

EDUCATION COMMITTEE OF THE SOCIETY OF ACTUARIES (SOA)

INTRODUCTORY STUDY NOTE

EXAM SESSION: FALL 2021

EXAM: ENTERPRISE RISK MANAGEMENT

DATE: Wednesday, November 3, 2021; Time scheduled with Prometric Test Center

1. The examination will consist of four hours and 15 minutes of written-answer questions worth 80 points.
2. The following link shows a recommended FSA module/exam sequence for each track:
<http://www.soa.org/Education/Exam-Req/edu-new-fsa-recommended.aspx>

This order is NOT mandated. Each candidate will determine the appropriate sequence based on factors including readiness to sit for an exam, exam administration schedules, or study time available. However, the Education committees believe that these recommendations provide the most effective guide for candidate success. An examination/module may assume familiarity with material that is covered in any requirement that is recommended to come before that examination or module.

3. The Syllabus material includes textbooks, online readings, and the study notes listed in the Appendix. Study notes listed with an asterisk (*) will also be included in the Revision set of study notes. The Appendix also may contain additional important information regarding this exam. A complete listing of the Syllabus and Learning Objectives is located in this exam's home page on the SOA Web site.
4. Several book distributors carry some or all of the textbooks for the Society of Actuaries exams. A list appears on the SOA Web site: <http://www.soa.org/education/exam-req/resources/edu-txt-manuals.aspx>.
5. Any changes in the Syllabus for this exam will be published under "Updates" in this exam's home page on the SOA Web site.
6. Past exams, solutions and case studies are available at: <http://www.soa.org/education/exam-req/syllabus-study-materials/edu-multiple-choice-exam.aspx>
7. When registering for this examination, candidates must select from six reading extensions. The Case Study for this examination also includes some extension-specific portions. Twenty-five percent of the examination points will be based on the Case Study and the selected extension. These questions may also draw on material from the core reading. Be sure to answer the questions asked by referring to the case study. For example, if asked for advantages of a particular plan design to a company referenced in the case study, limit your response to the specifics for that company. Other advantages should not be listed as they are extraneous to the question and will result in no additional credit. Further, if they conflict with the applicable advantages, no credit will be given. Candidates are advised to familiarize themselves with the case study. A copy will be included in the examination booklet. Candidates will not be allowed to bring their study note copy of the case study into the examination room.

8. The candidate should be very familiar with the Learning Objectives. These Learning Objectives are the first ingredient in developing the syllabus and also guide the examination committee when writing questions. The Learning Objectives set out the cognitive level needed to pass this exam. You will notice that the candidates are expected to “analyze,” “explain,” “calculate,” “describe,” “apply,” etc. While studying the syllabus material, candidates may want to refer back to the Learning Objectives to remain focused on the goals of the exam.
9. The examination questions for this exam will be based on the required readings for this exam. If a conflict exists (in definitions, terminology, etc.) between the readings for this exam and the readings for other exams, the questions should be answered on the basis of the readings for this exam.
10. Candidates may ONLY use these battery or solar-powered Texas Instruments models: BA-35, BA II Plus*, BAII Plus Professional*, TI-30Xa, TI-30X II* (IIS solar or IIB battery), and TI-30X MultiView* (XS solar or XB battery). Candidates may use more than one of the approved calculators during the examination.

Calculator instructions may not be brought into the exam room. During the exam, the calculator must be removed from its carrying case so the supervisor can confirm that it is an approved model. Candidates using a calculator other than the approved models will have their exams disqualified.

Candidates can purchase calculators directly from: Texas Instruments, Attn: Order Entry, PO Box 650311, Mail Station 3962, Dallas, TX 75265, phone 800/842-2737 or <http://epsstore.ti.com>.

The memory of the **BA II Plus, BA II Plus Professional, TI-30X II and TI-30X MultiView calculators will need to be cleared by the examination supervisor upon the candidate's entrance to the examination room.*

11. A list of various seminars/workshops and study manuals appears on the SOA Web site <http://www.soa.org/education/exam-reg/resources/edu-sem-workshops.aspx> and <http://www.soa.org/education/exam-reg/resources/edu-txt-manuals.aspx>. These seminars/workshops and study manuals do not reflect any official interpretation, opinion, or endorsement of the Society of Actuaries or its Education Committee.

Please note that the Education Committee expects candidates to read the material cited in the *Syllabus* and to use other material as a complement to the primary sources rather than a substitution for them.

12. The Society of Actuaries provides study notes to persons preparing for this examination. They are intended to acquaint candidates with some of the theoretical and practical considerations involved in the various subjects. While varying opinions are presented where appropriate, limits on the length of the material and other considerations sometimes prevent the inclusion of all possible opinions. These study notes do not, however, represent any official opinion, interpretation or endorsement of the Society of Actuaries. The Society is grateful to the authors for their contributions in preparing study notes.

The American Academy of Actuaries, the Canadian Institute of Actuaries, the Conference of Consulting Actuaries, and the Society of Actuaries jointly sponsor various examinations administered by the Society of Actuaries.

APPENDIX

Study notes for this exam

Code	Title
	Case Study (Available on syllabus page of Web site)
ERM-101-12	Measurement and Modelling of Dependencies in Economic Capital
ERM-104-12	Study Note on Parameter Risk
ERM-106-12	Economic Capital Modeling: Practical Considerations
ERM-107-12	Chapter 7 of <i>Strategic Risk Management Practice: How to Deal Effectively with Major Corporate Exposures</i>
ERM-110-12	Derivatives: Practices and Principles
ERM-112-12	Revisiting the Role of Insurance Company ALM within a Risk Management Framework
ERM-115-13	The Next Chapter: Creating an Understanding of Special Purpose Vehicles
ERM-119-14	Aggregation of Risks and Allocation of Capital
ERM-120-14	IAA Note on Stress Testing and Scenario Analysis
ERM-122-16	Chapter 1 of <i>Captives and the Management of Risk</i> , Third Edition
ERM-124-15	Chapter 2 of <i>Counterparty Credit Risk: the New Challenge for Global Financial Markets</i>
ERM-128-17	The Breadth and Scope of the Global Reinsurance Market Plays in Supporting Insurance in the United States
ERM-130-18	Model Governance Practice Note—Some Considerations for Practicing Life Actuaries
ERM-131-18	Leveraging COSO Across the Three Lines of Defense
ERM-133-19	Emerging Risks and Enterprise Risk Management
ERM-134-21*	Chapter 41 of <i>Group Insurance</i> Eighth Edition
ERM-135-20	Risk Management and the Rating Process for Insurance Companies
ERM-136-20	Managing Liquidity Risk: Industry Practices and Recommendations for CROs
ERM-137-20	ORSA and the Regulator
ERM-138-21*	Chapter 6 of <i>Quantitative Enterprise Risk Management</i>

Code	Title
ERM-139-21*	Chapter 7 of <i>Quantitative Enterprise Risk Management</i>
ERM-140-20	Chapters 3 and 7 of <i>Risk Adjustments for Insurance Contracts Under IFRS 17</i>
ERM-141-20	Chapter 9 Section 5 of <i>Managing Investment Portfolios</i> , Third Edition
ERM-142-20	Data Quality is the Biggest Challenge
ERM-143-20	Chapter 1, pages 11-17 and 27-35 of <i>Internal Controls Toolkit</i>
ERM-144-20	Chapter 13 of <i>International Actuarial Association Risk Book</i>
ERM-145-21*	Importance of Climate-Related Risks for Actuaries
ERM-146-21*	COVID-19: Implications for Insurer Risk Management and the Insurability of Pandemic Risk
ERM-147-21*	Working with Inherent and Residual Risk
ERM-321-14	LDI Evolution: Implementing Dynamic Asset Allocation Strategies that Respond to changes in Funded Status
ERM-327-17	Pension Funding Strategy: Considerations for Prefunding a Pension Plan
ERM-330-17	Liability-Relative Investing
ERM-331-17	Quantifying the Mortality-Longevity Offset
ERM-332-20	Longevity Risk Management: New Tools for Defined-Benefit Pension Plans
ERM-333-21	Green DB: Eliminate Wasteful Practices and Make your DB Plan Sustainable
ERM-401-12	Mapping of Life Insurance Risks
ERM-405-14	Secondary Guarantee Universal Life: Practical Considerations
ERM-408-14	The Captive Triangle: Where Life Insurers' Reserve and Capital Requirements Disappear
ERM-409-14	A Brief Primer on Financial Reinsurance
ERM-410-14	Coinsurance and its Variants
ERM-412-17	Surrenders in the Life Insurance Industry and Their Impact on Liquidity
ERM-413-17	Hedging for Liabilities in Life Insurance Companies
ERM-414-17	A Tale of Two Formulas: Solvency II SCR vs RBC
ERM-415-17	Strategic Risk Management in Insurance: Navigating the Rough Waters Ahead
ERM-418-19	Low Interest Rates and the Implications on Life Insurers

Code	Title
ERM-420-20	Variable Annuity Volatility Management: An Era of Risk-Control
ERM-421-20	The Specter of Antiselection
ERM-422-20	Mortality Improvement: Understanding the Past and Framing the Future
ERM-513-13	Extending the Insurance ERM Criteria to the Health Insurance Sector
ERM-517-15	The Cost of Waiting
ERM-521-17	Risk Transfer Formula for Individual and Small Group Markets Under the Affordable Care Act
ERM-522-17	Risk Selection Threatens Quality of Care for Certain Patients: Lessons from Europe's Health Insurance Exchanges
ERM-523-18	Why Are Many CO-Ops Failing?
ERM-524-18	Chapter 18 of <i>Life & Health and Annuity Reinsurance</i> , Fourth Edition
ERM-526-19	The Risks of Pricing New Insurance Products: The Case of Long-Term Care
ERM-528-20	Assessing the Health-Care Risk: The Clinical-VaR, A Key Indicator for Sound Management
ERM-529-20	RBC Calculation Examples
ERM-531-21	Top Health Industry Issues of 2020: Will Digital Start to Show an ROI
ERM-532-21	Shared Savings Model Risk in the MSSP Program
ERM-533-21	Building a Successful Value-Based Payer Contracting Strategy
ERM-534-21	What is Value-Based Healthcare?
ERM-613-17	Chapter 6 Sections 4 & 5 of <i>Managing Investment Portfolios: A Dynamic Process</i> , Third Edition
ERM-615-19	The Devil is in the Tails: Actuarial Mathematics and the Subprime Mortgage Crisis
ERM-617-19	Chapters 17, 19 and 29 of <i>Options, Futures, and Other Derivatives</i> , 10 th Edition
ERM-618-20	Chapter 9, Section 6 of <i>Managing Investment Portfolios: A Dynamic Process</i> , 3 rd Edition
ERM-619-20	Correlation: Pitfalls and Alternatives
ERM-620-21	The Evolution of LDI and Role of a Completion Manger
ERM-621-21	Liability Driven Investment Explained
ERM-702-12	IAA Note on ERM for Capital and Solvency Purposes in the Insurance Industry, Pages 9–38
ERM-708-13	Natural Catastrophe Loss Modeling

Code	Title
ERM-711-16	Risk Appetite Working Party (GIRO) Risk Appetite for a General Insurance Undertaking
ERM-712-16	Catastrophe Modelling: Guidance for Non-Catastrophe Modellers
ERM-714-18	U.S. Property-Casualty: Underwriting Cycle Modeling and Risk Benchmarks (section 2, pp. 95-108)
ERM-719-21	Top 10 Trends in Property & Casualty Insurance 2020–What you Need to Know
ERM-721-21	Understanding BCAR for US Property/Casualty Insurers
ERM-723-20	Issues Paper on Climate Change Risks to the Insurance Sector
ERM-724-21	Failures and New Misses in Insurance: Overview of the Causes and Early Identification, sections 1, 2, 5 & 6
ERM-811-15	Agency Theory and Asymmetric Information
ERM-812-15	Chapter 1 of <i>Valuation for Mergers and Acquisitions</i> , Second Edition
ERM-813-15	Financial Structure, Capital Structure (Capitalization), and Leverage Explained
ERM-814-15	Cognitive Bias and their Implications on the Financial Market
ERM-817-17	Speech by SEC Staff: The Role of Compliance and Ethics in Risk Management
ERM-819-19	Exchange Rate Risk Measurement and Management Issues and Approaches for Firms
ERM-820-19	CRO Forum Concept Paper on a Proposed Categorisation Methodology for Cyber Risk
ERM-822-20	Non-Financial Risk Convergence and Integration: Breaking Down the Silos
ERM-823-21	The Role of Human Resource Management in Risk Management
ERM-824-21	Strategic Crisis Management: A Basis for Renewal and Crisis Prevention
ERM-825-21	Understanding and Managing the IT Risk Landscape (excluding Sections 3.7 and Appendices)
ERM-826-21	Machine Decisions: Governance of AI and Big Data Analytics
ERM-827-21	SEC Staff Accounting Bulletin: No. 99–Materiality
ERM-828-21*	Developing a Business Continuity Strategy for a Post-Pandemic World

The following additional information applies to this exam:

1. EXAM OVERVIEW

The syllabus for this exam trains candidates in the financial and risk management aspects of

operating and evaluating a financial institution or other entity, with particular emphasis on enterprise risk management (ERM) concepts. This includes gaining an understanding of several subjects, including risk identification, risk measurement and management, risk modelling and risk measures.

the candidates should be familiar with the Learning Objectives as described in the syllabus. These Learning Objectives were the first ingredient in developing the syllabus and provide an indication of the level of understanding required for each major area of focus. While studying the syllabus material, candidates may want to consider both the organizational approach provided by this overview note, and to refer back to the Learning Objectives to remain focused on the goals of the Enterprise Risk Management exam.

The syllabus has been organized into five major areas of focus, which align with the Learning Objectives: Risk Categories and Identification; Risk Modelling and Aggregation of Risks, Risk Measures, Risk Management Tools and Techniques and Economic Capital. Note that many syllabus sources relate to more than one topic. In the exam, candidates will be expected to integrate material across the various topics.

The candidate should focus on both the concepts and principles addressed in the exam syllabus. Candidates may be asked to apply concepts and principles in a particular context in an examination question. For example, although the candidate is not expected to remember detailed economic capital requirements the candidate is expected to understand how the concept of economic capital may apply to different business entities as specified in the examination.

The exam comprises three types of questions: Focus (covers single Learning Objective), Integrated (synthesizes multiple Learning Objectives) and Case Study.

2. ERRATA

- Study note ERM-420-20 Variable Annuity Volatility Management: An Era of Risk-Control:

In Exhibit 22 on page 26, the 5% and 5.5% labels are incorrectly switched. The light blue bars should be a 5% withdrawal rate and the dark blue bars should be a 5.5% withdrawal rate