processes. (D5)
  - b. Evaluate different risk measures and capital-assessment approaches. (D5)
  - c. Demonstrate the ability to develop a capital model for a representative financial firm. (D6)
3. Compare techniques for allocating capital across an organization. (C4)



# Property and casualty track modules

## FCIA modules syllabuses overview

### Background

FCIA modules enable candidates to acquire and apply knowledge that is electronically administered. The learning management system serves as the overarching framework from which candidates obtain information on resources and activities required to complete the modules. Candidates will navigate through the materials by:

- Reading screens;
- Linking to PDF files, Excel files, and published material;
- Reviewing examples;
- Visiting other websites, viewing demonstrations and graphical images;
- Making decisions and selections around targeted scenarios or case studies; and
- Completing specified assessments, where applicable.

Module participants are expected to come from a wide array of educational and career backgrounds. Some will be ACIAs or have obtained a recognized Fellow-level designation, and have:

- Demonstrated knowledge of the fundamental concepts and techniques for modelling and managing risk.
- Learned the basic methods of applying fundamental concepts and techniques to common problems involving uncertain future events, especially those with financial implications.
- Completed a professionalism course covering the importance of adherence to recognized standards of practice and the CIA Rules of Professional Conduct or some other professional code of conduct.

The primary audience for the FCIA modules is individuals who desire to be admitted as Fellows of the CIA. Individuals seeking continuing professional development credit can also register for the FCIA modules.

Each FCIA candidate through Pathways 1 and 2 is required to complete both FCIA modules, while Pathway 3 candidates will have to complete the second module. It is anticipated that FCIA module candidates will have six months from the date of module purchase to complete each FCIA module. As a general guideline, candidates should expect to spend approximately 100 hours completing all activities included in a module.

# PC Module 1: Principles and practice of insurance and Canadian automobile insurance

## Part A – Principles and practice of insurance

### 1. Introduction to risk and insurance

1. Describe risk, including insurable risk.
2. Provide examples of types of insurable risks and classes of property and casualty (P&C) insurance that respond to insurable risk.
3. Describe and provide examples of perils and hazards.
4. Describe and provide examples of proximate cause.
5. Explain the objectives of risk management, including pre-loss and post-loss.
6. Explain the conflicts that can arise in the objectives of risk management.
7. Identify and describe the five steps of the risk management process:
  - a. Step 1 – Identifying and analyzing exposures.
  - b. Step 2 – Formulating options.
  - c. Step 3 – Selecting the best technique.
  - d. Step 4 – Implementing the risk management plan.
  - e. Step 5 – Monitoring results and modifying the plan.

### 2. Insurance categories and functions

1. Describe the basic insurance relationship of pooling funds to pay losses.
2. Explain the major functions of insurance:
  - a. Spread of risk.
  - b. Aid to security.
  - c. Aid to credit.
  - d. Loss prevention.
  - e. Source of capital.
  - f. Source of employment.
3. Identify and describe categories of insurance.

### 3. Regulatory framework

1. Describe the different roles of government in the regulation of insurance companies including federal control and provincial and territorial control.
2. Describe the role of the Property and Casualty Insurance Compensation Corporation (PACICC)
3. Describe the major laws and regulations impacting insurance in Canada including:
  - a. The Insurance Companies Act.
  - b. Provincial and territorial insurance acts.
  - c. The Highway Traffic Act.
  - d. Regulations.
4. Explain the purpose of statutory conditions and Québec general conditions related to P&C insurance

5. Describe the role of privacy laws in P&C insurance, including the *Personal Information Protection and Electronic Documents Act*

#### 4. Insurance as a contract: The insurance policy

1. Describe the requirements of contracts in common law and in Québec.
2. Describe the requirements of insurance contracts with respect to:
  - a. Insurable interest.
  - b. Indemnity, including the principle of indemnity.
  - c. Utmost good faith.
3. Explain the principles reinforcing indemnity, including:
  - a. Salvage.
  - b. Subrogation.
  - c. Contribution.
  - d. Excess insurance.

#### 5. Insurance documents and processes

1. Identify and explain key insurance documents, including:
  - a. The policy.
  - b. Certificates of insurance.
  - c. Endorsements.
  - d. Binders/cover notes.
2. Describe the major sections of an insurance policy, including:
  - a. Coverage summary.
  - b. Insuring agreements.
  - c. Statutory conditions and Québec general conditions.
  - d. Policy conditions.
  - e. Signature clause.
3. Describe the process and requirements for assigning, terminating, and renewing an insurance contract.

## 6. Insurance companies

1. Differentiate the types of insurance providers, including:
  - a. Stock companies.
  - b. Mutuels.
  - c. Government insurers.
  - d. Captive insurance companies.
  - e. Lloyd's insurance market.
2. Explain financial stability and returns for insurers, including the differences for stock companies and mutuels.
3. Describe the major functions of an insurance company, including:
  - a. Finance, accounting, and investment.
  - b. Actuarial.
  - c. Marketing, agency, or production.
  - d. Underwriting.
  - e. Claims.
4. Explain the purpose of reinsurance.
5. Describe the primary methods and types of reinsurance.

## 7. Claims

1. Describe claims in the P&C insurance context.
2. Explain the differences in first-party and third-party claims.
3. Describe direct and indirect losses.
4. Describe prejudice in the context of P&C insurance claims.
5. Define the following key terms of P&C insurance claims:
  - a. Forfeiture.
  - b. Prescription.
  - c. Salvage.
  - d. Subrogation.
  - e. Contribution.
  - f. Coinsurance.

## 8. Industry organizations: The customer

1. Describe the role of the following insurance industry organizations and associations:
  - a. Insurance Institute of Canada.
  - b. Insurance Bureau of Canada.
  - c. Institute for Catastrophic Loss Reduction.
  - d. Centre for Study of Insurance Operations.
  - e. Underwriters Laboratories of Canada.
  - f. Insurance Brokers Association of Canada.
  - g. Canadian Independent Adjusters' Association.
  - h. Canadian Insurance Claims Managers Association.
  - i. Facility Association.

## Part B – Automobile Insurance

### 1. Introduction to automobile insurance

1. Describe the role of the legal jurisdictions in automobile insurance, including:
  - a. Federal jurisdiction.
  - b. Provincial and territorial legislation.
  - c. Municipal bylaws.
2. Describe the origins of automobile insurance, including car-use exposures requiring coverage.
3. Explain the evolution of the automobile policy, including standard policy forms.
4. Describe proof-of-insurance requirements, including:
  - a. Motor vehicle liability insurance cards.
  - b. Proof of financial responsibility.

### 2. Third-party liability coverage; direct compensation-property damage coverage

1. Differentiate between tort and direct compensation systems.
2. Describe third-party liability coverage and exclusions under third-party liability coverage.
3. Identify and explain additional coverage available under third-party liability coverage, including:
  - a. Amounts exceeding the policy limit.
  - b. Rented or leased automobiles.
4. Describe the responsibilities of insured persons.
5. Describe non-economic and economic loss in the context of lawsuits for automobile-injury claims.
6. Describe absolute liability.
7. Describe direct compensation-property damage (DCPD) coverage, including:
  - a. Deductibles under DCPD.
  - b. Determination of fault.

### 3. Accident benefits

1. Identify insured persons under accident benefits coverage.
2. Describe the benefits under accident benefits coverage, including:
  - a. Income-replacement benefit.
  - b. Non-earner benefit.
  - c. Caregiver benefit.
  - d. Medical, rehabilitation, and attendant-care benefits.
  - e. Payment of other expenses.
  - f. Death and funeral benefits.
  - g. Optional benefits.
3. Identify and explain exclusions to accident benefits coverage.
4. Describe the interaction of accident benefits coverage with other systems, including:
  - a. Accidents arising out of province.
  - b. Social-assistance payments.

- c. Collateral benefits.
  - d. Workers' compensation.
5. Explain the situation with respect to accident benefits fraud, including:
- a. Operation of fraud rings.
  - b. Planned accidents.
  - c. Rehabilitation and medical-service providers.

#### 4. Uninsured automobile coverage

1. Describe the coverage for damage caused by uninsured or unidentified motorists, including:
  - a. What and who are covered.
  - b. Interpretation of "struck."
  - c. Claims procedures.
  - d. Limitations and exclusions.
2. Explain coverage for damage caused by inadequately insured motorists, including the family protection endorsement.
3. Identify and explain the operations of motor vehicle accident claims funds.

#### 5. Loss or damage coverages

1. Describe the different types of loss or damage coverages, including:
  - a. Specified perils.
  - b. Comprehensive.
  - c. Collision or upset.
  - d. All perils.
2. Describe exclusions under loss or damage coverages, including consequences of impaired driving and cannabis use.
3. Describe the deductible clause and deductible under loss or damage coverages.
4. Identify and explain additional benefits under loss or damage coverages, including:
  - a. Payment of charges.
  - b. Forgoing right to recover.
  - c. Temporary substitute automobiles.
  - d. Loss of use due to theft coverage.
5. Describe agreements of insureds under loss or damage coverages.
6. Explain the situation with respect to fraud under loss or damage coverages, including:
  - a. Fraudulent automobile insurance sales.
  - b. Leased and phantom vehicles.
  - c. Theft rings.
  - d. Staged accidents.
  - e. Arson.
7. Explain how data analytics are used to combat automobile insurance fraud and the role of CANATICS (Canadian National Insurance Crime Services).

## 6. Statutory conditions

1. Describe key statutory conditions related to automobile insurance.

## 7. General provisions, definitions, and exclusions

1. In the context of automobile insurance, define:
  - a. Occupant.
  - b. Automobile.
2. Describe the following general provisions and exclusions of automobile insurance:
  - a. Territory.
  - b. Two or more automobiles insured.
  - c. Trailers and towing.
  - d. Inspection.
  - e. General exclusions.
3. Describe the environment for automobile and transportation sharing and implications for automobile insurance.

## 8. Endorsements for use with the owner's policy, the driver's policy

1. Explain the purpose of automobile insurance endorsements.
2. Identify and describe endorsements:
  - a. Providing permission.
  - b. Restricting or excluding coverage.
  - c. Extending coverage.
  - d. To alter policy terms.
3. Describe the driver's auto policy.

## 9. Automobile insurance consumer protection

1. Identify and describe the laws and regulations impacting automobile insurance in Canada, including:
  - a. The *Insurance Companies Act*.
  - b. Provincial and territorial insurance acts.
  - c. The *Highway Traffic Act*, *Traffic Safety Act*, and *Motor Vehicle Act*.
  - d. Regulations.
2. Describe the automobile insurance regulations for consumer protection in Canada.
3. Describe the purpose and functions of the:
  - a. Facility Association.
  - b. Risk-sharing pool.
  - c. Québec risk-sharing plan.

## 10. Automobile insurance across Canada

1. Describe the environment for automobile insurance across Canada, including:
  - a. Distribution of automobile insurance.
  - b. Provinces and territories with private insurance systems.
  - c. Provinces with government insurance systems.
  - d. The Québec system, the Société de l'assurance automobile du Québec (SAAQ)
2. Describe property-loss settlements in private, government, tort, and no-fault jurisdictions.

## 11. Principles of actuarial evidence

1. Describe the role of actuaries in family law, including the valuation of pension-plan benefits in marriage (relationship) breakdown.
2. Describe the role of actuaries in civil litigation, including damages in personal injuries, fatalities, wrongful termination, insurance and reinsurance disputes, pension disputes, and other litigation.
3. Describe the role conferred to actuaries by the Criminal Code of Canada in calculating the criminal rate of interest.
4. Describe and distinguish the roles of a fact witness, an expert witness, and a provider of litigation advice.
5. Describe the context provided by the common law, legislation, and the rules of civil procedure on actuarial evidence practice.
6. Describe the role of CIA Rules of Professional Conduct and the Standards of Practice (Part 1000, general, and Part 4000, actuarial evidence) in guiding the professionalism of actuarial evidence practice. Show awareness of the importance of professionalism for actuaries whose actuarial evidence practice is incidental to full-time practice in another actuarial practice area, such as insurance or pensions.
7. Describe the functions fulfilled by other professionals in the litigation area, such as life-care planners, vocational experts, accountants, economists, engineers, personal financial planners, business valuers, appraisers and structured settlement brokers, and how these professionals complement and compete with the function of actuaries in actuarial evidence.



## PC Module 2: Insurance on property and insurance against liability

### Part A – Insurance on property

#### 1. Introduction to property insurance

1. Explain property insurance and how it works.
2. Describe the elements of a property insurance policy.
3. Describe the evolution of property insurance.
4. Describe who and what are covered in property insurance.
5. Identify and describe the development of property insurance contracts and key concepts, including claim concepts.

#### 2. Legislation and general principles in common-law provinces and territories and Québec

1. Explain the legal context for property insurance.
2. Describe the legislation and its interaction with property policies.
3. Describe the impact of privacy laws in property insurance.

#### 3. Perils and hazards

1. Define “peril.”
2. Explain the scope of property insurance including key concepts such as fortuitous event and perils and risk.
3. Identify and describe the named perils in Insurance Bureau of Canada Habitational Forms: discussion.
4. Identify and describe non-standard perils.
5. Describe and provide examples of hazards.

#### 4. Anatomy of a property policy: Overview

1. Describe the structure and types of personal property policies.
2. Describe key policy forms and clauses in property insurance.
3. Explain how to read a property policy.

## 5. Anatomy of a property policy: The homeowners form

1. Identify and describe the opening sections of homeowner forms.
2. Describe property insurance coverages, including:
  - a. Coverage A – dwelling building.
  - b. Coverage B – detached private structures.
  - c. Coverage C – personal property.
  - d. Coverage D – additional living expense.
3. Describe extensions, applications, and limitations of coverage.
4. Explain the basis of claim payment in property insurance.

## 6. Anatomy of a property policy: Exclusions

1. Provide an overview of exclusions in a property policy.
2. Describe exclusions for property not insured.
3. Describe exclusions for loss or damage not insured.
4. Describe application of the water-damage exclusion.

## 7. Endorsements and floaters

1. Describe and provide examples of endorsements in property insurance.
2. Describe and provide examples of floaters in property insurance.

## 8. Other property coverages

1. Describe property coverage for condominiums.
2. Describe property coverage for tenants.

## 9. Commercial property insurance

1. Describe the named perils and broad-form perils associated with commercial property insurance.
2. Describe exclusions of the commercial property broad form.
3. Explain limits of insurance of the commercial property broad form.

## Part B – Insurance against liability

### 1. Introduction to liability insurance

1. Describe liability imposed by law.
2. Describe Canadian law, including.
  - a. Jurisdiction.
  - b. Two systems of civil law in Canada.

### 2. Negligence: The ABC rule (common Law)

1. Describe negligence in tort.
2. Describe the duty of care, including:
  - a. Duty-to-your-neighbour principle.
  - b. Duty-of-care legislation.
  - c. Contractual duty.
  - d. Bailee's duty of care.
3. Describe breach of duty including foreseeability and the causal relationship between breach and damages.

### 3. Defenses against negligence in common law

1. Identify and describe defenses against negligence, including:
  - a. Common defenses.
  - b. Defenses to strict liability.
  - c. Defenses to absolute liability.
2. Describe the effect of onus of proof.

### 4. Québec: Extra-contractual liability

1. Describe extra-contractual liability in Québec.
2. Describe causal relationship between the fault and the injury.
3. Explain injury or damage suffered.

### 5. Québec: Defenses against extra-contractual liability

1. Identify and describe defenses against extra-contractual liability in Québec.
2. Identify and describe defenses for manufacturers and distributors of products.
3. Explain limitation periods.

## 6. General legal principles

1. Describe legal concepts between parties in a liability lawsuit.
2. Describe the principal and agent relationship in a liability lawsuit.
3. Explain municipal liability and categories of negligence.
4. Describe class actions, including limitation periods and judgment interest.

## 7. Products liability and its effects

1. Describe products liability, including burden of proof for products claims and contract theory of products liability.
2. Explain the effect of warnings and labels in product liability.
3. Describe other defences to product liability including contributory negligence and intermediate examination.

## 8. Standard commercial general liability policy

1. Identify and describe insuring agreements and their exclusions in commercial general liability (CGL) policy, including:
  - a. Section I – Coverages.
  - b. Section II – Who is insured.
  - c. Section III – Limits of insurance.
  - d. Section IV – Conditions.
  - e. Section V – Definitions.
2. Identify and describe common exclusions of the CGL policy.

## 9. Declarations page, other employer's liability coverages

1. Describe the CGL policy declarations.
2. Identify and describe other employer liability coverages, including workers' compensation and employer's liability insurance.

## 10. Emerging trends in liability insurance

1. Describe emerging trends in liability insurance, including:
  - a. Cyber risk.
  - b. The sharing economy.
  - c. The autonomous vehicle.



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Canadian Institute of Actuaries

360 Albert Street, Suite 1740

Ottawa, ON K1R 7X7

613-236-8196

[education@cia-ica.ca](mailto:education@cia-ica.ca)

[cia-ica.ca](http://cia-ica.ca)

[seeingbeyondrisk.ca](http://seeingbeyondrisk.ca)



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