

# Casualty Actuarial Society



## 2006 Syllabus of Basic Education

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For details about where to send registrations, orders, and payments, please see pages 7 and 8.

# Notice to Candidates

## 1. New Address for CAS Office

Effective December 1, 2005, the CAS Office's new address is:

Casualty Actuarial Society  
4350 N. Fairfax Drive, Suite 250  
Arlington, Virginia 22203

## 2. New Deadline for Refund Requests

The Casualty Actuarial Society and the Society of Actuaries have changed the deadlines for refund requests. For Exam 1/P, any refund request submitted later than noon of the third business day before the test appointment will not be considered. For all other exams, the deadline for refund requests to reach Preliminary Actuarial Examinations or the CAS Office (as described on page 12) is three weeks (21 days) after the date that the specific exam was administered.

## 3. CAS Code of Professional Conduct

Beginning this year, the CAS requires candidates taking CAS-specific examinations (i.e., Exams 3, 5-9) to abide by the CAS Code of Professional Conduct. By signing the application form for these exams, the candidate agrees that he or she has read and will agree to abide by the Code. The Code is included in the "Examination Rules" section of this *Syllabus* beginning on page 25.

## 4. Course on Professionalism

Beginning in 2006, a candidate must have passed five Associateship examinations and have credit for all three VEE topics to be eligible to take the Course on Professionalism. (Transitional VEE exams are not included in the count of exams for eligibility to take the Course.)

## 5. Calculators

Only approved calculators may be used for CAS Examinations. Details are provided on page 15. Please note that the TI-30X model is no longer on the list although the TI-30Xa and TI-30X II (IIS solar or IIB battery) remain on the approved list.

## 6. Extra Fee for Test Centers outside Canada and U.S. Discontinued

The CAS has discontinued the extra fee for candidates taking CAS administered exams outside Canada and the United States.

## 7. Details for Computer-Based Testing (Exam 1/P)

In addition to the details printed in this *Syllabus*, updated information will be available in the "Admission" section of the CAS Web Site. Please review this important information before registering for this exam.

## 8. Appeals for Exams 3, 5-9, and Transitional VEE Exams

The CAS has revised its appeals process for multiple-choice questions. (The policy for essay questions remains unchanged.)

### *Multiple-Choice Questions*

If a candidate believes that a multiple-choice question is ambiguous or defective, he or she should bring this to the attention of the Examination Committee in writing within two weeks after the



## 11. Supplemental Exam Materials

Some exams may have supplemental material distributed with the exam package. This *Syllabus* lists the supplemental material for some of these exams. For other exams, however, the decision to include supplemental material with the exam package may be made after publication of this *Syllabus*. It is the candidate's responsibility to check "Syllabus Update" in the "Admissions" section of CAS Web Site for any changes.

## 12. Notice of Examinations

The CAS posts the *Notice of Examinations* for Winter VEE Exams in October; Spring Exams in January; Summer VEE Exams in April; and the Fall Exams in July in the "Admissions" section of the CAS Web Site. The *Notice* contains important information for the exams as well as information on study aids and review seminars.

## 13. Materials for Study

Please refer to the appropriate examination section for the learning objectives, knowledge statements, and lists of readings. Any changes made after the publication of this *Syllabus* will be posted under "Syllabus Update" in the "Admissions" section of the CAS Web Site.

## 14. Obtaining Examination Booklet (Exams 3 and 5-9)

For Exams 3 and 5-9, a candidate wishing to obtain his or her own examination booklet and scrap paper subsequent to the examination should bring a self-addressed stamped envelope to the examination center. The recommended minimum postage is \$2.67 for domestic mail in the U.S. (Candidates taking transitional VEE exams will not be able to receive a copy of the VEE exam.)

## 15. Order CAS Publications at CAS Online Store

All CAS publications available for purchase, including Study Kits and Web Notes, may be bought at the CAS Online Store. The *Syllabus* only provides order information for the study materials.

## 16. CAS Web Site ([www.casact.org](http://www.casact.org))

The *Syllabus of Basic Education*, *Syllabus Update*, *Notice of Examinations*, List of Passing Candidate Numbers, List of Passing Candidate Names with New Fellows and Associates, *Future Fellows* newsletter, and other important information are posted in the "Admissions" section of the CAS Web Site.

**Note:** This *Syllabus* is subject to change in the future. The CAS is not responsible for any errors or omissions in the *Syllabus*.

# Foreword

Actuarial science originated in England in 1792 in the early days of life insurance. Because of the technical nature of the business, the first actuaries were mathematicians. Eventually, their numerical growth resulted in the formation of the Institute of Actuaries in England in 1848. Eight years later, in Scotland, the Faculty of Actuaries was formed. In the United States, the Actuarial Society of America was formed in 1889 and the American Institute of Actuaries in 1909. These two American organizations merged in 1949 to become the Society of Actuaries.

In the early years of the 20th century in the United States, problems requiring actuarial treatment were emerging in sickness, disability, and casualty insurance—particularly in workers compensation, which was introduced in 1911. The differences between the new problems and those of traditional life insurance led to the organization of the Casualty Actuarial and Statistical Society of America in 1914. Dr. I.M. Rubinow, who was responsible for the Society's formation, became its first president. At the time of its formation, the Casualty Actuarial and Statistical Society of America had 97 charter members of the grade of Fellow. The Society adopted its present name, the Casualty Actuarial Society, on May 14, 1921.

The purposes of the Society are to advance the body of knowledge of actuarial science applied to property, casualty, and similar risk exposures, to establish and maintain standards of qualification for membership, to promote and maintain high standards of conduct and competence for the members, and to increase the awareness of actuarial science. The Society's activities in support of this purpose include communication with those affected by insurance, presentation and discussion of papers, attendance at seminars and workshops, collection of a library, research, and other means.

Since the problems of workers compensation were the most urgent at the time of the Society's formation, many of the Society's original members played a leading part in developing the scientific basis for that line of insurance. From the beginning, however, the Society has grown constantly, not only in membership, but also in range of interest and in scientific and related contributions to all lines of insurance other than life, including automobile, liability other than automobile, fire, homeowners, commercial multiple peril, and others. These contributions are found principally in original papers prepared by members of the Society and published annually in the *Proceedings of the Casualty Actuarial Society*. The presidential addresses, also published in the *Proceedings*, have called attention to the most pressing actuarial problems, some of them still unsolved, that have faced the industry over the years.

The membership of the Society includes actuaries employed by insurance companies, industry advisory organizations, national brokers, accounting firms, educational institutions, state insurance departments, and the federal government. It also includes independent consultants. The Society has three classes of members, Fellows, Associates, and Affiliates. Fellows and Associates require successful completion of examinations as described in this *Syllabus*. Affiliates are qualified actuaries who practice in the general insurance field and wish to be active in the CAS but do not meet the qualifications to become a Fellow or Associate.

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Applications and order forms, including the applications for joint Exams 1/P, 2/FM, and 4/C, will be available in the “Admissions” section of the CAS Web Site ([www.casact.org](http://www.casact.org)) in December 2005.

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# INTRODUCTION

## Principles of the Casualty Actuarial Society for Basic Education

The primary purpose of the Casualty Actuarial Society (CAS) basic education process is to ascertain whether candidates for the CAS designations have satisfied CAS learning objectives. The CAS Board of Directors adopted the following principles on May 6, 2001.

1. Basic education will remain a cornerstone of the CAS.
2. The CAS will assure that its members have the knowledge of those areas needed to practice effectively in the broad and expanding range of property, casualty, and similar business and financial risks (general insurance).
3. The CAS is committed to a depth of knowledge of techniques associated with the broad range of property, casualty, and similar business and financial risks.
4. The CAS will provide the basic education necessary to meet qualification standards to sign statements of actuarial opinion for general insurance and related specialties in at least the U.S. and Canada.
5. The education process will provide a balance among theoretical concepts, practical applications, and business acumen, to prepare our members to deliver high-quality service to meet current and projected future needs of employers and clients.
6. The CAS will approve the syllabus and examination standards used in determining eligibility for CAS membership.
7. Demonstration of mastery of the skill sets required of members is critical to basic education.
8. The CAS is committed to maintaining self-study as one route for attainment of designations.
9. The CAS will pursue strong working relationships with academia and professionals in related fields.
10. The CAS will attract a pool of strong candidates from a variety of backgrounds to the actuarial profession.
11. The CAS supports the goal of developing a global shared foundation of actuarial education, including joint sponsorship of examinations where consistent with other principles.
12. The CAS, as an educator of general insurance and related specialties, will remain a significant contributor to the worldwide actuarial profession.

## Syllabus Goals and Objectives

One of the primary objectives of the Casualty Actuarial Society (CAS) is the development of qualified professionals in the field of casualty actuarial science. The CAS conducts an educational and examination program for prospective members in order to achieve this objective. The syllabus goals and objectives are as follows:

1. To develop a general understanding of the social, political, regulatory, legal, economic, and financial environment of the business of property and casualty insurance and similar risk assessment as well as the historical development of that environment.
2. To develop a thorough understanding of the fundamental mathematical concepts applicable to solving insurance and similar risk assessment problems, and to develop a high degree of skill in their applications.



3. To develop a comprehensive understanding of the business of property and casualty insurance, including underwriting, claims, marketing, and finance, as well as how these functions are performed and interrelated.
4. To develop a working knowledge of property and casualty insurance policies and contracts.
5. To develop an expert knowledge of a broad range of techniques to solve problems and to develop the ability to discern the appropriateness of techniques for particular applications based on a knowledge of the underlying assumptions, strengths, and weaknesses.
6. To develop an expert knowledge of a broad range of relevant and standard actuarial practices in order to present a framework for the use of problem-solving techniques.
7. To encourage a sense of inquisitiveness and creativity toward problem solving in order to foster an appreciation of the art in actuarial science.

**Note:** The items in this *Syllabus* were chosen for their educational value. They are intended to expose the candidate to a wide range of information and to a variety of methods, opinions, and practices in the casualty actuarial field. Inclusion of material in the *Syllabus* does not imply that the CAS endorses the views, methodologies, or techniques therein.

## Education and Examination System

The CAS vice president-admissions supervises the CAS education and examination system. The vice president-admissions is supported by the following four admissions committees:

### ***CAS Education Policy Committee***

The Education Policy Committee establishes the goals and objectives of the CAS education and examination system to ensure that the needs of the Society, its members, and its potential members are met. The committee also monitors the operations of the other educational and examination committees to ensure continued effectiveness.

### ***CAS Syllabus Committee***

The Syllabus Committee determines the scope and content of the *CAS Syllabus* and course of readings for CAS Examinations.

A chairperson supervises the committee that is composed of Fellows who represent a broad spectrum of CAS members including insurers, consultants, regulators, and academicians. At least one representative of the Canadian Institute of Actuaries (CIA) also serves on the committee; usually at least one of the representatives is a member of the CIA Education and Examination Committee. One or more members specialize in the material for each examination part. These specialists recommend changes to the *Syllabus*; however, recommendations must be approved by the entire committee.

The “Materials for Study” are reviewed regularly by members of the Syllabus Committee. Both short- and long-term goals for improvement are developed. Textbooks and articles may be designated for inclusion. If the committee determines that new study material needs to be developed or that existing material needs to be revised, the committee may commission the creation of Study Notes for inclusion. Every effort is made to develop material that is appropriate, relevant, up-to-date, concise, and well-written. Suggestions for improvement are always welcome and should be directed to the Syllabus Committee at the CAS Office address.

### ***CAS Examination Committee***

The Examination Committee organizes, manages, administers, and grades the CAS Examinations. The committee also establishes the standards to be achieved by successful candidates.

The chairperson supervises the committee and is responsible for the overall administration of the CAS Examinations. The chairperson is assisted by several senior committee officers with the title of general

officer. The committee is subdivided into Examination Part Committees, each headed by an examination part chairperson.

The committee work is similar for both the jointly administered Exams 1, 2, and 4 and the CAS-specific Exams 3, 5-9 and VEE Exams. The following provides details about the CAS-specific examinations:

- The responsibility for each CAS Examination is assigned to a part committee that writes, grades, and maintains the standards for that examination. Each part committee is assisted by two examination consultants who are CAS members and are experts on the material covered by that examination. The part committees are also assisted by a proofreader who concentrates on uniformity and grammar. In addition, some part committees are assisted by academic consultants who are independent experts from the academic community.
- Each examination is drafted by the responsible Examination Part Committee to test candidates' knowledge of the items listed in the "Materials for Study." The individual part committee, examination consultants, one of the Examination Committee general officers, the Examination Committee chairperson, and, in some cases, academic consultants review each examination to assure its quality.
- Every effort is made to ensure that the questions fall within the scope of the "Materials for Study." Complete coverage of all material is not practical for every examination every year. The goal is to produce examinations that contain representative, high-quality questions that test candidates' knowledge of the material. Trick questions are deliberately avoided, and the wording of each question is considered carefully to eliminate possible ambiguities. Preliminary versions of each examination are thoroughly reviewed in relation to all of these factors before the final examination is approved.

#### ***CAS Candidate Liaison Committee***

The Candidate Liaison Committee strives to focus on issues of importance to candidates who are taking CAS Examinations. The committee serves as a direct point of contact for candidates to voice individual or group concerns regarding the education and examination process. It also provides a means for an exchange of information between candidates and the admissions committees via *Future Fellows*, a quarterly newsletter. Candidate representatives who are actively involved in the examination process serve as advisors to the committee.

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# 2006 CAS BASIC EDUCATION SUMMARY

## Associateship Requirements

### *Validation by Educational Experience*

VEE-Applied Statistical Methods

VEE-Corporate Finance

VEE-Economics

### *Examinations*

Exam 1\* Probability (same as SOA Exam P)

Exam 2\* Financial Mathematics (same as SOA Exam FM)

Exam 3 Statistics and Actuarial Models

Exam 4\* Construction and Evaluation of Actuarial Models (same as SOA Exam C)

Exam 5 Introduction to Property and Casualty Insurance and Ratemaking

Exam 6 Reserving, Insurance Accounting Principles, Reinsurance, and Enterprise Risk Management

Exam 7† Nation-Specific: Annual Statement, Taxation, and Regulation

### *Course on Professionalism*

## Fellowship Examinations

Exam 8 Investments and Financial Analysis

Exam 9 Advanced Ratemaking, Rate of Return, and Individual Risk Rating Plans

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\* Preliminary Actuarial Examinations administers the jointly sponsored Exams 1, 2, and 4 of the Canadian Institute of Actuaries, Casualty Actuarial Society, and the Society of Actuaries.

† Candidates must specify their U.S. or Canadian specialty at the time of application.

# 2006 CAS EXAMINATION SCHEDULE

## Computer-Based Testing for Exam 1/P\*

	LOCATION	DATE(S)	DURATION
Winter Test Window	Canada and United States	February 21-23, 2006	3 Hours
	All other countries	February 21-22, 2006	3 Hours
Spring Test Window	Canada and United States	May 16-19, 2006	3 Hours
	All other countries	May 16-17, 2006	3 Hours
Summer Test Window	Canada and United States	August 15-18, 2006	3 Hours
	All other countries	August 15-16, 2006	3 Hours
Fall Test Window	Canada and United States	November 28 – December 1, 2006	3 Hours
	All other countries	November 28-29, 2006	3 Hours

## Transitional VEE Exams

TRANSITIONAL VEE EXAM	DATE	ZONE	START TIME	FINISH TIME
VEE-Economics	February 16, 2006	All time zones	9:30 a.m.	11:00 a.m.
	August 9, 2006	All time zones	9:30 a.m.	11:00 a.m.
VEE-Corporate Finance	February 16, 2006	All time zones	12:30 p.m.	2:00 p.m.
	August 9, 2006	All time zones	12:30 p.m.	2:00 p.m.
VEE-Applied Statistical Methods	February 16, 2006	All time zones	3:30 p.m.	5:00 p.m.
	August 9, 2006	All time zones	3:30 p.m.	5:00 p.m.

## Spring 2006 Exams

EXAM	DATE	ZONE	START TIME	FINISH TIME
Exam 2/FM	May 25, 2006*	All time zones	8:30 a.m.	10:30 a.m.
Exam 3	April 26, 2006	North and South America	9:30 a.m.	1:30 p.m.
	April 26, 2006	Europe, Africa, Asia, Australia	1:00 p.m.	5:00 p.m.
Exam 4/C	May 17, 2006*	All time zones	8:30 a.m.	12:30 p.m.
Exam 5	April 28, 2006	North and South America	9:30 a.m.	1:30 p.m.
	April 28, 2006	Europe, Africa, Asia, Australia	1:00 p.m.	5:00 p.m.
Exam 7	April 25, 2006	North and South America	9:30 a.m.	1:30 p.m.
	April 25, 2006	Europe, Africa, Asia, Australia	1:00 p.m.	5:00 p.m.
Exam 8	April 27, 2006	North and South America	9:30 a.m.	1:30 p.m.
	April 27, 2006	Europe, Africa, Asia, Australia	1:00 p.m.	5:00 p.m.

Starting time for examinations is local time for the specified zone.

\*Updated information for exams that are jointly administered by the Casualty Actuarial Society and the Society of Actuaries may be obtained from the CAS [www.casact.org or (703) 276-3100] or the SOA [www.soa.org or (847) 706-3500].

## Fall 2006 Exams

EXAM	DATE	ZONE	START TIME	FINISH TIME
Exam 2/FM	November 8, 2006*	All time zones	8:30 a.m.	10:30 a.m.
Exam 3	October 31, 2006	North and South America	9:30 a.m.	1:30 p.m.
	October 31, 2006	Europe, Africa, Asia, Australia	1:00 p.m.	5:00 p.m.
Exam 4/C	November 6, 2006*	All time zones	8:30 a.m.	12:30 p.m.
Exam 6	November 1, 2006	North and South America	9:30 a.m.	1:30 p.m.
	November 1, 2006	Europe, Africa, Asia, Australia	1:00 p.m.	5:00 p.m.
Exam 9	November 2, 2006	North and South America	9:30 a.m.	1:30 p.m.
	November 2, 2006	Europe, Africa, Asia, Australia	1:00 p.m.	5:00 p.m.

Starting time for examinations is local time for the specified zone.

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\*Updated information for exams that are jointly administered by the Casualty Actuarial Society and the Society of Actuaries may be obtained from the CAS [[www.casact.org](http://www.casact.org) or (703) 276-3100] or the SOA [[www.soa.org](http://www.soa.org) or (847) 706-3500].

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# EXAMINATION RULES

## Registration

### Administration of Examinations

The CAS education structure has three Validation by Educational Experience (VEE) requirements, nine examinations, and the Course on Professionalism. Exams 1/P, 2/FM, and 4/C are jointly administered by the CAS and the Society of Actuaries (SOA) through Preliminary Actuarial Examinations. Exams 3, 5-9, the transitional VEE exams, and the Course on Professionalism are exclusively administered by the CAS. The Canadian Institute of Actuaries (CIA) cosponsors all the examinations except Exam 7-U.S.

### Filing of Applications

All candidates filing for an examination(s) must submit an application for each examination period (Spring, Summer, and/or Fall). Application forms are enclosed in this *Syllabus* or may be downloaded from the CAS Web Site ([www.casact.org](http://www.casact.org)). Payment must accompany each application to be valid. Applications must be received by the following deadlines:

Exam Sitting	Exam	Registration Deadline
Winter 2006	Exam 1/P	December 15, 2005
	VEE Transitional Exams	January 5, 2006
Spring 2006	Exams 1/P	March 15, 2006
	Exams 2/FM, 4/C	April 1, 2006
	Exams 3, 5, 7, 8	March 16, 2006
Summer 2006	Exam 1/P	June 15, 2006
	VEE Transitional Exams	June 28, 2006
Fall 2006	Exam 1/P	September 15, 2006
	Exams 2/FM, 4/C	September 24, 2006
	Exams 3, 6, 9	September 21, 2006

Please allow at least 10 working days for your mailed application to reach its destination. Whether payment is made by personal or company check, **it is the candidate's responsibility to ensure that the application and fee are received by the stated deadline. Exceptions will not be made.** Send applications as follows:

#### ***Jointly Administered Exams 1/P, 2/FM, and 4/C***

Exams 1/P, 2/FM, and 4/C are administered by Preliminary Actuarial Examinations for the CAS, CIA and SOA. Candidates must send an original signed application for each examination session. Unsigned, photocopied, or facsimile applications are not valid. All applications must include an original signature. Fees should be remitted in U.S. funds (or equivalent) by check, money order, or credit card (American Express, MasterCard, or Visa). Please note that payment in Canadian currency may slightly delay the processing of the application.

For the joint exams, the candidate's letter of admission is also a tax receipt and should be retained after the examination if needed for tax purposes. Candidates will not be considered registered for an examination until Preliminary Actuarial Examinations has received an original, signed application for the examination session. Applications are available in the "Admissions" section of the CAS Web Site ([www.casact.org](http://www.casact.org)). Applications must be received before the published deadlines.

Send application with check or money order to:

Preliminary Actuarial Examinations  
P.O. Box 95600  
Chicago, IL 60694-5600

Send application with credit card payment and all overnight deliveries to:

SOA/Preliminary Actuarial Examinations  
475 N. Martingale Road, Suite 600  
Schaumburg, IL 60173

### **Exams 3, 5-9, and Transitional VEE Exams**

Candidates may submit examination registrations for Exams 3, 5-9, and transitional VEE exams by mail or online. Applications must be received before the published deadlines. Candidates submitting a hard copy of their registration should mail them as follows:

Send application with check or money order in U.S. funds or Canadian equivalent (payable to "Casualty Actuarial Society") to:

Casualty Actuarial Society  
P.O. Box 425  
Merrifield, VA 22116-0425

Send application with credit card payment (Visa, MasterCard, or American Express) and all overnight deliveries to:

Casualty Actuarial Society  
4350 N. Fairfax Drive, Suite 250  
Arlington, Virginia 22203

Candidates submitting their registrations online for Exams 3, 5-9, and transitional VEE exams must pay by credit card. All credit card payments will be processed in U.S. funds. Prior to completing an online application, candidates must submit an Electronic Signature Authorization Form (ESAF). By signing the ESAF, the candidate agrees to be bound by the rules and regulations related to the examinations. It will also provide a signature of record for comparison to signatures on the individual examination envelopes. The ESAF is available in the "Admissions" section of the CAS Web Site. Unless the candidate has a name change, the ESAF only needs to be submitted once. Candidates should allow three weeks for their ESAF to be processed. Candidates who intend to register online should submit their ESAFs by the end of February for Spring Exams, the end of May for Summer Exams, and the end of August for Fall Exams.

Candidates will be sent an acknowledgment of receipt of their application within three weeks of the date that the application form was received at the CAS Office beginning February 1 for Spring Examinations; May 16 for Summer VEE Examinations; and August 1 for Fall Examinations. This acknowledgment is the candidate's receipt of exam fees paid. Please retain this acknowledgment for tax purposes if needed.

## **Fees**

Examination fees must be paid each time a candidate registers for an exam. Payment options are described in the previous section, Filing of Applications. A \$20 surcharge will be assessed for all returned checks. The charts below show the examination fee schedules for 2006 at the time of publication. All fees are listed in U.S. dollars and are subject to change. Other fees that may apply include fees for change of center, translation, and/or centers outside the United States or Canada.

### **2006 Examination Fees**

	<b>Candidates</b>	<b>Full-Time Students</b>
Exam 1/P (CBT)	\$175	\$175
Exam 2/FM	\$150	\$150
Exams 3 and 4/C	\$375	\$300
Exams 5, 6, 7, 8, and 9	\$525	\$420
Transitional VEE Exams	\$225	\$180

### **Other Fees**

Refund	\$60
Change of Exam Center	\$60
Special Exam Center	\$60
Translation Fee <i>per exam</i> (This service only available for responses to Exams 5-9. No translation fee for French.)	\$50

**Note:** Fees listed above are per exam.

## Details for Computer-Based Testing (Exam 1/P)

Exam 1/P is offered by computer-based testing (CBT). This gives candidates more frequent opportunities to take Exam 1/P within a standardized environment. Because some details about CBT may change after publication of this *Syllabus*, additional details will be available in the “Admissions” section of the CAS Web Site ([www.casact.org](http://www.casact.org)). To register for Exam 1/P, follow the steps below.

### ***1. Send Application to Preliminary Actuarial Exams***

Submit an application with payment to Preliminary Actuarial Exams. All applications must reach Preliminary Actuarial Exams at the SOA Office prior to the published deadlines (see page 7). The application is available in the “Admissions” section of the CAS Web Site ([www.casact.org](http://www.casact.org)). A candidate with a formally diagnosed disability who needs special testing arrangements must submit a written request and documentation with the application. Requests for special arrangements and supporting documentation must be submitted, at the applicant’s expense, no later than the registration deadline.

### ***2. Receive and Verify Your Letter of Admission***

Approximately five weeks prior to the exam, all registered candidates will be mailed a letter of admission. Candidate must confirm that the information on their letter of admission is correct. If there are inaccuracies, candidates should contact the office listed on the letter of admission.

The letter of admission contains information for scheduling an appointment—the candidate number, dates when the candidate may schedule the exam, and an expiration date. The examination must be scheduled on the date(s) listed on the letter of admission. The candidate should take the letter of admission to the test center on the day of the exam.

### ***3. Make an Appointment at a CBT Center***

To increase the likelihood of testing at the candidate’s center of choice, each candidate should schedule an appointment (online or by phone) immediately upon receiving the letter of admission. A list of CBT centers will be available in the “Admission” section of the CAS Web Site.

#### **• Schedule Online**

After receiving a letter of admission, the candidate should schedule his or her test appointment on the Internet by going to: [www.2test.com](http://www.2test.com). The system allows the candidate access to real-time scheduling 24 hours a day, 7 days a week. Canadian and U.S. candidates are able to select their preferred testing date. All candidates are able to select their preferred location, receive immediate on-screen confirmation, and a follow-up e-mail confirmation of their appointment details.

For “Testing Program,” select “CAS/CIA/SOA Exams.” The opening page for scheduling the appointment will appear. Continue by following the instructions.

Candidates requiring special needs accommodations cannot make an appointment on the Internet but should call the Special Accommodations Department at Thomson Prometric to schedule an examination. (The appropriate telephone number is available with the CBT information in the “Admissions” section of the CAS Web Site.)

#### **• Schedule by Telephone**

After receiving a letter of admission, the candidate should schedule his or her test appointment by calling Thomson Prometric’s Candidate Services Contact Center (CSCC). Telephone numbers will be provided when the letters of admission are mailed. Candidates requiring Special Needs Accommodations should call the Special Accommodations Department at Thomson Prometric to schedule their test appointments.



#### ***4. Procedures for Changing or Canceling a Test Appointment***

To reschedule or cancel an appointment, candidates must do the following by noon of the third business day before the appointment (for example, to cancel an examination for Tuesday, you must notify the test center and Preliminary Actuarial Exams by noon on the Friday before the Tuesday appointment):

- Call the test center where you are scheduled to take the exam. Notification must be left directly with the administrator at the test center. Do ***not*** leave a message on the answering machine—this does not constitute official notification.
- Notify Preliminary Actuarial Exams at the SOA Office (exams@soa.org).
- Special needs candidates must call the Special Conditions Coordinator to reschedule or cancel.

A cancellation does not automatically ensure a refund. You must both cancel the appointment by noon of the third business day before the appointment and you must request a refund from Preliminary Actuarial Exams within the same time frame. (See the Refunds section below.) If a candidate fails to arrive for a scheduled appointment or cancels without giving the required notice as described above, no refund will be given.

#### **Exam 1/P Fee Reimbursement Program in U.S.**

The Joint CAS/SOA Committee on Minority Recruiting sponsors a program to reimburse qualified minority candidates for their Exam 1/P fee if they pass the exam on their first or second attempt. Eligible candidates are members of specified groups that are underrepresented in the actuarial profession in the United States, including African-Americans, Hispanics, and Native North Americans who are sitting for actuarial exams. The Exam 1/P reimbursement application is available in the “Minority Programs” section of the actuarial career Web site at [www.BeAnActuary.org](http://www.BeAnActuary.org).

#### **Fee Discount Program in Qualified Countries**

The CAS and SOA sponsor a program to provide financial relief to candidates of qualified countries. Eligible candidates must be current residents of a qualified country and verify that they are personally paying for exam fees and study materials without assistance from employers or other entities. Candidates must write their examinations within a qualified country. Application information, including a list of qualified countries, is available in the “Admissions” section of the CAS Web Site at [www.casact.org](http://www.casact.org).

#### **Examination Centers**

Examination centers are listed at the back of this *Syllabus* immediately before the application forms. Centers are determined by the number of candidates near a center and the availability of proctors. Special examination centers may be arranged at the discretion of the CAS or Preliminary Actuarial Examinations if the request is received by the registration deadline. The additional fee for a special center is \$60. Candidates will be sent the exact location of their examination center at least three weeks before the examination.

#### ***Letter of Admission (Exams 1/P, 2/FM and 4/C Only)***

For Exams 2 and 4, Preliminary Actuarial Examinations will send each candidate: 1) a letter of admission that indicates the examination(s) for which the candidate is registered, and 2) the *Instructions to Candidates*, which covers administrative details about the examination as well as exact examination center locations. Letters of admission will be mailed beginning March 1 for the Spring session and September 1 for the Fall session. **This letter of admission must be brought to the examination center.** A candidate who has not received a letter of admission two weeks before the examination, or whose letter of admission contains incorrect information, should contact the Society of Actuaries or the Casualty Actuarial Society.

### ***Change of Center***

Details for changing a CBT center for Exam 1/P are provided above in Details for Computer-Based Testing. For all other exams, any registered candidate who requests a change in examination center must pay a change-of-center fee. No requests will be accepted after the registration deadline. If a request for a change of center occurs, every effort will be made to have the candidate's records and supplies on hand at the appropriate center in time for the examination. If this effort fails, however, the administering organizations are not responsible. If either a candidate's registration and fees, or request for change of center are received so late that it is not feasible to arrange for the candidate to write the examination, the fees will be refunded in full. The administering organizations are not responsible for difficulties caused by postal service delays or inadequate postage.

## **Languages Other Than English**

### ***Exams 1/P, 2/FM, and 4/C***

Examination questions and instructions will be printed, and examinations administered, in English except in Canada where the examinations will be printed in both French and English.

### ***Exams 3, 5-9, and Transitional VEE Exams***

Exam questions and instructions will be printed, and exams administered, exclusively in English. Should a candidate wish to respond to any or all of the essay questions in a language other than English, advance notice of the language selected must be provided to the CAS Office when applying to write an exam. Provided such advance notice was received and a suitable translator is available, responses submitted in languages other than English will be translated into English by qualified translators and graded exclusively in translation. All translations will be literal translations from the original language to English. If advance notice has not been provided, non-English responses will not be graded. For non-English responses provided in languages other than French, a translation fee of 50 per exam must be submitted along with the exam fee. If a suitable translator cannot be engaged before the date of the exam, the candidate will be notified and the translation fee refunded. The CAS cannot guarantee the accuracy of any translation. Appeals based upon errors in translation of candidates' responses will not be considered. Grade reports for exams requiring translation may be delayed.

## **Special Arrangements for Candidates With a Disability**

A candidate with a formally diagnosed disability who needs special testing arrangements must submit a written request to Preliminary Actuarial Examinations (for Exams 1/P, 2/FM, and 4/C) or the CAS (for Exams 3, 5-9, and Transitional VEE Exams) for each examination the candidate intends to write. Documentation of the disability (e.g., physician's statement, diagnostic test results), as well as the need for special arrangements, are required of each candidate; previous accommodations given to the candidate in an educational program or work setting may be considered. Requests for special arrangements and supporting documentation must be submitted at the applicant's expense at least two weeks before the registration deadline.

## **Refunds**

### ***Exam 1/P—Computer-Based Testing***

Any candidate who submits an application for Exam 1/P and subsequently decides not to take the examination may receive a refund (less the \$60 refund fee) only by doing ***both*** of the following:

- Cancel the appointment by noon of the third business day (includes Saturdays) before the test appointment. For example, to cancel an examination for Tuesday, a candidate must notify the test center by noon on the Friday before the Tuesday appointment.

- Submit a refund request by e-mail (refund@soa.org) to Preliminary Actuarial Examinations by noon of the third business day before the test appointment. Examination fee refunds will be issued following the testing administration.

**Any refund request submitted later than noon of the third business day before the test appointment will not be considered.**

#### ***Exams 2/FM and 4/C***

Any candidate who submits an application for Exams 2/FM or 4/C and subsequently does not write the examination should submit a written request for an examination fee refund. **The deadline for refund requests to reach Preliminary Actuarial Examinations is three weeks (21 days) after the date that the specific exam was administered.** Refund requests may be sent via e-mail to exams@soa.org or by fax to (847) 706-3599. Late requests will not be considered. A \$60 administrative fee per examination is assessed on all refunds. Examination fees for Exams 2/FM and 4/C are only refundable from Preliminary Actuarial Examinations. Change-of-center fees and special center fees will not be refunded in any case. Fees cannot be transferred from one exam session to another.

#### ***Exams 3, 5-9, and Transitional VEE Exams***

Any candidate who submits an application for Exams 3, 5-9, or the transitional VEE exams and subsequently does not write the examination should submit a written request for an examination fee refund. **The deadline for refund requests to reach the CAS Office is three weeks (21 days) after the date that the specific exam was administered.** Refund requests may be sent via e-mail to refund@casact.org or by fax to (703) 276-3108. Late requests will not be considered. A \$60 administrative fee per examination will be assessed on all refunds. Change-of-center fees, special center fees, and other additional fees will not be refunded in any case. Refunds will be issued one month after the refund deadline. Refunds are issued in the manner that fees were paid (i.e., by credit to a bank card or by check to an individual or company). Fees cannot be transferred from one exam session to another.

# The Examination

## Introduction

The examinations for admission to the Casualty Actuarial Society are designed to establish the qualifications of candidates. The Examination Committee creates exams that follow guidelines developed by the Syllabus Committee. Complete coverage of all readings listed in the *Syllabus* is not practical for every exam every year. The goal is to produce exams that contain representative, high-quality questions that test candidates' knowledge of the syllabus material. Thus, the candidate should expect that each exam will cover a large proportion of the syllabus readings and that all readings will be tested at least once over the course of a few years.

The exam questions will be based on the published learning objectives and supporting knowledge statements. It is intended that the readings, in conjunction with the material on the lower numbered examinations, will provide sufficient resources to allow the candidate to perform the learning objectives. The exams will test not only candidates' knowledge of the subject matter, but also candidates' ability to apply that knowledge.

## Order of Examinations and VEE Topics

In the development of the syllabus readings and examination questions, it is assumed that candidates are familiar with material covered on earlier examinations. Therefore, it may be beneficial for candidates to take examinations in numerical order. There are, however, circumstances when another order might be more appropriate. For example, a candidate may wish to study an exam that is closely related to his or her current work.

VEE topics are not prerequisites to taking actuarial exams and may be fulfilled independently of the exam process (i.e., prior to or concurrent with taking actuarial exams). The following insights on VEE topics, however, may be helpful. VEE-Applied Statistical Methods will help strengthen candidates' statistical skills and completing it prior to taking Exams 3 and 4 will make these exams more tractable. VEE-Economics and VEE-Corporate Finance will help strengthen candidates' understanding of managerial decision making and completing these topics prior to taking Exam 8 will make this exam more tractable.

To help candidates decide which exam to take, the following chart indicates which exams assume knowledge of material found on prior exams. Most candidates will find it easiest to study for an exam after studying for all of the exams listed in the "prior knowledge" column.

	<b>Assumes Prior Knowledge from the Following Exam(s)</b>
VEE-Applied Statistical Methods	None
VEE-Corporate Finance	None
VEE-Economics	None
Exam 1/P	None
Exam 2/FM	None
Exam 3	Exams 1/P and 2/FM
Exam 4/C	Exams 1/P and 3
Exam 5	Exams 1/P and 2/FM
Exam 6	Exams 1/P and 2/FM
Exam 7	Exams 2/FM, 5, and 6
Exam 8	Exams 1/P, 2/FM, 3, 4/C, 5, and 6
Exam 9	Exams 1/P, 2/FM, 3, 4/C, and 5

### ***Notes on Order of Examinations***

- Exams 3, 4/C, and 9 make extensive use of Exam 1/P material. Exams 5, 6, and 8 assume an understanding of Exam 1/P material.
- Both Exams 5 and 6 are approachable without detailed knowledge of the material on Exam 2/FM. A candidate who has studied this material, however, may gain a deeper understanding of the material on Exams 5 and 6 and its foundations.
- Because they are so closely related, it makes sense for most candidates to take Exam 4/C immediately after Exam 3. Many candidates find it easier to study for these more mathematical exams when they are not too far removed from college math.
- Exam 4 covers the theory of credibility. Credibility theory is applied in Exams 5 and 6. Candidates who have mastered credibility theory in Exam 4/C may find its application more intuitive on Exams 5 and 6. On the other hand, candidates who have experience applying credibility on Exam 5 (or to a lesser extent Exam 6) may find the theory on Exam 4/C more tractable.
- There is a great deal of thematic overlap among Exams 7, 8, and 9. Candidates may find their understanding of whichever one they study last enhanced by the material learned on the other two.

### **Requirements for Admission to Examination Center**

To be admitted into an examination center, each candidate must present a positive identification with a signature and a photograph (e.g., driver's license, passport, school or work ID, etc.). If a photo ID is not available, the candidate must present *two* forms of identification with a signature, with at least one form containing a physical description (height, weight, hair color, eye color, etc.). Each candidate will be required to sign in at the examination center. A candidate who does not present positive identification or who refuses or is unable to provide a matching signature will not be permitted to write the examination. For Exams 1/P, 2/FM, and 4/C, candidates also must present a valid letter of admission that will be sent with *Instructions to Candidates* from Preliminary Actuarial Examinations.

Candidates should arrive at the examination center at least 45 minutes before the examination is scheduled to begin. Candidates may not leave until two hours after the start of the examination. For Exams 3, 5-9, and the transitional VEE exams, candidates may not leave during the last 15 minutes of the examination.

### **Conduct of Examinations**

The examinations are recorded exclusively in writing (except for Exam 1/P when it is offered as a computer-based test). Except as is noted in the following paragraphs, no books, papers, typewriters, slide rules, or electronic or mechanical aids for computation of any kind may be brought into the examination room by candidates, nor may any candidate communicate with, or obtain any assistance from, any other candidate during the examination. Candidates must respond in English unless advance notice is given (see "Languages Other than English" on page 11). Examination answer sheets are not returned to candidates.

For Exams 3 and 5-9, a candidate wishing to obtain his or her own examination booklet and scrap paper subsequent to the examination must bring a self-addressed stamped envelope to the examination center. The recommended minimum postage is \$2.67 for domestic mail in the U.S. Approximately one week after all examinations have been completed, the examination and a *preliminary* list of multiple-choice answers for Exams 3 and 5-9 will be posted in the "Admissions" section of the CAS Web Site. Sample solutions for essay questions will not be available until they are published on July 31, 2006, for Spring Examinations and January 31, 2007, for Fall Examinations. [Note: VEE exams will not be returned to candidates and will not be published. The August 2005 VEE exams were published as sample exams.]

## Calculators

Electronic calculators will be allowed in the examination room for all examinations. Only the calculators listed below may be brought into the examination room. Books, papers, computers, or other electronic devices may not be brought into the examination room. Candidates may use the battery- or solar-powered models of the following Texas Instruments calculators:

- BA-35
- BA II Plus
- BA II Plus Professional
- TI-30Xa
- TI-30X II (IIS solar or IIB battery)

Candidates may use more than one of the approved calculators during the examination. **For those using the BA II Plus, BA II Plus Professional, or TI-30X II (IIS solar or IIB battery) models, candidates will be required to show examination proctors that the memory has been cleared prior to the start of the examination. For the BA II Plus and BA II Plus Professional, clearing will reset the calculator to the factory default settings.**

Calculator instructions cannot be brought into the examination room. During the examination, the calculator must be removed from its carrying case so the proctor can confirm it is an approved model. **Any unauthorized calculator brought to the examination center will be confiscated for the duration of the examination. Candidates using a calculator other than the approved models will be subject to examination disqualification and other disciplinary action.**

Candidates may purchase calculators from stores or directly from Texas Instruments: telephone: (800) 842-2737; Web site: [www.ti.com](http://www.ti.com).

**It is the candidate's responsibility to see that the calculator used during the examination is in good working order.** For CAS Exams 3, 5-9, supervisors will have a spare approved calculator available for a candidate whose calculator malfunctions. It is not to be distributed to a candidate without a calculator or whose unauthorized calculator has been confiscated.

## Examination Discipline

Candidates must not give or receive assistance of any kind during the examination. Any cheating, attempt to cheat, assisting others to cheat, participating therein, or engaging in such improper conduct as listed below is a serious violation and will result in the CAS disqualifying the candidate's paper and other disciplinary action as may be deemed appropriate. Candidates have agreed in their applications for examination to be bound by the rules and regulations governing the examinations.

Examples of improper conduct include but are not limited to:

1. Gaining access to examination questions before the examination or aiding someone else to do so.
2. Using an unauthorized calculator (as defined in the *Syllabus*) or other mechanical aid that is not permitted.
3. Looking in the examination book before the instruction to begin is given.
4. Marking or otherwise writing on the examination book or answer sheet before the instruction to begin is given.
5. Making any changes, additions, deletions, or otherwise marking, erasing, or writing on the examination book or answer sheet after the time for the examination has expired.
6. Having access to or consulting notes or books during the examination.
7. Looking at or copying from another candidate's paper.
8. Enabling another candidate to copy from one's paper.
9. Talking or otherwise communicating with another candidate during the examination.

10. Disturbing other candidates during the examination.
11. Consulting other persons outside the examination room during the examination.
12. Copying questions, answers, or answer choices to take from the examination room.
13. Taking an examination book from the examination room.
14. Taking an examination for another candidate.
15. Arranging to have another person take an examination for the candidate.
16. Threatening or physically or verbally abusing a supervisor or proctor responsible for curbing or reporting improper conduct.
17. Disclosing the contents of an examination to any other person prior to the examination's release.  
For CAS Exams 3 and 5-9, this would generally apply to the day when the examination is administered.
18. Presenting false information on an examination application.
19. Failing to remain in the examination room for a minimum of two hours during the examination [for examinations with this requirement].
20. Failing to follow other examination instructions.

The CAS Examination Committee, or its designee, will investigate any irregularity or suspected violation of the rules involving the examination process, and a determination will be made regarding the matter. Where there is a determination to invoke a penalty, the candidate is advised by letter. In the case of a candidate who is a member of the CAS, the candidate's conduct will be reported to the Actuarial Board for Counseling and Discipline (ABCD) or to the Canadian Institute of Actuaries (CIA) if the final penalty invoked is more than disqualification of the examination.

Candidates for the CAS Examinations are expected to follow the rules and procedures included in this *Syllabus*, the *Notice of Examinations*, and the "Instructions to Candidates" printed on their examination booklets as well as announcements made by the supervisors at the examination locations. All candidates, on their applications for examinations, are required to read and sign the following statement: "I have read the rules and regulations concerning the examination(s) for which I am applying and agree to be bound by them. I have read the CAS Code of Professional Conduct and agree to abide by it. I also agree that the results of any examination(s) which I take, and any action taken as a result of my conduct may, at the sole discretion of the Casualty Actuarial Society [and/or the Society of Actuaries for jointly administered exams], be disclosed to any other bona fide actuarial organization that has a legitimate interest in such results and/or actions."

The CAS may, at its sole discretion, disclose to any other bona fide actuarial organization having a legitimate interest, information on the identity of candidates determined to have committed a serious examination violation (those for which the penalty is greater than the simple disqualification/nullification of the examination), and the specific penalties imposed on those candidates.

If an actuarial organization with which the CAS has a working relationship (such as the Society of Actuaries) invokes a penalty against a candidate for improper conduct during an examination for which the CAS is not a joint sponsor, the CAS will invoke the same penalty for all CAS-sponsored examinations. If the CAS takes any disciplinary action, it will notify the other actuarial organizations of that action.

These standards may seem stricter than those which candidates are accustomed to in other examination environments. The CAS maintains these strict standards because the examinations are such a significant part of a candidate's career. Therefore, the equitable administration of the examinations and enforcement of the highest standards of conduct cannot be emphasized too strongly.

Candidates may obtain a copy of the full CAS Policy on Examination Discipline by sending a written request to the CAS Office.

## **Computer-Based Testing Rules**

The Policy on Examination Discipline is the same for those taking exams by computer-based testing or in the traditional paper-and-pencil format. There are some unique rules for the CBT administration (available in the “Admissions” section of the CAS Web Site with other CBT details). If there is a discrepancy between specific rules for the traditional paper-and-pencil exam administration and computer-based testing, the computer-based testing rules will govern.

## **Multiple-Choice Questions**

Exams 1-4 and the transitional VEE exams consist entirely of multiple-choice questions; other CAS examinations may have a section of multiple-choice questions. Each multiple-choice problem includes five answer choices identified by the letters A, B, C, D, and E, only one of which is correct. For the computer-based testing format of Exam 1/P, candidates should click on the appropriate answer. For all other exam, a separate answer sheet provides a row of five ovals for each problem, identified with the letters A, B, C, D, and E, corresponding to the five answer choices. After deciding which answer is correct, candidates should blacken the oval that has the same letter as the appropriate answer. Since the answer sheets are scored by optical scanning equipment, a Number 2 pencil must be used to blacken the ovals. It is important that only one oval be blackened for each question.

## **Guessing Adjustment**

For Exams 1/P, 2/FM, and 4/C, as well as the transitional VEE exams, no guessing adjustment is made to candidates’ scores. Therefore, candidates will maximize their scores on these examinations by answering every question. On Exams 3 and 5-9, multiple-choice questions are scored in such a way that there is no advantage or disadvantage to be anticipated from guessing answers in a purely random fashion as compared with omitting the answers entirely. No additional points will be given for multiple-choice questions left blank, but one-quarter of the point value for each question will be deducted for each incorrect answer.

## **Lost Examinations**

The CAS is not responsible for lost or destroyed examinations. In the case where an examination is lost or destroyed, the examination fee will be refunded. The CAS and other organizations that jointly administer and/or jointly sponsor CAS Examinations will assume no other obligation and candidates must take the examinations with this knowledge. The only exception to this policy is for multiple-choice Exams 2/FM and 4/C. Whenever reasonably possible, Preliminary Actuarial Examinations will make use of a candidate’s examination book to reconstruct the answers selected by the candidate. Therefore, candidates may want to circle or otherwise clearly indicate their answer choices in the examination books. However, additional time in the examination period will not be given for candidates to do this. If a candidate receives a passing grade as a result of the review of the examination book, the examination fee will not be refunded.



# Grades and Accreditation

*The actual grading process is fairly similar for both the jointly administered Exams 1/P, 2/FM, and 4/C and CAS-specific Exams 3 and 5-9. The following provides details about CAS-specific Exams 5-9.*

## CAS Examination Processing

Examination papers are sent to the CAS Office upon completion of the examination. The CAS Office prepares the examinations for the grading process. Approximately one week after all examinations have been completed, the examination and a preliminary list of multiple-choice answers will be posted in the “Admissions” section of the CAS Web Site ([www.casact.org](http://www.casact.org)). This is intended to assist candidates and the Examination Committee in determining whether they believe a question is ambiguous or defective.

## Defective Questions

Occasionally, through error or because of varying interpretations, a question on an examination is found to be ambiguous or defective. If a candidate believes a question is ambiguous or defective, he or she should bring this to the attention of the Examination Committee in writing within two weeks after the examination date. The candidate must mail or fax this letter to Preliminary Actuarial Examinations for Exams 1/P, 2/FM, and 4/C, or to the CAS Office for Exams 3, 5-9, and the transitional VEE exams. The letter should include detailed reasons why the question is believed to be ambiguous or defective. In addition, statistics are calculated on each problem to see how well the candidates answered the question. The statistics can indicate that a question may be faulty and the question will be reviewed even without a candidate writing.

The CAS Examination Committee or Preliminary Actuarial Examinations will investigate all questions brought to their attention in this manner. Correspondence that does not reach these organizations within two weeks will not be considered in the grading process.

Any multiple-choice question found to be defective is carefully examined to determine the most reasonable way to correct the situation. In some cases, the question is discarded, leaving scores and rankings as they would have been if the defective question had not been asked. In other cases, more than one answer for a multiple-choice question is given credit for being correct.

## Grading of Examinations: A Timeline

### *Week 1*

After the examinations are administered, proctors return the packages to the CAS Office. Staff members log in each exam. Signatures are verified and the candidate numbers are checked against the proctor’s report. As each envelope is opened the candidate’s number must be checked against the number on the short answer card (both the written number and the coded number) and on all of the essay sheets. The short answer cards are prepared for scanning and the essay sheets for all the candidates must be sorted so that individual questions can be photocopied for the graders.

### *Week 2*

Essay questions are sent to a printer for photocopying. Short answer cards are scanned twice and output is compared to ensure accuracy. Random checks are made of each series of cards to make sure the scanner is working properly. When the essays return from the printer, the copies are packaged and sent to the individual graders. Any comments on ambiguous or defective questions are forwarded to the graders, exam part chair, and the general officer of the exam series for review.

#### *Weeks 3 and 4*

Committee members review candidate comments about possibly defective questions and decide how they will be handled in the grading process. Discussions on the best course of action are often a very time-consuming part of the grading process.

Each essay question on the exam is sent to two graders. Each grader is given two to four questions to grade. There can be 300 to 700 answer sheets for each grader to evaluate. A suggested answer key exists for each question, but alternative solutions may be correct, and the grader must be open to different approaches to a problem. About two dozen responses are graded and then the results are compared. The grading partners will establish a consistent grading scale and then evaluate the solution key. Consistency and accuracy are the most important factors in grading the questions. After looking at hundreds of papers, it is possible that a grader could slightly shift focus (either harder or easier). To minimize the chance of this happening the graders will begin grading at different points on the candidate list, then when the two grades are compared any significant differences will be checked. Each grader prepares a computer file with each candidate's number and the score for each question.

#### *Week 5*

The part chair holds the grading session with the graders. The first step is running the data through a standard grading program, verifying the data, and noting any significant discrepancies. For each candidate and each question the scores of each grading partner must be within a prescribed tolerance. If the scores do not fall within this tolerance the partners must discuss the candidate's answer sheet and come up with a decision on what the point value should be. When all the questions have been reconciled to the required tolerance, the scores are totaled and a tentative pass score is selected based on various statistics and guidelines.

This triggers the second round of reconciliation. Any candidates who have scores within a certain number of points from the tentative pass score will have all of their answers reconciled completely. This gives an exact score for any candidate near the passing score. The scores for any candidates who are close to passing will be checked manually as well. The committee will then look at the statistics one more time and make a final recommendation for the passing score.

#### *Weeks 6 and 7*

After the grading session, the part chair will submit a report to the general officer of the exam series and the Examination Committee chairperson. In the report, the part chair recommends a passing score, gives a detailed analysis of the exam, and notes any unusual questions or situations that required special handling. The chairperson and general officer hold a teleconference with the vice president–admissions to discuss all of the exams from the series and to finalize the passing scores.

#### *Week 8*

After the passing score has been approved by the vice president–admissions, the data is verified and released to the CAS Office to update each candidate's record, post a list of passing candidate numbers on the CAS Web Site, and print and mail the grade reports.

## **Determination of the Pass Mark**

According to CAS policy, the overriding goal in setting the examination pass marks is to pass all candidates who, in the opinion of the CAS, have demonstrated by their exam responses a sufficient grasp of the syllabus material and to fail those candidates who have not. No predetermined pass ratio will be used for setting the pass mark. As part of the input to the pass mark determination process, a panel of experts in the subject material is convened to review the examination. Each expert is asked to review each question in the examination, and assess the difficulty of that question. More specifically, the panelist is asked to estimate the amount of credit that a candidate with minimum adequate knowledge competency would receive for the question. This information, averaged across the panel of experts, gives a preliminary estimate of the pass mark. Because the level of difficulty for each examination may vary from year to year, each Part Committee collects extensive data to ascertain the level of difficulty of its

examination. The Part Committee compares the performance of the present year's candidates to the performance of candidates from prior years. Appropriate recognition is given to any peculiarities that may appear in connection with the answers to any question on an examination despite all the care taken in setting the examination questions.

After this, the pass mark is set consistent with the above goal. The examination part chairperson presents the recommended pass mark with the supporting data to the general officer who oversees that examination part, the Examination Committee chairperson, and the vice president-admissions. The final decision on the pass mark is the responsibility of the vice president-admissions.

With the use of content-based pass marks, a fluctuation from session to session is expected. Although the percentage of candidates passing will vary from year to year, those candidates demonstrating the required level of competence with the material will pass.

After the pass mark is finalized, each candidate is assigned a score. Scores of 0 to 5 are assigned to candidates who do not pass. On this scale, each interval is 10 percent of the pass mark. For example, a grade of 5 means failing with a mark of at least 90 percent, but less than 100 percent, of the pass mark. A grade of 0 means that the candidate's score is less than 50 percent of the pass mark. Candidates at or above the passing mark receive a grade of Pass.

The CAS releases the pass score information for Exams 3 and 5-9 after the appeal deadline for the exam session has passed. It is posted in the "Admissions" section of the CAS Web Site ([www.casact.org](http://www.casact.org)). The purpose of releasing the pass scores is to help candidates prepare for future exam sittings. The 75th and 95th percentile scores are also released for each exam. These two key statistics indicate the performance level achieved by the better prepared candidates on the exam. Raw scores are not provided to candidates.

## **Examination Results**

Examination results are available approximately eight weeks after the examination date. After exam results are received at the CAS Office, a list of passing candidate ID numbers will be posted in the "Admissions" section of the CAS Web Site ([www.casact.org](http://www.casact.org)) between 3:00 and 3:30 p.m. Eastern time. Individual statements of examination results generally are mailed to candidates on the day that they are posted on the CAS Web Site.

For Exams 3, 5-9, and transitional VEE exams, passing candidates are informed that they passed the exam, but they are not given a numeric score. Candidates with scores of 0 to 5 are informed of the score. Several weeks later, a list of the names of all passing candidates is posted on the CAS Web Site. Requests for reprints of individual grade reports will be accepted starting two weeks after the date that results were released.

To preserve candidate confidentiality, in the event of a lost or misplaced candidate ID number, the candidate ID number will be mailed to the candidate upon request. Under no circumstance will a candidate number be given over the telephone.

## **Analyses for Exams 3 and 5-9**

Candidates for Exams 3 and 5-9 who did not pass will automatically be sent an analysis of their examination with the grade notification. The analysis of an examination is computer-generated. Actual points received for multiple-choice questions will be displayed. For essay questions, ranges will be given for both the actual score and how the actual score relates to the mean of all candidates. This information is intended to provide the educational guidance that most candidates desire. Candidates who did not pass an exam may request a reprint of their exam analysis before the appeals deadline.

## Appeals for Exams 3, 5-9, and Transitional VEE Exams

### *Multiple-Choice Questions*

If a candidate believes that a multiple-choice question is ambiguous or defective, he or she should bring this to the attention of the Examination Committee in writing within two weeks after the examination date. In order to aid the candidate, preliminary answer keys for multiple-choice questions will be available the week following the examinations. The candidate may submit comments to the CAS Office by mail, fax, or e-mail. The correspondence should include detailed reasons why the question is believed to be ambiguous or defective. (In addition to candidate comments, statistics are calculated on each problem to see how well the candidates answered the question. The statistics can indicate that a question may be faulty and the question will be reviewed even without a candidate writing.) The CAS Examination Committee will investigate all questions brought to its attention in writing. To be considered in the grading process, correspondence must reach the CAS Office by the following deadlines:

- For Winter VEE Exams                      March 2, 2006
- For Spring Exams                              May 12, 2006
- For Summer VEE Exams                      August 23, 2006
- For Fall Exams                                  November 16, 2006

No appeals based on ambiguous or defective questions will be considered after these deadlines. After grades are released, the only appeal permitted on multiple-choice questions will be to request an administrative check of the candidate's short answer card to verify that the card reader scanned the card correctly and that the output file reflected this data. This request must be made within three weeks after the release of grades.

### *Essay Questions*

Once candidates have received an analysis of their exam, they may appeal their grade. Only candidates with valid appeals will be considered. Sample answers to essay questions will be available on July 31, 2006, for Spring Examinations, and January 31, 2007, for Fall Examinations. The sample essay answers are actual responses that have received credit and are illustrative of successful answers, although they may not be considered perfect answers.

If the candidate believes that the sample essay answer is incorrect or there is an alternative correct solution, the candidate must provide specific information on why his or her solution is correct. With specific information, the Examination Committee can research the answer properly and reply to the candidate. An example of an invalid appeal would be the following: "I am appealing my score of 5 on Exam 9, please recheck my examination." Another example of an invalid appeal would be: "On question number 2, I believe I should get full credit because I answered the following . . ."

Appeals must reach the CAS Office not later than August 31, 2006, for Spring Examinations and February 28, 2007, for Fall Examinations. When a valid appeal is received, it is reviewed by the part chairperson and a recommendation is made to the Examination Committee chairperson. The Examination Committee chairperson will respond based on the recommendation of the part chairperson.

## Confidentiality of Examination Records

The fact that a candidate has passed a particular examination is considered public knowledge. Any further information as to examinations taken by candidates and scores received by candidates is available only to the candidates themselves, to Examination Committee officials if required for committee purposes, and to the CAS Office, unless the candidate requests in writing that such information be provided to someone else. However, if any action is taken against a candidate as a result of his or her conduct (as described in the section on Examination Discipline), the Casualty Actuarial Society, at its sole discretion, may disclose such information to any other bona fide actuarial organization that has a legitimate interest in such results and/or actions.

## Transition Programs

The CAS generally reviews and makes revisions in the study material on an annual basis. Occasionally, a major topic will be added to or deleted from the study material. A major topic is defined as a series of readings comprising a segment of an examination. When a major topic is deleted from the recommended study material, the Syllabus Committee will determine if a transition program is appropriate. A transition program generally will be appropriate when candidates are in a position to lose credit for a segment of an examination.

A transition program usually will provide candidates with at least two opportunities to complete the requirements for that examination. The completion of the requirements will result in the achievement of credit for that entire examination. The failure to fulfill the requirements for that complete examination could result in the expiration of credit for that deleted topic at the end of the transition period. The CAS Board of Directors must approve any transition program.

The CAS Board of Directors approved the following transition rules for the revised preliminary education structure that was implemented in January 2005:

<b>Credit in 2004</b>	<b>Credit In New System Implemented In 2005</b>
Exam 1	Exam 1
Exam 2	Exam 2, VEE-Economics, VEE-Corporate Finance
Exam 3	Exam 3
Exam 4	Exam 4, VEE-Applied Statistical Methods

The following transition rules will also apply for candidates with **unused** credit from exams administered prior to 2000:

<b>Pre-2000 Credit</b>	<b>Credit In New System Implemented In 2005</b>
Exam 3A	VEE-Applied Statistical Methods
Exam 4A	Exam 2
Exam 4B	Exam 4
Exam 5A	VEE-Economics
Exam 5B	VEE-Corporate Finance

## CAS Course on Professionalism

The CAS Course on Professionalism is designed to present candidates with real situations that contain ethical and professional issues for the actuary. Volunteer members of the CAS facilitate small group discussions of actual case studies. Although grades are not given for the Course on Professionalism, candidates must actively participate in order to receive credit. Successful completion of this course is required before a candidate can become a member of the Casualty Actuarial Society. Candidates are urged to register for this course when they have passed five or more CAS Examinations. A candidate must have passed five Associateship examinations and have credit for all three VEE requirements to be eligible to take the Course on Professionalism. (Transitional VEE exams are *not* included in the count of exams for eligibility to take the Course.)

Dates for the CAS Course on Professionalism will be posted in the "Admissions" section of the CAS Web Site ([www.casact.org](http://www.casact.org)). Registered candidates will receive a study book of required readings before the start of the course. Each course is limited to 60 participants; early registration is recommended. Facility information and course times will be provided upon registration.

## **CAS Membership Requirements**

### ***Associateship***

Candidates for Associateship in the Casualty Actuarial Society must fulfill the examination requirements by successful completion of, or credit for, Exams 1-7, and have credit by Validation by Educational Experience (VEE) for the required topics of economics, corporate finance, and applied statistical methods. Exam 7 is nation specific, covering U.S- or Canadian-specific material, and passage of either of the two examinations fulfills the completion requirements. Candidates must complete the CAS Course on Professionalism prior to admission to the CAS.

After completing the prescribed requirements, all prospective Associate members must make formal application to the Casualty Actuarial Society. The CAS Office will mail application materials to these candidates, including instructions for obtaining letters of reference from two CAS members. Obtaining the two letters of reference is the prospective Associate's responsibility. If no members of the CAS are familiar with the prospective Associate and his or her work history, references from members of the American Academy of Actuaries, the Canadian Institute of Actuaries, the Society of Actuaries, or senior executives where the candidate is employed may be substituted. For further information on alternative acceptable references, please contact the CAS Office. An application for membership will not be processed without these references.

After all requirements are met and application is made, each candidate is voted on by the CAS Executive Council. Upon approval of the CAS Executive Council, the candidate will be admitted as an Associate of the Casualty Actuarial Society (ACAS). Candidates approved by the Executive Council will be notified by letter from the CAS president. Members may indicate their designation as an Associate of the Casualty Actuarial Society by using the initials "A.C.A.S." after their names only after they have received official notification of acceptance as an Associate from the CAS.

### ***Fellowship***

In addition to fulfilling all the requirements of Associateship, successful completion of, or credit for, all nine examinations is required to fulfill the examination requirements for Fellowship and to be designated as a Fellow of the Casualty Actuarial Society (FCAS). Candidates who are admitted to the CAS as Fellows rather than Associates may indicate their designation as a Fellow of the Casualty Actuarial Society by using the initials "F.C.A.S." after their names only after they have received official notification of acceptance as a Fellow from the CAS. Associates who complete their Fellowship requirements may use the "F.C.A.S." designation immediately following official notification of successful completion of all the Fellowship requirements as prescribed by the Board of Directors.

## **Waiver of Examinations**

Waiver of individual examination requirements will be granted by the CAS Board of Directors in instances where an applicant has passed or received credit for examinations sponsored by another recognized actuarial organization that cover equivalent material in both subject and depth. The granting of waivers by the Board will be based on the recommendation of the vice president-admissions. The vice president-admissions' recommendation will be guided by the policy established by the CAS Education Policy Committee.

The CAS generally will not grant waiver of all or any portion of its examination requirements for either work experience, contribution to actuarial literature, academic courses of study, or examinations of non-actuarial organizations. Individuals who claim competence in the areas covered by the examinations should not have difficulty demonstrating their competence by participating in the examination process.

In Fall 2003, the CAS began to offer its own version of Exam 3. The CAS will grant credit for CAS Exam 3 to those who successfully complete SOA Exam M in the current education and examination structure.

The CAS recognizes the examinations sponsored by the Faculty of Actuaries (Scotland) and the Institute of Actuaries (United Kingdom), and the Institute of Actuaries of Australia. Credit will be granted for examinations passed or waived in accordance with examination equivalencies between the CAS syllabus and the syllabi of each of the three aforementioned actuarial organizations. The CAS will not grant credit for examinations waived on account of academic records achieved in North American universities, nor for credit granted to candidates not qualifying directly in obtaining membership through the normal qualification/examination process. Credit will not be given to Fellows of the Faculty or Institutes who have attained their designation through mutual recognition rather than through the standard Faculty or Institutes credentialing process. Fellows by mutual recognition should pursue examination waivers based on their original credentials.

The following waiver policy has been approved by the CAS Board of Directors:

<b>Faculty or Institute Subject</b>	<b>Waiver Granted for CAS Exam/Experience</b>
CT1	Exam 2/FM
CT2	VEE-Corporate Finance
CT3	Exam 1/P
CT3, CT4, CT5, and CT6	Exams 3, 4/C, and VEE-Applied Statistical Methods
CT7	VEE-Economics

Candidates requesting a waiver of an examination requirement should present their request to the vice president-admissions with appropriate evidence that demonstrates the passing of (or score on) the actuarial examination equivalent for which a waiver is requested. The vice president-admissions will review all such requests and recommend action to the CAS Board of Directors.

Please address all waiver requests to:

Vice President-Admissions  
Casualty Actuarial Society  
4350 N. Fairfax Drive, Suite 250  
Arlington, Virginia 22203

Waivers are considered on a case-by-case basis for examination equivalents of actuarial organizations not named above. Candidates must present their requests to the vice president-admissions and include with their applications documented evidence that demonstrates the asserted equivalence, as well as the appropriate educational policy material of their local actuarial organizations. If such material is not included, the vice president-admissions will request it from the candidates. The vice president-admissions will forward the request to the Education Policy Committee for a determination of whether sufficient equivalence exists to permit granting any examination waiver.

# CAS Code of Professional Conduct

## Requirement

The CAS requires candidates taking CAS-specific examinations (i.e., Exams 3, 5-9) to abide by the CAS Code of Professional Conduct. By signing the examination application form, candidates agree that they have read and will agree to abide by the following Code. The current Code was amended November 12, 2000 and became effective January 1, 2001.

## CAS Code of Professional Conduct

*As Amended November 12, 2000; Effective January 1, 2001*

The purpose of this Code of Professional Conduct (“Code”) is to require Actuaries to adhere to the high standards of conduct, practice, and qualifications of the actuarial profession, thereby supporting the actuarial profession in fulfilling its responsibility to the public. An Actuary shall comply with the Code. An Actuary who commits a material violation of the provisions of the Code shall be subject to the profession’s counseling and discipline procedures.

The Precepts of the Code identify the professional and ethical standards with which an Actuary must comply in order to fulfill the Actuary’s responsibility to the public and to the actuarial profession. The Annotations provide additional explanatory, educational, and advisory material on how the Precepts are to be interpreted and applied.

In addition to this Code, an Actuary is subject to applicable rules of professional conduct or ethical standards that have been promulgated by a Recognized Actuarial Organization for the jurisdictions in which the Actuary renders Actuarial Services. Actuarial Services are considered to be rendered in the jurisdictions in which the Actuary intends them to be used unless specified otherwise by an agreement between a Recognized Actuarial Organization for any such jurisdiction and the organizations that have adopted the Code.

Laws may also impose obligations upon an Actuary. Where requirements of Law conflict with the Code, the requirements of Law shall take precedence.

An Actuary must be familiar with, and keep current with, not only the Code, but also applicable Law and rules of professional conduct for the jurisdictions in which the Actuary renders Actuarial Services. An Actuary is responsible for securing translations of such Laws or rules of conduct as may be necessary.

### *Definitions*

As used throughout the Code, the following terms are capitalized and have the meanings indicated:

**Actuarial Communication:** A written, electronic, or oral communication issued by an Actuary with respect to Actuarial Services.

**Actuarial Services:** Professional Services provided to a Principal by an individual acting in the capacity of an actuary. Such services include the rendering of advice, recommendations, findings, or opinions based upon actuarial considerations.

**Actuary:** An individual who has been admitted to a class of membership to which the Code applies by action of any organization having adopted the Code. When the term “actuary” is used without being capitalized, it refers to any individual practicing as an actuary, regardless of organizational membership or classification.

**Confidential Information:** Information not in the public domain of which an Actuary becomes aware as a result of providing Actuarial Services to a Principal. It includes information of a proprietary nature and information that is legally restricted from circulation.

**Law:** Statutes, regulations, judicial decisions, and other statements having legally binding authority.



**Principal:** A client or employer of the Actuary.

**Recognized Actuarial Organization:** An organization that has been accepted for full membership in the International Actuarial Association or a standards setting, counseling, or discipline body to which authority has been delegated by such an organization.

### ***Professional Integrity***

**PRECEPT 1.** An Actuary shall act honestly, with integrity and competence, and in a manner to fulfill the profession's responsibility to the public and to uphold the reputation of the actuarial profession.

ANNOTATION 1-1. An Actuary shall perform Actuarial Services with skill and care.

ANNOTATION 1-2. An Actuary shall not provide Actuarial Services for any Principal if the Actuary has reason to believe that such services may be used to violate or evade the Law or in a manner that would be detrimental to the reputation of the actuarial profession.

ANNOTATION 1-3. An Actuary shall not use a relationship with a third party or with a present or prospective Principal to attempt to obtain illegal or materially improper treatment from one such party on behalf of the other party.

ANNOTATION 1-4. An Actuary shall not engage in any professional conduct involving dishonesty, fraud, deceit, or misrepresentation or commit any act that reflects adversely on the actuarial profession.

### ***Qualification Standards***

**PRECEPT 2.** An Actuary shall perform Actuarial Services only when the Actuary is qualified to do so on the basis of basic and continuing education and experience and only when the Actuary satisfies applicable qualification standards.

ANNOTATION 2-1. It is the professional responsibility of an Actuary to observe applicable qualification standards that have been promulgated by a Recognized Actuarial Organization for the jurisdictions in which the Actuary renders Actuarial Services and to keep current regarding changes in these standards.

ANNOTATION 2-2. The absence of applicable qualification standards for a particular type of assignment or for the jurisdictions in which an Actuary renders Actuarial Services does not relieve the Actuary of the responsibility to perform such Actuarial Services only when qualified to do so in accordance with this Precept.

### ***Standards of Practice***

**PRECEPT 3.** An Actuary shall ensure that Actuarial Services performed by or under the direction of the Actuary satisfy applicable standards of practice.

ANNOTATION 3-1. It is the professional responsibility of an Actuary to observe applicable standards of practice that have been promulgated by a Recognized Actuarial Organization for the jurisdictions in which the Actuary renders Actuarial Services and to keep current regarding changes in these standards.

ANNOTATION 3-2. Where a question arises with regard to the applicability of a standard of practice, or where no applicable standard exists, an Actuary shall utilize professional judgment, taking into account generally accepted actuarial principles and practices.

ANNOTATION 3-3. When an Actuary uses procedures that depart materially from those set forth in an applicable standard of practice, the Actuary must be prepared to justify the use of such procedures.

### ***Communications and Disclosure***

**PRECEPT 4.** An Actuary who issues an Actuarial Communication shall take appropriate steps to ensure that the Actuarial Communication is clear and appropriate to the circumstances and its intended audience and satisfies applicable standards of practice.

ANNOTATION 4-1. An Actuary who issues an Actuarial Communication shall ensure that the Actuarial Communication clearly identifies the Actuary as being responsible for it.

ANNOTATION 4-2. An Actuary who issues an Actuarial Communication should indicate the extent to which the Actuary or other sources are available to provide supplementary information and explanation.

**PRECEPT 5.** An Actuary who issues an Actuarial Communication shall, as appropriate, identify the Principal(s) for whom the Actuarial Communication is issued and describe the capacity in which the Actuary serves.

**PRECEPT 6.** An Actuary shall make appropriate and timely disclosure to a present or prospective Principal of the sources of all direct and indirect material compensation that the Actuary or the Actuary's firm has received, or may receive, from another party in relation to an assignment for which the Actuary has provided, or will provide, Actuarial Services for that Principal. The disclosure of sources of material compensation that the Actuary's firm has received, or may receive, is limited to those sources known to, or reasonably ascertainable by, the Actuary.

ANNOTATION 6-1. An Actuary who is not financially and organizationally independent concerning any matter related to the performance of Actuarial Services should disclose to the Principal any pertinent relationship that is not apparent.

ANNOTATION 6-2. An Actuary employed by a firm that operates in multiple locations is subject to the requirement of disclosure of sources of compensation that the Actuary's firm may receive in relation to Actuarial Services with respect to a specific assignment for that Principal, regardless of the location in which such compensation is received.

### ***Conflict of Interest***

**PRECEPT 7.** An Actuary shall not knowingly perform Actuarial Services involving an actual or potential conflict of interest unless:

- (a) the Actuary's ability to act fairly is unimpaired;
- (b) there has been disclosure of the conflict to all present and known prospective Principals whose interests would be affected by the conflict; and
- (c) all such Principals have expressly agreed to the performance of the Actuarial Services by the Actuary.

### ***Control of Work Product***

**PRECEPT 8.** An Actuary who performs Actuarial Services shall take reasonable steps to ensure that such services are not used to mislead other parties.

ANNOTATION 8-1. An Actuarial Communication prepared by an Actuary may be used by another party in a way that may influence the actions of a third party. The Actuary should recognize the risks of misquotation, misinterpretation, or other misuse of the Actuarial Communication and should therefore take reasonable steps to present the Actuarial Communication clearly and fairly and to include, as appropriate, limitations on the distribution and utilization of the Actuarial Communication.

### ***Confidentiality***

**PRECEPT 9.** An Actuary shall not disclose to another party any Confidential Information unless authorized to do so by the Principal or required to do so by Law.

### ***Courtesy and Cooperation***

**PRECEPT 10.** An Actuary shall perform Actuarial Services with courtesy and professional respect and shall cooperate with others in the Principal's interest.

ANNOTATION 10-1. Differences of opinion among actuaries may arise, particularly in choices of assumptions and methods. Discussions of such differences between an Actuary and another actuary, or in observations made by an Actuary to a Principal on the work of another actuary, should be conducted objectively and with courtesy and respect.

ANNOTATION 10-2. A Principal has an indisputable right to choose a professional advisor. An Actuary may provide service to any Principal who requests it, even though such Principal is being or has been served by another actuary in the same matter.

ANNOTATION 10-3. An Actuary in the course of an engagement or employment may encounter a situation such that the best interest of the Principal would be served by the Actuary's setting out an alternative opinion to one expressed by another actuary, together with an explanation of the factors that lend support to the alternative opinion. Nothing in the Code should be construed as preventing the Actuary from expressing such an alternative opinion to the Principal.

ANNOTATION 10-4. An Actuary may be requested to advise a Principal for whom the Actuary knows or has reasonable grounds to believe that another actuary has provided, or is providing, Actuarial Services with respect to the same matter. In such event, the Actuary may choose to consult with such other actuary both to prepare adequately for the assignment and to make an informed judgment as to whether there are circumstances involving a potential violation of the Code that might affect acceptance of the assignment. The Actuary should request the Principal's consent prior to such consultation.

ANNOTATION 10-5. When a Principal has given consent for a new or additional actuary to consult with an Actuary with respect to a matter for which the Actuary is providing or has provided Actuarial Services, the Actuary shall cooperate in furnishing relevant information, subject to receiving reasonable compensation for the work required to assemble and transmit pertinent data and documents. The Actuary shall not refuse to consult or cooperate with the prospective new or additional actuary based upon unresolved compensation issues with the Principal unless such refusal is in accordance with a pre-existing agreement with the Principal. The Actuary need not provide any items of a proprietary nature, such as internal communications or computer programs.

### ***Advertising***

**PRECEPT 11.** An Actuary shall not engage in any advertising or business solicitation activities with respect to Actuarial Services that the Actuary knows or should know are false or misleading.

ANNOTATION 11-1. Advertising and business solicitation activities encompass all communications by whatever medium, including oral communications, that may directly or indirectly influence any person or organization in deciding whether there is a need for Actuarial Services or in selecting a specific Actuary or firm to perform Actuarial Services.

### ***Titles and Designations***

**PRECEPT 12.** An Actuary shall make use of membership titles and designations of a Recognized Actuarial Organization only in a manner that conforms to the practices authorized by that organization.

ANNOTATION 12-1. "Title" refers to any title conferred by a Recognized Actuarial Organization related to a specific position within that organization. "Designation" refers to a specific reference to membership status within such organization.

### ***Violations of the Code of Professional Conduct***

**PRECEPT 13.** An Actuary with knowledge of an apparent, unresolved, material violation of the Code by another Actuary should consider discussing the situation with the other Actuary and attempt to resolve the apparent violation. If such discussion is not attempted or is not successful, the Actuary shall disclose such violation to the appropriate counseling and discipline body of the profession, except where the disclosure would be contrary to Law or would divulge Confidential Information.

ANNOTATION 13-1. A violation of the Code is deemed to be material if it is important or affects the outcome of a situation, as opposed to a violation that is trivial, does not affect an outcome, or is one merely of form.

ANNOTATION 13-2. An Actuary is not expected to discuss an apparent, unresolved material violation of the Code with the other Actuary if either Actuary is prohibited by Law from doing so or is acting in an adversarial environment involving the other Actuary.

**PRECEPT 14.** An Actuary shall respond promptly, truthfully, and fully to any request for information by, and cooperate fully with, an appropriate counseling and disciplinary body of the profession in connection with any disciplinary, counseling or other proceeding of such body relating to the Code. The Actuary's responsibility to respond shall be subject to applicable restrictions on Confidential Information and those imposed by Law.

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# HINTS ON STUDY AND EXAM TECHNIQUES

*Editor's Note: These hints do not include any material on which candidates will be examined, but are provided by members of the CAS Syllabus and Examination Committees to encourage candidates to do their best when sitting for CAS Examinations.*

*"Hints On Study and Exam Techniques" is largely based on the experience and advice of others and was originally prepared for Society of Actuaries candidates by James L. Clare. Later, it was adapted by G.D. Morison for use by CAS candidates and was updated in 1992. The CAS will be glad to consider incorporating further comments and suggestions periodically. If you have any changes to suggest, please send them to the CAS Office.*

## Motivation

Motivation is the single most important ingredient in learning—and in passing examinations. Motivation suffers when candidates worry about or are preoccupied with personal matters or other problems. This suggests that candidates should keep studying and examination taking at the very top of their lists of priorities, and should always have a constructive attitude about their studying. In particular, candidates should approach the examination as an opportunity to enhance their knowledge and understanding of actuarial science, rather than as an obstacle in their paths to membership in the CAS.

Motivation is increased by incentives, such as the following:

- Passing actuarial examinations requires many hours of study—more for some people and less for others—but often more than many candidates realize. Putting in enough hours can actually save a candidate time. Suppose, for example, that mastering the syllabus for one examination will take a candidate 400 study hours, and that one candidate only puts in 300 hours and fails the examination the first time. He or she then puts in a second 300 hours and passes the examination the second time. That candidate will have spent 600 hours, when by studying 400 hours the first time around, he or she would have saved 200 hours, not to mention passing one year sooner. It is recommended that candidates decide for themselves how many hours they really need to study, and then do that much studying—the first time around.
- Candidates can increase their motivation level by regarding the examinations as a stepping stone to greater responsibility at their places of employment, to opportunities for getting more done on their own, and to greater results and rewards from their work.
- Candidates can also increase their motivation through sufficiently intensive and sustained study so that they come to appreciate more fully the fascination of the various subjects, and the interrelationship between them.

A number of doctors, educators, executives, and personnel people all agree that motivation can be greatly increased by having a goal in mind. Candidates must determine their goals and keep them in mind.

## Techniques

It has been proven many times in various countries, both by individuals and by controlled groups, that improved study and examination techniques can strengthen a candidate's mastery of a subject and increase his or her examination scores significantly. Provided that the candidate is motivated and spends enough time studying, techniques such as those given here may often make the difference between failing or passing an examination.

Each person has his or her own strengths and weaknesses, so candidates are advised to work out their own personal sets of techniques which will work best for them. What follows is merely a set of suggestions to help candidates in getting started in building up their own techniques.

## The Challenge

It is easy to underestimate the effort that is required because substantial changes may be needed to switch from college or university life to successful study of actuarial examinations.

University courses often stress understanding, and usually do much to smooth the path for the student with lectures, personal contacts, organized places of study, and a focus on learning.

By contrast, actuarial candidates must work a great deal on their own and generally must make a “long and grueling” journey to reach their goals. Much actuarial studying is normally fit in after a full day’s work, or is done on a weekend when one’s friends are free to do as they please. Making adequate time available for studying requires sustained self-discipline and is a purely individual and personal responsibility.

## Schedule of Study

There is only one substitute for hours of study time omitted one week—at least as many additional hours of study in another week. An unavoidably “necessary condition” for success in studying (though not necessarily “sufficient condition”) is simply spending enough total hours studying.

Candidates must decide how many hours in total they need to study. Then they need to set out their schedules in writing, specifically stating the weekday evening and weekend periods allocated to studying. They then should total the number of hours made available. If the total hours scheduled are less than the total hours necessary, candidates should expand their schedules until they at least have equalled the required total time plus an additional cushion for absorbing time that will inevitably be lost along the way on account of illness, work pressures, etc.

Then candidates should fit all the segments of the *Syllabus* into their schedules so that they will thoroughly cover the course of reading in good time before the examination, with time left over for a thorough final review. It is important for candidates to spread their time over the entire *Syllabus* in some deliberate way, for example, in proportion to the pages of reading material on the *Syllabus*.

Candidates may find it helpful to study several subjects within an examination, or all of them in parallel. This gives them more variety each week, and may give them a combination of both study that is more appealing and study that requires greater effort and concentration. Particularly demanding study may be best left for weekends when candidates are less fatigued from regular work.

It is a good idea for candidates to keep a record of the hours they spend studying. Even if candidates are completely confident that they know the *Syllabus* before putting in their required total hours, there is much to be said for carrying out the full schedule and completing the total time quotas.

## Retention

As part of human nature, our memories forget facts and ideas most rapidly during the time immediately following our study of them. For a given number of study hours, therefore, candidates will remember more if they review promptly and frequently. It is recommended that candidates review what they have learned as part of ending their study for the day. As they begin their next study session, candidates should review what they learned the last time and what they learned during other recent sessions. Then they can recall points they have learned during odd spare moments in between study sessions. It is important for candidates to leave time for a thorough final review before the examination.

In their study for the mathematical sections of the Associateship examinations, candidates are advised to work out as many examples as possible in order to acquire facility in the application of the mathematical principles and methods to specific problems.

There are some analogies that can be made between preparing for an actuarial examination and learning to drive a car. Most inexperienced drivers have good motivation for learning to drive and have a strong goal clearly in mind. Yet they still need to practice their driving skills until they become “second nature.” This is easier to do if they keep practicing their driving in the days immediately after a lesson. Candidates should equally be the master of their actuarial studies by the time they enter the examination room. Experienced drivers should be able to pass a driving test not just on a few familiar streets, but over any legal route. In the same way, actuarial candidates should be able to pass any set of examination questions which has been drawn from the *Syllabus*.

Candidates should note the considerable emphasis in actuarial examinations on knowledge. However, they should remember that the best way to learn facts by heart is to understand the whole subject, and to tie together ideas that are related. They should look at any single subject from several different angles, relating what they learn to what they know already. Candidates should look for as many connections as they can between their actuarial work and their actuarial studies.

As humans, we learn by doing. While the extent of a candidate’s notes will be a matter of his or her own personal tastes, taking thorough notes will be a good investment of time for most people. For candidates, “translating” the subject matter into their own words helps their memories, and forces to their attention those items that they do not really understand and require further study. Upon reviewing their notes, if candidates find gaps in their knowledge or in their understanding, they should bear down on those areas and master them.

Another study technique candidates might want to try is to test themselves as they go along. They can review previous examinations when they start to study to get an idea of the mastery of the *Syllabus* expected. Candidates can also take these as “trial examinations” to help them in testing their knowledge and understanding of the course of reading, and in improving their examination speed and confidence. Some candidates deliberately test themselves; others prefer not to do so.

Candidates should expect a gradual gathering of momentum as they begin their study for a particular examination. By keeping at it, according to their plans, candidates will find their rate of progress speeding up after the first few weeks.

When a candidate finds himself or herself getting very “stale,” one possibility is to stop studying altogether for, perhaps, three days. Then the candidate should continue on with his or her study plan, no matter how he or she feels, for at least the next month or six weeks. A candidate’s study plan should have enough spare time available in it to allow for such occasional “down time.” A mixed schedule, with a weekly combination of subjects that the candidate likes and subjects that he or she finds difficult, will help to minimize staleness.

Discussing the *Syllabus* with friends taking the same examination, or with others who have passed the examination, will help candidates remember the material firmly and to understand it. It also helps candidates to realize their own gaps and difficulties. If effective study circles and review courses can be found, they will give candidates a different slant on the subject, give them a chance to review and to practice, keep them moving through the *Syllabus*, and help to combat lethargy and self-satisfaction.

Candidates should beware, however, of someone else doing their own thinking for them. It is imperative that they develop and maintain their own command and understanding of each subject. When reading, candidates should challenge the author in their minds and debate with him or her, rather than merely swallowing everything whole.

## Formulating Answers

### *Multiple-Choice Questions*

Candidates can definitely improve their speed and mastery by seriously practicing sample examination-type questions before the examination. It helps to have a good understanding of the subject material. Candidates can also develop valuable shortcuts, such as eliminating impossible answers by checking out boundary conditions, by inspecting other aspects of certain suggested solutions, or by substituting numerical values and cutting out some answers. Since questions are varied, candidates will need a variety of techniques to cope with them.

In a multiple-choice examination, speed is an important factor. Candidates increase their chances of passing if they are able to seriously attempt each question on the entire paper at least once. It may help them to determine the proportionate number of questions to answer in the first half-hour of the examination, to check how much ground they cover in that time, and then accordingly either speed up, or slow down and dig more deeply.

When pressed for time, it may pay for candidates to omit a few multiple-choice questions that they expect to take more time than average, so as to have time for a larger number of more quickly answered questions. For example, a cluster of questions may have a common introduction that a candidate does not readily grasp, in which case he or she might skip the entire cluster at a first attempt.

Candidates may find it helpful to keep a list of the number of the questions not answered so that they quickly can get an idea of how many they are omitting. This will allow the candidate to quickly return to these questions.

Candidates should change their answers only if they are sure that their first solution was wrong.

### *Essay Questions*

The model response to the typical essay question is brief, less than one-half of a written page. Be concise—candidates do not need to answer in complete sentences when a well-composed outline format is more appropriate. Candidates should not waste time on obscure details. They should show that they have learned the relevant material and that they understand it. They should state the obvious, if it is part of the answer.

For questions that require candidates to work a numerical solution, candidates should take the time to set up the problem so that they document their understanding. They should set forth relevant equations or formulae, then enter appropriate values. They should lay out complicated calculations in tables that demonstrate their understanding of the correct solution.

Candidates should keep each answer relevant to the precise question being asked. They should make sure they first understand exactly what is wanted before they begin to answer a question. When they have written part or all of their answer, they should take another look at the question and make sure they have answered—not their own question—but the question as set on the examination page.

If candidates are asked to “discuss” a proposal, they should list all significant arguments both for and against it.

If a candidate believes that a question is ambiguous, or that it does not provide all the information necessary to answer the question, the candidate should state how he or she interprets the question and/or what assumptions are made to answer it.

Candidates should take time to write legibly, since examiners can only give credit for what they can read. They should try to “organize” their answer. Then, their main aim is to get down as much relevant material as they can.

There is no advantage to answering the questions in any particular order. Candidates may answer the questions in the order given if they wish. Alternatively, candidates can quickly read over the whole



paper, warm up with whichever question comes easily to them, gradually work into the questions they find more challenging, and end on a question that they think can be answered readily even though, by that time, their energy and concentration may be falling off.

Note that since each question is graded separately, each answer must be self-contained. Candidates should not say, “Part of my answer to question 1 is found in my answer to question 3.”

It is important that candidates remember that they have limited time. Candidates will find that it is worth checking their progress to assure that they have an opportunity to respond to every question. If they know that a question will take too much time, they can pass it and return to it later, if time permits.

## **Final Mental Preparations**

Olympic and professional athletes often vary their training schedules as a major contest approaches. They often ease up on endurance training, and shift their aim to sharpening their alertness, their effectiveness, and their will to win.

In any examination, it is just as important that candidates be alert and effective, with all their wits about them, and with an eager desire to do their best.

Some candidates fail in the first half-hour or so of an examination. Perhaps it would be more accurate to say they “defeat themselves” in that time. They become pessimistic and discouraged, and think too much about the possibility of their having made a bad start in answering the questions.

Other candidates, with the same ability, knowledge, and preparation—and making bumbles just as bad in parts of the examination as the first type of candidates—nevertheless succeed in passing the same examination. With actuarial exams, as in life, the difference between failure and success is often linked to a person’s attitude. Confidence and optimism, based on mastery of the subject through hard work and many hours of study, will help a candidate to keep going.

Instead of wasting time and energy worrying about how badly they believe they are doing, candidates should do something constructive on another question. They can always come back later to the weak answer, time permitting.

Candidates should never give up in the examination room. They should use every minute and every second of the available time. They should not “grade their own papers,” and decide not to hand in an answer to a question or two because they feel it is all wrong. They should hand in all of their answers, and let the examiners do the grading. More than one candidate has not handed in some answer pages which he or she had condemned in his or her own mind, only to find out later that the work was correct, and to find out still later that he or she had narrowly failed to pass.

## **Books to Read**

Some candidates may find it a good investment of their time to read one or more books discussing study and examination techniques. On the other hand, many candidates have successfully completed all their examinations without reference to such texts. These texts will be of little value to a candidate with solid study habits. For those candidates who have not developed good study habits, then these types of texts are more likely to be worthy of their consideration.

It is up to the candidate to decide for himself or herself on a single strategy to follow, especially if he or she refers to more than one book. While all books will have a common thrust, there may be some differences between them on certain points, such as on the most desirable level of the extensiveness of the notes a candidate should take. It is important for candidates to not chop and change from one technique to another during the time they are studying. Rather, they should read such books as they wish, and decide for themselves a single, clear path to travel—and then stick to it.

# STUDY RESOURCES

## Study Notes for Exams 1/P, 2/FM, and 4/C

Official Study Notes are published to help candidates prepare for the examinations. In some instances, Study Notes are the principal materials for study; in others, they are designed to coordinate the subject for the candidate or to complement other readings. Sample examinations, illustrative solutions, and answer keys for Exams 1/P, 2/FM, and 4/C are available as part of the set of Study Notes. Introductory Study Notes (ISN) contain important information about the examinations, including any changes to the course of readings, changes in examination times or dates, errata, and descriptions of examination formats. Occasionally, the course of reading for an examination may be changed after publication of the *Syllabus*. Such a change will be announced on the CAS and SOA Web Sites and in the ISN for the affected examination(s). If any conflict exists between information contained in this *Syllabus* and that contained in the ISN, the ISN will govern.

Study Notes may be downloaded at no charge from the “Admissions” section of the CAS Web Site ([www.casact.org](http://www.casact.org)) under Web Notes and from the SOA Web Site ([www.soa.org](http://www.soa.org)). The order form for a hard copy of the Study Notes is available in the “Admissions” section of the CAS Web Site.

## Study Kits and Web Notes for Exams 3 and 5-9

The readings listed as “Web Notes” in this *Syllabus* may be downloaded at no charge from the “Admissions” section of the CAS Web Site ([www.casact.org](http://www.casact.org)). For those who do not have access to the Web Site, a printed version of the Web Notes is available for sale from the CAS Office.

The Study Kit contains other required readings not owned by the CAS but for which the CAS has been granted permission to include in the Study Kit. Study Kits and the printed version of the Web Notes will be available December 1, 2005. Order from the CAS Online Store ([www.casact.org](http://www.casact.org)) or use order forms that are available in the “Admissions” section of the CAS Web Site or in the back of this *Syllabus*.

2006 Study Kits and Web Notes	Price
Exam 3 Web Notes	\$8.00
Exam 5 Study Kit	\$52.00
Exam 5 Web Notes	\$92.00
Exam 6 Study Kit	\$35.00
Exam 6 Web Notes	\$98.00
Exam 6 2006 Update to the 2005 Study Kit	\$12.00
Exam 7-Canada Study Kit	\$131.00
Exam 7-Canada Web Notes	\$13.00
Exam 7-Canada 2006 Update to the 2005 Study Kit	\$11.00
Exam 7-U.S. Study Kit	\$60.00
Exam 7-U.S. Web Notes	\$63.00
Exam 7-U.S. 2006 Update to the 2005 Study Kit	\$17.00
Exam 8 Study Kit	\$41.00
Exam 8 Web Notes	\$15.00
Exam 9 Study Kit	\$25.00
Exam 9 Web Notes	\$82.00
Exam 9 2006 Update to the 2005 Study Kit	\$14.00

Canadian residents must add 7% for GST; Virginia residents must add 5% sales tax. For deliveries outside the U.S. or Canada, add 50% of the total cost for shipping. Candidates should check the Study Kits for completeness (i.e., defective pages and/or omissions).

**Please allow four to six weeks for delivery. NO RETURNS. NO REFUNDS.**

## Sample Examination Questions

### *Exams 1/P, 2/FM, and 4/C*

Sample examination questions for Exams 1/P, 2/FM, and 4/C are available at no charge in the “Admissions” section of the CAS Web Site ([www.casact.org](http://www.casact.org)). The sample examinations, illustrative solutions, and answer keys also are included in the complete set of Study Notes. (The order form is available in the “Admissions” section of the CAS Web Site.)

### *Exams 3 and 5-9*

Past copies (last three sittings) of Exams 3 and 5-9 with answers are available at no charge under “Study Tools” in the “Admissions” section of the CAS Web Site ([www.casact.org](http://www.casact.org)). Sample essay answers are actual responses that received credit and are illustrative of successful answers, although they may not be considered perfect answers.

Exams 3 and 5-9 will be posted in the “Admissions” section of the CAS Web Site approximately one week after these examinations have been administered. They will include a *preliminary* list of multiple-choice answers. Sample essay answers and final multiple-choice answers will be posted on July 31, 2006, for Spring Examinations and January 31, 2007, for Fall Examinations.

In referring to a published prior examination, candidates should keep in mind that the questions were based on the course of readings in effect for that particular examination and may not reflect the current course of readings. Candidates may also expect future examinations to vary somewhat as to the proportions of question styles and subjects. New forms of questions may appear from time to time, and the total number of questions may vary from one exam sitting to the next.

### *Transitional VEE Exams*

The transitional VEE exams will not be released. The August 2005 VEE exams were posted in the “Admissions” section of the CAS Web Site for use as sample exams.

## CAS Web Site

The “Admissions” section of the CAS Web Site ([www.casact.org](http://www.casact.org)) contains the following resources for CAS examinations:

- *Syllabus of Basic Education*
- Updates to the *Syllabus of Basic Education*
- All readings listed as Web Notes
- Copies of sample and past published examinations
- *Notice of Examinations*
- Any change regarding the examinations
- CAS Online Store as well as order forms for study materials
- Registration forms for all examinations
- Online registration for Exams 3, 5-9, and VEE exams
- Discussion Forum
- Archives of the e-mail study groups
- Candidates’ examination status
- *The Future Actuary* newsletter
- *Future Fellows* newsletter
- Frequently asked questions

## E-Mail Study Groups

The CAS has available e-mail study groups for those preparing for CAS examinations. Information about joining a study group is available in the “Admissions” section of the CAS Web Site ([www.casact.org](http://www.casact.org)). Those without Web access may join by sending an e-mail to

imailsrv@lists.casact.org. In the body of the message, type *subscribe studygroup1 [your full name]*, *subscribe studygroup2 [your full name]*, etc., as appropriate. For example, *subscribe studygroup3 Mary Doe*. (Please specify *studygroup7C* or *studygroup7U*.) The e-mail list program will take the e-mail address from the sender's e-mail field. Candidates will receive an e-mail confirmation that they have been added to the study group list. Study group messages are archived on the CAS Web Site. Please direct any questions to the CAS webmaster at [webmaster@casact.org](mailto:webmaster@casact.org).

## CAS Library

The CAS Library has available for loan a limited number of the books marked with a bold **L** in this *Syllabus*. Candidates registered for CAS Examinations and all members of the CAS have access to the library facilities. The CAS Library is located at the CAS Office in Arlington, Virginia.

Books and manuals may be withdrawn from the library for a period of one month without charge. In general, not more than two references may be in the hands of one borrower at a time. Requests must be in writing and must include the borrower's complete name, address, and telephone number. Address requests for library books to:

Casualty Actuarial Society  
Library Service  
4350 N. Fairfax Drive, Suite 250  
Arlington, Virginia 22203  
Fax: (703) 276-3108  
E-mail: [library@casact.org](mailto:library@casact.org)

The CAS Office ships the requested book(s) in the U.S. and Canada via United Parcel Service (UPS) and internationally via Air Mail. Due to delays in the mail system, the CAS requires all shipments of books returned to the CAS Office to be shipped via UPS or an equivalent carrier with tracking capabilities. Please do not use the United States Postal Service. Overdue books will be charged at a cost of 25¢ per day.

Books that are not available through the CAS Library may be obtained by contacting the organizations listed in the "Publishers and Distributors" section in this *Syllabus*.

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# VALIDATION BY EDUCATIONAL EXPERIENCE

## Introduction

The preliminary education structure consists of three topics that will require Validation by Educational Experience (VEE) and four examinations:

- VEE-Applied Statistical Methods
- VEE-Corporate Finance
- VEE-Economics
- Exam 1, Probability (same as SOA Exam P)
- Exam 2, Financial Mathematics (same as SOA Exam FM)
- CAS Exam 3, Statistics and Actuarial Models (or SOA Course M, Actuarial Modeling)
- Exam 4, Construction and Evaluation of Actuarial Models (same as SOA Exam C)

In addition to the preliminary education requirements listed above, Exams 5-7 and the CAS Course on Professionalism will be required for Associateship. The syllabi for the examinations are provided in the “Materials for Study” section of this *Syllabus*. Details about the process for obtaining credit for the VEE topics are provided below. VEE topics are not prerequisites for the preliminary examinations and may be fulfilled independently of the preliminary exam process.

## Four Ways to Get VEE Credit

Validation by Educational Experience can be accomplished in one of four ways:

1. **College Course(s):** Complete one or more courses offered by a college or university and approved by the CAS, CIA, and SOA. Candidates must receive a grade of B- or better in each course. If the institution does not use letter grading, an appropriate translation will be determined.
2. **Standardized Examination:** Achieve a pre-set score on a standardized examination as determined by the CAS, CIA, and SOA. Specified score minimums on the Advanced Placement (AP) and College Level Examination Program (CLEP) tests for micro and macroeconomics will be accepted as VEE credit for economics. The VEE Administration Committee (VEEAC) will determine which other examinations qualify and the score required for credit.
3. **Other Educational Experiences:** Complete other educational experiences as approved by the CAS, CIA, and SOA. Approved educational experiences will be posted on the Web sites of the CAS ([www.casact.org](http://www.casact.org)), CIA ([www.actuaries.ca](http://www.actuaries.ca)), and SOA ([www.soa.org](http://www.soa.org)).
4. **Transitional VEE Exams:** Achieve a passing grade on a CAS transitional VEE exam that will be offered through at least 2006. The syllabi for the three transitional VEE exams are provided in the Appendix of this *Syllabus*, beginning on page 148.

## Step 1: Approval of Courses/Experiences

The VEE Administration Committee will determine which college courses, standardized exams, and other educational experiences are appropriate for VEE credit. Before a candidate may submit an application to receive individual credit for a VEE topic, the course or educational experience itself must first be approved.

For course/experience approval, an official application form (see page 173) must be completed and submitted with the required documentation. The VEEAC will review the course/experience. All approved courses/experiences will be listed in the “Directory of Approved VEE Courses/Experiences” that will be posted on CAS, CIA, and SOA Web Sites. The directory will identify the educational institution, the approved courses/experiences by VEE topic, a unique approval code for each course/experience, and the years for which the courses/experiences were approved.

The guidelines that the VEE Administration Committee will use to determine whether specific courses or educational experiences are appropriate to fulfill the VEE requirements are provided in the next three sections of this *Syllabus*.

## **Step 2: Approval of Individual VEE Credits for Candidates**

Candidates who have credit for at least two actuarial examinations may submit an application for their own VEE credits. In addition to the application, candidates will be required to arrange for an official transcript to be submitted to the VEE administrator. The “Application for Validation by Educational Experience Credit” (see pages 175-176) includes specific directions. Only courses/experiences that are listed in the online “Directory of Approved VEE Courses/Experiences” may be used for VEE credit. If a course/experience is not on the approved list, the candidate may submit the course for approval according to the procedures described in Step 1 above.

Once a candidate’s application and documentation of the required grade on an approved course/experience has been validated, credit for the specific VEE topic will be granted. The candidate will be sent a written response to each application.

Archive 2016

## VEE–Applied Statistical Methods

The following guidelines for the Validation by Educational Experience (VEE) requirement for Applied Statistical Methods will be used by the VEE Administration Committee to determine whether specific courses or educational experiences are appropriate to fulfill the VEE requirements. Details about submitting a course for approval as well as obtaining individual VEE credit are provided on pages 38-39. The “Directory of Approved VEE Courses/Experiences” will be posted on the CAS, CIA, and SOA Web Sites.

Courses that meet the requirement for VEE-Applied Statistical Methods may be taught in the mathematics, statistics, or economics department, or in the business school. In economics departments, this course may be called Econometrics. The material could be covered by one course or two. The level of mathematical sophistication of these courses will vary widely and all levels are intended to be acceptable. Most of the topics listed below should be covered:

### Regression analysis

1. Least square estimates of parameters
2. Single linear regression
3. Multiple linear regression
4. Hypothesis testing and confidence intervals in linear regression models
5. Testing of models, data analysis, and appropriateness of models

### Time series/forecasting

1. Linear time series models
2. Moving average, autoregressive, and/or ARIMA models
3. Estimation, data analysis, and forecasting with time series models
4. Forecast errors and confidence intervals

## VEE–Corporate Finance

The following guidelines for the Validation by Educational Experience (VEE) requirement for Corporate Finance will be used by the VEE Administration Committee to determine whether specific courses or educational experiences are appropriate to fulfill the VEE requirements. Details about submitting a course for approval as well as obtaining individual VEE credit are provided on pages 38-39. The “Directory of Approved VEE Courses/Experiences” will be posted on the CAS, CIA, and SOA Web Sites.

The typical corporate finance sequence in a business school consists of an introductory semester followed by an advanced semester. The advanced semester will more likely be the one that aligns with the learning objectives.

The standard validation method will be completion of the second semester of a two-semester corporate finance sequence. Generally, only the second semester course grade will be evaluated unless this is a narrow course in which case ***both*** the first and second semester course grades will be evaluated. The exceptional case where the corporate finance material is covered in one course only will also be considered.

Most of the topics in each category listed below should be covered:

### Finance

- Definitions of key finance terms: stock company; capital structure
- Key finance concepts: financing companies; characteristics and uses of financial instruments; sources of capital; cost of capital; dividend policy; personal and corporate taxation
- Factors to be considered by a company when deciding on its capital structure and dividend policy
- Impact of financial leverage and long/short term financing policies on capital structure
- Characteristics of the principal forms of financial instruments issued or used by companies, and the ways in which they may be issued
- How a company's cost of capital relates to the investment projects the company wishes to undertake

### Investment

- Key finance concepts: option pricing theory and stock valuation
- Definitions of key finance terms: financial instruments – bond, stock, basic options (calls, puts); dividends; price to earnings ratio
- Structure of a stock company and the different methods by which it may be financed
- Calculate value of stocks
- Calculate value of options
- Measures of financial performance: balance sheet; income statement; statement of cash flows; financial ratios (e.g. leverage, liquidity, profitability, market value ratios); net present value: the payback, discounted payback models; internal rate of return and profitability index models
- Assessment of financial performance using various measures: balance sheet; income statement; statement of cash flows, financial ratios (e.g. leverage, liquidity, profitability, market value ratios); net present value; the payback, discounted payback models; internal rate of return and profitability index models



## VEE–Economics

The following guidelines for the Validation by Educational Experience (VEE) requirement for Economics will be used by the VEE Administration Committee to determine whether specific courses or educational experiences are appropriate to fulfill the VEE requirements. Details about submitting a course for approval as well as obtaining individual VEE credit are provided on pages 38-39. The “Directory of Approved VEE Courses/Experiences” will be posted on the CAS, CIA, and SOA Web Sites.

Typically, the VEE requirement for Economics will be met if a candidate has completed two introductory economics courses, one course covering microeconomics and the other covering macroeconomics. Most of the topics listed below should be covered:

### Microeconomics

1. Interaction between supply and demand in the provision of a product and the way in which equilibrium market prices are determined
2. Elasticity of demand and supply and the effects on a market of different levels of elasticity
3. How rational utility maximizing agents make consumption choices
4. How profit-maximizing firms make short-run and long-run production choices
5. Different types of competition, or lack of it, and the practical effect on supply and demand

### Macroeconomics

1. Structure of public sector finances of an industrialized economy
2. GDP, GNP, and Net National Product: how these concepts are used in describing the economy and in making comparisons between countries, and the limitations of these concepts
3. Propensity to save or to consume by the private sector or the corporate sector and how it affects the economy
4. Impact of fiscal and monetary policy and other forms of government intervention on different aspects of the economy, and in particular on financial markets
5. Role of exchange rates and international trade in the economy and the meaning of the term balance of payments
6. Major factors affecting the rate of inflation, the level of interest rates, the exchange rate, the level of unemployment, and the rate of economic growth in the economy of an industrialized country

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# MATERIALS FOR STUDY

## Introduction

The syllabus for the CAS-specific Exams 3 and 5-9 is defined in the form of learning objectives, knowledge statements, and readings.

**LEARNING OBJECTIVES** set forth, usually in broad terms, what the candidate should be able to do in actual practice. Included in these learning objectives are certain ones that may not be possible to perform on an examination, such as complex simulations, but that the candidate would still be expected to explain in an examination setting.

**KNOWLEDGE STATEMENTS** identify some of the key terms, concepts and methods that are associated with each learning objective. These knowledge statements are not intended to represent an exhaustive list of topics that may be tested, but they are illustrative of the scope of each learning objective.

**READINGS** support the learning objectives. It is intended that the readings, in conjunction with the material on the lower numbered examinations, provide sufficient resources to allow the candidate to perform the learning objectives. Some readings are cited for more than one learning objective.

Thus, the learning objectives, knowledge statements, and readings complement each other. The learning objectives define the purpose, the knowledge statements illustrate more fully the intended scope of the learning objectives, and the readings provide the source material to achieve the learning objectives. Learning objectives should not be seen as independent units, but as building blocks for the understanding and integration of important competencies that the candidate will be able to demonstrate.

Note that the range of weights shown should be viewed as a guideline only. There is no intent that they be strictly adhered to on any given examination—the actual weight may fall outside the published range on any particular examination. The overall section weights should be viewed as having more significance than the individual learning objective weights. Over a number of years of examinations, absent changes, it is likely that the average of the weights for each individual overall section will be in the vicinity of the guideline weight. For the individual learning objective weights, such convergence is less likely. On a given examination, in which it is very possible that not every individual learning objective will be tested, there will be more divergence of guideline weights and actual weights. Questions on a given learning objective may be drawn from any of the listed readings, or a combination of the readings. There may be no questions from one or more readings on a particular exam.

After each set of learning objectives, the readings are listed in abbreviated form. It is suggested that the candidate cover the learning objectives and their corresponding set of readings in the order listed. Complete text references are provided at the end of each exam section.

## Key

- L** May be purchased from the publisher or bookstore or borrowed from the CAS Library.
- NEW** Indicates new or updated material or modified citation.
- SK** Represents material included in the 2006 CAS Study Kit.
- SKU** Represents material included in the 2006 CAS Study Kit and the 2006 Update to the 2005 Study Kit.
- W** Represents material that is available at no charge under Web Notes in the “Admissions” section of the CAS Web Site at [www.casact.org](http://www.casact.org). (For those without access to the Internet, printed copies of the Web Notes are available for a fee.)

Information for ordering Study Kits, Web Notes, and sample examinations, is available in the Study Resources section of this *Syllabus* beginning on page 35. A detailed identification of the text references

may be found at the end of each exam section of the *Syllabus*. The suggested reading material is designed to acquaint candidates with the respective subjects and should not be interpreted as representing views endorsed by the CAS. Although the CAS Library has a limited number of many of the *Syllabus* readings available for loan (citations indicated with a bold L), some must be obtained by contacting the organizations listed in the “Publishers and Distributors” section. (Some booksellers may not indicate the official copyright date of a specific edition. Please use the edition number as a guide.) Information about using the CAS Library is found on page 37.

If a new edition of any text becomes available after publication of this *Syllabus*, candidates should check “*Syllabus* Update” in the “Admissions” section of the CAS Web Site or contact the CAS Office for instructions regarding its acceptability and the appropriate chapters or pages in the new edition that correspond to the published study requirements.

# Associateship Examinations

## Exam 1 Probability

This three-hour, multiple-choice examination is administered by Preliminary Actuarial Examinations and is identical to SOA Course P. Information about Study Notes is available on page 35. Exam 1 is administered by computer-based testing (CBT). Please refer to the “Admissions” section of the CAS Web Site ([www.casact.org](http://www.casact.org)) for additional details about CBT.

The purpose of this examination is to develop a knowledge of the fundamental probability tools for quantitatively assessing risk. The application of these tools to problems encountered in actuarial science is emphasized. A thorough command of probability topics and the supporting calculus is assumed. Additionally, a very basic knowledge of insurance and risk management is assumed.

A table of values for the normal distribution will be included with the examination booklet.

### LEARNING OBJECTIVES

Candidates should be able to use and apply the following concepts in a risk management context:

1. General Probability
  - Set functions including set notation and basic elements of probability
  - Mutually exclusive events
  - Addition and multiplication rules
  - Independence of events
  - Combinatorial probability
  - Conditional probability—Non Bayes Theorem
  - Bayes’ Theorem/ Law of total probability
2. Univariate probability distributions (including binomial, negative binomial, geometric, hypergeometric, Poisson, uniform, exponential, chi-square, beta, Pareto, lognormal, gamma, Weibull, and normal)
  - Probability functions and probability density functions
  - Cumulative distribution functions
  - Mode, median, percentiles, and moments
  - Variance and measures of dispersion
  - Moment generating functions
  - Transformations
3. Multivariate probability distributions (including the bivariate normal)
  - Joint probability functions and joint probability density functions
  - Joint cumulative distribution functions
  - Central Limit Theorem
  - Conditional and marginal probability distributions
  - Moments for joint, conditional, and marginal probability distributions
  - Joint moment generating functions
  - Variance and measures of dispersion for conditional and marginal probability distributions
  - Covariance and correlation coefficients
  - Transformations and order statistics
  - Probabilities and moments for linear combinations of independent random variables

## READINGS

There is no single required text for this exam. The texts listed below may be considered as representative of the many texts available to cover material on which the candidate may be examined.

Not all the topics may be covered adequately by just one text. Candidates may wish to use more than one of the following or other texts of their choosing in their preparation. Earlier or later editions may also be adequate for review.

The candidate is expected to be familiar with the concepts introduced in the Study Note below.

## Text References for Exam 1

### Required Study Notes

Anderson, J.F.; and Brown, R.L., "Risk and Insurance," 2005, Society of Actuaries (SOA Study Note).	<b>W</b>
"Course P Introductory Study Note," Society of Actuaries (SOA Study Note).	<b>W</b>

### Additional Study Note

"Course P Sample Exam Questions and Solutions," Society of Actuaries (SOA Study Note).	<b>W</b>
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### Suggested Texts

Bean, M.A., <i>Probability: The Science of Uncertainty with Applications to Investments, Insurance, and Engineering</i> , 2001, Brooks/Cole Publishing Company, Chapters 1-9.
Ghahramani, S., <i>Fundamentals of Probability with Stochastic Processes</i> (Third Edition), 2005, Prentice Hall, Chapters 1-11.
Hassett, M.; and Stewart, D., <i>Probability for Risk Management</i> , 1999, ACTEX Publications, Chapters 1-11.
Miller, I.; and Miller, M., <i>John E. Freund's Mathematical Statistics with Applications</i> (Seventh Edition), 2004, Prentice Hall, Chapters 1-8.
Ross, S.M., <i>A First Course in Probability</i> (Seventh Edition), 2005, Prentice Hall, Chapters 1-8.
Wackerly, D.; Mendenhall III, W.; and Scheaffer, R., <i>Mathematical Statistics with Applications</i> (Sixth Edition), 2002, Duxbury Press, Chapters 1-7.

## Key

**NEW** Indicates new or updated material or modified citation.

**W** Represents material that is available at no charge under Web Notes in the "Admissions" section of the CAS Web Site at [www.casact.org](http://www.casact.org) or on the SOA Web Site at [www.soa.org](http://www.soa.org). (For those without access to the Internet, printed copies of the Web Notes are available for a fee.)

## Publishers and Distributors

Contact information is furnished for those who wish to purchase the text references cited for Exam 1. Publishers and distributors are independent and listed for the convenience of candidates; inclusion does not constitute endorsement by the CAS.

ACTEX Publications (Mad River Books), 140 Willow Street, Suite One, P.O. Box 974, Winsted, CT 06098; telephone: (800) 282-2839 or (860) 379-5470; fax: (860) 738-3152; e-mail: retail@actexmadriver.com.

Actuarial Bookstore, P.O. Box 69, Greenland, NH 03840; telephone: (800) 582-9672 (U.S. only) or (603) 430-1252; fax: (603) 430-1258; Web site: www.actuarialbookstore.com.

Anderson, J.F.; and Brown, R.L., "Risk and Insurance" (SN P-21-05), 2005, Society of Actuaries, 475 N. Martingale Road, Suite 600, Schaumburg, IL 60173-2226; telephone: (847) 706-3500; fax: (847) 706-3599; Web site: www.soa.org.

Bean, M.A., *Probability: The Science of Uncertainty with Applications to Investments, Insurance, and Engineering*, 2001, Brooks/Cole Publishing Company, a division of Thomson Learning, Order Department, 7625 Empire Drive, Florence, KY 41042; telephone: (800) 354-9706; Web site: www.brookscole.com.

Ghahramani, S., *Fundamentals of Probability with Stochastic Processes* (Third Edition), 2005, Prentice Hall, Inc., 200 Old Tappan Road, Old Tappan, NJ 07675; telephone: (800) 282-0693; Web site: vig.prenhall.com.

Hassett, M.; and Stewart, D., *Probability for Risk Management*, 1999, ACTEX Publications, 140 Willow Street, Suite One, P.O. Box 974, Winsted, CT 06098; telephone: (800) 282-2839 or (860) 379-5470; fax: (860) 738-3152; e-mail: retail@actexmadriver.com.

Miller, I; and Miller, M, *John E. Freund's Mathematical Statistics with Applications* (Seventh Edition), 2004, Prentice Hall, Inc., 200 Old Tappan Road, Old Tappan, NJ 07675; telephone: (800) 282-0693; Web site: vig.prenhall.com.

Ross, S.M., *A First Course in Probability* (Seventh Edition), 2005, Prentice Hall, Inc., 200 Old Tappan Road, Old Tappan, NJ 07675; telephone: (800) 282-0693; Web site: vig.prenhall.com.

SlideRule Books, 10 First Avenue East, Mobridge, SD 57601; telephone: (877) 407-5433 or (605) 845-5580; fax: (877) 417-5433 or (605) 845-7627; Web site: www.sliderulebooks.com.

Society of Actuaries, 475 N. Martingale Road, Suite 600, Schaumburg, IL 60173-2226; telephone: (847) 706-3500; fax: (847) 706-3599; Web site: www.soa.org.

Wackerly, D.; Mendenhall III, W.; and Scheaffer, R., *Mathematical Statistics with Applications* (Sixth Edition), 2002, Duxbury Press; telephone: (800) 354-9706; Web site: www.duxbury.com.

## Exam 2

### Financial Mathematics

This two-hour, multiple-choice examination is administered by Preliminary Actuarial Examinations and is identical to SOA Course FM. Information about Study Notes is available on page 35.

Please check the “Admissions” section of the CAS Web Site ([www.casact.org](http://www.casact.org)) for any changes to the *Syllabus*.

The goal of the Financial Mathematics exam is to provide an understanding of the fundamental concepts of financial mathematics, and how those concepts are applied in calculating present and accumulated values for various streams of cash flows as a basis for future use in: reserving, valuation, pricing, asset/liability management, investment income, capital budgeting, and valuing contingent cash flows.

#### LEARNING OBJECTIVES

The following learning objectives are presented with the understanding that candidates are allowed to use specified calculators on the exam. The education and examination of candidates should reflect that fact. In particular, such calculators eliminate the need for candidates to learn and be examined on certain mathematical methods of approximation.

1. Candidates will know definitions of key terms of financial mathematics: inflation; rates of interest [simple, compound (interest and discount), real, nominal, effective, dollar-weighted, time-weighted, spot, forward], term structure of interest rates; force of interest (constant and varying); equivalent measures of interest; yield rate; principal; equation of value; present value; future value; current value; net present value; accumulation function; discount function; annuity certain (immediate and due); perpetuity (immediate and due); stocks (common and preferred); bonds (including zero-coupon bonds); other financial instruments such as mutual funds, and guaranteed investment contracts.

Specifically, candidates are expected to demonstrate the ability to:

- a. Choose the term, given a definition
  - b. Define a given term
  - c. Determine an equation of value, given a valuation problem involving one or more sets of cash flows at specified times
2. Candidates will understand key procedures of financial mathematics: determining equivalent measures of interest; discounting; accumulating; determining yield rates; estimating the rate of return on a fund; and amortization.

Specifically, candidates are expected to demonstrate the ability to:

- a. Calculate the equivalent annual effective rate of interest, given a nominal annual rate and a frequency of interest conversion (discrete or continuous) other than annual.
- b. Calculate the equivalent effective rate of interest per payment period given a payment period different from the interest conversion period.
- c. Estimate the interest return on a fund
- d. Calculate the appropriate equivalent single value (present value, net present value, future (accumulated) value or combination), given a set of cash flows (level or varying), an appropriate term structure of interest rates, the method of crediting interest (e.g. portfolio or investment year) as necessary, an appropriate set of inflation rates as necessary, and accounting for reinvestment interest rates as necessary; for example:
  - i. Calculate the loan amount or outstanding loan balance, given a set of loan payments (level or varying) and the desired yield rate (level or varying)

- ii. Calculate the price of a bond (callable or non-callable), given the bond coupons, the redemption value, the term of the bond (constant or varying), the coupon interest rate, and the desired yield rate (level or varying)
  - iii. Calculate the value of a stock, given the pattern of dividends and the desired yield rate (level or varying)
  - iv. Calculate the net present value, given a set of investment contributions and investment returns
  - e. Calculate a unique yield rate, when it exists, given a set of investment cash flows
  - f. Calculate the amount(s) of investment contributions, given there is more than one contribution, and given a set of yield rates, the amount(s) and timing of investment return(s), and the desired timing of the investment contributions
  - g. Calculate the amount(s) of investment returns, given there is more than one return, and given a set of yield rates, the amount(s) and timing of investment contribution(s) and the desired timing of the investment returns; for example:
    - i. Calculate loan payments, given the loan amount(s), the term of the loan, and the desired yield rate (level or varying)
    - ii. Calculate the principal and interest portions of a loan payment, given the loan amount, the set of loan payments (level or varying), and a set of interest rates (level or varying).
    - iii. Calculate bond coupons or redemption values, given the bond price, the term of the bond, and the desired yield rate (level or varying)
  - h. Calculate the term of an investment, given a set of cash flows (level or varying), and a set of interest rates (level or varying); for example:
    - i. Calculate the length of time required to accumulate a given amount, given the yield rate and an initial amount
    - ii. Calculate the length of time to repay a given loan amount, given the loan payments and the loan interest rate(s)
    - iii. Calculate the time to maturity of a bond, given the price of the bond, the coupon payments, redemption value, and yield rate
3. Candidates will know definitions of key terms of modern financial analysis at an introductory and intuitive level, and be able to complete basic calculations involving such terms: yield curves, spot rates, forward rates, duration, convexity, immunization, and short sales.

Specifically, candidates are expected to demonstrate the ability to:

- a. Choose the term, given a definition
- b. Write the definition, given a term
- c. Perform calculations such as:
  - i. yield rate on a short sale
  - ii. measuring interest rate risk using duration and convexity
  - iii. basic immunization calculations

Note that probability-based calculations for applications of financial mathematics are in Exam 3.

## Text References for Exam 2

Knowledge and understanding of the Financial Mathematics concepts are significantly enhanced through working out problems based on those concepts. Thus, in preparing for the Financial Mathematics exam, whichever source textbooks candidates choose to use, candidates are encouraged to work out the textbook exercises related to the listed readings.



Candidates may use either course of reading shown below:

<b>Option A</b>
Kellison, S., <i>Theory of Interest</i> (Second Edition) 1991, Irwin/McGraw-Hill, Chapters 1; 2; 3 (3.1-3.5, and 3.7-3.9); 4 (p. 95; Examples 4.1 and 4.2; 4.4-4.8); 5 (5.1-5.7); 6 (6.1-6.4, and 6.6); 7 (7.1-7.7, and 7.10); 8 (8.7-8.8 excluding Options, Futures, Forwards and Swaps); 9 (9.4, 9.6, and 9.8-9.10); and Appendix VIII, Full Immunization.
<b>Option B</b>
Broverman, S.A.; <i>Mathematics of Investment and Credit</i> (Third Edition) 2004, ACTEX Publications, Chapters 1 (1.1-1.6); 2 (2.1-2.4 excluding 2.4.2, and 2.4.3); 3 (3.1-3.3 excluding pages 188–189); 4 (4.1-4.3.1); 5 (5.1-5.3 excluding 5.1.3, 5.1.4, and 5.3.2); 6 (6.1-6.3 excluding 6.2); 7 (7.1-7.2); and 8 (8.2.1, 8.2.2, 8.2.4, and 8.3.1-8.3.3).

#### Study Notes

“Course FM Introductory Study Note” (SOA Study Note).	<b>W</b>
“Course FM Sample Exam Questions and Solutions” (SOA Study Note).	<b>W</b>
“Review of Calculator Functions for the Texas Instruments BA-35” (SOA Study Note).	<b>W</b>
“Review of Calculator Functions for the Texas Instruments BA II Plus” (SOA Study Note).	<b>W</b>

## Publishers and Distributors

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Actuarial Bookstore, P.O. Box 69, Greenland, NH 03840; telephone: (800) 582-9672 (U.S. only) or (603) 430-1252; fax: (603) 430-1258; Web site: www.actuarialbookstore.com.

Broverman, S.A.; *Mathematics of Investment and Credit* (Third Edition) 2004, ACTEX Publications, 140 Willow Street, Suite One, P.O. Box 974, Winsted, CT 06098; telephone: (800) 282-2839 or (860) 379-5470; fax: (860) 738-3152; e-mail: retail@actexmadriver.com.

Kellison, S.G., *Theory of Interest*, 1991, Irwin/McGraw-Hill, P.O. Box 182605, Columbus, OH 43218-2605; telephone: (800) 262-4729.

Society of Actuaries, 475 N. Martingale Road, Suite 600, Schaumburg, IL 60173-2226; telephone: (847) 706-3500; fax: (847) 706-3599; Web site: www.soa.org.

SlideRule Books, 10 First Avenue East, Mobridge, SD 57601; telephone: (877) 407-5433 or (605) 845-5580; fax: (877) 417-5433 or (605) 845-7627; Web site: www.sliderulebooks.com.

## Exam 3

### Statistics and Actuarial Models

Before commencing study for this four-hour, multiple-choice examination, candidates should read the introduction to “Materials for Study” on page 43 of this *Syllabus* for important information about learning objectives, knowledge statements, readings, and the range of weights. Items marked with a bold **w** are available at no charge under Web Notes in the “Admissions” section of the CAS Web Site ([www.casact.org](http://www.casact.org)). Those without access to the Web may purchase a print version of the items marked with a **w**—the 2006 CAS Exam 3 Web Notes—from the CAS Office for a cost of \$8. Information about Web Notes is available on page 35.

Please check the “Admissions” section of the CAS Web Site ([www.casact.org](http://www.casact.org)) for any changes to the *Syllabus*.

The CAS will grant credit for CAS Exam 3 to those who successfully complete SOA Course M in the current education structure.

This examination develops the candidate’s knowledge of the theoretical basis of actuarial models and the application of those models to insurance and other financial risks. A thorough knowledge of calculus, probability, and interest theory is assumed. Knowledge of risk management at the level of Exam 1 is also assumed.

The candidate will be required to understand, in an actuarial context, what is meant by the word “model,” how and why models are used, and their advantages and their limitations. The candidate will be expected to understand what important results can be obtained from these models for the purpose of making business decisions, and what approaches can be used to determine these results.

A variety of tables will be provided to the candidate with the exam. Copies of the specific tables are available on the CAS Web Site under Web Notes. They include values for the standard normal distribution, illustrative life tables, abridged inventories of discrete and continuous probability distributions, Chi-square Distribution,  $t$ -Distribution, and  $F$ -Distribution. Since they will be included with the examination, candidates will not be allowed to bring copies of the tables into the examination room.

The CAS will test the candidate’s knowledge of the material, but may decide not to include questions from every reading on a particular exam. A guessing adjustment will be used in scoring Exam 3.

## A. Statistics

Range of weight for Section A: 20-25 percent

Candidates should be able to apply statistical theory to solve business problems.

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>1. Perform point estimation of statistical parameters using the following statistical methods:</p> <ul style="list-style-type: none"> <li>• Maximum likelihood estimation (“MLE”)</li> <li>• Method of moments</li> </ul> <p>Apply criteria to the estimates such as:</p> <ul style="list-style-type: none"> <li>• Consistency</li> <li>• Unbiasedness</li> <li>• Minimum variance</li> <li>• Mean square error</li> </ul> <p>Range of weight: 5-10 percent</p>	<p>a. Equations for MLE of mean, variance from a sample</p> <p>b. Estimation of mean and variance based on sample</p> <p>c. General equations for MLE of parameters</p> <p>d. Equations for estimation of parameters using method of moments for means, variances, and higher moments</p> <p>e. Recognition of consistency property of estimators and alternative measures of consistency</p> <p>f. Application of criteria for measurement when estimating parameters through minimization of variance, mean square error</p> <p>g. Definition of statistical bias and recognition of estimators that are unbiased or biased</p>
<p>2. Test statistical hypotheses including Type I and Type II errors using:</p> <ul style="list-style-type: none"> <li>• Neyman-Pearson lemma</li> <li>• Likelihood ratio tests</li> </ul> <p>Apply Neyman-Person lemma to construct likelihood ratio equation.</p> <p>Range of weight: 5-10 percent</p>	<p>a. Presentation of fundamental inequalities based on general assumptions and normal assumptions</p> <p>b. Definition of Type I and Type II errors</p> <p>c. Significance levels</p> <p>d. One-sided versus two-sided tests</p> <p>e. Estimation of sample sizes under normality to control for Type I and Type II errors</p> <p>f. Determination of critical regions</p> <p>g. Definition and measurement of likelihood ratio tests</p> <p>h. Determining parameters and testing using tabular values</p> <p>i. Recognizing when to apply likelihood ratio tests versus chi-square or other goodness of fit tests (statistics)</p>
<p>3. Calculate order statistics of a sample and use critical values from a sampling distributions to test means and variances.</p> <p>Range of weight: 0-5 percent</p>	<p>a. General form for distribution of <math>n^{\text{th}}</math> largest element of a set</p> <p>b. Application to a given distributional form</p> <p>c. Recognition of random variables from sample that behave as t-stat or F-stat</p> <p>d. Determination of parameters when applying these tests and obtaining tabular values</p> <p>e. Presentation of hypotheses testing from above for mean and variances</p>
<p>4. Perform a linear regression using the least squares method.</p> <p>Range of weight: 0-5 percent</p>	<p>a. Presentation and calculation of equations for regression statistics</p>

**READINGS**

There is no single required text for Section A. The texts listed below may be considered as representative of the many texts available to cover the material on which the candidate may be examined based on the learning objectives and knowledge statements:

Hoel  
 Hogg and Tanis  
 Hogg et al.  
 Mood et al.

**B. Survival and Severity Models**

Range of weight for Section B: 30-35 percent

Candidates should be able to work with discrete and continuous univariate probability distributions for failure time random variables. They will be expected to set up and solve equations in terms of life table functions, cumulative distribution functions, survival functions, probability density functions, and hazard functions (e.g., force of mortality), as appropriate. They should have similar facility with models of the joint distribution of two failure times (multiple lives) and the joint distribution of competing risks (multiple decrement).

Candidates should be able to define severity distributions and be able to use the parameters and moments of these distributions. Candidates also should be able to work with the families of distributions generated by algebraic manipulation and mixing of the basic distributions presented.

Candidates should be able to use Markov Chains in order to determine state probabilities and transition probabilities.

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>1. For discrete and continuous univariate probability distributions for failure time random variables, develop expressions in terms of the life table functions, <math>l_x</math>, <math>q_x</math>, <math>p_x</math>, <math>{}_nq_x</math>, <math>{}_np_x</math>, and <math>{}_{m n}q_x</math>, for the cumulative distribution function, the survival function, the probability density function and the hazard function (force of mortality), and be able to:</p> <ul style="list-style-type: none"> <li>• Establish relations between the different functions</li> <li>• Develop expressions, including recursion relations, in terms of the functions for probabilities and moments associated with functions of failure time random variables, and calculate such quantities using simple failure time distributions</li> <li>• Express the effect of explanatory variables on a failure time distribution in terms of proportional hazards and accelerated failure time models</li> </ul> <p>The distributions may be left-truncated, right-censored, both, or neither.</p> <p>Range of weight: 3-7 percent</p>	<ul style="list-style-type: none"> <li>a. Failure time random variables</li> <li>b. Life table functions</li> <li>c. Cumulative distribution functions</li> <li>d. Survival functions</li> <li>e. Probability density functions</li> <li>f. Hazard functions</li> <li>g. Relationships between the above variables in the above functions</li> </ul>

<b>READINGS</b>
Bowers, Chapter 3 (excluding 3.6)

<b>LEARNING OBJECTIVES</b>	<b>KNOWLEDGE STATEMENTS</b>
2. Assuming a uniform distribution of deaths, define the continuous survival time random variable that arises from the discrete survival time random variable. Range of weight: 0-5 percent	a. Life table function forms under uniform distribution of deaths assumption

<b>READINGS</b>
Bowers, Chapter 3.6

<b>LEARNING OBJECTIVES</b>	<b>KNOWLEDGE STATEMENTS</b>
3. Given the joint distribution of two failure times: <ul style="list-style-type: none"> <li>• Calculate probabilities and moments associated with functions of these random variables' variances.</li> <li>• Characterize the distribution of the smaller failure time (the joint life status) and the larger failure time (the last survivor status) in terms of functions analogous to those in the Learning Objective above, as appropriate.</li> <li>• Develop expressions, including recursion relations, for probabilities and moments of functions of the joint life status and the last survivor status, and express these in terms of the univariate functions in Learning Objective above (assuming independence of the two failure times).</li> </ul> Range of weight: 3-7 percent	a. Joint distribution of failure times b. Probabilities and moments

<b>READINGS</b>
Bowers, Chapter 9.1-9.5

<b>LEARNING OBJECTIVES</b>	<b>KNOWLEDGE STATEMENTS</b>
4. Based on the joint distribution (pdf and cdf) of the time until failure and the cause of failure in the competing risk (multiple decrement) model and in terms of the functions $l_x^{(t)}$ , ${}_tq_x^{(t)}$ , ${}_tp_x^{(t)}$ , ${}_td_x^{(t)}$ , ${}_tm_x^{(t)}(t)$ : <ul style="list-style-type: none"> <li>• Establish relations between the functions.</li> <li>• Calculate probabilities and moments associated with functions of these random variables, given the joint distribution of the time of failure and the cause of failure.</li> </ul> Range of weight: 3-7 percent	a. Time until failure b. Competing risk (multiple decrement) models

<b>READINGS</b>
Bowers, Chapter 10.1-10.3

<b>LEARNING OBJECTIVES</b>	<b>KNOWLEDGE STATEMENTS</b>
<p>5. For the transformed beta, transformed gamma, inverse transformed gamma, lognormal and inverse Gaussian following families of loss (severity) distributions:</p> <ul style="list-style-type: none"> <li>• Describe how changes in the parameters values affect the distribution.</li> <li>• Demonstrate how distributions within a family are related to each other.</li> <li>• Calculate their moments.</li> <li>• Apply the following techniques for creating new families of distributions: multiplication by a constant, raising to a power, exponentiation, mixing, and splicing.</li> <li>• Identify the applications in which these distributions are used and the reasons why they are used. Compare and contrast these distributions with non-parametric (data dependent) distributions.</li> <li>• Apply the distribution to an application, given the parameters of a distribution.</li> <li>• Calculate the various measures of tail weight and interpret the results to compare the tail weights of the listed distributions.</li> </ul> <p>Range of weight: 8-12 percent</p>	<ul style="list-style-type: none"> <li>a. Applications of loss distributions</li> <li>b. Families of loss distributions</li> <li>c. Parameters of loss distributions</li> <li>d. Scale distributions and scale parameters</li> <li>e. Moments of loss distributions</li> <li>f. Creation of new distributions and calculations of their moments</li> <li>g. Excess loss and limited loss distributions</li> <li>h. Tail weight measures: existence of moments, limiting density ratios, and hazard rate/mean residual life patterns</li> </ul>

<b>READINGS</b>
Klugman et al., Chapters 1-3, 4.1-4.5

<b>LEARNING OBJECTIVES</b>	<b>KNOWLEDGE STATEMENTS</b>
<p>6. Interpret and produce graphical representations of loss and counting distributions.</p> <p>Using either a graphical presentation of a distribution or an equation describing a distribution, identify or calculate, respectively, amounts that are:</p> <ul style="list-style-type: none"> <li>• Eliminated by a deductible</li> <li>• Covered under an insurance contract</li> <li>• Excess of the coverage provided by an insurance contract</li> </ul> <p>Range of weight: 0-5 percent</p>	<ul style="list-style-type: none"> <li>a. Lee diagrams</li> <li>b. Policy terms and modifications of policy terms</li> </ul>

<b>READINGS</b>
Lee (first principle applications of severity amount models)

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
7. For homogenous and non-homogenous discrete-time Markov chain models: <ul style="list-style-type: none"> <li>• Define each model.</li> <li>• Calculate probabilities of being in a particular state at a particular time.</li> <li>• Calculate probabilities of transitioning between states.</li> </ul> Range of weight: 3-7 percent	a. Markov chains b. Transition probability matrix c. Discrete-time Markov chains
<b>READINGS</b>	
Daniel, Chapters 1 and 3	

### C. Frequency Models

Range of weight for Section C: 13-17 percent

Candidates should be able to define frequency (counting) distributions, and be able to use the parameters and moments of these distributions. Candidates should be able to work with the families of distributions generated by algebraic manipulation and mixing of the basic distributions presented.

Candidates should be able to solve problems using stochastic processes. They should be able to determine the probabilities and distributions associated with these processes. Specifically, candidates should be able to use a Poisson process in these applications.

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
1. For the following counting distributions (frequency distributions): Poisson, mixed Poisson, negative binomial, binomial, geometric, and mixture distributions: <ul style="list-style-type: none"> <li>• Describe how changes in the parameters values affect the distribution.</li> <li>• Calculate their moments.</li> <li>• Identify the applications for which these distributions are used and the reasons why they are used.</li> <li>• Apply the distribution to an application given the parameters of a distribution.</li> </ul> Range of weight: 8-12 percent	a. Applications of frequency distributions b. Parameters of frequency distribution c. Moments of frequency distributions
<b>READINGS</b>	
Klugman et al., Chapters 1-3, 4.6.1-4.6.4, 4.6.5 (through the first full paragraph following definition 4.41), 4.6.7 (excluding Example 4.46, Theorem 4.49, Example 4.53 and following), 4.6.11	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
2. Describe the properties of Poisson processes: <ul style="list-style-type: none"> <li>• For increments in the homogeneous case</li> <li>• For interval times in the homogeneous case</li> <li>• For increments in the non-homogeneous case</li> <li>• Resulting from special types of events in the Poisson process</li> <li>• Resulting from sums of independent Poisson processes</li> </ul> Range of weight: 0-5 percent	a. Poisson process b. Non-homogeneous Poisson process
3. For any Poisson process and the interarrival and waiting distributions associated with the Poisson process, calculate: <ul style="list-style-type: none"> <li>• Expected values</li> <li>• Variances</li> <li>• Probabilities</li> </ul> Range of weight: 0-5 percent	a. Probability calculations for Poisson process
<b>READINGS</b>	
Ross, Chapters 5.3.1-5.3.4 and 5.4.1	

## D. Aggregate (Compound) Models

Range of weight for Section D: 10-15 percent

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
1. Describe properties of aggregate loss models and calculate probabilities and moments associated with a compound distribution. Range of weight: 3-7 percent	a. Collective risk models b. Individual risk models
2. Adjust the calculations described in Learning Objective B5, C1, and D1 for the effect of policy modifications such as deductibles, policy limits, and coinsurance. Range of weight: 3-7 percent	a. Impact of deductibles, policy limits, and coinsurance b. Loss elimination ratios c. Stop loss insurance
<b>READINGS</b>	
Klugman et al., Chapters 5, 6.1-6.7, 6.11.1, 6.11.2	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
3. For a compound Poisson process, calculate moments associated with the value of the process at a given time Range of weight: 0-5 percent	a. Compound Poisson process



<b>READINGS</b>
Ross, Chapter 5.4.2 preceding Example 5.25

## E. Life Contingency Models

Range of weight for Section E: 13-17 percent

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
1. Apply a principle to a present value model to associate a cost or pattern of costs (possibly contingent) with a set of future contingent cash flows. Range of weight: 5-10 percent	a. Principles include: equivalence, exponential, standard deviation, variance, and percentile b. Models including those listed in Learning Objectives B2-B4 c. Principle applications include: life insurance, annuities, health care, credit risk, environmental risk, consumer behavior (e.g., subscriptions), and warranties

<b>READINGS</b>
Bowers, Chapters 4.1-4.3, 5.1-5.3, 6.1-6.3, 9.7

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
2. Analyze present value of future loss random variables for life insurances and annuities and determine net liabilities using prospective and retrospective methods. Range of weight: 3-7 percent	a. Life insurance liability calculations b. Prospective and retrospective methods

<b>READINGS</b>
Bowers, Chapter 7.1-7.4

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
3. Using present-value-of-benefit random variables and present-value-of-future-loss random variables extended to discrete time Markov chains, calculate: <ul style="list-style-type: none"> <li>• Actuarial present values of cash flows at transitions between states</li> <li>• Actuarial present values of cash flows while in a state</li> <li>• Considerations (premiums) using the Equivalence Principle</li> <li>• Liabilities (reserves) using the prospective method</li> </ul> Range of weight: 0-5 percent	a. Cash flows at transition b. Triple product summation c. Transition probabilities

<b>READINGS</b>
Daniel, Chapters 2 and 3

## F. Ruin Theory

Range of weight for Section F: 3-7 percent

Candidates should be able to analyze the probability of ruin using various models. Other topics covered in this section include determining the distribution characteristics of the amount of surplus (deficit) at the first time below the initial level as well as the impact of reinsurance. (Knowledge regarding reinsurance terminology is not assumed. Cash flows from reinsurance will be determinable based on the description of the reinsurance provided on the examination.)

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
1. For a ruin model: <ul style="list-style-type: none"> <li>• Describe the considerations included in a ruin model</li> <li>• Calculate ruin probabilities for discrete time surplus processes</li> </ul> Range of weight: 3-7 percent	a. Ruin models
<b>READINGS</b>	
Klugman et al., Chapter 7.2.3, 7.3.1, and 7.3.2.1.	

### Complete Text References for Exam 3

*Text references are alphabetized by the citation column.*

Citation	Abbreviation	Learning Objectives	Source
Bowers, N.L.; Gerber, H.U.; Hickman, J.C.; Jones, D.A.; and Nesbitt, C.J., <i>Actuarial Mathematics</i> (Second Edition), 1997, Society of Actuaries.	Bowers et al.	B1-B4, E1, E2	L
Daniel, J.W., "Multi-state Transition Models with Actuarial Applications," Study Note, 2004.	Daniel	B7, E3	W
Hoel, P.G.; Port, S.C.; and Stone, C.J., <i>Introduction to Statistical Theory</i> , 1971, Houghton Mifflin Company.	Hoel	A1-A4	
Hogg, R.V.; Craig, A.T.; and McKean, J.W., <i>Introduction to Mathematical Statistics</i> (Sixth Edition), 2004, Prentice Hall.	Hogg et al.	A1-A4	
Hogg, R.V.; and Tanis, E., <i>Probability and Statistical Inference</i> (Sixth Edition), 2001, Prentice Hall.	Hogg and Tanis	A1-A4	
Klugman, S.A.; Panjer, H.H.; and Willmot, G.E., <i>Loss Models: From Data to Decisions</i> (Second Edition), 2004, John Wiley and Sons, New York, Chapters 1-3, 4.1-4.5, 4.6.1-4.6.4, 4.6.5 (through the first full paragraph following definition 4.41), 4.6.7 (excluding Example 4.46, Theorem 4.49, Example 4.53 and following), 4.6.11, 5, 6.1-6.7, 6.11.1, 6.11.2, 7.2.3, 7.3.1 and 7.3.2.1.	Klugman et al.	B5, C1, D1, D2, F1	L
Lee, Y.S., "The Mathematics of Excess of Loss Coverages and Retrospective Rating—A Graphical Approach," Section 1, <i>PCAS LXXV</i> , 1988, pp. 49-54.	Lee	B6	W
Mood, A.M.; Graybill, F.A.; and Boes, D.C., <i>Introduction to the Theory of Statistics</i> (Third Edition), 1974, McGraw-Hill [out of print].	Mood et al.	A1-A4	

Citation	Abbreviation	Learning Objectives	Source
Ross, S.M., <i>Introduction to Probability Models</i> (Eighth Edition), 2003, Academic Press, San Diego, Sections 5.3.1-5.3.4, 5.4.1-5.4.2 preceding Example 5.25. [Candidates may also use the seventh edition with the following citation: Sections 5.3.1-5.3.4, 5.4.1-5.4.2 preceding Example 5.25.]	Ross	C2, C3, D3	L

## Key

- L** May be purchased from the publisher or bookstore or borrowed from the CAS Library.
- NEW** Indicates new or updated material or modified citation.
- W** Represents material that is available at no charge from the “Admissions” section of CAS Web Site ([www.casact.org](http://www.casact.org)) under Syllabus Web Notes. (For those without access to the Internet, printed copies of the Web Notes are available for a fee.)

## Publishers and Distributors

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ACTEX Publications, 140 Willow Street, Suite One, P.O. Box 974, Winsted, CT 06098; telephone: (800) 282-2839 or (860) 379-5470; fax: (860) 738-3152; Web site: [www.actexamdriver.com](http://www.actexamdriver.com); e-mail: [retail@actexamdriver.com](mailto:retail@actexamdriver.com).

Actuarial Bookstore, P.O. Box 69, Greenland, NH 03840; telephone: (800) 582-9672 (U.S. only) or (603) 430-1252; fax: (603) 430-1258; Web site: [www.actuarialbookstore.com](http://www.actuarialbookstore.com).

Bowers, N.L.; Gerber, H.U.; Hickman, J.C.; Jones, D.A.; and Nesbitt, C.J., *Actuarial Mathematics* (Second Edition), 1997, Society of Actuaries, 475 N. Martingale Road, Suite 600, Schaumburg, IL 60173-2226; telephone: (847) 706-3500; fax: (847) 706-3599; Web site: [www.soa.org](http://www.soa.org).

Casualty Actuarial Society *Forum*, *Foundations of Casualty Actuarial Science* (Fourth Edition), *PCAS*, and *Discussion Paper Program*, Casualty Actuarial Society, 4350 N. Fairfax Drive, Suite 250, Arlington, VA 22203; telephone: (703) 276-3100; fax: (703) 276-3108; e-mail: [office@casact.org](mailto:office@casact.org); Web site: [www.casact.org](http://www.casact.org).

Hoel, P.G.; Port, S.C.; and Stone, C.J., *Introduction to Probability Theory*, 1971, Houghton Mifflin Company, [out of print].

Hogg, R.V.; Craig, A.T.; and McKean, J.W., *Introduction to Mathematical Statistics* (Sixth Edition), 2004, Prentice Hall, Inc., 200 Old Tappan Road, Old Tappan, NJ 07675; telephone: (800) 282-0693; Web site: [vig.prenhall.com](http://vig.prenhall.com).

Hogg, R.V.; and Tanis, E., *Probability and Statistical Inference* (Sixth Edition), 2001, Prentice Hall, Inc., 200 Old Tappan Road, Old Tappan, NJ 07675; telephone: (800) 282-0693; Web site: [vig.prenhall.com](http://vig.prenhall.com).

Klugman, S.A.; Panjer, H.H.; and Willmot, G.E., *Loss Models: From Data to Decisions* (Second Edition), 2004, John Wiley and Sons, One Wiley Drive, Somerset, NJ 08875; telephone: (800) 225-5945 or (732) 469-4400.

Mad River Books (A division of ACTEX Publications), 140 Willow Street, Suite One, P.O. Box 974, Winsted, CT 06098; telephone: (800) 282-2839 or (860) 379-5470; fax: (860) 738-3152; e-mail: [retail@actexamdriver.com](mailto:retail@actexamdriver.com).

Mood, A.M.; Graybill, F.A.; and Boes, D.C., *Introduction to the Theory of Statistics* (Third Edition), 1974, McGraw-Hill [out of print].

Ross, S.M., *Introduction to Probability Models* (Eighth Edition), 2003, Academic Press, 6277 Sea Harbor Drive, Attn: Customer Service (Fifth Floor), Orlando, FL 32887; telephone: (407) 345-3800.

SlideRule Books, 10 First Avenue East, Mobridge, SD 57601; telephone: (877) 407-5433 or (605) 845-5580; fax: (877) 417-5433 or (605) 845-7627; Web site: [www.sliderulebooks.com](http://www.sliderulebooks.com).

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## Exam 4

### Construction and Evaluation of Actuarial Models

This four-hour, multiple-choice examination is administered by Preliminary Actuarial Examinations and is identical to SOA Course C. Information about Study Notes is available on page 35.

Please check the “Admissions” section of the CAS Web Site ([www.casact.org](http://www.casact.org)) for any changes to the *Syllabus*.

This examination provides an introduction to modeling and covers important actuarial and statistical methods that are useful in modeling. A thorough knowledge of calculus, probability, and mathematical statistics is assumed. The candidate will be required to understand the steps involved in the modeling process and how to carry out these steps in solving business problems. The candidate should be able to: 1) analyze data from an application in a business context; 2) determine a suitable model including parameter values; and 3) provide measures of confidence for decisions based upon the model. The candidate will be introduced to a variety of tools for the calibration and evaluation of the models on Exam 3.

A variety of tables will be provided to the candidate in the Study Note Package and in the examination booklet. These include values for the standard normal distribution, chi-square distribution, and abridged inventories of discrete and continuous probability distributions. These tables are also available on the CAS and SOA Web Sites. Since they will be included with the examination, candidates will not be allowed to bring copies of the tables into the examination room.

#### LEARNING OBJECTIVES

The candidate is expected to apply statistical methods to sample data to quantify and evaluate models presented in CAS Exam 3 or SOA Course M. The candidate is further expected to identify steps in the modeling process, understand the underlying assumptions implicit in each family of models, and recognize which assumptions are applicable in a given business application.

Specifically, the candidate is expected to be able to perform the tasks listed below:

#### A. Construction of Empirical Models

1. Estimate failure time and loss distributions using:
  - a. Kaplan-Meier estimator, including approximations for large data sets
  - b. Nelson-Aalen estimator
  - c. Kernel density estimators
2. Estimate the variance of estimators and confidence intervals for failure time and loss distributions.
3. Estimate failure time and loss distributions with the Cox proportional hazards model and other basic models with covariates.
4. Apply the following concepts in estimating failure time and loss distribution:
  - a. Unbiasedness
  - b. Consistency
  - c. Mean squared error

#### B. Construction and Selection of Parametric Models

1. Estimate the parameters of failure time and loss distributions using:
  - a. Maximum likelihood
  - b. Method of moments
  - c. Percentile matching
  - d. Bayesian procedures

2. Estimate the parameters of failure time and loss distributions with censored and/or truncated data using maximum likelihood.
3. Estimate the variance of estimators and the confidence intervals for the parameters and functions of parameters of failure time and loss distributions.
4. Apply the following concepts in estimating failure time and loss distributions:
  - a. Unbiasedness
  - b. Asymptotic unbiasedness
  - c. Consistency
  - d. Mean squared error
  - e. Uniform minimum variance
5. Determine the acceptability of a fitted model using
  - a. Graphical procedures
  - b. Kolmogorov-Smirnov test
  - c. Anderson-Darling test
  - d. Chi-square goodness-of-fit test
  - e. Likelihood ratio test

### **C. Credibility**

1. Apply limited fluctuation (classical) credibility including criteria for both full and partial credibility.
2. Perform Bayesian analysis using both discrete and continuous models.
3. Apply Bühlmann and Bühlmann-Straub models and understand the relationship of these to the Bayesian model.
4. Apply conjugate priors in Bayesian analysis and in particular the Poisson-gamma model.
5. Apply empirical Bayesian methods in the nonparametric and semiparametric cases.

### **D. Interpolation and Smoothing**

1. Demonstrate an understanding of the purpose of smoothing data.
2. Apply polynomial splines, and cubic splines in particular, to actuarial data.

### **E. Simulation**

1. Simulate both discrete and continuous random variables using the inversion method.
2. Estimate the number of simulations needed to obtain an estimate with a given error and a given degree of confidence.
3. Use simulation to determine the p-value for a hypothesis test.
4. Use the bootstrap method to estimate the mean squared error of an estimator.
5. Apply simulation methods within the context of actuarial models.

### **Text References for Exam 4**

Klugman, S.A.; Panjer, H.H.; and Willmot, G.E., *Loss Models: From Data to Decisions* (Second Edition), 2004, John Wiley and Sons, New York, Chapters 1 (Section 1.1 only); 9-11; 12 (excluding 12.5.4, 12.5.5 and 12.6); 13; 15; and 17.

For credibility, the candidate may use any of the alternatives shown below.

<b>Option A</b>		
Klugman, S.A.; Panjer, H.H.; and Willmot, G.E., <i>Loss Models: From Data to Decisions</i> (Second Edition), 2004, John Wiley and Sons, New York, Chapter 16, Sections 16.1-16.2 (for background only); 16.3; 16.4 (excluding 16.4.7); 16.5 (excluding 16.5.3).		
<b>Option B</b>		
Mahler, H.C.; and Dean, C.G., "Credibility," <i>Foundations of Casualty Actuarial Science</i> (Fourth Edition), 2001, Casualty Actuarial Society, Chapter 8, Section 1 (background only) and Sections 2-5. (Also available as an SOA Study Note.)	<b>W</b>	
Dean, C.G., "Topics in Credibility Theory," 2004 (SOA Study Note).	<b>W</b>	
<b>Option C</b>		
Herzog, T.N., <i>Introduction to Credibility Theory</i> (Third Edition), 1999, Chapters 1-3 (background only); 4-8; and 9 (background only).		

#### Study Notes

"Course C Introductory Study Note" (SOA Study Note).	<b>W</b>
"Course C Sample Exam Questions and Solutions" (SOA Study Note).	<b>W</b>

## Key

**W** Represents material that is available at no charge under Web Notes in the "Admissions" section of the CAS Web Site at [www.casact.org](http://www.casact.org) or on the SOA Web Site at [www.soa.org](http://www.soa.org). (For those without access to the Internet, printed copies of the Web Notes are available for a fee.)

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Casualty Actuarial Society *Foundations of Casualty Actuarial Science* (Fourth Edition), 4350 N. Fairfax Drive, Suite 250, Arlington, VA 22203; telephone: (703) 276-3100; fax: (703) 276-3108; e-mail: [office@casact.org](mailto:office@casact.org); Web site: [www.casact.org](http://www.casact.org).

Herzog, T.N., *Introduction to Credibility Theory* (Third Edition), 1999, ACTEX Publications, 140 Willow Street, Suite One, P.O. Box 974, Winsted, CT 06098; telephone: (800) 282-2839 or (860) 379-5470; fax: (860) 738-3152; e-mail: [retail@actexamdriver.com](mailto:retail@actexamdriver.com).

Klugman, S.A.; Panjer, H.H.; and Willmot, G.E., *Loss Models: From Data to Decisions* (Second Edition), 2004, John Wiley and Sons, One Wiley Drive, Somerset, NJ 08875; telephone: (800) 225-5945 or (732) 469-4400.

SlideRule Books, 10 First Avenue East, Mobridge, SD 57601; telephone: (877) 407-5433 or (605) 845-5580; fax: (877) 417-5433 or (605) 845-7627; Web site: [www.sliderulebooks.com](http://www.sliderulebooks.com).

## Exam 5

# Introduction to Property and Casualty Insurance and Ratemaking

Before commencing study for this four-hour examination, candidates should read the introduction to “Materials for Study” on page 43 of this *Syllabus* for important information about learning objectives, knowledge statements, readings, and the range of weights. Items marked with a bold **SK** constitute the 2006 CAS Exam 5 Study Kit that is available from the CAS Office for a cost of \$52. Items marked with a bold **W** are available at no charge under Web Notes in the “Admissions” section of the CAS Web Site ([www.casact.org](http://www.casact.org)). Those without access to the Web may purchase a print version of the items marked with a **w**—the 2006 CAS Exam 5 Web Notes—from the CAS Office for a cost of \$92. Information about Study Kits and Web Notes is available on page 35.

Please check the “Admissions” section of the CAS Web Site ([www.casact.org](http://www.casact.org)) for any changes to the *Syllabus*.

The CAS will test the candidate’s knowledge of the material, but may decide not to include questions from every reading on a particular exam.

### A. Introduction to Property and Casualty Insurance

Range of weight for Section A: 15-20 percent

This section develops skills in reading and interpreting the policies that candidates will be pricing or for which they will be developing reserves. The policies covered in the readings should be viewed as representative illustrations of broad categories of property and casualty policies. Candidates will be expected to understand the various parts of the policies, as well as be familiar with typical policy provisions, such as coverages, conditions, exclusions, limitations, duties, etc.

For purposes of this section, each of the following objectives refer to the following lines of business:

- Personal lines (auto, home)
- Commercial (auto, property, general liability, workers compensation, umbrella)

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>1. Explain the basic purpose and structure of the insurance contract, including coverages, exclusions, exceptions, limits, and deductibles.</p> <p>Range of weight: 9-13 percent</p>	<p>a. Possible exposure to loss:</p> <ul style="list-style-type: none"> <li>• Individual</li> <li>• Company</li> <li>• First party</li> <li>• Third party (legal liability and triggers; state mandated)</li> <li>• Perils covered</li> </ul> <p>b. Lines of insurance that cover each of the exposures to loss</p> <p>c. Basic insurance terminology (e.g., premium, loss, loss adjustment expense)</p> <p>d. Basic policy structure</p> <p>e. Basic policy terminology (e.g., named insured, declarations)</p>



READINGS
ISO PAP Malecki and Flitner Malecki et al. Trupin and Flitner Wiening and Malecki Wiening et al.

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
2. Identify whether a loss is covered, under which policy/coverage it is covered, the amount of loss, and what portion of the loss is covered. Range of weight: 3-7 percent	a. Lines of insurance that cover each of the exposures to loss based on the contracts b. Coverage effective periods c. Loss versus loss expense d. Liability triggers

READINGS
ISO PAP Malecki and Flitner Malecki et al. Trupin and Flitner Wiening et al.

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
3. Calculate a policy premium for a specified risk using the rate pages provided. Range of weight: 0-5 percent	a. Exposure basis and how this is determined b. How to read and use rate pages c. Rating variables (e.g., territory, driver characteristics) d. How individual risk attributes contribute to loss exposure e. How rating variables relate to exposure to loss

READINGS
ISO PAM

## B. Insurance Operations

Range of weight for Section B: 10-15 percent

This section covers the operational aspects of insurance companies, including company organization, marketing and distribution systems, underwriting, and claims.

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
1. Explain the functions of underwriting, marketing, and claims adjusting within an insurance company. Range of weight: 3-8 percent	a. Roles and responsibilities within an insurance company of: <ul style="list-style-type: none"> <li>• Underwriting</li> <li>• Marketing</li> <li>• Claims</li> </ul>

READINGS
Webb et al.

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
2. Given specific actions by underwriting, marketing, and claims adjusting, explain the effect on rate adequacy and ratemaking. Range of weight: 0-5 percent	a. Components of ratemaking (premium, loss, expense) b. New versus renewal business c. Mix of business and changes to it, e.g., adding youthful operators d. Claims, e.g., changes in opening and closing practices e. Outstanding claims versus new claims
<b>READINGS</b>	
McClenahan	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
3. Explain how different distributional systems affect expenses. Range of weight: 0-5 percent	a. Distributional systems (brokers, independent agents, direct writers, exclusive agents) b. Expense calculations
<b>READINGS</b>	
Webb et al.	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
4. Given specific external events or market conditions, explain the effect on insurance operations. Range of weight: 0-5 percent	a. Measurements of economics of insurance, including retention rate and new business b. Relationship of insurance and economic cycles c. Legal environment and how changes in it can affect exposure to loss d. Regulatory environment
<b>READINGS</b>	
Boor 2 Boor 3	

### C. Specialized Lines of Business

Range of weight for Section C: 0-5 percent

This section is intended to give the candidates a high-level view of several additional types of insurance coverages that are not as common as those covered in Section A.

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
1. Define the key attributes associated with the following lines of business: <ul style="list-style-type: none"> <li>• Medical malpractice</li> <li>• Professional liability</li> <li>• Health</li> </ul> Weight 0-5 percent	a. Loss exposures and policy coverages
<b>READINGS</b>	
Bourdon Malecki et al. Wiening et al.	

## D. Ratemaking

Range of weight for Section D: 35-40 percent

This section contains objectives covering ratemaking in broad, general principles, as well as specific detail. Candidates should have a thorough understanding of the basic principles of ratemaking, so that they can analyze data, select an appropriate technique, and develop a solution to a numerical problem. In addition, the candidate should be able to compare specific ratemaking techniques in terms of advantages and disadvantages as they are applied to specific situations and different lines of business.

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
1. Explain the role of exposure bases in the ratemaking process. Range of weight: 0-5 percent	a. Definition of exposure base b. Characteristics of exposure base c. Impact of exposure change d. Coverage provisions
<b>READINGS</b>	
Bouska CAS Principles Feldblum 2 Finger Graves and Castillo Jones McClenahan	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
2. Use appropriate premium data to estimate premium input into the overall rate level indication, adjusting for the following: <ul style="list-style-type: none"> <li>• Coverage and benefit level changes</li> <li>• Rate level changes</li> <li>• Premium trend</li> </ul> Range of weight: 8-12 percent	a. Compilations of experience (Calendar Year/ Policy Year/Accident Year) b. Written versus earned premium c. Rate changes d. Policy terms e. Distributional shifts/changes in volumes (trend over time) f. Parallelogram method g. Extension of exposures h. Definition of exposures i. Impact of law changes
<b>READINGS</b>	
ASOP 13 CAS Principles Feldblum 1 Feldblum 2 Finger Jones McClenahan	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>3. Use appropriate loss and loss adjustment expense data to estimate loss and loss adjustment expense input into the overall rate level indication, adjusting for the following:</p> <ul style="list-style-type: none"> <li>• Coverage and benefit level changes</li> <li>• Loss trend</li> <li>• Loss development</li> <li>• Catastrophe provision</li> </ul> <p>Range of weight: 12-16 percent</p>	<ul style="list-style-type: none"> <li>a. Compilations of experience (Calendar Year/Policy Year/Accident Year/Report Year)</li> <li>b. Incurred versus paid losses</li> <li>c. Loss development</li> <li>d. Impact of law changes</li> <li>e. Frequency and its trend over time</li> <li>f. Severity and its trend over time</li> <li>g. Pure premium and its trend over time</li> <li>h. Exponential versus linear trend</li> <li>i. Relationship between trend and loss development</li> <li>j. Changes in mix of business</li> <li>k. Allocated versus unallocated loss adjustment expenses</li> <li>l. Policy provisions</li> <li>m. Credibility criteria</li> <li>n. Credibility formulas</li> <li>o. Large loss adjustment</li> <li>p. Adjustments for catastrophe</li> </ul>
<b>READINGS</b>	
<p>ASOP 13 Boor 1 Bourdon Burger et al. CAS Principles Feldblum 2 Finger Graves and Castillo Marker and Mohl McClenahan</p>	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>4. Calculate the underwriting expense provisions for estimating an overall rate level indication.</p> <p>Range of weight: 0-5 percent</p>	<ul style="list-style-type: none"> <li>a. Expense categories: <ul style="list-style-type: none"> <li>• Commission</li> <li>• General</li> <li>• Other acquisition</li> <li>• Tax, license, and fees</li> </ul> </li> <li>b. Profit and contingency provisions</li> <li>c. Sources of data and selection criteria</li> <li>d. Fixed and variable expense</li> <li>e. Expense fee calculation</li> <li>f. Differences in procedures for loss adjustment expenses versus underwriting expenses</li> </ul>

READINGS
Brown and Schmitz CAS Principles Feldblum 2 Graves and Castillo McClenahan Schofield Werner

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
5. Calculate an overall rate level indication using the pure premium and loss ratio methods. Range of weight: 5-10 percent	a. Loss ratio formula b. Pure premium formula c. Estimates of formula components

READINGS
Feldblum 2 Graves and Castillo McClenahan

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
6. Compare and contrast the loss ratio method and pure premium method in estimating an overall rate level indication. Range of weight: 0-5 percent	a. Loss ratio method <ul style="list-style-type: none"> <li>• Formula</li> <li>• Advantages/disadvantages</li> <li>• Assumptions and data needs</li> </ul> b. Pure premium method <ul style="list-style-type: none"> <li>• Formula</li> <li>• Advantages/disadvantages</li> <li>• Assumptions and data needs</li> </ul>

READINGS
CAS Principles McClenahan

## E. Classification Analysis

Range of weight for Section E: 10-15 percent

This section deals with a number of ratemaking issues surrounding the proper classification of insureds for the purposes of risk stratification.

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
1. Explain the purpose of and methods for segregating data into homogeneous groups. Range of weight: 0-5 percent	a. Effect on insurance operations (e.g., underwriting) b. Credibility c. Adverse selection d. Criteria for selection of classification grouping e. Efficiency of class plan

<b>READINGS</b>
Boor 1 Bouska Burger et al. CAS Principles Feldblum 2 Finger Lange Webb et al.

<b>LEARNING OBJECTIVES</b>	<b>KNOWLEDGE STATEMENTS</b>
2. Calculate rating factors/relativity for: <ul style="list-style-type: none"> <li>• Classification</li> <li>• Territory</li> <li>• Deductibles</li> <li>• Increased limits</li> </ul> Range of weight: 8-12 percent	<ul style="list-style-type: none"> <li>a. Credibility/complements of credibility</li> <li>b. Off balance</li> <li>c. Capping of changes</li> <li>d. Layers of loss</li> <li>e. Loss elimination</li> <li>f. Basic versus total limits</li> <li>g. Expense adjustments</li> <li>h. Formulas/processes for each rating factor</li> </ul>

<b>READINGS</b>
Boor 1 Bourdon Brown and Schmitz CAS Principles Feldblum 1 Feldblum 2 Finger Graves and Castillo Lange

## F. Miscellaneous Ratemaking Topics

Range of weight for Section F: 15-20 percent

This section includes assorted topics related to ratemaking.

<b>LEARNING OBJECTIVES</b>	<b>KNOWLEDGE STATEMENTS</b>
1. Explain the purpose of coinsurance. Range of weight: 0-5 percent	<ul style="list-style-type: none"> <li>a. Definition of coinsurance</li> <li>b. Insurance to Value concepts</li> <li>c. Layers of loss</li> <li>d. Coverage issues</li> <li>e. Coinsurance provisions</li> </ul>
2. Calculate premium for policies with coinsurance provisions. Range of weight: 0-5 percent	<ul style="list-style-type: none"> <li>a. Common policy provisions</li> <li>b. Formula and its components</li> <li>c. Layers of loss</li> </ul>
<b>READINGS</b>	
Anderson Kelley	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
3. Explain the impact of catastrophes on insurance company operations and ratemaking. Range of weight: 0-5 percent	a. Definition of catastrophe b. Concentration of exposure c. Underwriting issues d. Reinsurance e. Loss adjustment issues f. Claim issues g. Risk and profit loads
<b>READINGS</b>	
Burger et al.	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
4. Calculate a catastrophe provision. Range of weight: 0-5 percent	a. Definition of catastrophe b. Formula/process for estimating modeled and non-modeled catastrophes c. Definition of damage ratios d. Coverage terms
<b>READINGS</b>	
Burger et al.	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
5. Explain the use of statistical plans. Range of weight: 0-5 percent	a. Purpose of a statistical plan b. Components of a statistical plan c. Limitations of company and industry data
<b>READINGS</b>	
Moncher Prevosto	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
6. Explain the purpose of individual risk rating. Range of weight: 0-5 percent	a. Experience modifications b. Schedule rating c. Credibility d. Manual rating e. Retrospective rating f. Experience period
<b>READINGS</b>	
CAS Principles Sherwood Tiller	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
7. Perform individual risk rating calculations. Range of weight: 0-5 percent	a. Formula for experience modification and components b. Layers of loss c. Credibility d. Manual rating

READINGS
Sherwood Tiller

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
8. Calculate insurance prices using asset share and cash flow techniques for estimating costs. Range of weight: 3-7 percent	a. Model characteristics and formulas b. Premium c. Loss characteristics (frequency, severity) d. Expenses e. Persistency rates f. Policy durations g. Termination rates

READINGS
Feldblum 1

## Complete Text References for Exam 5

Text references are alphabetized by the citation column.

Citation	Abbreviation	Learning Objective	Source
Actuarial Standards Board of the American Academy of Actuaries, "Actuarial Standard of Practice No. 13, Trending Procedures in Property/Casualty Insurance Ratemaking."	ASOP 13	D2, D3	W
Anderson, G., "Insurance to Value," CAS Study Note, Third Edition, February 2005.	Anderson	F1, F2	W
Boor, J.A., "The Complement of Credibility," <i>PCAS LXXXIII</i> , 1996, pp. 1-40, including errata. Examination questions will not be based directly on Appendices A, B, and C, which were included in this Study Note for completeness.	Boor 1	D3, E1, E2	W
Boor, J.A., "The Impact of the Insurance Economic Cycle on Insurance Pricing" (Second Edition), CAS Study Note, August 2004.	Boor 2	B4	W
Boor, J.A., "A Macroeconomic View of the Insurance Marketplace," CAS Study Note, 1998.	Boor 3	B4	W
Bourdon, T.W.; Passwater, K.; and Priven, M., "An Introduction to Capitation and Health Care Provider Excess Insurance," <i>Health Care Issues for Property/Casualty Insurers</i> , Casualty Actuarial Society Discussion Paper Program, 1997, pp. 97-139, including erratum.	Bourdon	C, D3, E2	W
Bouska, A.S., "Exposure Bases Revisited," <i>PCAS LXXVI</i> , 1989, pp. 1-23.	Bouska	D1, E1,	W
Brown, B.Z.; and Schmitz, M.C., "Study Note Reading on Deductibles," CAS Study Note, 1998.	Brown and Schmitz	D4, E2	W



Citation	Abbreviation	Learning Objective	Source
Burger, G.; Fitzgerald, B.; Woods, P.; and White, J., "Incorporating a Hurricane Model into Property Ratemaking," Study Note, omitting pp. 42-53. Examination questions will not be based directly on the Appendix and Glossary, which were included in this Study Note for completeness.	Burger et al.	D3, E1, F3, F4	SK
Casualty Actuarial Society Committee on Ratemaking Principles, <i>Statement of Principles Regarding Property and Casualty Insurance Ratemaking</i> , Casualty Actuarial Society.	CAS Principles	D1-4, D6, E1, E2, F6	W
Feldblum, S., "Personal Automobile Premiums: An Asset Share Pricing Approach for Property-Casualty Insurance," <i>PCAS LXXXIII</i> , 1996, pp. 190-256 (excluding Sections 7-9).	Feldblum 1	D2, E2, F8	W
Feldblum, S., "Workers' Compensation Ratemaking," CAS Study Note, September 1993. Examination questions will not be based directly on the appendices, which were included in this Study Note for completeness.	Feldblum 2	D1-5, E1, E2,	W
Finger, R.J., "Risk Classification," <i>Foundations of Casualty Actuarial Science</i> (Fourth Edition), Casualty Actuarial Society, 2001, Chapter 6, pp. 287-342, including errata.	Finger	D1-3, E1, E2	W
Graves, N.; and Castillo, R., "Commercial General Liability Insurance Ratemaking for Premises and Operations," <i>Pricing Issues</i> , Casualty Actuarial Society <i>Discussion Paper Program</i> , 1990, Volume II, pp. 631-696 (excluding section on Minimum Bias Procedures, pp. 673-681).	Graves and Castillo	D1, D3, D4, D5, E2	W
Insurance Services Office, Inc., Personal Automobile Manual (Effective 6-98), General Rules 1-6 only. The entire manual is included for completeness.	ISO PAM	A3	SK
Insurance Services Office, Inc., Personal Automobile Policy (Edition 6-98).	ISO PAP	A1, A2	SK
Jones, B.D., "An Introduction to Premium Trend," CAS Study Note, 2002.	Jones	D1, D2	W
Kelley, R., "Homeowners Insurance to Value—An Update," <i>Casualty Actuarial Society Forum</i> including the Ratemaking Call Papers, 1994, pp. 529-562.	Kelley	F1, F2	W
Lange, J.T., "The Interpretation of Liability Increased Limits Statistics," <i>PCAS LVI</i> , 1969, pp. 163-173.	Lange	E1, E2	W
Malecki, D.S.; and Flitner, A.L., <i>Commercial Liability Insurance and Risk Management</i> (Fourth Edition), American Institute for Chartered Property Casualty Underwriters, 1998, Volume 1, pp. 1-33, 71-123.	Malecki and Flitner	A1, A2	SK

Citation	Abbreviation	Learning Objective	Source
Malecki, D.S.; Horn, R.C.; Wiening, E.A.; and Flitner, A.L., <i>Commercial Liability Insurance and Risk Management</i> (Third Edition), American Institute for Chartered Property Casualty Underwriters, 1996, Volume 2, pp. 1-60, 167-180.	Malecki et al.	A1, A2, C	SK
Marker, J.O.; and Mohl, J.J., "Rating Claims-Made Insurance Policies," <i>Pricing Property and Casualty Insurance Products</i> , Casualty Actuarial Society <i>Discussion Paper Program</i> , 1980, pp. 265-304 and errata. Including discussion of paper: McManus, M.F., pp. 305-322.	Marker and Mohl	D3	W
McClenahan, C.L., "Ratemaking," <i>Foundations of Casualty Actuarial Science</i> (Fourth Edition), Casualty Actuarial Society, 2001, Chapter 3, pp. 75-148, including errata.	McClenahan	B2, D1-6	W
Moncher, R.B., "Study Note: NCCI Data Collection Calls and Statistical Plans," CAS Study Note. Examination questions will not be taken from the history section that was included to emphasize the changing nature of data collection activities over time.	Moncher	F5	W
Prevosto, V.R., "Study Note: ISO Statistical Plans," CAS Study Note. Candidates will not responsible for the details of the Exhibits.	Prevosto	F5	W
Schofield, D., "Going From a Pure Premium to a Rate," CAS Study Note, 1998.	Schofield	D4	W
Sherwood, M.T., "Individual Risk Rating," <i>Foundations of Casualty Actuarial Science</i> (Fourth Edition), Casualty Actuarial Society, 2001, Chapter 4, pp. 149-195.	Sherwood	F6, F7	W
Tiller, M.W., "Individual Risk Rating," CAS Study Note.	Tiller	F6, F7	W
Trupin, J.; and Flitner, A.L., <i>Commercial Property Insurance and Risk Management</i> (Fifth Edition), American Institute for Chartered Property Casualty Underwriters, 1998, Volume 1, pp. 101-122.	Trupin and Flitner	A1, A2	SK
Webb, B.L.; Harrison, C.M.; and Markham, J.J., <i>Insurance Operations and Regulation</i> (First Edition), American Institute for Chartered Property Casualty Underwriters, 2002, pp. 1.3-1.13, 3.3-3.14 (up to Alternate Marketing Mechanisms), 3.23 (beginning at Market Distribution System Management) - 3.30 (up to Market Shares), 4.3-4.16, 5.3-5.26 (up to Underwriting Other Causes of Loss), 6.3-6.43 (up to Personal Liability Underwriting), 14.3-14.33 (up to Challenges Facing Specific Types of Property Claims), and 15.3-15.30 (up to Challenges Facing Specific Types of Liability Claims).	Webb et al.	B1, B3, E1	SK

Citation	Abbreviation	Learning Objective	Source
Werner, G.T., "Incorporation of Fixed Expenses," <i>Casualty Actuarial Society Forum</i> , Winter 2004, pp. 211-249.	Werner	D4	W
Wiening, E.A.; and Malecki, D.S., <i>Insurance Contract Analysis</i> (First Edition), American Institute for Chartered Property Casualty Underwriters, 1992, pp. 4-30, 37-74, 83-91, and 373-382.	Wiening and Malecki	A1	SK
Wiening, E. A.; Rejda, G. E.; Luthardt, C. M.; and Ferguson, C. L., <i>Personal Insurance</i> (First Edition), American Institute for Chartered Property Casualty Underwriters, 2002, pp. 1.3-1.16, 3.3-3.31, 4.3-4.21, 5.3-5.41, 6.3-6.19 (up to Section II—Additional Coverages), and 12.5-12.27.	Wiening et al.	A1, A2, C	L

## Source Key

- L** May be borrowed from the CAS Library.
- NEW** Indicates new or updated material or modified citation.
- SK** Represents material included in the 2006 CAS Study Kit.
- SKU** Represents material included in the 2006 CAS Study Kit and the 2006 Update to the 2005 Study Kit.
- W** Represents material that is available at no charge from the "Admissions" section of CAS Web Site ([www.casact.org](http://www.casact.org)) under Syllabus Web Notes. (For those without access to the Internet, printed copies of the Web Notes are available for a fee.)

## Publishers and Distributors

Contact information is furnished for those who wish to purchase the text references cited for Exam 5. Publishers and distributors are independent and listed for the convenience of candidates; inclusion does not constitute endorsement by the CAS.

ACTEX Publications (Mad River Books), 140 Willow Street, Suite One, P.O. Box 974, Winsted, CT 06098; telephone: (800) 282-2839 or (860) 379-5470; fax: (860) 738-3152; e-mail: [retail@actexamdriver.com](mailto:retail@actexamdriver.com).

Actuarial Bookstore, P.O. Box 69, Greenland, NH 03840; telephone: (800) 582-9672 (U.S. only) or (603) 430-1252; fax: (603) 430-1258; Web site: [www.actuarialbookstore.com](http://www.actuarialbookstore.com).

Actuarial Standards Board, American Academy of Actuaries, 475 N. Martingale Road, Suite 600, Schaumburg, IL 60173; telephone: (847) 706-3513; fax: (847) 706-3599.

American Institute for Chartered Property Casualty Underwriters, Order Department, P.O. Box 3016, 720 Providence Road, Malvern, PA 19355-0716; telephone: (610) 644-2100; fax: (610) 640-9576.

Casualty Actuarial Society, 4350 N. Fairfax Drive, Suite 250, Arlington, VA 22203; telephone: (703) 276-3100; fax: (703) 276-3108; e-mail: [office@casact.org](mailto:office@casact.org); Web site: [www.casact.org](http://www.casact.org).

Insurance Services Office, Inc., 545 Washington Boulevard, Jersey City, NJ 07310-1686; telephone: (800) 888-4476.

SlideRule Books, 10 First Avenue East, Mobridge, SD 57601; telephone: (877) 407-5433 or (605) 845-5580; fax: (877) 417-5433 or (605) 845-7627; Web site: [www.sliderulebooks.com](http://www.sliderulebooks.com).

## Exam 6

# Reserving, Insurance Accounting Principles, Reinsurance, and Enterprise Risk Management

Before commencing study for this four-hour examination, candidates should read the introduction to “Materials for Study” on page 43 of this *Syllabus* for important information about learning objectives, knowledge statements, readings, and the range of weights. Items marked with a bold **SK** or **SKU** constitute the 2006 CAS Exam 6 Study Kit that is available from the CAS Office for a cost of \$35. Items marked with a bold **w** are available at no charge under Web Notes in the “Admissions” section of the CAS Web Site ([www.casact.org](http://www.casact.org)). Those without access to the Web may purchase a print version of the items marked with a **w**—the 2006 CAS Exam 6 Web Notes—from the CAS Office for a cost of \$98. The 2006 Update to the 2005 Study Kit is available at a cost of \$12 and includes only the items marked with a bold **SKU**. Information about Study Kits and Web Notes is available on page 35.

Please check the “Admissions” section of the CAS Web Site for any changes to the *Syllabus*.

The CAS will test the candidate’s knowledge of the material, but may decide not to include questions from every reading on a particular exam.

### A. Actuarial Reserves

Range of weight for Section A: 40–55 percent

This section introduces the various techniques that the actuary uses to develop or review actuarial reserves that may be established by an insurance entity or by a noninsurance entity that is retaining risk. The principles and standards of practice for reserving will be examined.

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
1. Calculate loss reserves using each of the following reserving methods: <ul style="list-style-type: none"> <li>• Chainladder, Bornhuetter-Ferguson</li> <li>• Frequency/severity models</li> <li>• Credibility models</li> </ul> Range of weight: 10–15 percent	a. Standards of Practice, ASOP No. 9 b. Statement of Principles, CAS c. Mechanics associated with each of the methods d. Loss and claims handling process e. Accounting basis of the data f. Application of credibility g. Terms: loss reserves, salvage and subrogation, GAAP reserves, SAP reserves, IBNR, case reserves, gross and net of reinsurance exposure measures, payout pattern, reporting pattern
READINGS	
Adler and Kline ASB 9 Berquist and Sherman Bornhuetter and Ferguson Brosius CAS Fisher and Lange Mack Wiser et al.	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
2. Forecast reserves and their distributions using stochastic models. Range of weight: 0–5 percent	a. Define formal mathematical model b. Understand calendar year, accident year, and development year trends and their interrelationships c. Select appropriate parameters d. Calculate variance and percentiles of reserve distribution
<b>READINGS</b>	
Barnett and Zehnwirth	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
3. Forecast loss adjustment expense reserves. Range of weight: 0-5 percent	a. Forecast ALAE reserves b. Forecast ULAE reserves c. Forecast other categories of LAE (e.g., DCC, AOE) reserves
<b>READINGS</b>	
Johnson Kittel Wiser et al.	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
4. Identify strengths and weaknesses of reserving methods for specific situations/data. Range of weight: 8-12 percent	a. Ways data are organized b. Advantages and disadvantages of various methods c. Terms: age of data, limits, line of business d. Fundamentals of different types of insurance: long-tailed versus short tailed, high frequency, low severity
<b>READINGS</b>	
Adler and Kline ASB 9 Barnett and Zehnwirth Berquist and Sherman Bornhuetter and Ferguson Brosius CAS Fisher and Lange Fisher and Lester Hayne Johnson Kittel Mack Pinto and Gogol Wiser et al.	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
5. Adjust data and/or projections for changes in: <ul style="list-style-type: none"> <li>• Case reserve adequacy</li> <li>• Closure rates and insurance programs</li> <li>• Reinsurance programs</li> </ul> Note: focus on the ceding company's perspective. Range of weight: 3-7 percent	a. Accounting basis for the data, e.g., how claims are counted; how claims are grouped; claims-made versus occurrence b. Effect of subrogation and salvage on projections c. How reinsurance works
<b>READINGS</b>	
Berquist and Sherman Fisher and Lester	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
6. Test results of reserve analysis for adequacy/reasonableness. Range of weight: 5-10 percent	a. What an adequate reserve is b. Retrospective tests c. Prospective tests d. Credibility of reserves e. Reserve margin definition (confidence interval)
<b>READINGS</b>	
Berquist and Sherman Brosius Fisher and Lange Fisher and Lester Wiser et al.	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
7. Assess the impact of operating changes on the reserve estimate. Range of weight: 3-7 percent	a. How operating changes affect reserve estimates <ul style="list-style-type: none"> <li>• Underwriting and policy language</li> <li>• Marketing</li> <li>• Claims administration</li> <li>• Reinsurance</li> <li>• Deductibles</li> </ul>
<b>READINGS</b>	
ASB 9 Berquist and Sherman Fisher and Lester	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
8. Forecast reserves for various layers of loss. Range of weight: 0-5 percent	a. Methods for reserving losses in a deductible layer b. Methods for reserving unlimited losses excess of a threshold c. Methods for reserving losses excess of a retention but bounded by a limit d. Interrelationships between parameters for forecasting deductible, unlimited excess, layer excess and total losses

<b>READINGS</b>
Pinto and Gogol Siewert

<b>LEARNING OBJECTIVES</b>	<b>KNOWLEDGE STATEMENTS</b>
9. Forecast reserves for loss-sensitive contract features. Range of weight: 0-5 percent	a. Forecast reserves for retrospective premiums

<b>READINGS</b>
Teng and Perkins

<b>LEARNING OBJECTIVES</b>	<b>KNOWLEDGE STATEMENTS</b>
10. Make specific provisions in the reserve estimate for emerging mass tort liabilities. Range of weight: 0-5 percent	a. Mass tort liabilities that are emerging, e.g., mold, asbestos, pollution, lead paint b. Methods for estimating the reserves c. Differences between normal or traditional claim development and development of mass torts

<b>READINGS</b>
Bouska

<b>LEARNING OBJECTIVES</b>	<b>KNOWLEDGE STATEMENTS</b>
11. Calculate Unearned Premium Reserves (UEPR) Range of weight: 0-5 percent	a. Understand the various purposes of the UEPR b. Calculate the UEPR that corresponds to each purpose c. Select the appropriate final accounting value for the UEPR for warranty and service contracts

<b>READINGS</b>
Hayne

## B. Insurance Accounting Principles

Range of weight for Section B: 10-20 percent

This section presents the general concepts of insurance accounting to the candidate. The candidate should become familiar with insurance accounting terminology and practice. This includes differences between statutory and Generally Accepted Accounting Principles (GAAP) accounting, and the impact of reinsurance and reserves on financial statements.

<b>LEARNING OBJECTIVES</b>	<b>KNOWLEDGE STATEMENTS</b>
1. Explain the purposes and origins of accounting standards and regulations. Range of weight: 0-5 percent	a. Purpose of accounting b. Types of accounting c. Principal financial statements d. Sources of accounting rules e. Selected accounting concepts f. Common accounts for insurance companies g. The ways GAAP and SAP accounting can differ for a particular country (e.g., the United States)

<b>READINGS</b>
Blanchard Accounting Blanchard Premium FAS 5 FAS 60 IFRS 4 Basis IFRS 4 Standard Marshall et al.

<b>LEARNING OBJECTIVES</b>	<b>KNOWLEDGE STATEMENTS</b>
2. Create a balance sheet and income statement given major account balances at various points in time. Range of weight: 0-5 percent	a. Formulas associated with each component of the balance sheet and income statement b. Assignment of items to assets, liabilities, receipts, and expenses according to GAAP and SAP

<b>READINGS</b>
Blanchard Premium IASA IFRS 4 Basis IFRS 4 Standard Marshall et al. Troxel and Bouchie

<b>LEARNING OBJECTIVES</b>	<b>KNOWLEDGE STATEMENTS</b>
3. Analyze balance sheet and income statement to determine financial performance of insurance companies. Range of weight: 3-7 percent	a. Definition and purpose of balance sheet b. Definition and purpose of income statement c. Relevant measures that define financial performance, e.g., profitability, liquidity, leverage, underwriting ratios

<b>READINGS</b>
IASA Marshall et al. Troxel and Bouchie

<b>LEARNING OBJECTIVES</b>	<b>KNOWLEDGE STATEMENTS</b>
4. Evaluate risk transfer content of reinsurance contracts. Range of weight: 0-5 percent	a. Identification and evaluation of insurance and financing components of the contract b. Determination whether the contract qualifies for insurance accounting treatment or deposit accounting treatment

<b>READINGS</b>
CAS VFIC FAS 113 IASA IFRS 4 Basis IFRS 4 Standard



LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
5. Create accounting entries relating to reinsurance transactions and measure their effects on key financial statement values. Range of weight: 0-5 percent	a. Insurance accounting versus deposit accounting b. How surplus relief works c. Effect on loss reserves d. Effect on unearned premium reserves e. Types of reinsurance that apply f. Leverage ratios (gross versus net) g. FAS 113
<b>READINGS</b>	
CAS VFIC FAS 113 IASA IFRS 4 Standard IFRS 4 Basis	

## C. Reinsurance

Range of weight for Section C: 30-40 percent

This section provides the candidate with information related to the sharing of risk between an insurer and reinsurer. It introduces the various types of reinsurance, its purposes, and how it is marketed and underwritten. It also addresses how actuarial concepts such as pricing and reserving are adapted to apply to reinsurers.

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
1. Explain the meaning of various reinsurance terms. Range of weight: 0-5 percent	a. XOL b. Quota share c. Surplus share d. Treaty e. Facultative f. Rate-on-line g. Subject earned premium h. Commutation i. Finite reinsurance j. Insurance capacity k. Clash l. Ceded, direct, gross, assumed, net m. Catastrophe treaty n. Aggregate excess of loss o. Burning costs
2. Explain the purposes of various reinsurance arrangements. Range of weight: 3-7 percent	a. Capacity b. Surplus relief c. Smoothing of results
<b>READINGS</b>	
Harrison IASA	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
3. Determine the price of reinsurance programs using the appropriate methods. Range of weight: 3-7 percent	a. Loss distributions b. Increased limit factors c. Trend d. Expenses e. Reinsurance pricing methods <ul style="list-style-type: none"> <li>• Burn cost</li> <li>• Exposure method</li> <li>• Experience rating</li> </ul>
<b>READINGS</b>	
Clark Ludwig	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
4. Measure the effects on reinsurance pricing of: <ul style="list-style-type: none"> <li>• Sliding scale commissions</li> <li>• Reinstatement clauses</li> <li>• Loss corridors</li> <li>• Retrospective rating</li> <li>• Commutations</li> <li>• Clash</li> <li>• Catastrophe</li> </ul> Range of weight: 3-7 percent	a. Expenses b. Contract provisions, e.g., risk attaching versus losses occurring c. Loss distributions d. Present value e. Fundamentals of retrospective rating
<b>READINGS</b>	
Clark Ludwig Steenek	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
5. Calculate ceded losses when provided with gross losses using the provisions of the given reinsurance program. Range of weight: 3-7 percent	a. How reinsurance contracts apply <ul style="list-style-type: none"> <li>• ALAE included or excluded</li> <li>• Per occurrence limits</li> <li>• Aggregate limits</li> <li>• Order in which limits apply</li> </ul>
<b>READINGS</b>	
Harrison	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
6. Compare and contrast reinsurance and primary reserving procedures. Range of weight: 0-5 percent	a. Reinsurance and primary reserving methods b. Impact on assumptions because of differences in information available to reinsurers c. Stanard-Buhlmann method

7. Adjust primary methods and data to be used for reinsurance reserving. Range of weight: 0-5 percent	<ul style="list-style-type: none"> <li>a. Reinsurance and primary reserving methods</li> <li>b. Impact on assumptions because of differences in information available to reinsurers</li> <li>c. Underlying business characteristics e.g., concentration of exposures</li> <li>d. Data structures: <ul style="list-style-type: none"> <li>• Ground up versus excess loss</li> <li>• Accident year versus treaty year</li> </ul> </li> </ul>
8. Calculate ceded loss reserves using appropriate methods. Range of weight: 3-7 percent	<ul style="list-style-type: none"> <li>a. Reinsurance reserving methods</li> <li>b. Adjustments in data (see above)</li> <li>c. Statement of Principles, CAS</li> <li>d. Standards of Practice, ASOP No. 9</li> </ul>
<b>READINGS</b>	
Patrik	

## D. Enterprise Risk Management

Range of weight for Section D: 0–10 percent

This section introduces the candidate to the concepts and basic techniques of Enterprise Risk Management (ERM). ERM seeks to address the entire landscape of risk that confronts a business. Within the broad arena of ERM, the techniques of Dynamic Financial Analysis (DFA) provide a quantitative modeling framework for analyzing the potential financial results of a firm on a stochastic basis.

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
1. Explain concepts of ERM and DFA. Range of weight: 0-5 percent	<ul style="list-style-type: none"> <li>a. ERM's various categories of risk (description and examples)</li> <li>b. Description of basic concepts of DFA</li> </ul>
<b>READINGS</b>	
CAS ERM DFA	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
2. Map all sources of risk into an integrated framework. Range of weight: 0-10 percent	<ul style="list-style-type: none"> <li>a. Create comprehensive landscape of risks threatening a firm</li> <li>b. Identify positive and negative correlations among sources of risk</li> <li>c. Create probabilistic, quantitative model for Strategic Risk</li> <li>d. Create probabilistic, quantitative model for Operational Risk</li> </ul>
<b>READINGS</b>	
CAS ERM DFA Slywotzky and Drzik	

## Complete Text References for Exam 6

Text references are alphabetized by the citation column.

Citation	Abbreviation	Learning Objective	Source
Actuarial Standards Board of American Academy of Actuaries, "Actuarial Standard of Practice No. 9, Documentation and Disclosure in Property and Casualty Insurance Ratemaking, Loss Reserving, and Valuations (Doc. No. 027)," 1991. Excluding Appendices 1 and 3.	ASB 9	A1, A4, A7	W
Adler, M.; and Kline, C.D. Jr., "Evaluating Bodily Injury Liabilities Using a Claims Closure Model," <i>Evaluating Insurance Company Liabilities</i> , Casualty Actuarial Society Discussion Paper Program, 1988, pp. 1-66.	Adler and Kline	A1, A4	W
Barnett, G.; and Zehnwirth, B., "Best Estimates for Reserves," <i>PCAS LXXXVII</i> , 2000, pp. 245-303.	Barnett and Zehnwirth	A2, A4	W
Berquist, J.R.; and Sherman, R.E., "Loss Reserve Adequacy Testing: A Comprehensive, Systematic Approach," <i>PCAS LXIV</i> , 1977, pp. 123-184. Including discussion of paper: Thorne, J.O., <i>PCAS LXV</i> , 1978, pp. 10-33.	Berquist and Sherman	A1, A4, A5, A6, A7	W
Blanchard, R.S., "Accounting Concepts for the Actuary," CAS Study Note, June 2003.	Blanchard Accounting	B1	W
Blanchard, R.S., "Premium Accounting," CAS Study Note, May 2005.	Blanchard Premium	B1, B2	W NEW
Bornhuetter, R.L.; and Ferguson, R.E., "The Actuary and IBNR," <i>PCAS LIX</i> , 1972, pp. 181-195. Including discussions of paper: Cooper, W.P., <i>PCAS LX</i> , 1973, pp. 161-164; and White, H.G., <i>PCAS LX</i> 1973, pp. 165-168.	Bornhuetter and Ferguson	A1, A4	W
Bouska, A.S., "From Disability Income to Mega-Risks: Policy-Event Based Loss Estimation," <i>Casualty Actuarial Society Forum</i> , Summer 1996, pp. 291-320.	Bouska	A10	W
Brosius, E., "Loss Development Using Credibility," CAS Study Note, March 1993.	Brosius	A1, A4, A6	W
Casualty Actuarial Society Enterprise Risk Management Committee, "Overview of Enterprise Risk Management," <i>Casualty Actuarial Society Forum</i> , Summer 2003, Section 3 and Appendix B.	CAS ERM	D1, D2	W
Casualty Actuarial Society, <i>Statement of Principles Regarding Property and Casualty Loss and Loss Adjustment Expense Reserves</i> , May 1988.	CAS	A1, A4	W
Casualty Actuarial Society Valuation, Finance, and Investments Committee, "Accounting Rule Guidance Statement of Financial Accounting Standards No. 113—Considerations in Risk Transfer Testing" <i>Casualty Actuarial Society Forum</i> , Fall 2002, pp. 305-338, excluding Section 7, Beyond VaR Tests.	CAS VFIC	B4, B5	W

Citation	Abbreviation	Learning Objective	Source
Clark, D.R., "Basics of Reinsurance Pricing," CAS Study Note, 1996.	Clark	C3, C4	W
Dynamic Financial Analysis Committee of the Casualty Actuarial Society, "Overview of Dynamic Financial Analysis," DFA Research Handbook, CAS Web Site ( <a href="http://www.casact.org/research/dfa/dfahbch1.pdf">www.casact.org/research/dfa/dfahbch1.pdf</a> ), Chapter 1.	DFA	D1, D2	W
Financial Accounting Standards Board, "Statement of Financial Accounting Standards No. 5, Accounting for Contingencies," Paragraphs 1-4, 8-11, 15, 40-45.	FAS 5	B1	SK
Financial Accounting Standards Board, "Statement of Financial Accounting Standards No. 60, Accounting and Reporting by Insurance Enterprises," Paragraphs 1-9, 11, 13-14, 17-18, 20, 27-34, 38-41, 44, 60 a-h.	FAS 60	B1	SK
Financial Accounting Standards Board, "Statement of Financial Accounting Standards, No. 113, Accounting and Reporting for Reinsurance of Short-Duration and Long-Duration Contracts," December 1992, Paragraphs 1-11, 14-25, 34-67, and 70-109. Candidate will not be responsible for material relating to long-duration contracts and/or life insurance.	FAS 113	B4, B5	SK
Fisher, W.H.; and Lange, J.T., "Loss Reserve Testing: A Report Year Approach," <i>PCAS LX</i> , 1973, pp. 189-207. Including discussions of paper: Skurnick, D., <i>PCAS LXI</i> , 1974, pp. 73-83; and authors' response, <i>PCAS LXI</i> , 1974, pp. 84-85.	Fisher and Lange	A1, A4, A6	W
Fisher, W.H.; and Lester, E.P., "Loss Reserve Testing in a Changing Environment," <i>PCAS LXII</i> , 1975, pp. 154-171.	Fisher and Lester	A4, A5, A6, A7	W
Harrison, C.M., <i>Reinsurance Principles and Practices</i> (First Edition), American Institute for Chartered Property Casualty Underwriters/Insurance Institute of America, 2004, Chapter 1, 2 (from beginning through page 2.21), 4, 8, 9, and 10.	Harrison	C1, C2, C5	L NEW
Hayne, R.H., "Unearned Premium Reserves—Change is in the Wind," <i>Casualty Actuarial Society Forum</i> , Fall 1999, pp. 177-205.	Hayne	A4, A11	W
Insurance Accounting and Systems Association, <i>Property-Casualty Insurance Accounting</i> (Eighth Edition), 2003, Chapter 11 (excluding "Annual Statement Requirements," pp. 11-26 through 11-29).	IASA	B2, B3, B4, B5, C1, C2	L NEW
International Accounting Standards Board, Basis for Conclusions on IFRS 4 Insurance Contracts, paragraphs BC11-BC39	IFRS 4 Basis	B1, B2, B4, B5	SKU NEW
International Accounting Standards Board, International Financial Reporting Standard 4 Insurance Contracts, Appendix A (only the defined terms for fair value, financial risk, insurance contract, and insurance risk) and Appendix B (entire Appendix).	IFRS 4 Standard	B1, B2, B4, B5	SKU NEW

Citation	Abbreviation	Learning Objective	Source
Johnson, W.A., "Determination of Outstanding Liabilities for Unallocated Loss Adjustment Expenses," <i>PCAS LXXVI</i> , 1989, pp. 111-125. Corrections to Exhibits 2-5 are included.	Johnson	A3, A4	W
Kittel, J., "Unallocated Loss Adjustment Expense Reserves in an Inflationary Economic Environment," <i>Inflation Implications for Property-Casualty Insurance</i> , Casualty Actuarial Society Discussion Paper Program, 1981, pp. 311-331. Including discussion of paper: Bill, R., pp. 332-343.	Kittel	A3, A4	W
Ludwig, S.J., "An Exposure Rating Approach to Pricing Property Excess-of-Loss Reinsurance," <i>PCAS LXXVIII</i> , 1991, pp. 110-145. Includes discussion: Feldblum, S., <i>PCAS LXXX</i> , 1993, pp. 380-395.	Ludwig	C3, C4	W
Mack, T. "Credible Claims Reserve: The Benktander Method," <i>ASTIN Bulletin</i> , 2000, pp. 333-337.	Mack	A1, A4	W
Marshall, D.H.; McManus, W.W.; and Scoles, K.N., Jr., <i>Accounting and Finance for Insurance Professionals</i> (Second Edition), American Institute for Chartered Property Casualty Underwriters, 2001, Chapters 5 and 11 (pp. 11.1-11.6, 11.26-11.39, 11.45). Note: Although other portions of the text will not specifically be tested, candidates may find this text to be useful as basic accounting background.	Marshall et al.	B1, B2, B3	SK
Patrik, G.S., "Reinsurance," <i>Foundations of Casualty Actuarial Science</i> (Fourth Edition), Casualty Actuarial Society, 2001, Chapter 7, pp. 434-464 (section on Reinsurance Loss Reserving).	Patrik	C6, C7, C8	W
Pinto, E.; and Gogol, D.F., "An Analysis of Excess Loss Development," <i>PCAS LXXIV</i> , 1987, pp. 227-255. Including discussions of paper: Levine, G.M., <i>PCAS LXXIV</i> , 1987, pp. 256-271; and Bear, R.A., <i>PCAS LXXIX</i> , 1992, pp. 134-148.	Pinto and Gogol	A4, A8	W
Siewert, J.J., "A Model for Reserving Workers Compensation High Deductibles," <i>Casualty Actuarial Society Forum</i> , Summer 1996, pp. 217-244.	Siewert	A8	W
Slywotzky, A.J.; and Drzik, J., "Countering the Biggest Risk of All," <i>Harvard Business Review</i> , April 2005, Harvard Business School Publishing.	Slywotzky and Drzik	D2	SKU NEW
Steenek, L., "Commutation of Claims," CAS Study Note, 1998.	Steenek	C4	W
Teng, M.T.S.; and Perkins, M.E., "Estimating the Premium Asset on Retrospectively Rated Policies," <i>PCAS LXXXIII</i> , 1996, pp. 611-647. Including discussion of paper: Feldblum, S., <i>PCAS LXXXV</i> , 1998, pp. 274-315. Candidates will not be held responsible for specific Annual Statement notation but will be responsible for concepts presented.	Teng and Perkins	A9	W

Citation	Abbreviation	Learning Objective	Source
Troxel, T.E.; and Bouchie, G.E., <i>Property-Liability Insurance Accounting and Finance</i> (Fourth Edition), American Institute for Chartered Property Casualty Underwriters, 1995, Chapters 2 and 3 (pp. 126-131).	Troxel and Bouchie	B2, B3	SK
Wiser, R.F.; Cockley, J.E; and Gardner A., "Loss Reserving," <i>Foundations of Casualty Actuarial Science</i> (Fourth Edition), Casualty Actuarial Society, 2001, Chapter 5, pp. 197-285.	Wiser et al.	A1, A3, A4, A6	W

## Source Key

- L** May be purchased from the publisher or bookstore or borrowed from the CAS Library.
- NEW** Indicates new or updated material or modified citation.
- SK** Represents material included in the 2006 CAS Study Kit.
- SKU** Represents material included in the 2006 CAS Study Kit and the 2006 Update to the 2005 Study Kit.
- W** Represents material that is available at no charge from the "Admissions" section of CAS Web Site ([www.casact.org](http://www.casact.org)) under Syllabus Web Notes. (For those without access to the Internet, printed copies of the Web Notes are available.)

## Publishers and Distributors

Contact information is furnished for those who wish to purchase the text references cited for Exam 6. Publishers and distributors are independent and listed for the convenience of candidates; inclusion does not constitute endorsement by the CAS.

ACTEX Publications, 140 Willow Street, Suite One, P.O. Box 974, Winsted, CT 06098; telephone: (800) 282-2839 or (860) 379-5470; fax: (860) 738-3152; Web site: [www.actexamdriver.com](http://www.actexamdriver.com); e-mail: [retail@actexamdriver.com](mailto:retail@actexamdriver.com).

Actuarial Bookstore, P.O. Box 69, Greenland, NH 03840; telephone: (800) 582-9672 (U.S. only) or (603) 430-1252; fax: (603) 430-1258; Web site: [www.actuarialbookstore.com](http://www.actuarialbookstore.com).

Actuarial Standards Board, American Academy of Actuaries, 475 N. Martingale Road, Suite 600, Schaumburg, IL 60173; telephone: (847) 706-3513; fax: (847) 706-3599.

American Institute for Chartered Property Casualty Underwriters, Order Department, P.O. Box 3016, 720 Providence Road, Malvern, PA 19355-0716; telephone: (610) 644-2100; fax: (610) 640-9576.

Casualty Actuarial Society *Forum*, *Foundations of Casualty Actuarial Science* (Fourth Edition), *PCAS*, and *Discussion Paper Program*, Casualty Actuarial Society, 4350 N. Fairfax Drive, Suite 250, Arlington, VA 22203; telephone: (703) 276-3100; fax: (703) 276-3108; e-mail: [office@casact.org](mailto:office@casact.org); Web site: [www.casact.org](http://www.casact.org).

Financial Accounting Standards Board, 401 Merret 7, P.O. Box 5116, Norwalk, CT 06856-5116; telephone: (203) 847-0700.

Harvard Business School Publishing, 60 Harvard Way, Boston, MA 02163; telephone (617) 783-7500; fax: (617) 783-7555.

Insurance Accounting and Systems Association, *Property-Casualty Insurance Accounting* (Eighth Edition), 2003, IASA Fulfillment Center, P.O. Box 51008, Durham, NC 27717; telephone: (800) 817-4272 or (919) 489-0991; fax: (800) 668-4272; Web site: [www.iasa.org](http://www.iasa.org).

Insurance Institute of America, 720 Providence Road, Malvern, PA 19355-0716; telephone: (610) 644-2100; fax: (610) 640-9576.

International Accounting Standards Board, 30 Cannon Street, London EC4M 6XH, United Kingdom; telephone: +44 (0)20 7246 6410; fax: telephone: +44 (0)20 7246 6411; Web site: [www.iasb.org](http://www.iasb.org).

SlideRule Books, 10 First Avenue East, Mobridge, SD 57601; telephone: (877) 407-5433 or (605) 845-5580; fax: (877) 417-5433 or (605) 845-7627; Web site: [www.sliderulebooks.com](http://www.sliderulebooks.com).

Archive 2008



# Exam 7-Canada

## Nation-Specific Examination: Annual Statement, Taxation, and Regulation

Before commencing study for this four-hour examination, candidates should read the introduction to “Materials for Study” on page 43 of this *Syllabus* for important information about learning objectives, knowledge statements, readings, and the range of weights. Items marked with a bold **SK** or **SKU** constitute the 2006 CAS Exam 7-Canada Study Kit that is available from the CAS Office for a cost of \$131. Items marked with a bold **W** are available at no charge under Web Notes in the “Admissions” section of the CAS Web Site ([www.casact.org](http://www.casact.org)). Those without access to the Web may purchase a print version of the items marked with a **W**—the 2006 CAS Exam 7-Canada Web Notes—from the CAS Office for a cost of \$13. The 2006 Update to the 2005 Study Kit is available at a cost of \$11 and includes only the items marked with a bold **SKU**. Information about Study Kits and Web Notes is available on page 35.

Please check the “Admissions” section of the CAS Web Site ([www.casact.org](http://www.casact.org)) for any changes to the *Syllabus*.

The CAS will test the candidate’s knowledge of the material, but may decide not to include questions from every reading on a particular exam.

Section A of this examination includes a comprehensive presentation of Canadian tort law in the perspective of the insurance business in Canada. Section B focuses on insurance regulation and insurance contract law while Section C presents an overview of government and industry insurance programs. Finally, Section D covers financial reporting and solvency issues. It includes insurance accounting and its relevant laws, regulations, and standards of practice. It also deals with solvency monitoring systems such as the Dynamic Capital Adequacy Testing of the Canadian Institute of Actuaries. All sections are complemented, where appropriate, with information from other countries.

### A. Background Law and Insurance

Range of weight for Section A: 13-18 percent

The legal foundation of tort law is a subject that is not strictly actuarial in nature, but that affects many areas of an actuary’s work. Since no prior legal knowledge is assumed, this first section includes a comprehensive presentation of Canadian tort law including functions of tort law, negligence, strict liability, products liability, government liability, occupiers liability, and damages and remedies. The material in this section should provide background and a basic understanding of how tort law gives rise to the need for insurance.

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
1. Identify and describe the key components of tort law. Range of weight: 3-8 percent	a. Functions of tort law b. Negligence theory including standard of care, duty, remoteness of damage and proximate cause, defenses c. Strict liability d. Products liability e. Government liability f. Occupiers’ liability
<b>READINGS</b>	
Baer and Rendall Linden	

<b>LEARNING OBJECTIVES</b>	<b>KNOWLEDGE STATEMENTS</b>
2. Identify and describe the underlying principles of insurance law. Range of weight: 0-5 percent	a. Utmost good faith b. Fortuity c. Indemnity d. Consumer protection e. Compensation
<b>READINGS</b>	
Brown	

<b>LEARNING OBJECTIVES</b>	<b>KNOWLEDGE STATEMENTS</b>
3. Discuss major elements of insurance contract law. Range of weight: 0-5 percent	a. Disclosure during negotiation b. Insurable interest c. Policy interpretation d. Relief from forfeiture, waiver, and estoppel e. Dispute resolution f. Liability insurance claims g. Salvage and subrogation
<b>READINGS</b>	
Baer and Rendall Brown	

<b>LEARNING OBJECTIVES</b>	<b>KNOWLEDGE STATEMENTS</b>
4. Distinguish between the different types of damages with respect to remedies in tort. Range of weight: 0-5 percent	a. Nominal damages b. Contemptuous damages c. Real damages d. Punitive or exemplary damages e. Aggravated damages f. Parasitic damages
5. Discuss the measurement of damages and the elements of personal injury damages. Range of weight: 0-5 percent	a. General and special damages b. Restitution in integrum c. Mitigation d. Non-pecuniary loss e. Pecuniary loss f. Structured settlements and judgments g. Survival of actions
<b>READINGS</b>	
Klar et al.	

<b>LEARNING OBJECTIVES</b>	<b>KNOWLEDGE STATEMENTS</b>
6. Discuss the trends in tort litigation including options for tort reform. Range of weight: 0-5 percent	a. Options for tort reform
<b>READINGS</b>	
BC Civil Liability Biggs CMPA Linden (Asbestos) Towers Perrin	

## B. Regulation of Insurance

Range of weight for Section B: 13-18 percent

Candidates should understand the role of the insurance business as a supplier of an essential service. Because of the essential and highly technical nature of insurance, a system of regulatory controls has been established to require the industry to demonstrate that it is providing fair and reliable services in accordance with the statutes and regulations of the jurisdiction.

The material in this section presents the historical development of insurance regulation in Canada as well as the fundamentals of insurance regulation. This section also includes a comprehensive review of Canadian insurance contract law. Judicial decisions affect insurance regulation to the extent they interpret the law and thereby modify regulatory behavior. Therefore, candidates are presented with a number of Canadian cases that have contributed to the development of legal precedents.

Candidates are also provided with a broad overview of the history, objectives, and current issues surrounding rate regulation in the United States.

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
1. Describe the reasons and the objectives of insurance regulation. Range of weight: 3-8 percent	a. Solvency b. Economics c. Contract regulation d. Market conduct e. Rate regulation
<b>READINGS</b>	
Baer and Rendall Ettlinger et al. McDonald	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
2. Describe both the historical development and the current state of insurance regulation, including the division of responsibility between federal and state/provincial regulators. Range of weight: 3-8 percent	a. British North America Act b. Privy Council c. Insurance Companies Act d. Role of CCIR e. Federal and provincial regulation, legislation, and case law f. Federal, foreign, and provincial companies g. U.S. rate regulation
<b>READINGS</b>	
Baer and Rendall Brown Ettlinger et al. McDonald	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
3. Compare and contrast different types of rate filing approaches; discuss state/provincial rate filing guidelines. Range of weight: 0-5 percent	a. Prior approval b. File and use c. Use and file d. Open competition e. State mandated

<b>READINGS</b>
Ettlinger et al. FSCO

<b>LEARNING OBJECTIVES</b>	<b>KNOWLEDGE STATEMENTS</b>
4. Discuss the issues, outcome, rationale and implications of landmark decisions for the insurance industry. Range of weight: 0-5 percent	a. Specific court cases noted in the Readings section directly below

<b>READINGS</b>
Baer and Rendall Best's Review Landmark Legal Linden McDonald

<b>LEARNING OBJECTIVES</b>	<b>KNOWLEDGE STATEMENTS</b>
5. Describe the structure of the insurance industry in Canada. Range of weight: 0-5 percent	a. Types of insurance carriers b. Nature of competition c. Insurance industry organizations d. Types of insurance (social and private, marine and non-marine, indemnity and non-indemnity, group and individual)

<b>READINGS</b>
Baer and Rendall

### C. Government and Industry Insurance Programs

Range of weight for Section C: 20-25 percent

Government plans are an intrinsic part of the overall insurance system. The actuary should have a general understanding of Canadian federal and provincial plans. Candidates are expected to be familiar with the basic principles and concepts underlying Canadian Employment Insurance and the Canadian pension programs. Candidates are not expected to have detailed knowledge of the current levels of benefits or the formulae used to calculate such benefits. This section also includes material regarding Canadian earthquake guidelines. Candidates are responsible for a general understanding of Canadian provincial health plans. An understanding of the workers compensation system in Canada is also required. In the statutory automobile insurance area, candidates should understand Canadian automobile insurance programs, including no-fault concepts and residual market requirements. Finally, candidates are introduced to provincial guaranty funds.

<b>LEARNING OBJECTIVES</b>	<b>KNOWLEDGE STATEMENTS</b>
1. Describe the origin and purpose of the following government and industry insurance programs: <ul style="list-style-type: none"> <li>• Flood insurance</li> <li>• Crop insurance</li> <li>• Unemployment</li> <li>• Medicare/Health Care</li> </ul>	a. Reason for inception b. Major historical developments c. Philosophy of program

<ul style="list-style-type: none"> <li>• Residual markets (e.g., auto, workers compensation, property)</li> <li>• Crime and riot</li> <li>• Workers Compensation</li> <li>• Automobile</li> <li>• Pension Plans</li> <li>• Guaranty Funds</li> </ul> <p>Range of weight: 5-10 percent</p>	
<p>2. Describe the operations and risk transfer process for each government/industry program listed in Section C.1, and the interactions of government/industry insurance programs and the voluntary private insurance sector.</p> <p>Range of weight: 5-10 percent</p>	<ul style="list-style-type: none"> <li>a. Funding mechanisms/sources</li> <li>b. Allocation/assignment of exposures and associated costs</li> <li>c. Eligibility provisions</li> <li>d. Loss payment provisions</li> <li>e. Claim settlement provisions</li> <li>f. Welfare (subsidization) versus insurance principles</li> <li>g. Insurance coverage provisions</li> <li>h. Private response to gap in government program (e.g., Medigap, supplementary health)</li> <li>i. Government response to gap in private program (e.g., FWUA, Canadian Public Auto)</li> </ul>
<p>3. Evaluate the effectiveness of a government/industry program (actual, as listed in Section C.1, or hypothetical).</p> <p>Range of weight: 5-10 percent</p>	<ul style="list-style-type: none"> <li>a. How to measure performance of programs: <ul style="list-style-type: none"> <li>• Solvency</li> <li>• Efficiencies</li> <li>• Stability</li> <li>• Viability/longer term prospects</li> </ul> </li> <li>b. How well program meets its purpose</li> <li>c. Impact of external factors (e.g., economic conditions, weather, regulation, etc.)</li> </ul>
<p><b>READINGS</b></p>	
<p>Agricultural Programs  CIA Health Care  FA  FSCO  Greenan  Greene  Groupement des assureurs automobiles By-Law 7  Groupement des assureurs automobiles Plan  Hamilton and Ferguson  IBC Alberta Automobile  IBC Availability  KPMG, et al. 1  KPMG, et al. 2  New Brunswick Auto  OSFI Earthquake  PACICC 1  PACICC 2</p>	

## D. Financial Reporting

Range of weight for Section D: 40-50 percent

This section covers finance and solvency issues. The intent is to address Canadian and global issues. The lack of Canadian literature on certain subjects led to the use of U.S. material. In the long run, the core of the syllabus will be on Canadian matters with an overview of other countries' relevant differences.

Candidates should have detailed familiarity with the contents, purposes, and recent changes in the Annual Return. This includes recent guidelines from the Office of the Superintendent of Financial Institutions (OSFI) and the provincial regulatory bodies. Candidates should be prepared to discuss professional guidelines and standards of practice applicable to financial reporting.

Candidates should understand the details of, and the reasons for the differences between, the Statutory and Generally Accepted Accounting Principles (GAAP) accounting methods.

This section is complemented by readings on solvency monitoring systems such as the Minimum Capital Test and the Dynamic Capital Adequacy Testing of the Canadian Institute of Actuaries.

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>1. Evaluate the financial health of an insurance entity. Range of weight: 19-21 percent</p>	<p>a. Annual Statement and Annual Return</p> <ul style="list-style-type: none"> <li>• Balance sheet</li> <li>• Income statement</li> <li>• Change in surplus</li> <li>• Notes to financial statements</li> <li>• Cash flow exhibit</li> <li>• Actuarial liabilities</li> <li>• Reinsurance accounting</li> </ul> <p>b. Risk-Based Capital, Minimum Capital Test</p> <p>c. Dynamic Capital Adequacy Testing</p> <p>d. Rating Agencies</p> <p>e. IRIS Ratios</p>
<b>READINGS</b>	
<p>A.M. Best Cantin and Trahan CCIR Instructions CIA CSOP (2500) CIA DCAT CIA Discounting CIA Min Capital CIA Valuation Feldblum Gorvett IASA Linden (Asbestos) MSA NAIC Accounting NAIC Annual Statement OSFI MCT PwC Uniform Annual Return</p>	

<b>LEARNING OBJECTIVES</b>	<b>KNOWLEDGE STATEMENTS</b>
2. Complete specific schedules and exhibits of Annual Statements/Annual Returns: <ul style="list-style-type: none"> <li>• Balance sheet</li> <li>• Income statement</li> <li>• Schedule P</li> <li>• Insurance Expense Exhibit</li> <li>• Net Claims and Adjustment Expenses Runoff</li> </ul> Range of weight: 5-7 percent	a. Valuation of assets and liabilities b. Schedule P c. Calculation of change in surplus d. Calculation of net income e. Calculation of Insurance Expense Exhibit f. Calculation of reinsurance penalties g. Calculation of excess (deficiency) ratio from page 60.40 of the Annual Return h. Direct Expense Report
<b>READINGS</b>	
CCIR Instructions CIA Runoff IASA IBC Expense NAIC Annual Statement Uniform Annual Return	
<b>LEARNING OBJECTIVES</b>	<b>KNOWLEDGE STATEMENTS</b>
3. Calculate the MCT and interpret its results. Range of weight: 4-6 percent	a. MCT Formula b. Definition of components of MCT
<b>READINGS</b>	
CIA Min Capital OSFI MCT	
<b>LEARNING OBJECTIVES</b>	<b>KNOWLEDGE STATEMENTS</b>
4. Differentiate between different accounting reporting principles (e.g., GAAP, SAP, IAS) Range of weight: 3-5 percent	a. U.S. Statutory Accounting Principles b. Generally Accepted Accounting Principles c. Adjustments to go from SAP to GAAP d. Canadian Statutory Accounting Principles e. Actuarial Liabilities f. Fair value of claims liabilities g. International Accounting Standards
<b>READINGS</b>	
CAS Fair Value CIA Discounting CIAA Fair Value Conger et al. Feldblum IASA Littmann et al. NAIC Accounting	
<b>LEARNING OBJECTIVES</b>	<b>KNOWLEDGE STATEMENTS</b>
5. Explain the responsibilities of an actuary as defined by standards of practice, regulators and insurance laws for financial reporting. Range of weight: 9-11 percent	a. Statutory Actuarial Opinion b. Contents of Statutory Report of the Actuary c. Standards of Practice d. Educational Notes e. Insurance Companies Act f. Actuary and auditor relationship

READINGS
CIA CSOP 1630, 2100, 2200, 2400
CIA Discounting
CIA Min Capital
CIA Peer Review
CIA Runoff
CIA Valuation
ICA
OSFI External Review
OSFI Memorandum

## Complete Text References for Exam 7-Canada

Text references are alphabetized by the citation column.

Citation	Abbreviation	Learning Objective	Source
Agriculture and Agri-Food Canada, <i>Canada's Agricultural Business Risk Management Programs</i> , pages 1-8.	Agricultural Programs	C1, C2, C3	SK
A.M. Best Company, <i>Best's Key Rating Guide, Property/Casualty, United States &amp; Canada</i> , 2005, Preface (only Sections I-IV, X and XI). Candidates are not expected to memorize the details of published insurance statistics.	A.M. Best	D1	SKU NEW
A.M. Best Company, "Business as Never Before," <i>Best's Review</i> , January 2005. Candidates are not responsible for the cases related to HMO (p. 29) and asbestos (p. 32).	Best's Review	B4	SKU NEW
Baer, M.G.; and Rendall, J.A., <i>Cases on the Canadian Law of Insurance</i> (Fifth Edition), Carswell, 1995, pp. 23-28, 33-34, 59-88 (excluding tables on pp. 62-67), 90-97, 277-279, 507-519, 742-748 and 750-752. Candidates are responsible for the following cases: <i>Glenn v. Scottish Union and National Insurance Company Ltd.</i> (Chapter 1); <i>Regal Films Corporation Ltd. v. Glens Falls Insurance Company</i> (Chapter 2); <i>Fletcher v. MPIC</i> (Chapter 8); <i>Broadhurst and Ball v. American Home</i> ; and <i>Dillon v. Guardian Insurance</i> (Chapter 11).	Baer and Rendall	A1, A3, B1, B2, B5	SK NEW
Biggs, J.L., "Statement of Jennifer L. Biggs, FCAS, MAAA, Chairperson, Mass Torts Subcommittee, American Academy of Actuaries," Hearing on "Proposed Resolution Regarding the Need for Effective Asbestos Reform" of the Committee on Property/Casualty Insurance, National Conference of Insurance Legislators, July 10, 2003, pp. 1-10. Candidates will not be responsible for statistics contained within the paper or material from the tables or exhibits.	Biggs	A6, C1, C2, C3	SKU NEW
British Columbia, Ministry of Attorney General, "Civil Liability Review, Consultation Paper," April 2002; and "Civil Liability Review, Summary of Responses," February 2003, Executive Summary only.	BC Civil Liability	A6	SK
Brown, C., <i>Canadian Insurance Contracts Law in a Nutshell</i> , Carswell, 1995 Edition, Chapters 1-3, 5, 6, 9, 11, 12 (Sections 5 and 6 only) and 13.	Brown	A2, A3, B2, B4	L



Citation	Abbreviation	Learning Objective	Source
Canadian Council of Insurance Regulators, <i>Annual Statement Instructions P&amp;C-1</i> , Sections I, III, IV, V and VI, excluding instructions for Annual Return pp. 30.40, 30.45, and 40.10-40.60. [Note: Page numbers refer to the 2004 statement. The Web version of the <i>Syllabus</i> and the <i>Notice of Examinations</i> will contain updated page references for the 2005 statement.]	CCIR Instructions	D1, D2	L NEW
Canadian Institute of Actuaries, Consolidated Standards of Practice, 1630, 2100, 2200, 2400, and 2500.	CIA CSOP	D1, D5	SK
Canadian Institute of Actuaries, "Educational Note: Review of Work of an Actuary," September 2003.	CIA Peer Review	D5	SK
Canadian Institute of Actuaries, "Educational Note: DCAT – Minimum Regulatory Capital Requirement," July 2003.	CIA Min Capital	D1, D3, D5	SK
Canadian Institute of Actuaries, "Educational Note: Valuation of Policy Liabilities P&C Insurance Considerations Regarding Claim Liabilities and Premium Liabilities," June 2003.	CIA Valuation	D1, D5	SK
Canadian Institute of Actuaries, "Educational Note: Discounting," April 1999.	CIA Discounting	D1, D4, D5	SK
Canadian Institute of Actuaries, "Educational Note: Dynamic Capital Adequacy Testing—Life, Property and Casualty," June 1999. Candidates are not responsible for details related to life insurance companies.	CIA DCAT	D1	SK
Canadian Institute of Actuaries, "Educational Note: Evaluation of the Runoff of Claims Liabilities when the Liabilities are Discounted in Accordance with Accepted Actuarial Practice," March 2003.	CIA Runoff	D2, D5	SK
Canadian Institute of Actuaries, "Submission to the Commission on the Future of Health Care in Canada," January 2002.	CIA Health Care	C1, C2, C3	SK
Canadian Insurance Accountants Association, Professional Development Program, The Insurance Accountants' Information Circular MDR-31, <i>Fair Value of Claims Liabilities</i> , Joe S. Cheng & Partners Inc.	CIAA Fair Value	D4	SK
The Canadian Medical Protective Association, "Proceedings of the Tort Reform Conference," Toronto, Ontario, November 5, 1998, pp. 24-38 and Appendix C.	CMPA	A6	SK
Cantin, C.; and Trahan, P.; "Study Note on the Actuarial Evaluation of Premium Liabilities," CAS Study Note, 1999. Candidates will be responsible for Exhibits but not for Appendices.	Cantin and Trahan	D1	W
Casualty Actuarial Society, CAS Task Force on Fair Value Liabilities, <i>White Paper on Fair Valuing Property/Casualty Insurance Liabilities</i> , Executive Summary, pages i-viii.	CAS Fair Value	D4	W

Citation	Abbreviation	Learning Objective	Source
Conger, R.F.; Hurley, J.D.; and Lowe, S.P., "How Might the Presentation of Liabilities at Fair Value Have Affected the Reported Results of U.S. Property Casualty Insurers," <i>Fair Value of P&amp;C Liabilities: Practical Implications</i> , Casualty Actuarial Society, 2004, pp. 3-8.	Conger et al.	D4	W
Ettlenger, K.H.; Hamilton, K.L.; and Krohm, G., <i>State Insurance Regulation</i> (First Edition), Insurance Institute of America, 1995, Chapter 4 (including Exhibits 4-1 and 4-3). Candidates will not be tested on material that appears only in the exhibits unless the exhibit is specifically identified in the <i>Syllabus</i> .	Ettlenger et al.	B1, B2, B3	SK
Facility Association, <i>Plan of Operation</i> , Consolidated June 2002, pp. 1-10, and 23-41.	FA	C1, C2, C3	SK
Feldblum, S., "Statutory Surplus: Computation, Pricing and Valuation," CAS Study Note, June 2003.	Feldblum	D1, D4	W
Financial Services Commission of Ontario, <i>Section 410 Filing Guidelines—Major for Proposed Revisions to Automobile Insurance Rates and Risk Classification Systems</i> , February 2001, Part A, Part B, Part C (Sections 3 - 7 and 10), Appendices B1 and B2.	FSCO	B3, C1, C2, C3	SK
Gorvett, R.W.; Tedeschi, J.L.; and Ward, K.A., "Special Issues: Data Sources," <i>Foundations of Casualty Actuarial Science</i> (Fourth Edition), Casualty Actuarial Society, 2001, Chapter 10, pp. 787-796.	Gorvett	D1	W
Greenan, J. (Ed.), <i>The Handbook of Canadian Pension and Benefit Plans</i> (Twelfth Edition), 2002, CCH Canadian Limited, Chapters 3, 12, 13-15.	Greenan	C1, C2, C3	L
Greene, M., "Government Insurers," <i>Issues in Insurance</i> (Fourth Edition), American Institute for Property and Liability Underwriters, 1987, Volume I, Sections I and VI.	Greene	C1, C2, C3	SK
Groupement des assureurs automobiles, <i>Risk Sharing Plan—Procedures Manual; By-Law No.7—Risk Sharing Plan</i> , October 2003, Sections 1.1, 1.11, 2.1 to 2.4, 2.7 to 2.9, 3.1 to 3.3, 3.5 to 3.9, 4.1 to 4.3, 4.11 to 4.16, 5.1 to 5.5, 7.1 to 7.6, 8.1 to 8.3, and 9.1 to 9.6.	Groupement des assureurs automobiles: By-Law 7	C1, C2, C3	SK
Groupement des assureurs automobiles, <i>Risk Sharing Plan—Procedures Manual; General Description of the Plan</i> , October 2003, Sections 15A to 15E and 15G.	Groupement des assureurs automobiles: Plan	C1, C2, C3	SK
Hamilton, K.L.; and Ferguson, C.L., <i>Personal Risk Management and Property-Liability Insurance</i> (First Edition), American Institute for Chartered Property Casualty Underwriters, 2002, pp. 6.20-6.34 and 9.36-9.40.	Hamilton and Ferguson	C1, C2, C3	SK

<b>Citation</b>	<b>Abbreviation</b>	<b>Learning Objective</b>	<b>Source</b>
Insurance Accounting and Systems Association, <i>Property-Casualty Insurance Accounting</i> (Eighth Edition), 2003, Chapters 2, 5, 9, 10, and 18. Candidates will not be responsible for additional material from references to “Relevant Literature.”	IASA	D1, D2, D4	L
Insurance Bureau of Canada, Direct Expense Report, Instructions, Forms and Results, Parts I; and II, Sections A, D, E, and K.	IBC Expense	D2	L
Insurance Bureau of Canada, “Insurance Bureau of Canada Submission to Alberta Finance on the Automobile Insurance Consultation Paper,” January 24, 2003.	IBC Alberta Automobile	C1, C2, C3	SK
Insurance Bureau of Canada, “Residential Insurance Availability,” October 2001.	IBC Availability	C1, C2, C3	SK
“Insurance Companies Act,” <i>Financial Institutions Act</i> , Chapter 47, Sections 165(1), 165 (2), 203, 331(1), 331(2), 331(4), 346, 357-370, 464, 465, 476-478, 516(1), 516(4), 517, 581, 626-632, 641, 664, 665, 667(1), 667(2), and 674 (updated to August 31, 2004).	ICA	D5	SKU NEW
Klar, L.N.; Linden, A.M.; Cherniak, E.A.; and Kryworuk, P.W., <i>Remedies in Tort</i> , Carswell, 1997 (Release 6), Volume 4, pp. 27-45 to 27-162.42, excluding pp. 162.2-162.26. Candidates will not be tested on material included in “Additional Authorities” sections. However, candidates might find it helpful to read these sections for further clarification of concepts on which they will be tested. Candidates will not be responsible for text included in references. Candidates will not be responsible for any cases cited in this text.	Klar et al.	A4, A5	SK
KPMG, Eckler Partners Ltd. & Exactor Insurance Services, Inc., “Motor Vehicle Insurance in British Columbia—At the Crossroads, Volume I: The Case for Change,” Section I, Parts A, B, and C; Section II, Parts A, B, and C. Candidates will not be responsible for information in exhibits.	KPMG et al. 1	C1, C2, C3	SK
KPMG, Eckler Partners Ltd. & Exactor Insurance Services, Inc., “Motor Vehicle Insurance in British Columbia—At the Crossroads, Volume II: Options and Choices,” Section II. Candidates will not be responsible for information in exhibits.	KPMG et al. 2	C1, C2, C3	SK
“Landmark Legal Insurance Cases in Canada.”	Landmark Legal	B4	SK

Citation	Abbreviation	Learning Objective	Source
Linden, A.M., <i>Canadian Tort Law</i> (Seventh Edition) (paperback), Butterworths, 2001, pp. 1-32, 101-116, 119-127, 129-151, 160-164, 233-243, 267-276, 280-282, 296-298, 323-328, 344-346, 370-372, 445-447, 451-460, 469-474, 478-481, 486-489, 491-495, 503-514, 553-563, 567-581, 585-599, 607-609, 611-621, 629-635, 637-643, and 650. Candidates are responsible for the following cases: <i>Rylands v. Fletcher</i> (Chapter 14); <i>Donaghue v. Stevenson</i> (Chapter 16); and <i>Just v. British Columbia</i> (Chapter 17).	Linden	A1, B4	L
Linden, O.M., "Asbestos and the Laws of Newton," <i>Contingencies</i> , March/April 2005, American Academy of Actuaries.	Linden (Asbestos)	A6, D1	SKU NEW
Littmann, M.W.; Thomas, D.E.; Tarrant, M.; and Gutterman, S., "An Investigation of Practical Matters Related to Implementing Fair Value Accounting for Property/Casualty Loss Reserves," <i>Fair Value of P&amp;C Liabilities: Practical Implications</i> , Casualty Actuarial Society, 2004, pp. 115-124.	Littmann et al.	D4	W
McDonald, B.R., <i>Life Insurance Laws of Canada (Common Law Provinces)</i> , Life Underwriters Association of Canada, 1995, pp. A1-1, A2-1 to A2-9, B1-1 to B1-2, B2-1 to B2-3, and B4-1 to B4-3. Candidates are responsible for all cases cited in this text.	McDonald	B1, B2, B4	SK
MSA Research, Inc., "MSA Report on Property & Casualty, Canada, 2005," Section 3, pp. 1-9.	MSA	D1	SKU NEW
National Association of Insurance Commissioners, <i>Official NAIC Annual Statement Blanks, Property and Casualty</i> , 2005 (both individual and consolidated basis), pp. 2-4, Schedule P. Candidates will be expected to have knowledge of other sections of the annual statement that are discussed in other <i>Syllabus</i> readings. [Note: Page numbers refer to the 2004 statement. The Web version of the <i>Syllabus</i> and the <i>Notice of Examinations</i> will contain updated page references for the 2005 statement.]	NAIC Annual Statement	D1, D2	L NEW
National Association of Insurance Commissioners, <i>Accounting Practices and Procedures Manual</i> , 2005, Preamble.	NAIC Accounting	D1, D4	SKU NEW
New Brunswick, "Auto Insurance for New Brunswick—Final Report of the Select Committee on Private Passenger Automobile Insurance," November 2002, pp. 7-21; and "New Brunswick Canada – Government Response to the Report of the Select Committee on Private Passenger Automobile Insurance," March 28, 2003.	New Brunswick Auto	C1, C2, C3	SK
Office of the Superintendent of Financial Institutions Canada, "2005 Memorandum for Actuarial Reports on Property and Casualty Business," Fall 2005.	OSFI Memorandum	D5	SKU NEW
Office of the Superintendent of Financial Institutions Canada, Guideline E-15 "Appointed Actuary: Legal Requirements, Qualifications and External Review," August 2003.	OSFI External Review	D5	SK

Office of the Superintendent of Financial Institutions Canada, "Earthquake Exposure Sound Practices Guideline," 1997, including Appendices 1 and 2. Candidates are not responsible for the tables in Appendix 2.	OSFI Earthquake	C1, C2, C3	<b>SK</b>
Office of the Superintendent of Financial Institutions Canada, "Guideline—Minimum Capital Test (MCT) for Property and Casualty Insurance Companies," pp. 1-9, 17-22, July 2003; and "Notes on the Development of the Minimum Capital Test (MCT)," pp. 1-7, July 2003.	OSFI MCT	D1, D3	<b>SK</b>
PricewaterhouseCoopers, "Financial Reporting for the Property & Casualty Insurance Industry," 1999.	PwC	D1	<b>SK</b>
Property and Casualty Insurance Compensation Corporation, "Options to ensure another fifteen successful years of service," March 4, 2003 (excluding Annex D, PACICC member questionnaire).	PACICC 1	C1, C2, C3	<b>SK</b>
Property and Casualty Insurance Compensation Corporation, "A Proactive vision for PACICC in a challenging business environment," April 29, 2003 (excluding Annex A and Annex B).	PACICC 2	C1, C2, C3	<b>SK</b>
Towers Perrin Tillinghast, "U.S. Tort Costs: 2004 Update, Trends and Findings on the Cost of the U.S. Tort System." Candidates will not be responsible for statistics contained within the paper or material from the tables or appendices.	Towers Perrin	A6	<b>SKU NEW</b>
Uniform Annual Return (2005) approved by the Canadian Council of Insurance Regulators—P&C-1, pp. 10.40-10.42, 10.60, 20.10-20.52, 30.70-30.71, 40.05, 60.10-60.50, 67.10, 67.20-67.30, 70.10-70.21, 70.38, 80.10-80.20, and 99.10. [Note: Page numbers refer to the 2004 statement. The Web version of the <i>Syllabus</i> and the <i>Notice of Examinations</i> will contain updated page references for the 2005 statement.]	Uniform Annual Return	D1, D2	<b>L NEW</b>

## Source Key

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- SK** Represents material included in the 2006 CAS Study Kit.
- SKU** Represents material included in the 2006 CAS Study Kit and the 2006 Update to the 2005 Study Kit.
- W** Represents material that is available at no charge from the "Admissions" section of CAS Web Site ([www.casact.org](http://www.casact.org)) under Syllabus Web Notes. (For those without access to the Internet, printed copies of the Web Notes are available for a fee.)

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Actuarial Bookstore, P.O. Box 69, Greenland, NH 03840; telephone: (800) 582-9672 (U.S. only) or (603) 430-1252; fax: (603) 430-1258; Web site: [www.actuarialbookstore.com](http://www.actuarialbookstore.com).

American Academy of Actuaries, 1100 Seventeenth Street NW, Seventh Floor, Washington, DC 20036; telephone: (202) 223-8196; Web site: [www.actuary.org](http://www.actuary.org).

American Institute for Chartered Property Casualty Underwriters, Order Department, P.O. Box 3016, 720 Providence Road, Malvern, PA 19355-0716; telephone: (610) 644-2100; fax: (610) 640-9576.

Baer, M.G.; and Rendall, J.A., *Cases on the Canadian Law of Insurance* (Fifth Edition), 1995, Carswell, Attention: Customer and Order Services, One Corporate Plaza, 2075 Kennedy Road, Scarborough, Ontario M1T 3V4, Canada; telephone: (416) 609-3800 or (800) 387-5164; fax: (416) 298-5082; Web site: [www.carswell.com](http://www.carswell.com).

Bowne Insurance Division, 800 Central Boulevard, Carlstadt, NJ 07072; telephone: (800) 223-3103 (for the *NAIC Annual Statement Blanks, Property and Casualty*).

Brown, C.; *Canadian Insurance Contracts Law in a Nutshell*, 1995, Carswell, Attention: Customer and Order Services, One Corporate Plaza, 2075 Kennedy Road, Scarborough, Ontario M1T 3V4, Canada; telephone: (416) 609-3800 or (800) 387-5164; fax: (416) 298-5082; Web site: [www.carswell.com](http://www.carswell.com).

Canadian Institute of Actuaries, Secretariat, Suite 820, 360 Albert Street, Ottawa, Ontario K1R 7X7, Canada; telephone: (613) 236-8196; fax: (613) 233-4552; Web site: [www.actuaries.ca](http://www.actuaries.ca).

Casualty Actuarial Society *Forum, Foundations of Casualty Actuarial Science* (Fourth Edition), *PCAS*, and *Discussion Paper Program*, Casualty Actuarial Society, 4350 N. Fairfax Drive, Suite 250, Arlington, VA 22203; telephone: (703) 276-3100; fax: (703) 276-3108; e-mail: [office@casact.org](mailto:office@casact.org); Web site: [www.casact.org](http://www.casact.org).

Ettlinger, K.H.; Hamilton, K.L.; and Krohm, G., *State Insurance Regulation* (First Edition), 1995, Insurance Institute of America, 720 Providence Road, Malvern, PA 19355-0770; telephone: (610) 644-2100.

Facility Association, 151 Yonge Street, 18<sup>th</sup> Floor, Toronto, Ontario M5C 2W7, Canada; telephone: (416) 863-1750 or (800) 268-9572; fax: (416) 868-0894.

*Financial Institutions Act*, "Insurance Companies Act," Chapter 47, The Federal Publication, 388 King Street West, Toronto, Ontario M5V 1K2, Canada; telephone: (416) 860-1611.

Financial Services Commission of Ontario, 5160 Yonge Street, P.O. Box 85, North York, Ontario M2N 6L9, Canada; telephone: (416) 250-7250; fax: (416) 590-7070; Web site: [www.ontarioinsurance.com](http://www.ontarioinsurance.com).

Greenan, J. (Ed.), *The Handbook of Canadian Pension and Benefit Plans* (Twelfth Edition), 2002, CCH Canadian Limited, 90 Shepherd East, Suite 300, North York, Ontario M2N 6X1, Canada; telephone: (416) 224-2248; fax: (800) 461-4131; Web site: [www.ca.cch.com](http://www.ca.cch.com).

Insurance Accounting and Systems Association, *Property-Casualty Insurance Accounting* (Eighth Edition), 2003, IASA Fulfillment Center, P.O. Box 51008, Durham, NC 27717; telephone: (800) 817-4272 or (919) 489-0991; fax: (800) 668-4272; Web site: [www.iasa.org](http://www.iasa.org).

Insurance Bureau of Canada, 240 Duncan Mill Road, Suite 700, Toronto, Ontario M3B 1Z4, Canada; telephone: (416) 445-5912; fax: (416) 445-2183.

Klar, L.N.; Linden, A.M.; Cherniak, E.A.; and Kryworuk, P.W., *Remedies in Tort*, 1997 (Release 6), Volume 4, Carswell, Attention: Customer and Order Services, One Corporate Plaza, 2075 Kennedy Road, Scarborough, Ontario M1T 3V4, Canada; telephone: (416) 609-3800 or (800) 387-5164; fax: (416) 298-5082; Web site: [www.carswell.com](http://www.carswell.com).

Linden, A.M., *Canadian Tort Law* (Seventh Edition), 2001, Butterworths, The Butterworths Group of Companies, 75 Clegg Road, Markham, Ontario L6G 1A1, Canada; telephone: (905) 479-2665; fax: (905) 479-2826; Web site: [www.butterworths.ca](http://www.butterworths.ca).

*NAIC Annual Statement Blanks, Property and Casualty* may be obtained from Bowne Insurance Division, 800 Central Boulevard, Carlstadt, NJ 07072; telephone: (800) 223-3103.

National Association of Insurance Commissioners, 120 W. 12<sup>th</sup> Street, #1100, Kansas City, MO 64105; telephone: (816) 842-3600.

Office of the Superintendent of Financial Institutions Canada, 255 Albert Street, Ottawa, Ontario K1A 0H2 Canada; telephone: (613) 990-7788; fax: (613) 952-8219; Web site: [www.osfi-bsif.gc.ca](http://www.osfi-bsif.gc.ca).

# Exam 7-United States

## Nation-Specific Examination: Annual Statement, Taxation, and Regulation

Before commencing study for this four-hour examination, candidates should read the introduction and key to “Materials for Study” on page 43 of this *Syllabus* for important information about learning objectives, knowledge statements, readings, and the range of weights. Items marked with a bold **SK** or **SKU** constitute the 2006 CAS Exam 7-U.S. Study Kit that is available from the CAS Office for a cost of \$60. Items marked with a bold **w** are available at no charge under Web Notes in the “Admissions” section of the CAS Web Site ([www.casact.org](http://www.casact.org)). Those without access to the Web may purchase a print version of the items marked with a **w**—the 2006 CAS Exam 7-U.S. Web Notes—from the CAS Office for a cost of \$63. The 2006 Update to the 2005 Study Kit is available at a cost of \$17 and includes only the items marked with a bold **SKU**. Information about Study Kits and Web Notes is available on page 35.

Please check the “Admissions” section of the CAS Web Site for any changes to the *Syllabus*.

The CAS will test the candidate’s knowledge of the material, but may decide not to include questions from every reading on a particular exam.

Section A of this examination covers U.S. tort law as it affects the property-casualty business. Section B covers insurance regulation with regards to property-casualty coverages, ratemaking, and pricing. Section C covers markets, coverages, and private and governmental programs for the property-casualty business in the United States. Section D covers the aspects of statutory and GAAP insurance accounting and taxation as these affect reserving and statutory reporting in the United States.

### A. Background Law

Range of weight for Section A: 5-10 percent

U.S. tort law, while not a strictly actuarial subject, affects many areas of an actuary’s work. No prior knowledge is assumed in this area and the readings should provide background and a basic understanding of how tort law gives rise to the need for insurance. The judicial role in the development of tort law is also covered.

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
1. Describe the different theories of tort law as applied to insurance. Range of weight: 3-7 percent	a. Types of negligence b. Causation c. Immunities d. Common law principles (e.g., assumption of risk) e. Theories of liability f. Criteria for torts
READINGS	
Hensler et al. Keeton Mallor et al.	



LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
2. Describe the difference between tort systems and no-fault systems. Range of weight: 0-5 percent	a. Tort b. No fault (workers compensation, auto) c. History of no fault d. Type of threshold e. Advantages and disadvantages of each f. Experience of individual systems
<b>READINGS</b>	
Hensler et al. Keeton	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
3. Discuss the trends in tort litigation. Range of weight: 0-5 percent	a. Trends in litigation b. Jury awards c. Litigation costs d. Asbestos litigation
<b>READINGS</b>	
A.M.Best 2 Biggs Hensler et al. Keeton	

## B. Regulation of Insurance

Range of weight for Section B: 25-30 percent

Candidates should understand that insurers are regulated by various governmental agencies because insurance is a valuable public service. An understanding of the dual U.S. state and federal regulatory system is required, along with the various state systems of regulation. The major areas of regulation for rate, contract terms, and solvency should be understood, as should the role of antitrust law as it pertains to insurance regulation.

Regulation as it affects insurance ratemaking in the U.S. is covered. The regulator's view of insurer profitability and the concept of excess profit regulation are covered. Regulatory and political aspects of risk classification are also covered. Some learning objectives extend the topic to the regulation and governmental actions to enhance the availability of insurance.

This section also covers the regulation for solvency in the U.S., including financial ratios tested by the National Association of Insurance Commissioners (IRIS tests) and guaranty fund mechanisms set up by the various states. Also covered are risk-based capital calculations from the statutory blank and how they are used to monitor solvency.

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
1. Describe the reasons and the objectives of insurance regulation. Range of weight: 8 percent to 12 percent	a. Solvency b. Market conduct c. Rate regulation

<b>READINGS</b>
Bartlett et al. Brady et al. Ettlenger et al. Ghezzi Harrington NAIC Model Law

<b>LEARNING OBJECTIVES</b>	<b>KNOWLEDGE STATEMENTS</b>
2. Describe both the historical development and the current state of insurance regulation including the division of responsibility between federal and state/provincial regulators.  Range of weight: 3-7 percent	a. SEC reporting and regulation b. McCarran-Ferguson c. Basis of insurance regulation d. Solvency, including RBC, insurance department examination, NAIC regulatory tests e. Functions of NAIC f. Antitrust provisions g. Landmark cases

<b>READINGS</b>
Brady et al. Ettlenger et al. Feldblum (RBC) Feldblum (Schedule P), pp. 38-41 Harrington Troxel and Bouchie Wagner

<b>LEARNING OBJECTIVES</b>	<b>KNOWLEDGE STATEMENTS</b>
3. Compare and contrast different types of rate filing approaches; discuss state rate filing guidelines.  Range of weight: 5-10 percent	a. Prior approval b. File and use c. Use and file d. Open competition e. State mandated

<b>READINGS</b>
A.M. Best 1 Brady et al. Ettlenger et al. Harrington Harrington and Doerpinghaus Wagner Williams

<b>LEARNING OBJECTIVES</b>	<b>KNOWLEDGE STATEMENTS</b>
4. Discuss the issues, outcome, rationale and implications of landmark decisions for the insurance industry.  Range of weight: 0-5 percent	a. Sherman Antitrust b. McCarran-Ferguson c. Southeastern Underwriters d. Montrose Claims

<b>READINGS</b>
Harrington Wagner

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
5. Describe the different treatment and rationale of that treatment of domestic, foreign, and alien insurers. Range of weight: 0-5 percent	a. Licensing b. Capital Requirements c. Branch versus domestic
<b>READINGS</b>	
A.M. Best 1 Brady et al. Wagner	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
6. Describe the regulatory issues related to catastrophe and other modeling. Range of weight: 0-5 percent	a. Acceptance of models by regulators b. Proprietary issues
<b>READINGS</b>	
Musulin	

### C. Government and Industry Insurance Programs

Range of weight for Section C: 10-15 percent

From this section, candidates should gain a detailed knowledge of the U.S. Social Security and Medicare systems. Candidates also should gain a working knowledge of the regulations concerning insurance for catastrophic events. An understanding of the regulatory environment surrounding the U.S. workers compensation system is required. Other federal, state, and industry programs are also covered.

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
1. Describe the origin and purpose of the following government and industry insurance programs: <ul style="list-style-type: none"> <li>• Social Security</li> <li>• Flood insurance</li> <li>• Crop insurance</li> <li>• Unemployment</li> <li>• Medicare/Health Care</li> <li>• Residual markets (e.g., auto, workers compensation, property)</li> <li>• Crime and riot</li> <li>• Nuclear</li> <li>• Workers compensation</li> <li>• Automobile</li> <li>• Pension plans</li> <li>• Guaranty funds</li> </ul> Range of weight: 3-7 percent	a. Reason for inception b. Major historical developments c. Philosophy of program

<b>READINGS</b>
Ettlenger et al. Greene Hamilton and Ferguson Jenkins Rejda Wiening et al. Wilcox

<b>LEARNING OBJECTIVES</b>	<b>KNOWLEDGE STATEMENTS</b>
2. Describe the operations and risk transfer process for each government/industry program, and the interactions of government/industry insurance programs and the voluntary private insurance sector. Range of weight: 5-10 percent	a. Funding mechanisms/sources b. Allocation/assignment of exposures and associated costs c. Eligibility provisions d. Loss payment provisions e. Claim settlement provisions f. Welfare (subsidization) versus insurance principles g. Insurance coverage provisions h. Private response to gap in government program (e.g., Medigap, supplementary health)

<b>READINGS</b>
Bartlett et al. Ettlenger et al. Greene Hamilton and Ferguson Rejda Wiening et al.

<b>LEARNING OBJECTIVES</b>	<b>KNOWLEDGE STATEMENTS</b>
3. Evaluate the effectiveness of a government/industry program (actual or hypothetical) Range of weight: 0-5 percent	a. How to measure performance of programs b. Solvency c. Efficiencies d. Stability e. Viability/longer term prospects f. How well program meets its purpose g. Impact of external factors (e.g., economic conditions, weather, regulation, etc.)

<b>READINGS</b>
Bartlett et al. Ettlenger et al. Greene Hamilton and Ferguson Jenkins Rejda Wiening et al.

## D. Financial Reporting and Taxation

Range of weight for Section D: 50-55 percent

This section covers the aspects of statutory and GAAP insurance accounting and taxation as they affect reserving and statutory reporting in the U.S. Candidates should gain a thorough knowledge of U.S. statutory accounting forms presented in the NAIC blanks and the Insurance Expense Exhibits. A detailed knowledge of reserves and values required in the blank is needed. Knowledge of federal income tax treatment, including reserve discounting, should also be mastered.

Related to these areas, this section covers the codification of statutory accounting, differences in the accounting treatment for GAAP, tax, and statutory uses, audits of insurance companies, and some aspects of Canadian accounting for insurance companies.

The material in this examination assumes a working knowledge of general accounting such as that which would be gained from Exam 6. If needed, a review of the following material, or other general accounting material, may enhance the understanding of the U.S.-specific material presented on this examination: sections of the IASA text; the Exam 6 reading, "Accounting Concepts for the Actuary," by R.S. Blanchard or the CPCU Course 540 text, *Fundamentals of Corporate Finance*.

As background reading for the responsibilities of actuaries, it is highly recommended that the candidate study ASOP 36. The candidate will only be tested on those portions of the ASOP as mentioned in the COPLFR Practice Note.

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>1. Evaluate the financial health of an insurance entity. Range of weight: 20-25 percent</p>	<p>a. Annual Statement b. Balance sheet c. Income statement d. Change in surplus e. Notes to financial statements f. Cash flow exhibit g. Reinsurance accounting h. Risk-Based Capital (RBC) i. Rating Agencies j. IRIS ratios</p>
<b>READINGS</b>	
<p>2005 IEE Feldblum (RBC, Notes, Surplus, Schedule F, Schedule P, and IEE) Gorvett et al. IASA 1 IASA 2 NAIC Annual Statement NAIC SSAP 62 NAIC SSAP 65 OSFI MCT Troxel and Bouchie</p>	

<b>LEARNING OBJECTIVES</b>	<b>KNOWLEDGE STATEMENTS</b>
2. Complete specific schedules and exhibits of: <ul style="list-style-type: none"> <li>• Annual Statements/Annual Returns</li> <li>• Balance sheet</li> <li>• Income statement</li> <li>• Schedule P</li> <li>• IEE</li> <li>• Schedule F</li> </ul> Range of weight: 8-12 percent	a. Valuation of assets and liabilities b. Schedule P c. Calculation of change in surplus d. Calculation of net income e. Calculation of Insurance Expense Exhibit f. Calculation of reinsurance penalties
<b>READINGS</b>	
2005 IEE Feldblum (Notes, Surplus, Schedule F, Schedule P, and IEE) IASA 1 IASA 3 NAIC Annual Statement NAIC SSAP 53, 62, and 65 OSFI MCT	
<b>LEARNING OBJECTIVES</b>	<b>KNOWLEDGE STATEMENTS</b>
3. Calculate the RBC and interpret its results. Range of weight: 5-10 percent	a. RBC formula b. Definition of components of RBC
<b>READINGS</b>	
Feldblum (RBC)	
<b>LEARNING OBJECTIVES</b>	<b>KNOWLEDGE STATEMENTS</b>
4. Differentiate between various accounting reporting principles, e.g., GAAP, SAP, IAS. Range of weight: 3-7 percent	a. U.S. Statutory Accounting Principles b. Generally Accepted Accounting Principles c. Adjustments to go from SAP to GAAP d. Canadian Statutory Accounting Principles e. Fair value of claims liabilities f. International Accounting Standards
<b>READINGS</b>	
Conger et al. IASA 1, Chapter 14 NAIC APPM, Preamble OSFI MCT	
<b>LEARNING OBJECTIVES</b>	<b>KNOWLEDGE STATEMENTS</b>
5. Explain the responsibilities of an actuary as defined by standards of practice, regulators and insurance laws for financial reporting. Range of weight: 3-7 percent	a. Statutory Actuarial Opinion b. Standards of Practice c. Actuary and auditor relationship
<b>READINGS</b>	
COPLFR P&C Practice Note Feldblum (Schedule P), pp. 69-72	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>6. Calculate specific elements of income tax and evaluate their implications for a property/casualty insurer. Range of weight: 3-7 percent</p>	<p>a. Discounting b. Elements of income tax calculation c. Book income versus taxable income d. Alternative minimum tax e. DTA and DTL</p>
READINGS	
<p>Almagro and Ghezzi IASA 2 NAIC SSAP 65</p>	

## Complete Text References for Exam 7-United States

*Text references are alphabetized by the citation column.*

Citation	Abbreviation	Learning Objective	Source
2005 Insurance Expense Exhibit.	2005 IEE	D1, D2	L, NEW
A.M. Best, <i>Annual Review of the Excess and Surplus Lines Industry</i> , September 2001, sections IV and V, pp. 21-32.	A.M. Best 1	B3, B5	SK
A.M. Best, "Business as Never Before," <i>Best's Review</i> , January 2005.	A.M. Best 2	A3	SKU NEW
Actuarial Standards Board of the American Academy of Actuaries, "Actuarial Standard of Practice, No. 36, Statements of Actuarial Opinion Regarding Property/Casualty Loss and Loss Adjustment Expense Reserves."	ASOP 36	D5	W
Almagro, M.; and Ghezzi, T.L., "Federal Income Taxes—Provisions Affecting Property/Casualty Insurers," <i>PCAS LXXV</i> , 1988, Appendix B only, pp. 144-160.	Almagro and Ghezzi	D6	W NEW
Bartlett, D.K.; Klein, R.W.; and Russell, D.T., "Attempts to Socialize Insurance Costs in Voluntary Insurance Markets: The Historical Record," <i>Journal of Insurance Regulation</i> , Summer 1999, pp. 478-511.	Bartlett et al.	B1, C2, C3	SK
Biggs, J.L., "Statement of Jennifer L. Biggs, FCAS, MAAA, Chairperson, Mass Torts Subcommittee, American Academy of Actuaries," Hearing on "Proposed Resolution Regarding the Need for Effective Asbestos Reform" of the Committee on Property/Casualty Insurance, National Conference of Insurance Legislators, July 10, 2003, pp. 1-9, and 16.	Biggs	A3	SK
Brady, J.L.; Mellinger, J.H.; and Scoles, K.N., <i>The Regulation of Insurance</i> (First Edition), Insurance Institute of America, 1995, Chapters 2 (pp. 43-49), 3, 4, 5 (excluding "Other Federal Regulation Affecting the Insurance Industry," pp 148-154 but including Exhibit 5-1), and 6 (excluding "Other Interest Groups," pp. 172-177 but including Exhibit 6-5). Candidates will not be tested on material that appears only in exhibits unless the exhibit is specifically identified in the <i>Syllabus</i> .	Brady et al.	B1, B2, B3, B5	L

Citation	Abbreviation	Learning Objective	Source
Committee on Property and Liability Financial Reporting, American Academy of Actuaries, "Property and Casualty Practice Note, Statements of Actuarial Opinion on P&C Loss Reserves as of December 31, 2004."	COPLFR P&C Practice Note	D5	<b>W</b> <b>NEW</b>
Conger, R.F.; Hurley, J.D.; and Lowe, S.P., "How Might the Presentation of Liabilities at Fair Value Have Affected the Reported Results of U.S. Property Casualty Insurers," <i>Fair Value of P&amp;C Liabilities: Practical Implications</i> , 2004, Casualty Actuarial Society, pp. 13-24.	Conger et al.	D4	<b>W</b>
Ettlenger, K.H.; Hamilton, K.L.; and Krohm, G., <i>State Insurance Regulation</i> (First Edition), Insurance Institute of America, 1995, Chapter 6 (excluding "Monitoring Capital Adequacy Through Risk-Based Capital," pp. 156-161 but including Exhibits 6-1 and 6-3) and Chapter 8. Candidates will not be tested on material that appears only in exhibits unless the exhibit is specifically identified in the <i>Syllabus</i> .	Ettlenger et al.	B1, B2, B3, C1, C2, C3	<b>L</b>
Feldblum, S., "Completing and Using Schedule P" (Eighth Edition), CAS Study Note, June 2003. Candidates are not responsible for the end notes.	Feldblum (Schedule P)	B2, D1, D2, D5	<b>W</b>
Feldblum, S., "The Insurance Expense Exhibit and the Allocation of Investment Income" (Fifth Edition), CAS Study Note, May 1997.	Feldblum (IEE)	D1, D2	<b>W</b>
Feldblum, S., "NAIC Property/Casualty Insurance Company Risk-Based Capital Requirements," <i>PCAS LXXXIII</i> , 1996, pp. 297-389 (excluding Section 11 and related exhibits).	Feldblum (RBC)	B2, D1, D3	<b>W</b>
Feldblum, S., "Notes to the Financial Statement," CAS Study Note, May 2004.	Feldblum (Notes)	D1, D2	<b>W</b>
Feldblum, S., "Reinsurance Accounting: Schedule F" (Eighth Edition), CAS Study Note, April 2003. Candidates are not responsible for the end notes.	Feldblum (Schedule F)	D1, D2	<b>W</b>
Feldblum, S., "Statutory Surplus: Computation, Pricing and Valuation," CAS Study Note, June 2003. Candidates are not responsible for the end notes.	Feldblum (Surplus)	D1, D2	<b>W</b>
Ghezzi, T.L., "Actuarial Perspective on Property/Casualty Redlining Issues," <i>Actuarial Digest</i> , Volume 15, No. 1, February/March 1996.	Ghezzi	B1	<b>SK</b>
Gorvett, R.W.; Tedeschi, J.L.; and Ward, K.A., "Special Issues—Data Sources," <i>Foundations of Casualty Actuarial Science</i> (Fourth Edition), Casualty Actuarial Society, 2001, Chapter 10, pp. 787-796.	Gorvett et al.	D1	<b>W</b>
Greene, M. "Government Insurers," <i>Issues in Insurance</i> (Fourth Edition), American Institute for Property and Liability Underwriters, 1987, Volume I (excluding Chapters IX and X).	Greene	C1, C2, C3	<b>SK</b>



Citation	Abbreviation	Learning Objective	Source
Hamilton, K.L.; and Ferguson, C.L., <i>Personal Risk Management and Property-Liability Insurance</i> (First Edition), American Institute for Chartered Property Casualty Underwriters, 2002, pp. 6.20 – 6.34 and 9.36-9.40.	Hamilton and Ferguson	C1, C2, C3	SK
Harrington, S.E., “Insurance Rate Regulation in the 20 <sup>th</sup> Century,” <i>Journal of Insurance Regulation</i> , Winter 2000, pp. 204-217.	Harrington	B1, B2, B3, B4	SK
Harrington, S.E.; and Doeringhaus, H.I., “The Economics and Politics of Automobile Insurance Rate Classification,” <i>Journal of Risk and Insurance</i> , 1993, pp. 59-84.	Harrington and Doeringhaus	B3	SK
Hensler, D.R.; Vaiana, M.E.; Kakalik, J.S.; and Peterson, M.A., <i>Trends in Tort Litigation, The Story Behind the Statistics</i> , Rand Institute for Civil Justice, 1987.	Hensler et al.	A1, A2, A3	SK
Insurance Accounting and Systems Association, <i>Property-Casualty Insurance Accounting</i> (Eighth Edition), 2003, Chapters 2, 5, 8, 9, 10, 14, 15, and 18.	IASA 1	D1, D2, D4	L
Insurance Accounting and Systems Association, <i>Property-Casualty Insurance Accounting</i> (Eighth Edition), 2003, Chapter 12 (pp. 12-5 to 12-34, 12-65 to 12-67, and 12-70 to 12-76)	IASA 2	D1, D6	L
Insurance Accounting and Systems Association, <i>Property-Casualty Insurance Accounting</i> (Eighth Edition), 2003, Appendix D, pp. D10, D11, D12, D17, D18, D19, D20, and D21 (Canadian Annual Statement Exhibits).	IASA 3	D2	L
Jenkins, W.O., “National Flood Insurance Program, Actions to Address Repetitive Loss Properties,” Testimony before the Subcommittee on Economic Policy, Committee on Banking, Housing, and Urban Affairs, U.S. Senate, March 25, 2004, pp. 1-5.	Jenkins	C1, C3	SK
Keeton, R. “The Impact on Insurance of Trends in Tort Law,” <i>Issues in Insurance</i> (Third Edition), American Institute for Property and Liability Underwriters, 1984, Volume I.	Keeton	A1, A2, A3	SK
Mallor, J.P.; Barnes, A.J.; Bowers, T.; Phillips, M.J.; and Langvardt, A.W., <i>The Legal Environment of Risk Management and Insurance</i> (First Edition), American Institute for Chartered Property Casualty Underwriters, 2000, pp. 87-88, 107-121, and 125-145.	Mallor et al.	A1	SK
Musulin, R.T., “Issues in the Regulatory Acceptance of Computer Modeling for Property Insurance Ratemaking,” <i>Journal of Insurance Regulation</i> , Spring 1997, pp. 342-359.	Musulin	B6	SK
National Association of Insurance Commissioners, <i>Accounting Practices and Procedures Manual</i> , 2005, Preamble.	NAIC APPM, Preamble	D4	SKU NEW

<b>Citation</b>	<b>Abbreviation</b>	<b>Learning Objective</b>	<b>Source</b>
National Association of Insurance Commissioners, <i>Accounting Practices and Procedures Manual</i> , 2005, Statement of Statutory Accounting Principles 53, “Property Casualty Contracts—Premiums,” paragraphs 1-17.	NAIC SSAP 53	D2	SKU NEW
National Association of Insurance Commissioners, <i>Accounting Practices and Procedures Manual</i> , 2005, Statement of Statutory Accounting Principles 62, “Property and Casualty Reinsurance,” paragraphs 1-71.	NAIC SSAP 62	D1, D2	SKU NEW
National Association of Insurance Commissioners, <i>Accounting Practices and Procedures Manual</i> , 2005, Statement of Statutory Accounting Principles 65, “Property and Casualty Contracts,” paragraphs 1-45.	NAIC SSAP 65	D1, D2, D6	SKU NEW
National Association of Insurance Commissioners, <i>Official 2005 NAIC Annual Statement Blanks, Property and Casualty</i> , (both individual and consolidated basis), pp. 2-13, Notes to the Financial Statement p. 14, (Notes 23-27, 32, and 33); Schedules D (pp. 23-28 and E-08 through E-14), F (pp. 34-41), H (pp. 42-44), P (pp. 45-103). Candidates will be expected to have knowledge of other sections of the annual statement that are discussed in other <i>Syllabus</i> readings. Candidates are not responsible for page numbers. [The “Notes to the Financial Statement” are cited for reference only. Candidates are responsible for the Notes as described in “Notes to the Financial Statement” (May 2004) by Feldblum where the Notes are referenced by title.]	NAIC Annual Statement	D1, D2	L NEW
National Association of Insurance Commissioners, “Property and Casualty Model Rating Law (File and Use Version),” Model Regulation Service—January 1998.	NAIC Model Law	B1	SKU NEW
Office of the Superintendent of Financial Institutions Canada, “Guideline—Minimum Capital Test (MCT) for Property and Casualty Insurance Companies,” pp. 1-9, 17-22, July 2003.	OSFI MCT	D1, D2, D4	SK
Rejda, G.E., “Financing the Social Security Program,” <i>Social Insurance &amp; Economic Security</i> (Sixth Edition), Prentice Hall, 1999, Chapter 7 (pp. 148-166).	Rejda	C1, C2, C3	SK
Troxel, T.; and Bouchie, G.E., <i>Property-Liability Insurance Accounting and Finance</i> (Fourth Edition), American Institute for Chartered Property Casualty Underwriters, 1995, pp. 216-236.	Troxel and Bouchie	B2, D1	SK
Wagner, T., “Insurance Rating Bureaus,” <i>Journal of Insurance Regulation</i> , Winter 2000, pp. 189-202.	Wagner	B2, B3, B4, B5	SK
Wiening, E.A.; Rejda, G.E.; Luthardt, C.M.; and Ferguson, C.L.; <i>Personal Insurance</i> (First Edition), American Institute for Chartered Property Casualty Underwriters, 2002, pp. 10.25-10.32 and 12.26-12.33.	Wiening et al.	C1, C2, C3	SK

Citation	Abbreviation	Learning Objective	Source
Wilcox, C.J., "The US Guaranty Association Concept at 25," <i>Journal of Insurance Regulation</i> , Spring 1996, pp. 369-371 (up to The Life and Health Scorecard) and pp. 385-403 (starting with The Property and Casualty Scorecard).	Wilcox	C1	SK
Williams, C.A., "Regulating Property and Liability Insurance Rates Through Excess Profits Statutes," <i>Journal of Risk and Insurance</i> , September 1983, pp. 445-472.	Williams	B3	SK

## Source Key

- L** May be purchased from the publisher or bookstore or borrowed from the CAS Library.
- NEW** Indicates new or updated material or modified citation.
- SK** Represents material included in the 2006 CAS Study Kit.
- SKU** Represents material included in the 2006 CAS Study Kit and the 2006 Update to the 2005 Study Kit.
- W** Represents material that is available at no charge from the "Admissions" section of CAS Web Site ([www.casact.org](http://www.casact.org)) under Syllabus Web Notes. (For those without access to the Internet, printed copies of the Web Notes are available for a fee.)

## Publishers and Distributors

Contact information is furnished for those who wish to purchase the text references cited for Exam 7-United States. Publishers and distributors are independent and listed for the convenience of candidates; inclusion does not constitute endorsement by the CAS.

ACTEX Publications (Mad River Books), 140 Willow Street, Suite One, P.O. Box 974, Winsted, CT 06098; telephone: (800) 282-2839 or (860) 379-5470; fax: (860) 738-3152; e-mail: [retail@actexamdriver.com](mailto:retail@actexamdriver.com).

Actuarial Bookstore, P.O. Box 69, Greenland, NH 03840; telephone: (800) 582-9672 (U.S. only) or (603) 430-1252; fax: (603) 430-1258; Web site: [www.actuarialbookstore.com](http://www.actuarialbookstore.com).

*Actuarial Digest*, P.O. Box 1127, Ponte Vedra, FL 32004.

American Academy of Actuaries, 1100 Seventeenth Street NW, Seventh Floor, Washington, DC 20036; telephone: (202) 223-8196; Web site: [www.actuary.org](http://www.actuary.org).

American Institute for Chartered Property Casualty Underwriters, Order Department, P.O. Box 3016, 720 Providence Road, Malvern, PA 19355-0716; telephone: (610) 644-2100; fax: (610) 640-9576.

*Association Form of the Annual Statement Blanks*, Bowne Insurance Division, 800 Central Boulevard, Carlstadt, NJ 07072; telephone: (800) 223-3103.

Bowne Insurance Division, 800 Central Boulevard, Carlstadt, NJ 07072; telephone: (800) 223-3103 (for the *NAIC Annual Statement Blanks, Property and Casualty*).

Casualty Actuarial Society *Forum*, *Foundations of Casualty Actuarial Science* (Fourth Edition), *PCAS*, and *Discussion Paper Program*, Casualty Actuarial Society, 4350 N. Fairfax Drive, Suite 250, Arlington, VA 22203; telephone: (703) 276-3100; fax: (703) 276-3108; e-mail: office@casact.org; Web site: www.casact.org.

Insurance Accounting and Systems Association, *Property-Casualty Insurance Accounting* (Eighth Edition), 2003, IASA Fulfillment Center, P.O. Box 51008, Durham, NC 27717; telephone: (800) 817-4272 or (919) 489-0991; fax: (800) 668-4272; Web site: www.iasa.org.

Insurance Expense Exhibit, Bowne Insurance Division, 800 Central Boulevard, Carlstadt, NJ 07072; telephone: (800) 223-3103.

Insurance Institute of America, 720 Providence Road, Malvern, PA 19355-0770; telephone: (610) 644-2100.

*Journal of Insurance Regulation*, National Association of Insurance Commissioners, 120 W. 12<sup>th</sup> Street, #1100, Kansas City, MO 64105; telephone: (816) 842-3600.

*Journal of Risk and Insurance*, *The*, American Risk and Insurance Association, 716 Providence Road, P.O. Box 3028, Malvern, PA 19355; telephone: (610) 640-1997; fax: (610) 725-1007; Web site: www.aria@cpcuia.org.

*NAIC Annual Statement Blanks*, *Property and Casualty* may be obtained from Bowne Insurance Division, 800 Central Boulevard, Carlstadt, NJ 07072; telephone: (800) 223-3103.

National Association of Insurance Commissioners, 120 W. 12th Street, #1100, Kansas City, MO 64105; telephone: (816) 842-3600.

Office of the Superintendent of Financial Institutions Canada, 255 Albert Street, Ottawa, Ontario K1A 0H2 Canada; telephone: (613) 990-7788; fax: (613) 952-8219; Web site: www.osfi-bsif.gc.ca.

Rejda, G.E., *Social Insurance and Economic Security* (Sixth Edition), 1999, Prentice Hall, Inc., 200 Old Tappan Road, Old Tappan, NJ 07675; telephone: (800) 282-0693; Web site: vig.prenhall.com.

# Fellowship Exams

## Exam 8

### Investments and Financial Analysis

Before commencing study for this four-hour examination, candidates should read the introduction to “Materials for Study” on page 43 of this *Syllabus* for important information about learning objectives, knowledge statements, readings, and the range of weights. Items marked with a bold **SK** constitute the 2006 CAS Exam 8 Study Kit that is available from the CAS Office for a cost of \$41. Items marked with a bold **W** are available at no charge under Web Notes in the “Admissions” section of the CAS Web Site ([www.casact.org](http://www.casact.org)). Those without access to the Web may purchase a print version of the items marked with a **W**—the 2006 CAS Exam 8 Web Notes—from the CAS Office for a cost of \$15. Information about Study Kits and Web Notes is available on page 35.

Please check the “Admissions” section of the CAS Web Site for any changes to the *Syllabus*.

The CAS will test the candidate’s knowledge of the material, but may decide not to include questions from every reading on a particular exam.

Exam 8 focuses on a broad array of finance, investment, and financial risk management topics. The exam can be viewed as having two parts, with Sections A-G covering mostly financial theory and tools and Sections H-J covering various financial applications. The material in Exam 8 presupposes and builds upon introductory knowledge of finance. It also presupposes knowledge of probability and statistical modeling, liability and reserve risk and insurance underwriting.

#### READINGS

There are two main texts used for Sections A-G: *Investments* (2005) by Bodie, Kane, and Marcus and *Options, Futures and Other Derivatives* (2006) by Hull. In addition, two chapters from *The Handbook of Fixed Income Securities* (2001) edited by Fabozzi are included. For those candidates wishing to gain a broader exposure to fixed income securities, Fabozzi has a wealth of additional material, although this additional material will not be tested.

The *Investments* (Bodie, Kane, and Marcus) text contains references to various Web sites. Candidates are not responsible for the identity of the Web sites, or the actual content of the Web sites, except to the extent the content is reproduced in the text. Candidates are also not responsible for any aspect of the boxes entitled “E-Investments” that are usually placed at or towards the end of a chapter.

While, in general, it is suggested that the candidate cover the learning objectives in the order listed, some text references to later chapters in texts may occur before text references to earlier chapters. In these cases, the candidate may need to review these earlier chapters first and then return to the learning objectives that reference the later chapters.

For Exam 8, the appendices are included unless specifically excluded.

There are various numeric tables scattered throughout the readings, illustrating actual observations or hypothetical examples. Candidates are not responsible for the actual numeric values.

## A. Financial Markets and Instruments

Range of weight for Section A: 0-5 percent

This section provides candidates with an overview of various financial markets and instruments.

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
1. Briefly describe the four financial market segments and the key characteristics of securities from each market. Range of weight: 0-5 percent	a. Money Market b. Bond (Fixed Income) Market c. Equity Markets d. Derivatives Markets
2. Construct equity market indices using time series of prices. Range of weight: 0-5 percent	a. Price-weighted, value-weighted and equally-weighted indices b. Impact of splits, dividends, and composition changes
<b>READINGS</b>	
BKM Chapter 2 (For background, the candidate may wish to refer to Chapter 1, but no questions will be taken from Chapter 1.)	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
3. Calculate the pre-tax and post-tax real interest rates given nominal interest rates and inflation rates. Range of weight: 0-5 percent	a. Real and nominal rates of interest b. Fisher equation
4. Describe the historical relationship between risk and return for different types of securities. Range of weight: 0-5 percent	a. Average return b. Standard deviation as risk measure
<b>READINGS</b>	
BKM Chapter 5 (For background, the candidate may wish to refer to Chapters 3 and 4, but no questions will be taken from Chapters 3 and 4.)	

## B. Portfolio Theory

Range of weight for Section B: 3-7 percent

This section discusses the relationship between the risk and return for different combinations of risky and risk-free investments and discusses the impact of diversification on this relationship. Candidates are introduced to the manner in which investors might select, from those available, a particular portfolio that best suits their individual preferences for risk and return.

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
1. Describe the relationship between risk and return and explain how utility scores are used to assess the trade-off between risk and return. Range of weight: 0-5 percent	a. Utility functions and utility maximization b. Risk aversion c. Mean-variance criterion
<b>READINGS</b>	
BKM Chapter 6	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
2. Calculate expected return and standard deviation of return for portfolios consisting of risky and risk-free securities and identify optimal combinations of a risky asset and a risk-free asset for investors with different levels of risk aversion. Range of weight: 3-7 percent	a. Capital allocation line b. Risk aversion c. Complete portfolio
<b>READINGS</b>	
BKM Chapter 7	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
3. Describe the impact of diversification on risk and return measures for portfolios of two or more risky assets. Range of weight: 0-5 percent	a. Expected return for portfolios of risky and risk-free assets b. Standard deviation of return for portfolios of two or more risky assets c. Standard deviation of return for portfolios of risky and risk-free assets d. Efficient portfolios and efficient frontier e. Optimal risky portfolio f. Asset allocation versus security selection g. Markowitz's Portfolio Selection Model and the Separation Property
4. Explain the limitations of diversification as a risk management tool. Range of weight: 0-5 percent	a. Insurance principle b. Fallacy of time diversification
<b>READINGS</b>	
BKM Chapter 8	

### C. Equilibrium in Capital Markets

Range of weight for Section C: 5-10 percent

This section expands on the portfolio choice results of the previous section and examines how equilibrium market prices are ultimately determined, with a particular emphasis on prices of equity securities. Various equilibrium models are presented, including the Capital Asset Pricing Model, Arbitrage Pricing Theory and Index Models, along with empirical findings regarding their validity. The concept of market efficiency is presented to help candidates understand the factors that move market prices towards and away from the theoretical prices presented in these models.

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
1. Explain the Capital Asset Pricing Model, including the major assumptions and examples of its applications and be able to use it to measure expected returns for risky securities with different risk characteristics. Range of weight: 3-7 percent	a. CAPM assumptions b. Capital market line c. Security market line d. CAPM e. Derivation of standard CAPM and zero-beta CAPM f. Adjustments to CAPM to reflect illiquidity
<b>READINGS</b>	
BKM, Chapter 9	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>2. Use a Single Index Model to measure a security's return variance and other inputs into the Markowitz Portfolio Selection Model such as correlation and covariance with other securities' returns.</p> <p>Range of weight: 0-5 percent</p>	<p>a. Index Models and their relationship to CAPM</p> <p>b. Correlation and covariance estimates from index models</p> <p>c. Industry index models</p>
<p>3. Describe how to use a single index model to estimate a security's CAPM beta.</p> <p>Range of weight: 0-5 percent</p>	<p>a. Index Models and their relationship to CAPM</p> <p>b. Estimating beta using single index model</p> <p>c. Adjusting beta to reflect tendency to move towards 1.0 and statistical errors</p> <p>d. Forecasting beta</p>
<b>READINGS</b>	
BKM, Chapter 10	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>4. Use Arbitrage Pricing Theory to determine the expected return for a security given its factor sensitivities and the expected returns on the factor portfolios.</p> <p>Range of weight: 0-5 percent</p>	<p>a. Arbitrage</p> <p>b. Factor portfolios</p> <p>c. Arbitrage Pricing Theory (APT) and its comparison to CAPM</p> <p>d. Alternative Factors in Multifactor Models—Macroeconomic Factors (Chen, Roll &amp; Ross), Fama-French Factors, Intertemporal CAPM</p>
<p>5. Determine the expected returns on the APT factor portfolios based on the expected returns and factor sensitivities of other diversified portfolios.</p> <p>Range of weight: 0-5 percent</p>	<p>a. APT</p> <p>b. APT factor portfolios</p>
<b>READINGS</b>	
BKM, Chapter 11	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>6. Describe the concept of market efficiency, including the three major forms.</p> <p>Range of weight: 0-5 percent</p>	<p>a. Impact of technical analysis and fundamental analysis on market efficiency</p> <p>b. Event studies</p>
<p>7. Describe various market anomalies, their implications for market efficiency and the potential behavioral interpretations of the observed results.</p> <p>Range of weight: 0-5 percent</p>	<p>a. Market anomalies, including momentum, P/E effect, small-firm effect, neglected-firm effect, book-to-market effect</p> <p>b. Behavioral Issues—Information processing errors, behavioral biases and limits to arbitrage, including examples from each of these three categories</p>
<b>READINGS</b>	
BKM, Chapter 12	



LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>8. Describe the use of historical data to test the CAPM and APT, the statistical limitations of these tests and the key findings of various studies.</p> <p>Range of weight: 0-5 percent</p>	<p>a. Two-stage test of CAPM</p> <p>b. Statistical limitations, including actual versus expected returns, market index as proxy for market portfolio, measurement error, stochastic volatility</p> <p>c. Important tests of CAPM, such as Miller and Scholes; Black, Jensen and Scholes; Fama and Macbeth, and their results/conclusions</p> <p>d. Roll's Critique</p> <p>e. Chen, Roll and Ross tests of APT</p> <p>f. Fama and French's 3-Factor Model</p>
<p>9. Describe the Equity Premium Puzzle, the explanations for the puzzle based on Fama and French's analysis and the impact of survivorship bias.</p> <p>Range of weight: 0-5 percent</p>	<p>a. Equity Premium Puzzle</p> <p>b. Fama and French's analysis based on the dividend discount model</p> <p>c. Survivorship bias and its impact on both the equity premium puzzle and tests of market efficiency</p>
<b>READINGS</b>	
BKM, Chapter 13	

## D. Fixed Income Securities

Range of weight for Section D: 18-22 percent

This section covers the features of various fixed income securities, including U.S. Government Bonds, Corporate Bonds and Mortgage-Backed Securities, and details of how these securities are valued, including the term structure of interest rates.

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>1. Describe and give examples of various types of fixed income securities, including unique aspects of each.</p> <p>Range of weight: 0-5 percent</p>	<p>a. Treasury Notes and Bonds</p> <p>b. Corporate Bonds</p> <p>c. Preferred Stock</p> <p>d. Asset-Backed Securities</p> <p>e. Catastrophe Bonds</p> <p>f. International Bonds</p> <p>g. Indexed Bonds (e.g., TIPS)</p>
<b>READINGS</b>	
BKM, Chapter 14 Fabozzi, Chapter 24 Gorrivett	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>2. Determine the quoted price, cash price, and yield to maturity of U.S. Treasury Bonds and Corporate Bonds.</p> <p>Range of weight: 3-7 percent</p>	<p>a. Accrued interest</p> <p>b. Quoted or Clean price</p> <p>c. Sale, Invoice, Cash or Dirty price</p> <p>d. Alternative yield measures—current yield, yield to maturity, yield to call, par yield</p> <p>e. Prices and yields for Zero Coupon Bonds</p> <p>f. Annual, quarterly and continuous compounding</p> <p>g. Day count conventions</p>
<b>READINGS</b>	
<p>BKM, Chapter 14</p> <p>Hull, Chapter 4 and Sections 6.1 and 6.2</p>	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>3. Calculate the pre-tax and after-tax holding period returns, taking into account taxes associated with the amortization of original issue discount.</p> <p>Range of weight: 0-5 percent</p>	<p>a. Holding Period Returns</p> <p>b. Original Issue Discount</p>
<b>READINGS</b>	
<p>BKM, Chapter 14</p>	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>4. Explain the three different Term Structure Theories.</p> <p>Range of weight: 0-5 percent</p>	<p>a. Three theories, including Expectations Hypothesis, Liquidity Preference Theory and Segmentation Theory</p> <p>b. Forward rate versus expected spot rate</p>
<p>5. Determine U.S. Treasury zero rates at different maturities (i.e., the term structure) based on US Treasury bond yields.</p> <p>Range of weight: 3-7 percent</p>	<p>a. Bootstrap method for determining zero rates from coupon bonds</p> <p>b. Statistical approaches to measuring a discount function from the prices of many coupon bonds</p> <p>c. Zero coupon yield curve using both continuous compounding and semi-annual compounding</p>
<p>6. Calculate US Treasury and LIBOR forward rates from zero rates.</p> <p>Range of weight: 0-5 percent</p>	<p>a. Determining forward rates from spot rates (zero rates)</p> <p>b. LIBOR zero rates</p> <p>c. Forward Rate Agreements</p>
<b>READINGS</b>	
<p>BKM, Chapter 15</p> <p>Hull, Chapter 4</p>	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>7. Describe the process used to rate the default risk on corporate bonds and the various mechanisms used to limit this risk to investors.</p> <p>Range of weight: 0-5 percent</p>	<p>a. Methods to estimate bond default probabilities, including Financial Ratios and Altman's Z-Score</p> <p>b. Bond indentures including, sinking funds, subordination, dividend restrictions, and collateral</p>
<b>READINGS</b>	
BKM, Chapter 14	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>8. Determine the promised (stated) yield and expected yield for Corporate Bonds, taking into account default probabilities and expected recovery rates.</p> <p>Range of weight: 3-7 percent</p>	<p>a. Promised (stated) yield</p> <p>b. Expected yield</p> <p>c. Unconditional default probability</p> <p>d. Conditional default probability, default intensity or hazard rate</p> <p>e. Default premium or yield spread</p>
<b>READINGS</b>	
BKM, Chapter 14	
Hull, Chapter 20	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>9. Determine the approximate default intensity for a corporate bond given its yield, the risk free yield and its expected recovery rate.</p> <p>Range of weight: 0-5 percent</p>	<p>a. Default intensity</p> <p>b. Yield spread</p> <p>c. Recovery rate</p>
<p>10. Determine the annual unconditional probability of default for a corporate bond given its yield, the risk free yield and its expected recovery rate.</p> <p>Range of weight: 0-5 percent</p>	<p>a. Expected loss from default</p> <p>b. Unconditional default probability</p> <p>c. Recovery rate</p>
<b>READINGS</b>	
Hull, Chapter 20	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>11. Calculate the historical default probabilities for corporate bonds using Altman's bond mortality method.</p> <p>Range of weight: 0-5 percent</p>	<p>a. Bond Mortality</p> <p>b. Marginal and Cumulative Mortality Rates</p>
<b>READINGS</b>	
Altman	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>12. Discuss the reasons Altman gives for excess historical default premiums and the reasons Hull gives for differences between historical default probabilities and default probabilities implied by bond prices.</p> <p>Range of weight: 0-5 percent</p>	<p>a. Historical statistics of bond defaults and yields for various rating cohorts</p> <p>b. Explanations for excess historical default premiums, including overcompensation, other risk factors such as liquidity risk and reinvestment risk, overstated recovery rates, systematic default risk, investor constraints</p> <p>c. Risk Neutral versus Real World estimates of default probabilities</p>
<b>READINGS</b>	
Altman Hull, Chapter 20	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>13. Describe the use of Merton's model to estimate probabilities of default using equity prices and equity volatility.</p> <p>Range of weight: 0-5 percent</p>	<p>a. Equity as a call option on the assets of the firm</p> <p>b. Relationship between asset volatility and equity volatility</p>
<b>READINGS</b>	
Hull, Chapter 20	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>14. Estimate the cash flows for Mortgage Pass Throughs, Collateralized Mortgage Obligations, and Stripped Mortgage Backed Securities under alternative assumptions regarding mortgage prepayment.</p> <p>Range of weight: 0-5 percent</p>	<p>a. Types of mortgages and mortgage backed securities</p> <p>b. Prepayment risk</p> <p>c. Cash flow characteristics and prepayment risk of various tranches of Collateralized Mortgage Obligations, IOs and POs</p>
<b>READINGS</b>	
Fabozzi, Chapter 24	

## E. Futures, Forward and Swaps

Range of weight for Section E: 8-12 percent

This section covers in detail various derivative instruments, including futures, forwards, and swaps. The emphasis in each case is on understanding their cash flow characteristics, using the concept of arbitrage to determine the theoretical value of these securities, and managing financial risk through use of these financial instruments.

<b>LEARNING OBJECTIVES</b>	<b>KNOWLEDGE STATEMENTS</b>
1. Describe the standardized features of futures contracts that are specified by the Exchange and how futures contracts differ from forward contracts.  Range of weight: 0-5 percent	a. Standardized features, including asset description, contract size, delivery arrangements, delivery months, method of quoting prices, price and position limits b. Margins c. Marking to market d. Closing out positions
<b>READINGS</b>	
Hull, Chapter 2 (For background, the candidate may wish to refer to Chapter 1, but no questions will be taken from Chapter 1.)	

<b>LEARNING OBJECTIVES</b>	<b>KNOWLEDGE STATEMENTS</b>
2. Use forward and/or futures contracts to either hedge the future purchase or sale of an asset or to hedge a portfolio of stocks.  Range of weight: 0-5 percent	a. Long hedge versus short hedge b. Arguments for and against hedging c. Basis risk d. Minimum variance hedge ratio e. Optimal number of futures contracts for hedging asset positions f. Optimal number of index futures contracts to hedge portfolios
<b>READINGS</b>	
Hull, Chapter 3 (excluding Appendix)	

<b>LEARNING OBJECTIVES</b>	<b>KNOWLEDGE STATEMENTS</b>
3. Use arbitrage arguments to determine equilibrium forward prices for non-dividend paying stocks, dividend paying stocks, currencies and commodities.  Range of weight: 3-7 percent	a. Arbitrage b. Short selling c. Forward prices versus futures prices d. Convenience yields e. Relationship between forward prices and expected future spot prices f. Cost of carry
4. Determine the value of an existing forward contract.  Range of weight: 0-5 percent	a. Present value difference of forward price and the delivery price of an existing forward contract
<b>READINGS</b>	
Hull, Chapters 5 (excluding Appendix)	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
5. Describe how Interest Rate Swaps or Currency Swaps can be used to alter the interest rate sensitivity or exchange rate sensitivity of an asset or a liability. Range of weight: 0-5 percent	a. Swap cash flow mechanics b. Role of financial intermediary c. Comparative advantage argument for swaps and the role of the counterparties' credit ratings
6. Determine the value of an existing interest rate swap or currency swap and the equilibrium swap rate. Range of weight: 0-5 percent	a. Swap rate b. LIBOR/swap zero rate c. Value of a swap as an exchange of bonds d. Value of a swap as series of forward agreements
<b>READINGS</b>	
Hull, Chapter 7	

## F. Options

Range of weight for Section F: 18-22 percent

This section covers options in detail. The emphasis is in understanding their cash-flow characteristics, how to use the concept of arbitrage to determine the theoretical value of these securities, and how they can be used to manage financial risk. Various valuation models are presented and used to determine the values of a variety of options.

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
1. Explain the fundamental aspects of put and call options on stocks, including how they are traded and quoted, key contract provisions, and their payoffs at maturity. Range of weight: 0-5 percent	a. Effect of cash dividends, stock dividends and stock splits on stock option contracts. b. Key determinants of the value of put and call options, including underlying asset price, exercise price, term to maturity, risk free rate and volatility of underlying asset price c. Early exercise of American puts and calls, with and without dividends
<b>READINGS</b>	
Hull, Chapters 8 and 9	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
2. Use Put-Call Parity to determine the relationship between prices of European Put and Call options and to identify arbitrage opportunities. Range of weight: 0-5 percent	a. Arbitrage b. Put-Call Parity for European options c. Use of short selling to lock in arbitrage profits d. Effect of dividends on put-call parity
<b>READINGS</b>	
Hull, Chapter 9	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
3. Draw payoff and profit diagrams for different trading strategies involving options. Range of weight: 0-5 percent	a. Combinations of options with underlying stock b. Spreads—Bull, Bear, Box, Butterfly, Calendar, Diagonal c. Combinations—Straddle, Strips, Straps, Strangles
<b>READINGS</b>	
Hull, Chapter 10	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
4. Value European and American Put and Call options using the Binomial Model or Risk Neutral Valuation Model. Range of weight: 3-7 percent	a. Single period and multi-period binomial stock price trees b. Selecting parameters ( $u$ and $d$ ) for the binomial option pricing model based on the stock volatility c. Risk neutral valuation method d. Risk neutral probabilities e. Early exercise of American options f. Binomial model for options on dividend-paying stocks, indices, currencies and futures
<b>READINGS</b>	
Hull, Chapter 11	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
5. Value European Puts and Calls using the Black-Scholes Option Pricing Formula for dividend and non-dividend paying stocks, indices, currencies, and futures contracts. Range of weight: 3-7 percent	a. Geometric Brownian Motion as a model for stock prices b. Estimation of volatility for option pricing purposes and implied volatility c. Put-call parity d. Methods for valuing European and American call options on dividend paying stocks, including Black's Approximation for American options e. Black Model for valuing futures options
<b>READINGS</b>	
Hull, Chapters 12 (excluding Appendix), 13 (excluding Appendix), and 14	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
6. Explain the impact that various real-world deviations from the standard Black-Scholes assumptions would have on the accuracy of the Black-Scholes option pricing formula. Range of weight: 0-5 percent	Impact of: a. Changes in volatility b. Jumps in asset prices c. Changes in interest rates d. Borrowing penalties e. Short-selling restrictions f. Trading costs g. Taxes h. Dividends i. Takeovers
<b>READINGS</b>	
Hull, Chapter 13 (excluding Appendix) Black	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
7. Determine whether a particular function is a valid formula for the price of a derivative security using the Black-Scholes-Merton Differential Equation. Range of weight: 0-5 percent	a. Ito's Lemma b. Black-Scholes-Merton Differential Equation c. Riskless portfolio
<b>READINGS</b>	
Hull, Section 12.5 and Chapter 13 (excluding Appendix)	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
8. Explain the difference between warrants or executive stock options and standard options; describe how the Black-Scholes model can be adjusted to determine the value of warrants. Range of weight: 0-5 percent	a. Black-Scholes Model b. Adjustments for new shares issued and exercise price paid
<b>READINGS</b>	
Hull, Chapter 13 (excluding Appendix)	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
9. Determine the value of bonds with embedded put or call features using a Binomial Interest Rate Tree. Range of weight: 3-7 percent	a. Binomial interest rate tree for short rate b. Calibrating a binomial interest rate tree using U.S. Government bonds c. Option-adjusted spread
<b>READINGS</b>	
Fabozzi, Chapter 34	

## G. International Securities

Range of weight for Section G: 0-5 percent

This section introduces the candidate to the impact of global diversification on portfolio risk-return trade-offs and how exchange rate risks and political risks affect the risk of international securities.

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
1. Describe sources of risk in investing internationally, including exchange rate risk and country-specific risk. Range of weight: 0-5 percent	a. Exchange Rate Risk b. Country-specific risk and political risk
2. Describe the sources of potential diversification benefits from investing in international securities. Range of weight: 0-5 percent	a. EAFE Index b. World Equity Benchmark Shares
<b>READINGS</b>	
BKM, Chapter 25	



## H. Asset-Liability Management

Range of weight for Section H: 5-10 percent

This section introduces the candidate to factors that affect the price sensitivity of fixed income securities and presents various ways in which a portfolio manager might manage the interest rate and cash flow risk in a portfolio of these instruments. This is extended to include a firm's liabilities, as well as its assets, along with strategies to manage the associated net interest rate and cash flow risks.

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
1. Calculate the Macaulay Duration, Modified Duration and Convexity of a bond using either annually or continuously compounded interest rates. Range of weight: 0-5 percent	a. Macaulay duration b. Modified duration c. Effective duration d. Convexity
2. Use duration and convexity measures to estimate the percentage change in a bond's price for a given change in the rates used to discount the bond cash flows. Range of weight: 0-5 percent	a. Modified duration b. Convexity
<b>READINGS</b>	
BKM, Chapter 16 Hull, Sections 4.8 and 4.9	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
3. Calculate the Macaulay duration of loss reserves and the Macaulay duration of the surplus of a property-casualty insurance company. Range of weight: 0-5 percent	a. Macaulay duration b. Relationship between surplus, asset and liability durations for a property-casualty insurance company
<b>READINGS</b>	
Feldblum Noris (excluding sections I, II, V, and VI)	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
4. Describe how to use various immunization strategies, including Net Worth Immunization, Target Date Immunization, Cash Flow Matching and Contingent Immunization, to manage interest rate risk and cash flow risk in a bond portfolio and demonstrate the effectiveness of each strategy under different interest rate scenarios. Range of weight: 3-7 percent	a. Net worth immunization b. Target date immunization c. Cash flow matching d. Contingent immunization e. Use of interest rate swaps, mortgage-backed securities, and other derivative securities to alter the interest rate risk for a bond portfolio
<b>READINGS</b>	
BKM, Chapter 16 Gorvett	

## I. Financial Risk Management

Range of weight for Section I: 18-22 percent

This section goes beyond the treatment of Asset-Liability Management in Section H to include other sources of financial risk and addresses the theoretical basis for financial risk management. Measures of the price sensitivity of derivative securities and the use of these instruments to manage financial risk are presented. Other measures of financial risk, such as Value at Risk and the Expected Policyholder Deficit, and their uses are presented.

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
1. Calculate the sensitivity of an option price to various parameters, including the stock price (delta and gamma), volatility (vega), time (theta), and interest rates (rho). Range of weight: 0-5 percent	a. Delta b. Gamma c. Vega d. Theta e. Rho
2. Demonstrate how to delta, gamma and vega hedge a portfolio of stocks and options. Range of weight: 3-7 percent	a. Strategies for managing risk of written option contracts: do nothing, cover, stop loss, delta hedging b. Delta hedging c. Gamma hedging d. Vega hedging e. Delta, gamma, and vega of stocks, futures, and forwards f. Using futures or forwards to delta hedge efficiently g. Portfolio insurance (synthetic)
<b>READINGS</b>	
Hull, Section 14.3 and Chapter 15 (excluding Appendix)	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
3. Calculate the Value at Risk (VaR) for a portfolio containing a single stock, multiple stocks, fixed income securities, or options. Range of weight: 3-7 percent	a. VaR definition b. VaR for individual stocks using model building (variance-covariance) approach c. VaR for portfolio of stocks using linear model d. VaR for bonds using linear model and duration e. Cash flow mapping procedure for bonds f. VaR for options using linear model and quadratic model
<b>READINGS</b>	
Hull, Chapter 18	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
4. Describe alternative ways to estimate the VaR besides analytical calculations. Range of weight: 0-5 percent	a. Historical simulation b. Monte Carlo simulation, including partial simulation approach c. Stress testing and back testing
<b>READINGS</b>	
Hull, Chapter 18	
Culp, Miller and Neves (excluding Appendix)	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
5. Describe various mechanisms firms can use to reduce their credit risk on derivatives. Range of weight: 0-5 percent	a. Netting b. Collateralization c. Downgrade triggers
6. Describe the <i>CreditMetrics</i> approach to estimating Credit Value at Risk for a single bond or a portfolio of bonds. Range of weight: 0-5 percent	a. Credit ratings transition matrix b. Use of Gaussian copula to simulate correlated ratings transitions for two bonds
<b>READINGS</b>	
Hull, Chapter 20 (excluding the sections “Using Factors to Define the Correlation Structure” and “Binomial Correlation Measure” on pages 498-499)	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
7. Describe the limitations of VaR for non-financial firms and the advantages of alternatives such as Cash Flow at Risk, Risk-Based Capital and Shortfall Risk. Range of weight: 0-5 percent	a. Examples of firms experiencing large losses due to poor financial risk management, including Proctor and Gamble, Barings, Orange County, Metallgesellschaft and Daimler Benz b. Limitations of VaR, including limited data to parameterize models over long horizons and deviations of real world distributions from normality assumption c. Cash Flow at Risk d. Risk-Based Capital e. Shortfall Risk
<b>READINGS</b>	
Stulz Culp, Miller and Neves (excluding Appendix) Butsic Cummins	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
8. Explain why financial risk management can enhance the value of a firm. Range of weight: 0-5 percent	Effect of risk management on: a. Bankruptcy costs b. Taxes c. Payments to stakeholders d. Access to capital for new investments e. Capital structure f. Management incentives
<b>READINGS</b>	
Stulz Gorvett Butsic	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>9. Describe how a firm's capital structure or credit rating could affect their preferred degree of financial risk management.</p> <p>Range of weight: 0-5 percent</p>	<p>a. Highly-rated firms</p> <p>b. Low-rated firms</p> <p>c. Firms in distress</p>
<b>READINGS</b>	
Stulz	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>10. Describe how firms can use Risk Adjusted Return on Capital (RAROC) and Economic Value Added (EVA) measures to maximize value creation.</p> <p>Range of weight: 0-5 percent</p>	<p>a. RAROC</p> <p>b. EVA and EVAOC</p> <p>c. Management of risk taking by measuring gains on a risk-adjusted basis and design of compensation systems to reward excess returns only</p>
<b>READINGS</b>	
<p>Nakada</p> <p>Cummins</p> <p>Stulz</p>	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>11. Describe strengths and weaknesses of the principal methods insurers can use to allocate capital to lines of business.</p> <p>Range of weight: 0-5 percent</p>	<p>a. Regulatory Risk-Based Capital</p> <p>b. Value at Risk</p> <p>c. Insolvency Put Option/Expected Policyholder Deficit</p> <p>d. Marginal capital allocation methods reflecting diversification, including Merton-Perold and Myers-Read</p>
<p>12. Describe the three types of friction costs associated with an insurer's capital.</p> <p>Range of weight: 0-5 percent</p>	<p>a. Friction costs, including agency costs, double taxation and regulation</p>
<b>READINGS</b>	
Cummins	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
<p>13. Calculate the Expected Policyholder Deficit (EPD) for an insurance policy or line of business.</p> <p>Range of weight: 0-5 percent</p>	<p>a. Expected Policyholder Deficit (EPD)</p>
<p>14. Determine the capital required to maintain a constant EPD Ratio when adding a new policy or line of business to an existing portfolio of risks.</p> <p>Range of weight: 0-5 percent</p>	<p>a. EPD ratio</p> <p>b. Alternative assumptions about invested assets (cash versus risky securities)</p>

<b>READINGS</b>
Butsic Cummins

<b>LEARNING OBJECTIVES</b>	<b>KNOWLEDGE STATEMENTS</b>
15. Describe the key risk types included in Nakada's risk-adjusted return on capital (RAROC) framework. Range of weight: 0-5 percent	<ul style="list-style-type: none"> <li>a. Credit Risk</li> <li>b. Market Risk</li> <li>c. Non-Catastrophe Insurance Risk</li> <li>d. Catastrophe Risk</li> <li>e. Operating (Business &amp; Event) Risk</li> </ul>
16. Describe the methodology used in Nakada's aggregate industry analysis of capital adequacy and risk-adjusted profitability and discuss the five main insights from that study. Range of weight: 0-5 percent	<ul style="list-style-type: none"> <li>a. Required (or economic) capital, including how this differs from the available equity capital for a property-casualty insurer</li> <li>b. Industry available capital relative to economic capital</li> <li>c. Relative contributions of each risk category to total economic capital</li> <li>d. Magnitude of diversification benefits across risk types</li> <li>e. Appropriateness of evaluating catastrophe risk independently of the rest of the portfolio of risks</li> <li>f. Impact of catastrophe risk on solvency and on profitability</li> </ul>

<b>READINGS</b>
Nakada

<b>LEARNING OBJECTIVES</b>	<b>KNOWLEDGE STATEMENTS</b>
17. Describe the factors identified by Gorvett as influencing the development of the insurance securitization market. Range of weight: 0-5 percent	<ul style="list-style-type: none"> <li>a. Insurance securitization</li> <li>b. Catastrophe experience</li> <li>c. Capital markets developments</li> <li>d. Insurance industry structure</li> <li>e. Complexity</li> <li>f. Cost</li> <li>g. Legal, tax and regulatory issues</li> </ul>

<b>READINGS</b>
Gorvett

## J. Valuation

Range of weight for Section J: 5-10 percent

This section covers the methods used to determine the theoretical value of equity securities and covers issues associated with the valuation of property and casualty insurance companies.

Learning Objectives	Knowledge Statements
<p>1. Value the equity of a firm based on its expected future dividends. Range of weight: 0-5 percent</p>	<p>a. Dividend Discount Model (DDM), using no growth, constant growth, or two-stage growth assumptions b. Estimating dividend growth rates based on dividend payout ratios and return on equity c. Terminal values</p>
<p>2. Calculate the impact of loss and expense reserve requirements and regulatory or rating agency capital requirements on the free cash flow to equity for a P&amp;C insurer.  Range of weight: 0-5 percent</p>	<p>a. Free cash flow to equity for a P&amp;C insurer</p>
<p>3. Value the equity of a P&amp;C insurer firm based on its expected future dividends, its free cash flow to equity, or its expected abnormal earnings. Range of weight: 3-7 percent</p>	<p>a. Dividend Discount Model (DDM) b. Free cash flow to equity for a P&amp;C insurer c. Discounted Cash Flow (DCF) Valuation using free cash flow to equity (FCFE), including impact of alternative methods of estimating terminal values and reasons why this method is preferred over the free cash flow to the firm (FCFF) method for P&amp;C insurers d. Abnormal earnings e. Abnormal Earnings Valuation (AE), including impact of alternative methods of estimating terminal values</p>
<p>4. Value the equity of a firm using comparative or relative valuation methods based on multiples of selected financial variables obtained from either peer companies or from underlying fundamentals. Range of weight: 0-5 percent</p>	<p>a. Comparative valuation ratios including price-earnings, price-sales, price-book, price-cash flow b. Relationship between the dividend discount model and the price-earnings (P-E) ratio c. Relationship between the abnormal earnings valuation model and the price-book value (P-BV) ratio</p>
<b>READINGS</b>	
BKM, Chapter 18 Goldfarb	

### Complete Text References for Exam 8

*Text references are alphabetized by the citation column.*

Citation	Abbreviation	Learning Objective	Source
Altman, E.I., "Measuring Corporate Bond Mortality and Performance," <i>The Journal of Finance</i> , Volume 44, No. 4, September 1989, pp. 909-922.	Altman	D11-12	SK

Citation	Abbreviation	Learning Objective	Source
Black, F., "How to Use the Holes in Black-Scholes," <i>The New Corporate Finance: Where Theory Meets Practice</i> (Third Edition), Chew, D.H., editor; McGraw-Hill/Irwin, 2001, Chapter 32, pp. 455-461.	Black	F6	SK
Bodie, Z.; Kane, A.; and Marcus, A.J., <i>Investments</i> (Sixth Edition), McGraw-Hill/Irwin, 2005. Chapter or section citations are listed under the appropriate learning objective, and include Chapters 2, 5, 6-16, and 18.	BKM	A1-4, B1-4, C1-9, D1-8, G1-2, H1-2, H4, J1-4	L
Butsic, R.P., "Solvency Measurement for Property-Liability Risk-Based Capital Applications," <i>The Journal of Risk and Insurance</i> , Volume 61, No. 4 (December 1994), pp. 656-690.	Butsic	I7-8, I13-14	SK
Culp, C.L.; Miller, M.H.; and Neves, A.M.P., "Value at Risk: Uses and Abuses," <i>The New Corporate Finance: Where Theory Meets Practice</i> (Third Edition), Chew, D.H., editor; McGraw-Hill/Irwin, 2001, Chapter 33, pp. 462-471.	Culp, Miller, and Neves	I4, I7	SK
Cummins, J. D., "Allocation of Capital in the Insurance Industry", <i>Risk Management and Insurance Review</i> , American Risk and Insurance Association, Inc., Spring 2000, Vol. 3, No. 1, pp. 7-27.	Cummins	I7, I10-14	SK
Fabozzi, F.J., <i>The Handbook of Fixed Income Securities</i> (Sixth Edition), McGraw-Hill, 2001, Chapters 24 and 34.	Fabozzi	DI, D14, F9	SK
Feldblum, S., "Asset Liability Matching For Property/Casualty Insurers," <i>Valuation Issues, CAS Special Interest Seminar</i> , 1989, pp. 117-154.	Feldblum	H3	W
Goldfarb, R. "CAS Exam 8 Study Note: P&C Insurance Company Valuation," August 2005.	Goldfarb	J1-4	W NEW
Gorvett, R.W., "Insurance Securitization: The Development of a New Asset Class," <i>Securitization of Risk, Casualty Actuarial Society Discussion Paper Program</i> , May 1999, pp. 133-173.	Gorvett	D1, H4, I8, I17	W
Hull, J.C., <i>Options, Futures, and Other Derivatives</i> (Sixth Edition), Prentice Hall, 2006. Chapter or section citations are listed under the appropriate learning objective, and include Chapters 2-5, 6.1-6.2, 7-15, 18, and 20.	Hull	D2, D4-6, D8-10, D12-13, E1-6, F1-8, H1-2, I1-6	L NEW
Nakada, P.; Shah, H.; Koyluoglu, H.U.; and Collignon, O., "P&C RAROC: A Catalyst for Improved Capital Management in the Property and Casualty Insurance Industry," <i>The Journal of Risk Finance</i> , Fall 1999.	Nakada	I10, I15-16	SK
Noris, P.D., "Asset/Liability Management Strategies for Property and Casualty Companies," Morgan Stanley, May 1985.	Noris	H3	SK

Citation	Abbreviation	Learning Objective	Source
Stulz, R.M., "Rethinking Risk Management," <i>The New Corporate Finance: Where Theory Meets Practice</i> (Third Edition), Chew, D.H., editor; McGraw-Hill/Irwin, 2001, Chapter 29, pp. 411-427.	Stulz	I7-10	SK

## Source Key

- L** May be purchased from the publisher or bookstore or borrowed from the CAS Library.
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- SK** Represents material included in the 2006 CAS Study Kit.
- SKU** Represents material included in the 2006 CAS Study Kit and the 2006 Update to the 2005 Study Kit.
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ACTEX Publications (Mad River Books), 140 Willow Street, Suite One, P.O. Box 974, Winsted, CT 06098; telephone: (800) 282-2839 or (860) 379-5470; fax: (860) 738-3152; e-mail: [retail@actexamdriver.com](mailto:retail@actexamdriver.com).

Actuarial Bookstore, P.O. Box 69, Greenland, NH 03840; telephone: (800) 582-9672 (U.S. only) or (603) 430-1252; fax: (603) 430-1258; Web site: [www.actuarialbookstore.com](http://www.actuarialbookstore.com).

Bodie, Z.; Kane, A.; and Marcus, A.J., *Investments* (Sixth Edition), 2005, McGraw-Hill/Irwin, 860 Taylor Station Road, Blacklick, OH 43004; telephone: (800) 262-4729.

Casualty Actuarial Society *Forum*, *PCAS*, and *Discussion Paper Program*, Casualty Actuarial Society, 4350 N. Fairfax Drive, Suite 250, Arlington, VA 22203; telephone: (703) 276-3100; fax: (703) 276-3108; e-mail: [office@casact.org](mailto:office@casact.org); Web site: [www.casact.org](http://www.casact.org).

Chew, D.H., editor, *The New Corporate Finance: Where Theory Meets Practice* (Third Edition), 2001, McGraw-Hill/Irwin, 860 Taylor Station Road, Blacklick, OH 43004; telephone: (800) 262-4729.

Fabozzi, F.J., *The Handbook of Fixed Income Securities* (Sixth Edition), 2001, McGraw-Hill, 860 Taylor Station Road, Blacklick, OH 43004; telephone: (800) 262-4729.

Hull, J.C., *Options, Futures, and Other Derivatives* (Sixth Edition), 2006, Prentice Hall; telephone: (800) 374-1200; Web site: [www.prenhall.com](http://www.prenhall.com).

*Journal of Risk and Insurance*, The American Risk and Insurance Association, 716 Providence Road, P.O. Box 3028, Malvern, PA 19355; telephone: (610) 640-1997; fax: (610) 725-1007; Web site: [www.aria@cpcuia.org](http://www.aria@cpcuia.org).

McGraw-Hill/Irwin, 860 Taylor Station Road, Blacklick, OH 43004; telephone: (800) 262-4729.



## Exam 9

# Advanced Ratemaking, Rate of Return, and Individual Risk Rating Plans

Before commencing study for this four-hour examination, candidates should read the introduction and key to “Materials for Study” on page 43 of this *Syllabus* for important information about learning objectives, knowledge statements, readings, and the range of weights. Items marked with a bold **SK** or **SKU** constitute the 2006 CAS Exam 9 Study Kit that is available from the CAS Office for a cost of \$25. Items marked with a bold **W** are available at no charge under Web Notes in the “Admissions” section of the CAS Web Site ([www.casact.org](http://www.casact.org)). Those without access to the Web may purchase a print version of the items marked with a **W**—the 2006 CAS Exam 9 Web Notes—from the CAS Office for a cost of \$82. The 2006 Update to the 2005 Study Kit is available at a cost of \$14 and includes only the items marked with a bold **SKU**. Information about Study Kits and Web Notes is available on page 35.

Please check the “Admissions” section of the CAS Web Site for any changes to the *Syllabus*.

Candidates for Exam 9 are expected to have already acquired considerable technical knowledge and practical experience in insurance ratemaking. This examination will assume a working knowledge of basic ratemaking and will deal with advanced problems that fall within the learning objectives. The ability to apply ratemaking knowledge and experience may be tested through questions dealing with problems for which there are no generally recognized solutions. To some degree, the examination will deal with the types of practical problems that a fully qualified actuary working in ratemaking should be able to solve.

The readings for Exam 9 should be read for illustrations of basic principles and theories, as well as insights into advanced ratemaking problems and their solutions. Some readings are included primarily for their historical significance or to illustrate unique solutions to a ratemaking problem.

### A. Classification Ratemaking

Range of weight for Section A: 13-18 percent

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
1. Identify possible rate classes. Range of weight: 0-5 percent	a. Characteristics of appropriate classes (Statement of Principles) b. Sampling techniques c. Credibility considerations
2. Measure the statistical significance of possible classes. Range of weight: 0-5 percent	a. Characteristics of appropriate classes (Statement of Principles) b. Sampling techniques c. Credibility considerations
3. Formularize and solve General Linear Models (GLMs). Range of weight: 0-5 percent	a. GLM assumptions compared to one-way analysis, minimum bias procedures, and classical linear analysis b. Components of a GLM formula c. Aliasing and near-aliasing

<b>READINGS</b>
AAA Anderson et al. Bailey and Simon Cummins et al. Mahler Feldblum and Brosius

<b>LEARNING OBJECTIVES</b>	<b>KNOWLEDGE STATEMENTS</b>
4. Translate the class differences into price differences. Range of weight: 5-10 percent	a. Multidimensional relativities b. Credibility techniques
<b>READINGS</b>	
Bailey and Simon Feldblum and Brosius	

## B. Cost of Layers of Risk (Excess and Deductible Rating)

Range of weight for Section B: 13-18 percent

<b>LEARNING OBJECTIVES</b>	<b>KNOWLEDGE STATEMENTS</b>
1. Apply frequency and severity distributions to determine expected losses by layer of insurance. Range of weight: 5-10 percent	a. Different descriptions of severity distributions: including severity distribution, ILFs, Loss Elimination Ratios (LERs) b. Properties of ILFs c. Interaction among inflation, changes in layer, and losses d. Methods of estimating frequency and severity distributions from losses
<b>READINGS</b>	
Lee 1 Miccolis Finger Gillam and Snader 1	

<b>LEARNING OBJECTIVES</b>	<b>KNOWLEDGE STATEMENTS</b>
2. Estimate aggregate loss distributions. Range of weight: 5-10 percent	a. Techniques to estimate aggregate loss distributions directly from aggregate data (e.g., Table M, Table L) b. Construction of an aggregate loss distribution from frequency and severity distributions
<b>READINGS</b>	
Gillam and Snader 2 Lee 2 Skurnick Gillam 1 Brosius	

## C. Pricing of Catastrophic Events

Range of weight for Section C: 0-5 percent

This section introduces the methods used to model losses due to catastrophic events in order to generate the catastrophe risk load.

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
1. Estimate the probability and potential cost of Catastrophic Events. Range of weight: 0-5 percent	a. Models used to estimate the probability and potential cost of catastrophic events
READINGS	
Walters and Morin	

## D. Rate of Return, Risk Loads, and Contingency Provision

Range of weight for Section D: 30-35 percent

This section explores the relationship between insurance concepts (such as underwriting profits, premium-to-surplus ratios, and investment income) and financial concepts (such as interest rates, inflation rates, cost of capital, and risk premiums). The readings build on a background of finance as related to the insurance business and deal with specific techniques used by actuaries to develop an appropriate profit loading in insurance prices.

Because insurance claims are fortuitous, the loading for profit in rates may not be realized. The models discussed in Learning Objectives 1 and 2 tend to assume that insured events are predictable in time and amount. Some consideration should be made for uncertainty of claims, particularly where capacity is limited and/or sufficient diversification of exposure is impossible. Learning Objective 3 covers this.

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
1. Analyze rate of return. Range of weight: 10-15 percent	a. Composition of surplus b. Measures of return (including ROE, underwriting profit, IRR) <ul style="list-style-type: none"> <li>• Advantages</li> <li>• Disadvantages</li> <li>• Perspectives of users</li> </ul> b. Sources and types of data used for analysis including calendar year versus accident year
2. Estimate a rate in order to achieve a target rate of return. Range of weight: 10-15 percent	a. Composition of surplus b. Measures of return (including ROE, underwriting profit, IRR) <ul style="list-style-type: none"> <li>• Advantages</li> <li>• Disadvantages</li> <li>• Perspectives of users</li> </ul> c. Sources and types of data used for analysis including calendar year versus accident year
READINGS	
McClenahan Butsic Ferrari Robbin Roth Feldblum	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
3. Determine risk load and contingency provision to be included in insurance rates. Range of weight: 10-15 percent	a. Theory underlying the risk load (including why a risk load is necessary and relationship between risk load and variability)
READINGS	
Butsic Ferrari Roth Feldblum Bault Mango	

## E. Individual Risk Rating

Range of weight for Section E: 33-38 percent

One of the important functions performed by an actuary is rating individual risks. Prior to Exam 9, most of the readings were addressed to group or classification risk rating. This part is intended to prepare candidates to design and manage an individual risk rating system.

Individual risk rating consists of two subsections:

1. Prospective rating, in which prior individual risk experience is used to adjust rates prospectively (also known as experience rating);
2. Retrospective and Loss Sensitive rating, in which the insured will pay an amount (in premium or retained loss) that depends on the experience after the policy has been written.

The readings range from those that discuss the theoretical foundation of individual risk rating to those that discuss the application of various rating plans. Candidates can be expected to apply these concepts in a creative and problem-solving manner.

Candidates are also expected to be knowledgeable in the application of individual risk rating plans currently in use and should anticipate answering questions in the manner of an insurance consultant for an insured.

Excerpts from the NCCI *Experience Rating Plan Manual for Workers Compensation and Employers Liability Insurance*, NCCI *Retrospective Rating Plan Manual for Workers Compensation and Employers Liability Insurance*, and ISO *Experience and Schedule Rating Plans Applicable to General Liability* will be provided with the examination. Candidates are not required to memorize the details, but will be expected to be able to use them during the examination. Since they will be included with the examination, candidates will not be allowed to bring copies of the documents into the examination room.

### **Prospective Rating** (Range of weight: 13-18 percent)

The main idea of experience rating is to adjust an individual risk's rate to reflect the extent to which that risk's own experience identifies it as being different from other risks in the same class. The readings begin with principles and concepts, then move to a discussion of plans in current use.

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
1. Adjust class rates based on individual risk exposure and experience. Range of weight: 5-10 percent	a. Actuarial principles and concepts underlying development of experience rating plans b. Credibility concepts (e.g., maximum single loss) c. Current NCCI and ISO experience rating plans d. Schedule rating
<b>READINGS</b>	
Venter Gillam 2 Gillam and Snader 1 NCCI 1 NCCI 2 ISO	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
2. Assess effectiveness of experience rating plans. Range of weight: 5-10 percent	a. Off-balance factors b. Evaluation techniques (e.g., quintile test)
<b>READINGS</b>	
Venter Gillam 2	

***Retrospective and Loss Sensitive Rating*** (Range of weight: 15-20)

Retrospective rating allows adjustment of individual risk premium after policy expiration in response to actual loss and expenses associated with the policy. The retrospective rating plans currently in use adjust the premium up or down within limits selected in advance.

Excess and deductible rating is another method that allows the insured to retain loss and loss expense up to limits selected in advance. Instead of adjusting premium after policy expiration to achieve this goal, however, the insured is responsible for the retained portion of loss and loss expense.

Candidates should have a general knowledge and understanding of deductible and excess coverages, and the problems inherent in pricing these coverages for various lines. This section builds on the material covered in Section B, Cost of Layers of Risk.

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
3. Construct a retrospectively rated plan. Range of weight: 8-13 percent	a. Actuarial principles and concepts underlying the construction of a retrospective rating plan (e.g., balance principle, construction of table of insurance charges) b. NCCI retrospective rating plans
<b>READINGS</b>	
Gillam and Snader 2 Lee 2 Skurnick Brosius NCCI 3	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
4. Analyze the elements of a loss sensitive rating plan. Range of weight: 3-8 percent	a. How the parameters and other elements of the plan affect the final price and potential profitability of product b. How the parameters and other elements of the plan affect cost and cash flow to insured
<b>READINGS</b>	
Gillam and Snader 2 Lee 2 Skurnick Fisher	

LEARNING OBJECTIVES	KNOWLEDGE STATEMENTS
5. Calculate the cost of the layer of risk given the loss cost. Range of weight: 0-5 percent	a. How expenses vary by layer and policy provisions (combined or separate?) b. Large dollar deductible (LDD) and excess policy provisions c. Advantages of LDD and excess policies
<b>READINGS</b>	
Gillam and Snader 3 Fisher Teng	

## Complete Text References for Exam 9

*Text references are alphabetized by the citation column.*

Citation	Abbreviation	Learning Objective	Source
American Academy of Actuaries Committee on Risk Classification, "Risk Classification Statement of Principles," June 1980. (Available at no charge from the American Academy of Actuaries at (202) 223-8196 or on the Academy's Web Site at www.actuary.org.)	AAA	A1, A2	<b>W</b>
Anderson, D.; Feldblum, S; Modlin, C; Schirmacher, D.; Schirmacher, E.; and Thandi, N., "A Practitioner's Guide to Generalized Linear Models" (Second Edition), CAS Study Note, May 2005, pp. 4-39 only. [Note: the study note edition is a revised version of a paper from the <i>CAS Discussion Paper Program</i> . Candidates must use the study note edition.]	Anderson et al.	A3	<b>W NEW</b>
Bailey, R.A.; and Simon, L.J., "An Actuarial Note on the Credibility of Experience of a Single Private Passenger Car," <i>PCAS XLVI</i> , 1959, pp. 159-164. Including discussion of paper: Hazam, W.J., <i>PCAS XLVII</i> , 1960, pp. 150-152.	Bailey and Simon	A1, A2, A3, A4	<b>W</b>

Citation	Abbreviation	Learning Objective	Source
Bault, T., Discussion of Feldblum: "Risk Load for Insurers," <i>PCAS LXXII</i> , 1995, pp. 78-96. Candidates may wish to review the following articles as background to the above, although no questions will be directly drawn from them: Feldblum, S., "Risk Loads for Insurers," <i>PCAS LXXVII</i> , 1990, pp. 160-195, including discussions of paper: Philbrick, S.W., <i>PCAS LXXVIII</i> , 1991, pp. 56-63.	Bault	D3	W
Brosius, J.E., "Table M Construction," CAS Study Note, 2002.	Brosius	B2, E3	W
Butsic, R.P., "Determining the Proper Interest Rate for Loss Reserve Discounting: An Economic Approach," <i>Evaluating Insurance Company Liabilities</i> , Casualty Actuarial Society Discussion Paper Program, 1988, pp. 147-186, excluding pp. 171-178. (Appendix II is also excluded.)	Butsic	D1, D2, D3	W
Cummins, J.D.; Smith, B.D.; Vance, R.N.; and VanDerhei, J.L., <i>Risk Classification in Life Insurance</i> , 1983, Kluwer-Nijhoff Publishing, Chapter 3. Candidates are not responsible for mathematical proofs.	Cummins et al.	A1, A2	SK
Feldblum, S., "Pricing Insurance Policies: The Internal Rate of Return Model," CAS Study Note, May 1992. Only Sections 1, 3, and 6 will be directly tested, but the other sections may provide useful background.	Feldblum	D1, D2, D3	W
Feldblum, S.; and Brosius, J.E., "The Minimum Bias Procedure, A Practitioner's Guide," CAS Study Note, April 2003, including errata. Formulae in the summary section (pp. 53-54) are for reference only and need not be memorized.	Feldblum and Brosius	A1, A2, A3, A4	W
Ferrari, J.R., "The Relationship of Underwriting, Investment, Leverage, and Exposure to Total Return on Owners' Equity," <i>PCAS LV</i> , 1968, pp. 295-302. Includes discussion: Balcarek, R.J., <i>PCAS LVI</i> , 1969, pp. 58-60.	Ferrari	D1, D2, D3	W
Finger, R.J., "Estimating Pure Premiums by Layer," <i>PCAS LXIII</i> , 1976, pp. 34-52. Including discussion of paper: Steeneck, L.R., <i>PCAS LXIII</i> , 1976, pp. 53-55.	Finger	B1	W
Fisher, G.K., "Pricing Aggregates on Deductible Policies," CAS Study Note, 2002.	Fisher	E4, E5	W
Gillam, W.R., "Retrospective Rating: Excess Loss Factors," <i>PCAS LXXVIII</i> , 1991, pp. 1-40. Candidates are not responsible for loss distribution formulae.	Gillam 1	B2	W
Gillam, W.R., "Workers' Compensation Experience Rating: What Every Actuary Should Know," <i>PCAS LXXIX</i> , 1992, Sections 1-5, pp. 215-239.	Gillam 2	E1, E2	W
Gillam, W.R.; and Snader, R.H., "Fundamentals of Individual Risk Rating," National Council on Compensation Insurance (Study Note), 1992, Part I.	Gillam and Snader 1	B1, E1	W

Citation	Abbreviation	Learning Objective	Source
Gillam, W.R.; and Snader, R.H., "Fundamentals of Individual Risk Rating," National Council on Compensation Insurance (Study Note), 1992, Part II.	Gillam and Snader 2	B2, E3, E4	W
Gillam, W.R.; and Snader, R.H., "Fundamentals of Individual Risk Rating," National Council on Compensation Insurance (Study Note), 1992, Part III.	Gillam and Snader 3	E5	W
Insurance Services Office, Inc., <i>Experience and Schedule Rating Plans Applicable to General Liability</i> , ISO Circular GL-90-217 (Conversion to Loss Cost Basis). Excerpts from the ISO <i>Experience and Schedule Rating Plans Applicable to General Liability</i> will be provided with the exam. Candidates are not required to memorize the details, but will be expected to be able to use them on the exam. Since they will be included with the exam, candidates will not be allowed to bring copies of the documents into the examination room.	ISO	E1	SK
Lee, Y.S., "The Mathematics of Excess of Loss Coverages and Retrospective Rating—A Graphical Approach," Sections 1-3, <i>PCAS LXXV</i> , 1988, pp. 49-64.	Lee 1	B1	W
Lee, Y.S., "The Mathematics of Excess of Loss Coverage and Retrospective Rating—A Graphical Approach," Section 4, <i>PCAS LXXV</i> , 1988, pp. 64-78. Candidates are not responsible for "Other Applications" on pp. 75-76.	Lee 2	B2, E3, E4	W
Mahler, H.C., "An Example of Credibility and Shifting Risk Parameters," <i>PCAS LXXVII</i> , 1990, pp. 225-282. Candidates will not be tested on the Appendices.	Mahler	A1, A2	W
Mango, D.F., "An Application of Game Theory: Property Catastrophe Risk Load," <i>PCAS LXXXV</i> , 1998, pp. 157-186. Exam questions will not be drawn from Section 9.	Mango	D3	W
McClenahan, C.L., "Insurance Profitability," <i>Actuarial Considerations Regarding Risk and Return in Property-Casualty Insurance Pricing</i> , Casualty Actuarial Society, 1999, Chapter 8.	McClenahan	D1, D2	W
Miccolis, R.S., "On the Theory of Increased Limits and Excess of Loss Pricing," <i>PCAS LXIV</i> , 1977, pp. 27-59 excluding "Risk Reduction by Layering" (pp. 45-49). Including discussion of paper: Rosenberg, S., <i>PCAS LXIV</i> , 1977, pp. 60-73.	Miccolis	B1	W
National Council on Compensation Insurance, <i>The 1998 Adjustment to the Experience Rating Plan: Your Guide to Understanding the Changes</i> .	NCCI 1	E1	SK



Citation	Abbreviation	Learning Objective	Source
National Council on Compensation Insurance, <i>Experience Rating Plan Manual for Workers Compensation and Employers Liability Insurance</i> , October 2003 Edition (as of June 30, 2005). Candidates are responsible for only the excerpted material. Excerpts from the NCCI <i>Experience Rating Plan Manual for Workers Compensation and Employers Liability Insurance</i> will be provided with the examination. Candidates are not required to memorize the details, but will be expected to be able to use them on the examination. Since they will be included with the examination, candidates will not be allowed to bring copies of the documents into the examination room.	NCCI 2	E1	SKU NEW
National Council on Compensation Insurance, <i>Retrospective Rating Plan Manual for Workers Compensation and Employers Liability Insurance</i> (as of June 30, 2005). Candidates are responsible for only the excerpted material. Exclude Part 2, Section III, on cancellation provisions. Excerpts from the NCCI <i>Retrospective Rating Plan Manual for Workers Compensation and Employers Liability Insurance</i> will be provided with the examination. Candidates are not required to memorize the details, but will be expected to be able to use them on the examination. Since they will be included with the examination, candidates will not be allowed to bring copies of the documents into the examination room.	NCCI 3	E3	SKU NEW
Robbin, Ira, "The Underwriting Profit Provision," CAS Study Note, as updated in 1992.	Robbin	D1, D2	W
Roth, R., "Analysis of Surplus and Rate of Return Without Using Leverage Ratios," <i>Insurer Financial Solvency</i> , Casualty Actuarial Society <i>Discussion Paper Program</i> , 1992, Volume I, pp. 439-464.	Roth	D1, D2, D3	W
Skurnick, D., "The California Table L," <i>PCAS LXI</i> , 1974, pp. 117-140. Including discussion of this paper: Gillam, W.R., <i>PCAS LXXX</i> , 1993, pp. 353-365.	Skurnick	B2, E3, E4	W
Teng, M.T.S., "Pricing Workers' Compensation Large Deductible and Excess Insurance," <i>Casualty Actuarial Society Forum</i> , Winter 1994, pp. 413-437.	Teng	E5	W
Venter, G.G., "Experience Rating—Equity and Predictive Accuracy," <i>NCCI Digest</i> , April 1987, Volume II, Issue I, pp. 27-35. (Pages are shown as 1-9 in the Study Kit version.)	Venter	E1, E2	SK
Walters, M.A.; and Morin, F., "Homeowners Ratemaking Revisited (Use of Computer Models to Estimate Catastrophe Loss Costs)," <i>PCAS LXXXIV</i> , 1997, pp. 1-43.	Walters and Morin	C1	W

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Actuarial Bookstore, P.O. Box 69, Greenland, NH 03840; telephone: (800) 582-9672 (U.S. only) or (603) 430-1252; fax: (603) 430-1258; Web site: [www.actuarialbookstore.com](http://www.actuarialbookstore.com).

American Academy of Actuaries, 1100 Seventeenth Street NW, Seventh Floor, Washington, DC 20036; telephone: (202) 223-8196; Web site: [www.actuary.org](http://www.actuary.org).

Casualty Actuarial Society *Forum*, *PCAS*, and *Discussion Paper Program*, Casualty Actuarial Society, 4350 N. Fairfax Drive, Suite 250, Arlington, VA 22203; telephone: (703) 276-3100; fax: (703) 276-3108; e-mail: [office@casact.org](mailto:office@casact.org); Web site: [www.casact.org](http://www.casact.org).

Cummins, J.D.; Smith, B.D.; Vance, R.N.; and VanDerhei, J.L., *Risk Classification in Life Insurance*, 1983, Kluwer-Nijhoff Publishing, 101 Philip Drive, Norwell, MA 02061; telephone: (781) 871-6600; fax: (781) 871-6528.

Insurance Services Office, Inc., 545 Washington Boulevard, Jersey City, NJ 07310-1686; telephone: (800) 888-4476.

National Council on Compensation Insurance, 901 Peninsula Corporate Circle, Boca Raton, FL 33487; telephone: (800) NCCI-123.

SlideRule Books, 10 First Avenue East, Mobridge, SD 57601; telephone: (877) 407-5433 or (605) 845-5580; fax: (877) 417-5433 or (605) 845-7627; Web site: [www.sliderulebooks.com](http://www.sliderulebooks.com).

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# APPENDIX

*Syllabus for the*

## **VEE-Applied Statistical Methods Transitional Exam**

This 90-minute, multiple-choice examination is administered by the CAS to satisfy the Validation by Educational Experience (VEE)–Applied Statistical Methods requirement for candidates who have not otherwise satisfied this VEE requirement.

Please check the “Admissions” section of the CAS Web Site ([www.casact.org](http://www.casact.org)) for any changes to the *Syllabus*.

The following tables will be provided to the candidate with the exam: Normal Distribution, Chi-square Distribution,  $t$ -Distribution, and  $F$ -Distribution. Copies of these tables are available on the CAS Web Site under Web Notes. Since the tables will be included with the examination, candidates will not be allowed to bring copies of the tables into the examination room.

### **LEARNING OBJECTIVES**

The candidate is expected to demonstrate an understanding of the terminology and underlying assumptions of regression and time series models, and to be able to apply and analyze an appropriately selected model when solving insurance related problems. Specifically, the candidate is expected to be able to perform the tasks listed in the learning objectives below.

#### **A. Regression**

1. Estimate the parameters of linear regression models.
2. Test hypotheses and construct confidence intervals for the parameters of linear regression models.
3. Determine the appropriateness of a regression model by analyzing residuals and applying the  $F$ -test.
4. Calculate elasticities and partial correlations.
5. Apply appropriate measures when the data is observed to possess one or more of the following characteristics:
  - a. Heteroscedasticity
  - b. Serial correlation
  - c. Multicollinearity
  - d. Nonlinearity
6. Estimate and determine confidence intervals for future observations using linear regression models.
7. Demonstrate familiarity with inherently nonlinear regression models and set up equations that would be used in estimating parameters of such models.

#### **B. Time Series**

1. Distinguish between regression and time series models.
2. Distinguish between and apply deterministic and stochastic time series models.
3. Recognize characteristics of stationary time series and compute autocorrelation functions.
4. Analyze data using a random walk model.
5. Estimate the parameters of ARIMA models, and the simpler models AR, MA, and ARMA as special cases.
6. Run diagnostic checks to validate a specified time series model.
7. Generate forecasts using ARIMA, and simpler, models and develop confidence intervals for the forecasts.
8. Demonstrate familiarity with the properties of ARIMA forecasts.

## READINGS

Pindyck, R.S.; and Rubinfeld, D.L., *Econometric Models and Economic Forecasts* (Fourth Edition), 1998, Irwin McGraw-Hill, Boston, Chapters 1, 3, 4, 5, 6 (excluding Appendix 6.1), Sections 8.1, 8.2, 10.1, Chapters 15, 16 (excluding Appendix 16.1), 17 (excluding Appendix 17.1), and 18.

## Publishers and Distributors

Contact information is furnished for those who wish to purchase the text references cited for VEE-Applied Statistical Methods. Publishers and distributors are independent and listed for the convenience of candidates; inclusion does not constitute endorsement by the CAS.

ACTEX Publications (Mad River Books), 140 Willow Street, Suite One, P.O. Box 974, Winsted, CT 06098; telephone: (800) 282-2839 or (860) 379-5470; fax: (860) 738-3152; e-mail: retail@actexamdriver.com.

Actuarial Bookstore, P.O. Box 69, Greenland, NH 03840; telephone: (800) 582-9672 (U.S. only) or (603) 430-1252; fax: (603) 430-1258; Web site: [www.actuarialbookstore.com](http://www.actuarialbookstore.com).

Pindyck, R.S.; and Rubinfeld, D.L., *Econometric Models and Economic Forecasts* (Fourth Edition), 1998, Irwin McGraw-Hill, P.O. Box 182605, Columbus, OH 43218-2605; telephone: (800) 262-4729.

SlideRule Books, 10 First Avenue East, Mobridge, SD 57601; telephone: (877) 407-5433 or (605) 845-5580; fax: (877) 417-5433 or (605) 845-7627; Web site: [www.sliderulebooks.com](http://www.sliderulebooks.com).

*Syllabus for the*

## **VEE-Corporate Finance Transitional Exam**

This 90-minute, multiple-choice examination is administered by the CAS to satisfy the Validation by Educational Experience (VEE)–Corporate Finance requirement for candidates who have not otherwise satisfied this VEE requirement.

Please check the “Admissions” section of the CAS Web Site ([www.casact.org](http://www.casact.org)) for any changes to the *Syllabus*.

The purpose of this examination is to test the candidate’s basic knowledge of concepts from corporate finance. These concepts are fundamental to understanding the general business environment. Basic knowledge of calculus and probability is assumed.

### **LEARNING OBJECTIVES**

1. Candidates should understand and be able to analyze financial statements including balance sheets, income statements, and statements of cash flow. Candidates should be able to calculate discounted cash flows, internal rate of return, present and future values of bonds, and apply the dividend growth model and price/earnings ratios concept to valuing stocks.
2. Candidates must be able to assess financial performance using net present value and the payback, discounted payback models, internal rate of return, and profitability index models. Candidates should be able to analyze statements and identify what should be discounted, what other factors should be considered, and the possible interactions between models.
3. Candidates should understand the trade-off between risk and return, the implications of the efficient market theory to the valuation of securities, and be able to perform the following:
  - Apply measures of portfolio risk and analyze the effects of diversification, systematic and unsystematic risks. Calculate portfolio risk and analyze the impact of individual securities on portfolio risk
  - Identify efficient portfolios and apply the CAPM to firm cost of capital measures
  - Value cash flows and analyze the certainty equivalent versus risk-adjusted discount rates using assumptions for inflation, the term structure of interest rates, and default risk correctly in their calculations
4. Candidates should understand the following concepts and be able to use them to analyze financial structures:
  - Efficient markets and their effect on security prices
  - Capital structure and the impact of financial leverage and long- and short-term financing policies on capital structure
  - Sources of capital and the definitions of techniques for valuing basic options such as calls and puts
5. Candidates should understand and be able to analyze financial performance by evaluating financial statements and financial ratios such as leverage, liquidity, profitability, market value ratios and analysis of accounting return versus economic return.
6. Candidates should understand and be able to apply the basic principles of option pricing theory including:
  - Black-Scholes formula
  - Valuation of basic options

Note: Concepts, principles, and techniques needed for VEE-Corporate Finance are covered in the references listed below. Candidates and educators may use other references, but candidates should be very familiar with the notation, terminology, and viewpoints espoused in the listed references. A table of values for the normal distribution and the Black-Scholes formula will be provided with the examination.

## READINGS

**NEW** Brealey, R.A.; Myers, S.C.; and Allen, F., *Principles of Corporate Finance* (Eighth Edition), 2005, McGraw-Hill, Chapters: 1, Finance and the Financial Manager; 4, The Value of Bonds and Common Stocks; 5, Why Net Present Value Leads to Better Investment Decisions than Other Criteria; 6, Making Investment Decisions with the Net Present Value Rule; 7, Introduction to Risk, Return, and the Opportunity Cost of Capital; 8, Risk and Return; 9, Capital Budgeting and Risk; 10, A Project is Not a Black Box; 11, Strategy and the Capital Investment Decision; 12, Agency Problems, Management Compensation, and the Management of Performance; 13, Corporate Financing and the Six Lessons of Market Efficiency; 14, An Overview of Corporate Financing; 15, How Corporations Issue Securities; 16, Payout Policy; 17, Does Debt Policy Matter?; 18, How Much Should a Firm Borrow?; 19, Financing and Valuation; 20, Understanding Options; 21, Valuing Options; 22, Real Options; and 29, Financial Analysis and Planning.

## Publishers and Distributors

Contact information is furnished for those who wish to purchase the text references cited for VEE Finance. Publishers and distributors are independent and listed for the convenience of candidates; inclusion does not constitute endorsement by the CAS.

ACTEX Publications (Mad River Books), 140 Willow Street, Suite One, P.O. Box 974, Winsted, CT 06098; telephone: (800) 282-2839 or (860) 379-5470; fax: (860) 738-3152; e-mail: retail@actexamdriver.com.

Actuarial Bookstore, P.O. Box 69, Greenland, NH 03840; telephone: (800) 582-9672 (U.S. only) or (603) 430-1252; fax: (603) 430-1258; Web site: www.actuarialbookstore.com.

Brealey, R.A.; and Myers, S.C., *Principles of Corporate Finance* (Eighth Edition), 2005, McGraw-Hill, P.O. Box 182605, Columbus, OH 43218-2605; telephone: (800) 262-4729.

SlideRule Books, 10 First Avenue East, Mobridge, SD 57601; telephone: (877) 407-5433 or (605) 845-5580; fax: (877) 417-5433 or (605) 845-7627; Web site: www.sliderulebooks.com.

*Syllabus for the*

## **VEE-Economics Transitional Exam**

This 90-minute, multiple-choice examination is administered by the CAS to satisfy the Validation by Educational Experience (VEE)–Economics requirement for candidates who have not taken the required courses. Information about Web Notes is available on page 35.

Please check the “Admissions” section of the CAS Web Site ([www.casact.org](http://www.casact.org)) for any changes to the *Syllabus*.

The purpose of this examination is to test the candidate’s basic knowledge of concepts from microeconomics and macroeconomics. These concepts are fundamental to understanding the general business environment. Basic knowledge of calculus and probability is assumed.

### **LEARNING OBJECTIVES**

1. Microeconomics

a. Candidates should be able to use the following microeconomic principles to build models to increase their understanding of the framework of contingent events and to use as a frame for activities such as pricing:

- The shape of the Demand Curve, demand versus quantity demanded, changes in demand, and market demand
- The supply versus quantity supplied equilibrium and the point of equilibrium and changes in the equilibrium point
- Tastes, indifference curves, and the Marginal Rate of Substitution
- Changes in income and the budget line, the Engel Curve
- Changes in price and changes in the budget line, the Demand Curve
- Income and substitution effects, the Compensated Demand Curve, why Demand Curves slope downward
- Decisions under uncertainty such as the following: attitudes toward risk, and the theory of rational expectations
- Adverse selection and moral hazard

b. Candidates should be able to use knowledge of the following microeconomic principles to increase their understanding of the markets in which we operate and of the regulatory issues. Candidates should also be able to use the following microeconomic principles to increase their understanding of the ramification of strategic decisions:

- The competitive firm, the competitive industry in the short run, revenue, costs and supply, elasticity of supply, and competitive equilibrium
- The competitive firm, the competitive industry in the long run, long-run costs, supply, profits, constant/decreasing-cost industries, and equilibrium
- Sources of monopoly power: natural, patents, resources, and legal barriers
- Oligopoly, contestable markets, a fixed number of firms
- Collusion, game theory, the prisoner’s dilemma and the breakdown of cartels
- Monopolistic competition, product differentiation, and the economics of location
- Consumers’ and producers’ surplus economics, theories of value
- Adverse selection and moral hazard

2. Macroeconomics

Candidates should understand the following macroeconomic principles and use them in developing economic models and/or economic assumptions and understanding the business cycle:

- The general accounting conventions and data sources used in tracking economic activity
- The simplified Keynesian model, without adjustments for changes in price level or money supply, as it applies to changes in GDP caused by changes in investment, government spending, and net exports

- The relationship among interest rates, demand for money, consumption and investment using concepts such as the IS/LM curve, fiscal and monetary policy, and how foreign exchange rates affect GDP/NI
- The instruments and processes that shape the money supply including the money multiplier and the role of central banks, and their impact on inflation
- The relationship of price level, money demand, total demand, and total supply under the Keynesian Model

Note: Concepts, principles, and techniques needed for VEE Economics are covered in the references listed below. Candidates and educators may use other references, but candidates should be very familiar with the notation, terminology, and viewpoints espoused in the listed references.

## READINGS

Landsburg, S.E., *Price Theory and Applications* (Sixth Edition), 2005, International Thomson Publishing. Chapters: 1, Supply, Demand, and Equilibrium; 2, Prices, Costs, and the Gains from Trade; 3, The Behavior of Consumers; 4, Consumers in the Marketplace; 5, The Behavior of Firms; 7, Competition; 8, Welfare Economics and the Gains from Trade; 9, Knowledge and Information (9.3 only—Topics in the Economics of Information); 10, Monopoly; 11, Market Power, Collusion, and Oligopoly; and 14, Common Property and Public Goods. (Candidates may also use the Fifth Edition, 2002, with the same citations.)

- W** Wachtel, P., “Macroeconomics,” Society of Actuaries Study Note 2-21-00 (Third or Fourth Printing, including the errata).

## Source Key

- W** Represents material that is available at no charge from the “Admissions” section of CAS Web Site ([www.casact.org](http://www.casact.org)) under Syllabus Web Notes. (For those without access to the Internet, printed copies of the Web Note are available for a fee from the Society of Actuaries.)

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Actuarial Bookstore, P.O. Box 69, Greenland, NH 03840; telephone: (800) 582-9672 (U.S. only) or (603) 430-1252; fax: (603) 430-1258; Web site: [www.actuarialbookstore.com](http://www.actuarialbookstore.com).

Landsburg, S.E., *Price Theory and Applications* (Sixth Edition), 2005, International Thomson Publishing, Order Department, P.O. Box 6904, Florence, KY 41022; telephone: (800) 347-7707.

SlideRule Books, 10 First Avenue East, Mobridge, SD 57601; telephone: (877) 407-5433 or (605) 845-5580; fax: (877) 417-5433 or (605) 845-7627; Web site: [www.sliderulebooks.com](http://www.sliderulebooks.com).

Society of Actuaries, 475 N. Martingale Road, Suite 600, Schaumburg, IL 60173-2226; telephone: (847) 706-3500; fax: (847) 706-3599; Web site: [www.soa.org](http://www.soa.org).

Wachtel, P., “Macroeconomics,” Study Note 2-21-00, Society of Actuaries, 475 N. Martingale Road, Suite 600, Schaumburg, IL 60173-2226; telephone: (847) 706-3500; fax: (847) 706-3599; Web site: [www.soa.org](http://www.soa.org).



## Publishers and Distributors

Many required readings may be downloaded free of charge from the “Admissions” section of the CAS Web Site ([www.casact.org](http://www.casact.org)). These readings are listed as Web Notes in this *Syllabus* and are indicated with a bold **W**. Other readings, indicated with a bold **SK** or **SKU**, are available in the CAS Study Kits that may be purchased from the CAS Office. Some text references must be purchased from the publisher or a bookstore. Material that is new in 2006 will be made available by December 1, 2005.

The following information is furnished for those who wish to purchase the text references cited in the examination descriptions. Publishers and distributors are independent and listed for the convenience of candidates; inclusion does not constitute endorsement by the CAS.

The exam codes for the transitional VEE exams are: VS (Applied Statistical Methods), VF (Corporate Finance), and VE (Economics).

Exam	Contact Information
7-C	A.M. Best Canada Ltd., Suite 600, 133 Richmond Street West, Toronto, Ontario M5H 2I3, Canada; telephone: (416) 363-8266; Web site: <a href="http://www.ambest.ca">www.ambest.ca</a> .
All	ACTEX Publications (Mad River Books), 140 Willow Street, Suite One, P.O. Box 974, Winsted, CT 06098; telephone: (800) 282-2839 or (860) 379-5470; fax: (860) 738-3152; e-mail: <a href="mailto:retail@actexmadriver.com">retail@actexmadriver.com</a> .
All	Actuarial Bookstore, P.O. Box 69, Greenland, NH 03840; telephone: (800) 582-9672 (U.S. only) or (603) 430-1252; fax: (603) 430-1258; Web site: <a href="http://www.actuarialbookstore.com">www.actuarialbookstore.com</a> .
7-U.S.	<i>Actuarial Digest</i> , P.O. Box 1127, Ponte Vedra, FL 32004.
5, 6	Actuarial Standards Board, American Academy of Actuaries, 475 N. Martingale Road, Suite 600, Schaumburg, IL 60173; telephone: (847) 706-3513; fax: (847) 706-3599.
7-C, 7-U.S., 9	American Academy of Actuaries, 1100 Seventeenth Street NW, Seventh Floor, Washington, DC 20036; telephone: (202) 223-8196; Web site: <a href="http://www.actuary.org">www.actuary.org</a> .
5, 6, 7-C, 7-U.S.	American Institute for Chartered Property Casualty Underwriters, Order Department, P.O. Box 3016, 720 Providence Road, Malvern, PA 19355-0716; telephone: (610) 644-2100; fax: (610) 640-9576.
1	Anderson, J.F.; and Brown, R.L., “Risk and Insurance” (SN 1-21-05), 2005, Society of Actuaries, 475 N. Martingale Road, Suite 600, Schaumburg, IL 60173-2226; telephone: (847) 706-3500; fax: (847) 706-3599; Web site: <a href="http://www.soa.org">www.soa.org</a> .
7-U.S.	<i>Association Form of the Annual Statement Blanks</i> , Bowne Insurance Division, 800 Central Boulevard, Carlstadt, NJ 07072; telephone: (800) 223-3103.
7-C	Baer, M.G.; and Rendall, J.A., <i>Cases on the Canadian Law of Insurance</i> (Fifth Edition), 1995, Carswell, Attention: Customer and Order Services, One Corporate Plaza, 2075 Kennedy Road, Scarborough, Ontario M1T 3V4, Canada; telephone: (416) 609-3800 or (800) 387-5164; fax: (416) 298-5082; Web site: <a href="http://www.carswell.com">www.carswell.com</a> .
1	Bean, M.A., <i>Probability: The Science of Uncertainty with Applications to Investments, Insurance, and Engineering</i> , 2001, Brooks/Cole Publishing Company, a division of Thomson Learning, Order Department, 7625 Empire Drive, Florence, KY 41042; telephone: (800) 354-9706; Web site: <a href="http://training.thomsonlearning.com">http://training.thomsonlearning.com</a> .

8	Bodie, Z.; Kane, A.; and Marcus, A.J., <i>Investments</i> (Sixth Edition), 2005, Irwin McGraw-Hill, P.O. Box 182605, Columbus, OH 43218-2605; telephone: (800) 262-4729.
3	Bowers, N.L.; Gerber, H.U.; Hickman, J.C.; Jones, D.A.; and Nesbitt, C.J., <i>Actuarial Mathematics</i> (Second Edition), 1997, Society of Actuaries, 475 N. Martingale Road, Suite 600, Schaumburg, IL 60173-2226; telephone: (847) 706-3500; fax: (847) 706-3599; Web site: www.soa.org.
7-C, 7-US	Bowne Insurance Division, 800 Central Boulevard, Carlstadt, NJ 07072; telephone: (800) 223-3103 (for the <i>NAIC Annual Statement Blanks, Property and Casualty</i> ).
VF	Brealey, R.A.; Myers, S.C.; and Allen, F., <i>Principles of Corporate Finance</i> (Eighth Edition), 2005, McGraw-Hill, P.O. Box 182605, Columbus, OH 43218-2605; telephone: (800) 262-4729.
2	Broverman, S.A.; <i>Mathematics of Investment and Credit</i> (Third Edition) 2004, ACTEX Publications, 140 Willow Street, Suite One, P.O. Box 974, Winsted, CT 06098; telephone: (800) 282-2839 or (860) 379-5470; fax: (860) 738-3152; e-mail: retail@actexamdriver.com.
7-C	Brown, C.; <i>Canadian Insurance Contracts Law in a Nutshell</i> , 1995, Carswell, Attention: Customer and Order Services, One Corporate Plaza, 2075 Kennedy Road, Scarborough, Ontario M1T 3V4, Canada; telephone: (416) 609-3800 or (800) 387-5164; fax: (416) 298-5082; Web site: www.carswell.com.
7-C	Canadian Institute of Actuaries, Secretariat, Suite 820, 360 Albert Street, Ottawa, Ontario K1R 7X7, Canada; telephone: (613) 236-8196; fax: (613) 233-4552; Web site: www.actuaries.ca.
3, 4-9	Casualty Actuarial Society <i>Forum</i> , <i>Foundations of Casualty Actuarial Science</i> (Fourth Edition), <i>PCAS</i> , and <i>Discussion Paper Program</i> , Casualty Actuarial Society, 4350 N. Fairfax Drive, Suite 250, Arlington, VA 22203; telephone: (703) 276-3100; fax: (703) 276-3108; e-mail: office@casact.org; Web site: www.casact.org.
8	Chew, D.H., editor, <i>The New Corporate Finance: Where Theory Meets Practice</i> (Third Edition), 2001, McGraw-Hill/Irwin, P.O. Box 182605, Columbus, OH 43218-2605; telephone: (800) 262-4729.
9	Cummins, J.D.; Smith, B.D.; Vance, R.N.; and VanDerhei, J.L., <i>Risk Classification in Life Insurance</i> , 1983, Kluwer-Nijhoff Publishing, 101 Philip Drive, Norwell, MA 02061; telephone: (781) 871-6600; fax: (781) 871-6528.
7-C	Ettlinger, K.H.; Hamilton, K.L.; and Krohm, G., <i>State Insurance Regulation</i> (First Edition), 1995, Insurance Institute of America, 720 Providence Road, Malvern, PA 19355-0770; telephone: (610) 644-2100.
8	Fabozzi, F.J., <i>The Handbook of Fixed Income Securities</i> (Sixth Edition), 2001, McGraw-Hill, P.O. Box 182605, Columbus, OH 43218-2605; telephone: (800) 262-4729.
7-C	Facility Association, 151 Yonge Street, 18 <sup>th</sup> Floor, Toronto, Ontario M5C 2W7, Canada; telephone: (416) 863-1750 or (800) 268-9572; fax: (416) 868-0894.
6	Financial Accounting Standards Board, 401 Merret 7, P.O. Box 5116, Norwalk, CT 06856-5116; telephone: (203) 847-0700.
7-C	<i>Financial Institutions Act</i> , "Insurance Companies Act," Chapter 47, The Federal Publication, 388 King Street West, Toronto, Ontario M5V 1K2, Canada; telephone: (416) 860-1611.

7-C	Financial Services Commission of Ontario, 5160 Yonge Street, P.O. Box 85, North York, Ontario M2N 6L9, Canada; telephone: (416) 250-7250; fax: (416) 590-7070; Web site: www.ontarioinsurance.com.
4, 5, 6, 7-C, 7-U.S.	<i>Foundations of Casualty Actuarial Science</i> (Fourth Edition), 2001, Casualty Actuarial Society, 1100 N. Glebe Road, Suite 600, Arlington, VA 22201-4798; telephone: (703) 276-3100; fax: (703) 276-3108; e-mail: office@casact.org.
1	Ghahramani, S., <i>Fundamentals of Probability with Stochastic Processes</i> (Third Edition), 2005, Prentice Hall, Inc., 200 Old Tappan Road, Old Tappan, NJ 07675; telephone: (800) 282-0693; Web site: vig.prenhall.com.
7-C	Greenan, J. (Ed.), <i>The Handbook of Canadian Pension and Benefit Plans</i> (Twelfth Edition), 2002, CCH Canadian Limited, 90 Shepherd East, Suite 300, North York, Ontario M2N 6X1, Canada; telephone: (416) 224-2248; fax: (800) 461-4131; Web site: www.ca.cch.com.
6	Harvard Business School Publishing, 60 Harvard Way, Boston, MA 02163; telephone (617) 783-7500; fax: (617) 783-7555.
1	Hassett, M.; and Stewart, D., <i>Probability for Risk Management</i> , 1999, ACTEX Publications, 140 Willow Street, Suite One, P.O. Box 974, Winsted, CT 06098; telephone: (800) 282-2839 or (860) 379-5470; fax: (860) 738-3152; e-mail: retail@actexamdriver.com.
4	Herzog, T.N., <i>Introduction to Credibility Theory</i> (Third Edition), 1999, ACTEX Publications, 140 Willow Street, Suite One, P.O. Box 974, Winsted, CT 06098; telephone: (800) 282-2839 or (860) 379-5470; fax: (860) 738-3152; e-mail: retail@actexamdriver.com.
3	Hogg, R.V.; Craig, A.T.; and McKean, J.W., <i>Introduction to Mathematical Statistics</i> (Sixth Edition), 2004, Prentice Hall, Inc., 200 Old Tappan Road, Old Tappan, NJ 07675; telephone: (800) 282-0693; Web site: vig.prenhall.com..
3	Hogg, R.V.; and Tanis, E., <i>Probability and Statistical Inference</i> (Sixth Edition), 2001, Prentice Hall, Inc., 200 Old Tappan Road, Old Tappan, NJ 07675; telephone: (800) 282-0693; Web site: vig.prenhall.com.
8	Hull, J.C., <i>Options, Futures, and Other Derivatives</i> (Sixth Edition), 2006, Prentice Hall, Inc., 200 Old Tappan Road, Old Tappan, NJ 07675; telephone: (800) 282-0693; Web site: vig.prenhall.com.
6, 7-C, 7-U.S.	Insurance Accounting and Systems Association, <i>Property-Casualty Insurance Accounting</i> (Eighth Edition), 2003, IASA Fulfillment Center, P.O. Box 51008, Durham, NC 27717; telephone: (800) 817-4272 or (919) 489-0991; fax: (800) 668-4272; Web site: www.iasa.org.
7-C	Insurance Bureau of Canada, 240 Duncan Mill Road, Suite 700, Toronto, Ontario M3B 1Z4, Canada; telephone: (416) 445-5912; fax: (416) 445-2183.
7-U.S.	Insurance Expense Exhibit, Bowne Insurance Division, 800 Central Boulevard, Carlstadt, NJ 07072; telephone: (800) 223-3103.
6, 7-U.S.	Insurance Institute of America, 720 Providence Road, Malvern, PA 19355-0716; telephone: (610) 644-2100; fax: (610) 640-9576.
5, 9	Insurance Services Office, Inc., 545 Washington Boulevard, Jersey City, NJ 07310-1686; telephone: (800) 888-4476.

6	International Accounting Standards Board, 30 Cannon Street, London EC4M 6XH, United Kingdom; telephone: +44 (0)20 7246 6410; fax: telephone: +44 (0)20 7246 6411; Web site: www.iasb.org.
7-U.S.	<i>Journal of Insurance Regulation</i> , National Association of Insurance Commissioners, 120 W. 12th Street, #1100, Kansas City, MO 64105; telephone: (816) 842-3600.
7-U.S., 8	<i>Journal of Risk and Insurance, The</i> , American Risk and Insurance Association, 716 Providence Road, P.O. Box 3028, Malvern, PA 19355; telephone: (610) 640-1997; fax: (610) 725-1007; Web site: www.aria@cpcuia.org.
2	Kellison, S.G., <i>Theory of Interest</i> , 1991, Irwin/McGraw-Hill, P.O. Box 182605, Columbus, OH 43218-2605; telephone: (800) 262-4729.
7-C	Klar, L.N.; Linden, A.M.; Cherniak, E.A.; and Kryworuk, P.W., <i>Remedies in Tort</i> , 1997 (Release 6), Volume 4, Carswell, Attention: Customer and Order Services, One Corporate Plaza, 2075 Kennedy Road, Scarborough, Ontario M1T 3V4, Canada; telephone: (416) 609-3800 or (800) 387-5164; fax: (416) 298-5082; Web site: www.carswell.com.
3, 4	Klugman, S.A.; Panjer, H.H.; and Willmot, G.E., <i>Loss Models: From Data to Decisions</i> (Second Edition), 2004, John Wiley and Sons, One Wiley Drive, Somerset, NJ 08875; telephone: (800) 225-5945 or (732) 469-4400.
VE	Landsburg, S.E., <i>Price Theory and Applications</i> (Sixth Edition), 2005, International Thomson Publishing, Order Department, P.O. Box 6904, Florence, KY 41022; telephone: (800) 347-7707.
7-C	Linden, A.M., <i>Canadian Tort Law</i> (Seventh Edition), 2001, Butterworths, The Butterworths Group of Companies, 75 Clegg Road, Markham, Ontario L6G 1A1, Canada; telephone: (905) 479-2665; fax: (905) 479-2826; Web site: www.butterworths.ca.
1	Miller, I; and Miller, M, <i>John E. Freund's Mathematical Statistics with Applications</i> (Seventh Edition), 2004, Prentice Hall, Inc., 200 Old Tappan Road, Old Tappan, NJ 07675; telephone: (800) 282-0693; Web site: vig.prenhall.com.
7-U.S.	<i>NAIC Annual Statement Blanks, Property and Casualty</i> may be obtained from Bowne Insurance Division, 800 Central Boulevard, Carlstadt, NJ 07072; telephone: (800) 223-3103.
7-C, 7-U.S.	National Association of Insurance Commissioners, 120 W. 12 <sup>th</sup> Street, #1100, Kansas City, MO 64105; telephone: (816) 842-3600.
9	National Council on Compensation Insurance, 901 Peninsula Corporate Circle, Boca Raton, FL 33487; telephone: (800) NCCI-123.
7-C	Office of the Superintendent of Financial Institutions Canada, 255 Albert Street, Ottawa, Ontario K1A 0H2 Canada; telephone: (613) 990-7788; fax: (613) 952-8219; Web site: www.osfi-bsif.gc.ca.
VS	Pindyck, R.S.; and Rubinfeld, D.L., <i>Econometric Models and Economic Forecasts</i> (Fourth Edition), 1998, Irwin McGraw-Hill, P.O. Box 182605, Columbus, OH 43218-2605; telephone: (800) 262-4729.
1, 2, 4	Preliminary Actuarial Examinations, P.O. Box 95600, Chicago, IL 60694-5600; telephone: (847) 706-3500; fax: (847) 706-3599.

7-U.S.	Rejda, G.E., <i>Social Insurance and Economic Security</i> (Sixth Edition), 1999, Prentice Hall, Inc., 200 Old Tappan Road, Old Tappan, NJ 07675; telephone: (800) 282-0693; Web site: vig.prenhall.com.
1	Ross, S.M., <i>A First Course in Probability</i> (Seventh Edition), 2005, Prentice Hall, Inc., 200 Old Tappan Road, Old Tappan, NJ 07675; telephone: (800) 282-0693; Web site: vig.prenhall.com.
3	Ross, S.M., <i>Introduction to Probability Models</i> (Eighth Edition), 2003, Academic Press, 6277 Sea Harbor Drive, Attn: Customer Service (Fifth Floor), Orlando, FL 32887; telephone: (407) 345-3800.
All	SlideRule Books, 10 First Avenue East, Mobridge, SD 57601; telephone: (877) 407-5433 or (605) 845-5580; fax: (877) 417-5433 or (605) 845-7627; Web site: www.sliderulebooks.com.
1-4, VE	Society of Actuaries, 475 N. Martingale Road, Suite 600, Schaumburg, IL 60173-2226; telephone: (847) 706-3500; fax: (847) 706-3599; Web site: www.soa.org.
All	Texas Instruments, Attention: Order Entry, P.O. Box 650311, Mail Station 3962, Dallas, TX 75265; telephone: (800) 842-2737; Web site: www.ti.com.
VE	Wachtel, P., "Macroeconomics," SOA Study Note 2-21-00, Society of Actuaries, 475 N. Martingale Road, Suite 600, Schaumburg, IL 60173-2226; telephone: (847) 706-3500; fax: (847) 706-3599; Web site: www.soa.org.
1	Wackerly, D.; Mendenhall III, W.; and Scheaffer, R., <i>Mathematical Statistics with Applications</i> (Sixth Edition), 2002, Duxbury Press; telephone: (800) 354-9706; Web site: www.duxbury.com.

# Application and Order Forms

## CAS Examination Centers

If an examination center is canceled for any reason, candidates will be reassigned to the nearest available examination center. For the most current list of centers, please see the “Admissions” section of the CAS Web Site at [www.casact.org](http://www.casact.org).

### UNITED STATES

**Alabama**  
Birmingham

**Alaska**  
Juneau

**Arizona**  
Scottsdale

**California**  
Los Angeles  
Novato  
San Diego  
San Mateo  
Woodland Hills

**Colorado**  
Denver

**Connecticut**  
Hartford

**District of Columbia**  
Washington

**Florida**  
Boca Raton  
Gainesville  
Jacksonville  
Miami  
Tallahassee

**Georgia**  
Atlanta

**Hawaii**  
Honolulu

**Illinois**  
Bloomington  
Chicago  
Long Grove  
Northbrook  
Schaumburg  
Springfield

**Indiana**  
Fort Wayne  
Indianapolis

**Iowa**  
Des Moines

**Kansas**  
McPhearson  
Overland Park

**Louisiana**  
Baton Rouge\*

**Maine**  
Portland

**Maryland**  
Baltimore

**Massachusetts**  
Boston  
Worcester

**Michigan**  
Dearborn  
Lansing

**Minnesota**  
Owatonna  
St. Paul

**Mississippi**  
Jackson

**Missouri**  
Springfield  
St. Louis

**Nebraska**  
Omaha  
South Sioux City

**Nevada**  
Carson City\*

**New Hampshire**  
Keene

**New Jersey**  
Princeton  
Warren

**New Mexico**  
Santa Fe

**New York**  
Albany  
Buffalo  
New York City  
Utica

**North Carolina**  
Charlotte  
Greensboro  
Raleigh  
Winston-Salem

**North Dakota**  
Grand Forks

**Ohio**  
Cincinnati  
Cleveland  
Columbus  
Hamilton  
Wooster

**Oklahoma**  
Oklahoma City

**Oregon**  
Ashland  
Portland

**Pennsylvania**  
Erie  
Harleysville  
Harrisburg  
Philadelphia  
Pittsburgh

**Rhode Island**  
Lincoln

**South Carolina**  
Columbia

**Tennessee**  
Chattanooga\*  
Nashville

**Texas**  
Austin  
Dallas  
Houston  
San Antonio

**Utah**  
Salt Lake City

**Virginia**  
Richmond

**Washington**  
Seattle

**Wisconsin**  
Brookfield  
Madison  
Stevens Point  
Wausau

### CANADA

**Alberta**  
Calgary  
Edmonton

**British Columbia**  
Vancouver

**Manitoba**  
Winnipeg

**New Brunswick**  
Fredericton

**New Foundland**  
St. John's

**Ontario**  
Ottawa  
Toronto  
Waterloo

**Quebec**  
Montreal  
Quebec City

**Saskatchewan**  
Saskatoon

### OTHER COUNTRIES

**Argentina**  
Buenos Aires

**Australia**  
Sydney

**Bahamas**  
Nassau

**Barbados**  
St. Michael

**Bermuda**  
Hamilton

**China, People's Republic**  
Anhui  
Beijing  
Hong Kong  
Shanghai  
Shenzhen  
Tianjin

**China, Republic of (Taiwan)**  
Taipei

**Cyprus**  
Nicosia

**England**  
London

**France**  
Paris

**Greece**  
Athens

**India**  
Delhi  
Kolkata  
Mumbai

**Israel**  
Tel-Aviv

**Japan**  
Tokyo

**Jamaica**  
Kingston

**Korea**  
Seoul

**Malaysia**  
Kuala Lumpur

**Pakistan**  
Lahore  
Karachi

**Singapore**  
Singapore City

**South Africa**  
Cape Town

**Switzerland**  
Zurich

\*Site available for select exams only.

## Reminder

*From the “Admissions” section of the CAS Web Site ([www.casact.org/admissions](http://www.casact.org/admissions)), candidates can:*

- ***Print Exam Applications for Joint Exams***

Exam Applications for joint CAS/CIA/SOA Exams 1/P, 2/FM, and 4/C are available in “Exam Applications & Order Forms” under “General Exam Information” in the “Admissions” section of the CAS Web Site.

- ***Register Online for Exams 3, 5-9, and Transitional VEE Exams***

Candidates may register online for Exams 3, 5-9, and Transitional VEE Exams during the registration period in the “Admissions” section of the CAS Web Site. Prior to completing an online application, candidates must submit an Electronic Signature Authorization Form—details are available in the under “General Exam Information” in the “Admissions” section of the CAS Web Site.

- ***Order Study Kits and Web Notes Online***

Candidates may order the study materials listed on the 2006 Order Forms from the CAS Online Store that is linked from the “Admissions” section of the CAS Web Site.



Canadian Institute of Actuaries

# Winter 2006 Exam Application

## Transitional VEE Exams

Application must reach the CAS Office by **January 5, 2006.**



Casualty Actuarial Society

**Registration is also available online in the "Admissions" section of the CAS Web Site ([www.casact.org](http://www.casact.org)).**

For Office Use Only		I have previously registered for an exam with the CAS: <input type="checkbox"/> Yes <input type="checkbox"/> No	
		Prefix (check one): <input type="checkbox"/> Mr. <input type="checkbox"/> Ms. <input type="checkbox"/> Mrs. <input type="checkbox"/> _____	
Last Name/Family Name		First Name	Middle Name
Suffix			
If a <b>different name</b> was used on a previous application, print it here:		Date of Birth (Month-Day-Year)	
<b>Preferred Address</b>	Please check for preferred address: <input type="checkbox"/> Home Address <input type="checkbox"/> Office Address <input type="checkbox"/> New Address		
Organization Name (only if a company address)			
Street or P.O. Box			
City	State/Province	Zip/Postal Code	Country
Business Telephone	Business E-Mail	Home E-Mail	
Date of First Full-Time Property-Casualty Employment (Month/Year)		Home Telephone	
<b>Preliminary Education</b>	I have credit for: <input type="checkbox"/> Exam 1/P <input type="checkbox"/> Exam 2/FM <input type="checkbox"/> Exam 3 <input type="checkbox"/> Exam 4/C		
	<input type="checkbox"/> VEE-Applied Statistical Methods <input type="checkbox"/> VEE-Corporate Finance <input type="checkbox"/> VEE-Economics		
<b>For Full-time Students</b>	Name of College/University	Expected Graduation Year	<input type="checkbox"/> Undergraduate <input type="checkbox"/> Graduate
<b>Exam Registration Information</b>	I am registering for the following exam(s) on Thursday, February 16, 2006:		
<b>Exam Center</b>	Centers are listed on page 159.		
	<input type="checkbox"/> VEE-Economics <input type="checkbox"/> VEE-Corporate Finance <input type="checkbox"/> VEE- Applied Statistical Methods		
<b>Method of Payment</b>	Indicate One: <input type="checkbox"/> Personal Check <input type="checkbox"/> Company Check <input type="checkbox"/> Money Order <input type="checkbox"/> Credit Card		
If paying by credit card, please indicate the card: <input type="checkbox"/> American Express <input type="checkbox"/> MasterCard <input type="checkbox"/> Visa		<b>Payment Information</b>	
Account Number: _____		Exam Fee(s)	
Expiration Date: _____ Cardholder's Name _____			
Cardholder's Address: _____		<b>TOTAL</b> Amount Enclosed	
Cardholder's Signature (Required)			
<b>Mail check or money order payments to:</b> Casualty Actuarial Society P.O. Box 425 Merrifield, VA 22116-0425 U.S.A.		<b>Mail credit card payments (and <u>all</u> overnight/courier deliveries) to:</b> Casualty Actuarial Society 4350 N. Fairfax Drive, Suite 250 Arlington, Virginia 22203 U.S.A.	
"I have read the rules and regulations concerning the examination(s) for which I am applying and agree to be bound by them. I also agree that the results of any examination(s) which I take, and any action taken as a result of my conduct may, at the sole discretion of the Casualty Actuarial Society, be disclosed to any other bona fide actuarial organization that has a legitimate interest in such results and/or actions."			
<b>Signature</b>	_____		<input type="checkbox"/> Check here if you have attached a written request for accommodation to meet a special need.
	Your signature is required for this application to be valid.		



# Instructions For Completing Winter 2006 Exam Application

Registration Deadline: **January 5, 2006**

All applications must be received at the CAS Office by January 5, 2006. No late applications will be accepted.

Please allow **TEN WORKING DAYS** for the application to arrive; otherwise, the use of an overnight courier is strongly recommended. Postmark dates will **NOT** be considered. Applications received after the deadline will **NOT** be accepted. Late applications will be returned to the candidate with a full refund. When using an overnight courier, send application directly to the CAS street address (see directions for credit card payments) as a courier will not deliver to a post office box.

## CANDIDATE NAME and PREFERRED ADDRESS

- Indicate if you have registered previously for an exam with the CAS by checking yes or no.
- If you used a different name on your last application (e.g., a maiden name), print that name in the space provided.
- Print your full name (include middle name), your date of birth, address, daytime telephone number, and e-mail address. All CAS correspondence will be sent to your preferred address.
- Employment date is your **FIRST** full-time job in the property and casualty industry (month and year) where taking and passing actuarial exams is an expected part of the job. Do not count internships.

## PRELIMINARY EDUCATION

- Indicate the preliminary actuarial exams and Validation by Educational Experience (VEE) requirements for which you have credit.

## INFORMATION FOR FULL-TIME STUDENTS

- In order to pay the discounted exam fee for full-time students, the candidate must complete this section.

## EXAMINATION REGISTRATION and EXAMINATION CENTER

- Indicate the exam(s) you wish to write by placing an "X" in front of the desired exam.
- Refer to the list of examination centers page 159. Print the center name in the space provided. If a test center is cancelled or filled to capacity, candidates will be reassigned to the nearest available center.

## EXAMINATION FEES

- Registration is not valid until the account is paid in full. Fees listed in U.S. dollars. Write fees in appropriate boxes.

Winter 2006 Exam	Fee	Full-Time Student
For <i>each</i> Transitional VEE Exam	\$225	\$180

## OTHER FEES

- **Center Change Request:** A non-refundable \$60 administrative fee is required from candidates who request a change in center from their initial application. Requests for a center change will not be considered after the registration deadline.
- **Refund Request:** A \$60 administrative fee will be assessed to all refunds. Candidates must submit a written refund request to the CAS Office by March 9, 2006.

## PAYMENT INFORMATION

- Exam fees may be paid by check, money order, or credit card (American Express, MasterCard, or Visa). Checks should be payable to "Casualty Actuarial Society." Send applications to the appropriate address listed on the front of this application. Fees must be in U.S. funds (or Canadian equivalent). Credit card payments will be processed in U.S. funds. The amount billed to an individual's credit card will be automatically adjusted when the amount due is miscalculated. Fees are not transferable from one session to another. A \$20 fee will be assessed on any checks returned due to insufficient funds.
- If paying by credit card, the completed application form may be faxed to the CAS Office at 703.276.3108.

**SIGNATURE:** In order for this application to be valid, your signature must appear on the front of this application (lower left corner).

**CONFIRMATION/RECEIPT:** A confirmation will be sent that contains your Candidate Number for this session. It serves as your receipt. Use the bottom half to request refunds or to make changes to your name, address, or examination center location.

**CHANGE OF ADDRESS:** Report any change of address to the CAS Office promptly (fax: 703.276.3108; e-mail: office@casact.org).

**SPECIAL NEEDS:** Candidates with special needs must submit a written request with their application that details the requested accommodation. Documentation of the disability and the need for special arrangements are required. Documentation is requested as early as possible but must be submitted prior to the registration deadline.

**Retain your Candidate Number. Candidate Numbers will not be given over the telephone.**



# Spring 2006 Order Form

Order from the CAS Online Store at [www.casact.org](http://www.casact.org).

Valid through May 2006

### Please print clearly.

Name (First, M.I., Last): \_\_\_\_\_

If last name is different from that used previously by the CAS, please indicate prior name: \_\_\_\_\_

Date of Birth: \_\_\_\_\_

Daytime Telephone: \_\_\_\_\_

E-mail: \_\_\_\_\_

### Method of Payment

Personal Check     Company Check     Money Order

Credit Card *Please indicate which card:*

Master Card     Visa     American Express

Account No.: \_\_\_\_\_

Expiration Date: \_\_\_\_\_

Cardholder's Name: \_\_\_\_\_

Billing Address: \_\_\_\_\_

Signature (Required): \_\_\_\_\_

### Shipping Address *Check one: Home Office*

Company Name (if applicable): \_\_\_\_\_

Street (no P.O. Boxes): \_\_\_\_\_

City: \_\_\_\_\_

State/Prov./Country: \_\_\_\_\_

Zip/Postal Code/Zone: \_\_\_\_\_

Prices include postage and handling for orders delivered in the U.S. and Canada. For deliveries outside the U.S. and Canada, add 50% to all prices. Materials are sent via United Parcel Service Ground in the U.S. and by U.S. Postal Service to all other countries. Prepayment is required for all orders. Payment may be made by check or by money order in U.S. funds or Canadian equivalent. Credit card payment will be processed in U.S. funds and requires a signature. For special shipping needs, please contact the CAS Member Resource Center at (703) 276-3100 or [mrc@casact.org](mailto:mrc@casact.org).

**Please allow four to six weeks delivery within the U.S. and Canada. NO RETURNS, NO REFUNDS.**

*If paying by check or money order (payable to "Casualty Actuarial Society" in U.S. or Canadian funds), send payment and order form to:*

**Casualty Actuarial Society  
P.O. Box 425  
Merrifield, VA 22116-0425**

*If paying by credit card, send order form to:*

**Casualty Actuarial Society  
4350 N. Fairfax Dr., Suite 250  
Arlington, VA 22203**

*If paying by credit card, order may be faxed to 703.276.3108.*

Study Kits and Web Notes are available after December 1, 2005.

Study Material	US\$	Quantity	Total
Exam 3 Web Notes (available free-of-charge on the CAS Web Site)	\$8.00		
Exam 5 Study Kit	\$52.00		
Exam 5 Web Notes (available free-of-charge on the CAS Web Site)	\$92.00		
Exam 7-Canada Study Kit	\$131.00		
Exam 7-Canada Web Notes (available free-of-charge on the CAS Web Site)	\$13.00		
Exam 7-Canada 2006 Update to the 2005 Study Kit	\$11.00		
Exam 7-US Study Kit	\$60.00		
Exam 7-US Web Notes (available free-of-charge on the CAS Web Site)	\$63.00		
Exam 7-US 2006 Update to the 2005 Study Kit	\$17.00		
Exam 8 Study Kit	\$41.00		
Exam 8 Web Notes (available free-of-charge on the CAS Web Site)	\$15.00		
Subtotal			
Discount if applicable (20%)*			
International Postage (if outside the U.S. or Canada, add 50% of subtotal)			
Canadian residents add 7% GST, Virginia residents add 5% sales tax			
<b>TOTAL</b>			

\*Bulk orders of 20 or more copies of any single publication will receive a 20% discount.

## Reminder

*From the “Admissions” section of the CAS Web Site ([www.casact.org/admissions](http://www.casact.org/admissions)), candidates can:*

- ***Print Exam Applications for Joint Exams***

Exam Applications for joint CAS/CIA/SOA Exams 1/P, 2/FM, and 4/C are available in “Exam Applications & Order Forms” under “General Exam Information” in the “Admissions” section of the CAS Web Site.

- ***Register Online for Exams 3, 5-9, and Transitional VEE Exams***

Candidates may register online for Exams 3, 5-9, and Transitional VEE Exams during the registration period in the “Admissions” section of the CAS Web Site. Prior to completing an online application, candidates must submit an Electronic Signature Authorization Form—details are available in the under “General Exam Information” in the “Admissions” section of the CAS Web Site.

- ***Order Study Kits and Web Notes Online***

Candidates may order the study materials listed on the 2006 Order Forms from the CAS Online Store that is linked from the “Admissions” section of the CAS Web Site.

Archive 2008



Canadian Institute of Actuaries

# Spring 2006 Exam Application

Exams 3, 5, 7, and 8

Application must reach the CAS Office by **March 16, 2006.**



Casualty Actuarial Society

**Registration is also available online in the "Admissions" section of the CAS Web Site ([www.casact.org](http://www.casact.org)).**

For Office Use Only		I have previously registered for an exam with the CAS: <input type="checkbox"/> Yes <input type="checkbox"/> No	
		Prefix (check one): <input type="checkbox"/> Mr. <input type="checkbox"/> Ms. <input type="checkbox"/> Mrs. <input type="checkbox"/> _____	
Last Name/Family Name		First Name	Middle Name
Suffix			
If a <b>different name</b> was used on a previous application, print it here:		Date of Birth (Month-Day-Year)	
<b>Preferred Address</b>	Please check for preferred address: <input type="checkbox"/> Home Address <input type="checkbox"/> Office Address <input type="checkbox"/> New Address		
Organization Name (only if a company address)			
Street or P.O. Box			
City	State/Province	Zip/Postal Code	Country
Business Telephone	Business E-Mail	Home E-Mail	
Date of First Full-Time Property-Casualty Employment (Month/Year)		Home Telephone	
<b>Preliminary Education</b>	I have credit for: <input type="checkbox"/> Exam 1/P <input type="checkbox"/> Exam 2/FM <input type="checkbox"/> Exam 3 <input type="checkbox"/> Exam 4/C <input type="checkbox"/> VEE-Applied Statistical Methods <input type="checkbox"/> VEE-Corporate Finance <input type="checkbox"/> VEE-Economics		
<b>For Full-time Students</b>	Name of College/University	Expected Graduation Year	<input type="checkbox"/> Undergraduate <input type="checkbox"/> Graduate
<b>Exam Registration Information</b>		I am registering for the following:	
<b>Exam Center</b>	Centers are listed on page 159.	<input type="checkbox"/> Exam 3 (Wednesday, April 26, 2006)	<input type="checkbox"/> Exam 7-Canada (Tuesday, April 25, 2006)
		<input type="checkbox"/> Exam 5 (Friday, April 28, 2006)	<input type="checkbox"/> Exam 7-U.S. (Tuesday, April 25, 2006)
			<input type="checkbox"/> Exam 8 (Thursday, April 27, 2006)
<b>Method of Payment</b>		Indicate One: <input type="checkbox"/> Personal Check <input type="checkbox"/> Company Check <input type="checkbox"/> Money Order <input type="checkbox"/> Credit Card	
If paying by credit card, please indicate the card: <input type="checkbox"/> American Express <input type="checkbox"/> MasterCard <input type="checkbox"/> Visa		<b>Payment Information</b>	
Account Number: _____		Exam Fee(s)	
Expiration Date: _____ Cardholder's Name: _____		Translation Fee	
Cardholder's Address: _____		<b>TOTAL</b> Amount Enclosed	
Cardholder's Signature (Required)			
<b>Translation Service</b>	<input type="checkbox"/> To answer exam questions in a language other than English, check here and indicate language:		
<b>Mail check or money order payments to:</b> Casualty Actuarial Society P.O. Box 425 Merrifield, VA 22116-0425 U.S.A.		<b>Mail credit card payments (and all overnight/courier deliveries) to:</b> Casualty Actuarial Society 4350 N. Fairfax Drive, Suite 250 Arlington, Virginia 22203 U.S.A.	
"I have read the rules and regulations concerning the examination(s) for which I am applying and agree to be bound by them. I have read the CAS Code of Professional Conduct and agree to abide by it. I also agree that the results of any examination(s) which I take, and any action taken as a result of my conduct may, at the sole discretion of the Casualty Actuarial Society, be disclosed to any other bona fide actuarial organization that has a legitimate interest in such results and/or actions."			
<b>Signature</b>	_____		<input type="checkbox"/> Check here if you have attached a written request for accommodation to meet a special need.
	Your signature is required for this application to be valid.		

# Instructions For Completing Spring 2006 Exam Application

Registration Deadline: **MARCH 15, 2006**

All applications must be received at the CAS Office by March 15, 2006. No late applications will be accepted.

Please allow **TEN WORKING DAYS** for the application to arrive; otherwise, the use of an overnight courier is strongly recommended. Postmark dates will **NOT** be considered. Applications received after the deadline will **NOT** be accepted. Late applications will be returned to the candidate with a full refund. When using an overnight courier, send application directly to the CAS street address (see directions for credit card payments) as a courier will not deliver to a post office box.

## CANDIDATE NAME and PREFERRED ADDRESS

- Indicate if you have registered previously for an exam with the CAS by checking yes or no.
- If you used a different name on your last application (e.g., a maiden name), print that name in the space provided.
- Print your full name (include middle name), your date of birth, address, daytime telephone number, and e-mail address. All CAS correspondence will be sent to your preferred address.
- Employment date is your **FIRST** full-time job in the property and casualty industry (month and year) where taking and passing actuarial exams is an expected part of the job. Do not count internships.

## PRELIMINARY EDUCATION

- Indicate the preliminary actuarial exams and Validation by Educational Experience (VEE) requirements for which you have credit.

## INFORMATION FOR FULL-TIME STUDENTS

- In order to pay the discounted exam fee for full-time students, the candidate must complete this section.

## EXAMINATION REGISTRATION and EXAMINATION CENTER

- Indicate the exam(s) you wish to write by placing an "X" in front of the desired exam.
- Refer to the list of examination centers page 159. Print the center name in the space provided. If a test center is cancelled or filled to capacity, candidates will be reassigned to the nearest available center.

## EXAMINATION FEES

- Registration is not valid until the account is paid in full. Fees listed in U.S. dollars. Write fees in appropriate boxes.

Spring 2006 Exam Fees	Candidate	Full-Time Student
Exam 3	\$375	\$300
Exams 5, 7, and 8 (for <i>each</i> exam)	\$525	\$420

## OTHER FEES

- **Translation Service:** All exam questions are in English. For Exams 5-9, if you plan to respond to exam questions in a language other than English, check this box and indicate the language. A fee of \$50 per exam must be submitted along with the exam fee for non-English languages other than French. Responses must be in English unless this service is used.
- **Center Change Request:** A non-refundable \$60 administrative fee is required from candidates who request a change in center from their initial application. Requests for a center change will not be considered after the registration deadline.
- **Refund Request:** A \$60 administrative fee will be assessed to all refunds. Candidates must submit a written refund request to the CAS Office within three weeks (21 days) of the exam date.

## PAYMENT INFORMATION

- Exam fees may be paid by check, money order, or credit card (American Express, MasterCard, or Visa). Checks should be payable to "Casualty Actuarial Society." Send applications to the appropriate address listed on the front of this application. Fees must be in U.S. funds (or Canadian equivalent). Credit card payments will be processed in U.S. funds. The amount billed to an individual's credit card will be automatically adjusted when the amount due is miscalculated. Fees are not transferable from one session to another. A \$20 fee will be assessed on any checks returned due to insufficient funds.
- If paying by credit card, the completed application form may be faxed to the CAS Office at 703.276.3108.

**SIGNATURE:** In order for this application to be valid, your signature must appear on the front of this application (lower left corner).

**CONFIRMATION/RECEIPT:** A confirmation will be sent that contains your Candidate Number for this session. It serves as your receipt. Use the bottom half to request refunds or to make changes to your name, address, or examination center location.

**CHANGE OF ADDRESS:** Report any change of address to the CAS Office promptly (fax: 703.276.3108; e-mail: office@casact.org).

**SPECIAL NEEDS:** Candidates with special needs must submit a written request with their application that details the requested accommodation. Documentation of the disability and the need for special arrangements are required. Documentation is requested as early as possible but must be submitted prior to the registration deadline.

**Retain your Candidate Number. Candidate Numbers will not be given over the telephone.**



Canadian Institute of Actuaries

# Summer 2006 Exam Application

## Transitional VEE Exams

Application must reach the CAS Office by **June 28, 2006.**



Casualty Actuarial Society

**Registration is also available online in the "Admissions" section of the CAS Web Site ([www.casact.org](http://www.casact.org)).**

For Office Use Only		I have previously registered for an exam with the CAS: <input type="checkbox"/> Yes <input type="checkbox"/> No	
		Prefix (check one): <input type="checkbox"/> Mr. <input type="checkbox"/> Ms. <input type="checkbox"/> Mrs. <input type="checkbox"/> _____	
Last Name/Family Name		First Name	Middle Name
Suffix			
If a <b>different name</b> was used on a previous application, print it here:		Date of Birth (Month-Day-Year)	
<b>Preferred Address</b>	Please check for preferred address: <input type="checkbox"/> Home Address <input type="checkbox"/> Office Address <input type="checkbox"/> New Address		
Organization Name (only if a company address)			
Street or P.O. Box			
City	State/Province	Zip/Postal Code	Country
Business Telephone	Business E-Mail	Home E-Mail	
Date of First Full-Time Property-Casualty Employment (Month/Year)		Home Telephone	
<b>Preliminary Education</b>	I have credit for: <input type="checkbox"/> Exam 1/P <input type="checkbox"/> Exam 2/FM <input type="checkbox"/> Exam 3 <input type="checkbox"/> Exam 4/C <input type="checkbox"/> VEE-Applied Statistical Methods <input type="checkbox"/> VEE-Corporate Finance <input type="checkbox"/> VEE-Economics		
<b>For Full-time Students</b>	Name of College/University	Expected Graduation Year	<input type="checkbox"/> Undergraduate <input type="checkbox"/> Graduate
<b>Exam Registration Information</b>	I am registering for the following exam(s) on Wednesday, August 9, 2006: <input type="checkbox"/> VEE-Economics <input type="checkbox"/> VEE-Corporate Finance <input type="checkbox"/> VEE- Applied Statistical Methods		
<b>Exam Center</b>	Centers are listed on page 159.		
<b>Method of Payment</b>	Indicate One: <input type="checkbox"/> Personal Check <input type="checkbox"/> Company Check <input type="checkbox"/> Money Order <input type="checkbox"/> Credit Card		
If paying by credit card, please indicate the card: <input type="checkbox"/> American Express <input type="checkbox"/> MasterCard <input type="checkbox"/> Visa		<b>Payment Information</b>	
Account Number: _____		Exam Fee(s)	
Expiration Date: _____ Cardholder's Name _____			
Cardholder's Address: _____		<b>TOTAL</b> Amount Enclosed	
Cardholder's Signature (Required)			
<b>Mail check or money order payments to:</b> Casualty Actuarial Society P.O. Box 425 Merrifield, VA 22116-0425 U.S.A.		<b>Mail credit card payments (and all overnight/courier deliveries) to:</b> Casualty Actuarial Society 4350 N. Fairfax Drive, Suite 250 Arlington, Virginia 22203 U.S.A.	
"I have read the rules and regulations concerning the examination(s) for which I am applying and agree to be bound by them. I also agree that the results of any examination(s) which I take, and any action taken as a result of my conduct may, at the sole discretion of the Casualty Actuarial Society, be disclosed to any other bona fide actuarial organization that has a legitimate interest in such results and/or actions."			
<b>Signature</b>	_____		<input type="checkbox"/> Check here if you have attached a written request for accommodation to meet a special need.
	Your signature is required for this application to be valid.		

# Instructions For Completing Summer 2006 Exam Application

Registration Deadline: **June 28, 2006**

All applications must be received at the CAS Office by June 28, 2006. No late applications will be accepted.

Please allow **TEN WORKING DAYS** for the application to arrive; otherwise, the use of an overnight courier is strongly recommended. Postmark dates will **NOT** be considered. Applications received after the deadline will **NOT** be accepted. Late applications will be returned to the candidate with a full refund. When using an overnight courier, send application directly to the CAS street address (see directions for credit card payments) as a courier will not deliver to a post office box.

## CANDIDATE NAME and PREFERRED ADDRESS

- Indicate if you have registered previously for an exam with the CAS by checking yes or no.
- If you used a different name on your last application (e.g., a maiden name), print that name in the space provided.
- Print your full name (include middle name), your date of birth, address, daytime telephone number, and e-mail address. All CAS correspondence will be sent to your preferred address.
- Employment date is your **FIRST** full-time job in the property and casualty industry (month and year) where taking and passing actuarial exams is an expected part of the job. Do not count internships.

## PRELIMINARY EDUCATION

- Indicate the preliminary actuarial exams and Validation by Educational Experience (VEE) requirements for which you have credit.

## INFORMATION FOR FULL-TIME STUDENTS

- In order to pay the discounted exam fee for full-time students, the candidate must complete this section.

## EXAMINATION REGISTRATION and EXAMINATION CENTER

- Indicate the exam(s) you wish to write by placing an "X" in front of the desired exam.
- Refer to the list of examination centers page 159. Print the center name in the space provided. If a test center is cancelled or filled to capacity, candidates will be reassigned to the nearest available center.

## EXAMINATION FEES

- Registration is not valid until the account is paid in full. Fees listed in U.S. dollars. Write fees in appropriate boxes.

Summer 2006 Exam	Fee	Full-Time Student
For <i>each</i> Transitional VEE Exam	\$225	\$180

## OTHER FEES

- **Center Change Request:** A non-refundable \$60 administrative fee is required from candidates who request a change in center from their initial application. Requests for a center change will not be considered after the registration deadline.
- **Refund Request:** A \$60 administrative fee will be assessed to all refunds. Candidates must submit a written refund request to the CAS Office by August 30, 2006.

## PAYMENT INFORMATION

- Exam fees may be paid by check, money order, or credit card (American Express, MasterCard, or Visa). Checks should be payable to "Casualty Actuarial Society." Send applications to the appropriate address listed on the front of this application. Fees must be in U.S. funds (or Canadian equivalent). Credit card payments will be processed in U.S. funds. The amount billed to an individual's credit card will be automatically adjusted when the amount due is miscalculated. Fees are not transferable from one session to another. A \$20 fee will be assessed on any checks returned due to insufficient funds.
- If paying by credit card, the completed application form may be faxed to the CAS Office at 703.276.3108.

**SIGNATURE:** In order for this application to be valid, your signature must appear on the front of this application (lower left corner).

**CONFIRMATION/RECEIPT:** A confirmation will be sent that contains your Candidate Number for this session. It serves as your receipt. Use the bottom half to request refunds or to make changes to your name, address, or examination center location.

**CHANGE OF ADDRESS:** Report any change of address to the CAS Office promptly (fax: 703.276.3108; e-mail: office@casact.org).

**SPECIAL NEEDS:** Candidates with special needs must submit a written request with their application that details the requested accommodation. Documentation of the disability and the need for special arrangements are required. Documentation is requested as early as possible but must be submitted prior to the registration deadline.

**Retain your Candidate Number. Candidate Numbers will not be given over the telephone.**



Order from the CAS Online Store at [www.casact.org](http://www.casact.org).

# Fall 2006 Order Form

Valid through November 2006

**Please print clearly.**

Name (First, M.I., Last): \_\_\_\_\_

If last name is different from that used previously by the CAS, please indicate prior name: \_\_\_\_\_

Date of Birth: \_\_\_\_\_

Daytime Telephone: \_\_\_\_\_

E-mail: \_\_\_\_\_

**Method of Payment**

Personal Check     Company Check     Money Order

Credit Card *Please indicate which card:*

Master Card     Visa     American Express

Account No.: \_\_\_\_\_

Expiration Date: \_\_\_\_\_

Cardholder's Name: \_\_\_\_\_

Billing Address: \_\_\_\_\_

Signature (Required): \_\_\_\_\_

**Shipping Address** *Check one:*  Home     Office

Company Name (if applicable): \_\_\_\_\_

Street (no P.O. Boxes): \_\_\_\_\_

City: \_\_\_\_\_

State/Prov./Country: \_\_\_\_\_

Zip/Postal Code/Zone: \_\_\_\_\_

Prices include postage and handling for orders delivered in the U.S. and Canada. For deliveries outside the U.S. and Canada, add 50% to all prices. Materials are sent via United Parcel Service Ground in the U.S. and by U.S. Postal Service to all other countries. Prepayment is required for all orders. Payment may be made by check or by money order in U.S. funds or Canadian equivalent. Credit card payment will be processed in U.S. funds and requires a signature. For special shipping needs, please contact the CAS Member Resource Center at (703) 276-3100 or [mrc@casact.org](mailto:mrc@casact.org).

**Please allow four to six weeks delivery within the U.S. and Canada. NO RETURNS, NO REFUNDS.**

*If paying by check or money order (payable to "Casualty Actuarial Society" in U.S. or Canadian funds), send payment and order form to:*

**Casualty Actuarial Society  
P.O. Box 425  
Merrifield, VA 22116-0425**

*If paying by credit card, send order form to:*

**Casualty Actuarial Society  
4350 N. Fairfax Dr., Suite 250  
Arlington, VA 22203**

*If paying by credit card, order may be faxed to 703.276.3108.*

Study Kits and Web Notes are available after December 1, 2005.

Study Material	US\$	Quantity	Total
Exam 3 Web Notes (available free-of-charge on the CAS Web Site)	\$8.00		
Exam 6 Study Kit	\$35.00		
Exam 6 Web Notes (available free-of-charge on the CAS Web Site)	\$98.00		
Exam 6 2006 Update to the 2005 Study Kit	\$12.00		
Exam 9 Study Kit	\$25.00		
Exam 9 Web Notes (available free-of-charge on the CAS Web Site)	\$82.00		
Exam 9 2006 Update to the 2005 Study Kit	\$14.00		
		Subtotal	
		Discount if applicable (20%)*	
		International Postage (if outside the U.S. or Canada, add 50% of subtotal)	
		Canadian residents add 7% GST, Virginia residents add 5% sales tax	
		<b>TOTAL</b>	

\*Bulk orders of 20 or more copies of any single publication will receive a 20% discount.



## Reminder

*From the “Admissions” section of the CAS Web Site ([www.casact.org/admissions](http://www.casact.org/admissions)), candidates can:*

- ***Print Exam Applications for Joint Exams***

Exam Applications for joint CAS/CIA/SOA Exams 1/P, 2/FM, and 4/C are available in “Exam Applications & Order Forms” under “General Exam Information” in the “Admissions” section of the CAS Web Site.

- ***Register Online for Exams 3, 5-9, and Transitional VEE Exams***

Candidates may register online for Exams 3, 5-9, and Transitional VEE Exams during the registration period in the “Admissions” section of the CAS Web Site. Prior to completing an online application, candidates must submit an Electronic Signature Authorization Form—details are available in the under “General Exam Information” in the “Admissions” section of the CAS Web Site.

- ***Order Study Kits and Web Notes Online***

Candidates may order the study materials listed on the 2006 Order Forms from the CAS Online Store that is linked from the “Admissions” section of the CAS Web Site.

Archive 2006



Canadian Institute of Actuaries

# Fall 2006 Exam Application

Exams 3, 6, and 9

Application must reach the CAS Office by **September 21, 2006.**



Casualty Actuarial Society

**Registration is also available online in the "Admissions" section of the CAS Web Site ([www.casact.org](http://www.casact.org)).**

For Office Use Only		I have previously registered for an exam with the CAS: <input type="checkbox"/> Yes <input type="checkbox"/> No	
		Prefix (check one): <input type="checkbox"/> Mr. <input type="checkbox"/> Ms. <input type="checkbox"/> Mrs. <input type="checkbox"/> _____	
Last Name/Family Name		First Name	Middle Name
Suffix			
If a <b>different name</b> was used on a previous application, print it here:		Date of Birth (Month-Day-Year)	
<b>Preferred Address</b>	Please check for preferred address: <input type="checkbox"/> Home Address <input type="checkbox"/> Office Address <input type="checkbox"/> New Address		
Organization Name (only if a company address)			
Street or P.O. Box			
City	State/Province	Zip/Postal Code	Country
Business Telephone	Business E-Mail	Home E-Mail	
Date of First Full-Time Property-Casualty Employment (Month/Year)		Home Telephone	
<b>Preliminary Education</b>	I have credit for: <input type="checkbox"/> Exam 1/P <input type="checkbox"/> Exam 2/FM <input type="checkbox"/> Exam 3 <input type="checkbox"/> Exam 4/C <input type="checkbox"/> VEE-Applied Statistical Methods <input type="checkbox"/> VEE-Corporate Finance <input type="checkbox"/> VEE-Economics		
<b>For Full-time Students</b>	Name of College/University	Expected Graduation Year	<input type="checkbox"/> Undergraduate <input type="checkbox"/> Graduate
<b>Exam Registration Information</b>	I am registering for the following: <input type="checkbox"/> Exam 6 (Wednesday, November 1, 2006) <input type="checkbox"/> Exam 3 (Tuesday, October 31, 2006) <input type="checkbox"/> Exam 9 (Thursday, November 2, 2006)		
<b>Exam Center</b>	Centers are listed on page 159.		
<b>Method of Payment</b>	Indicate One: <input type="checkbox"/> Personal Check <input type="checkbox"/> Company Check <input type="checkbox"/> Money Order <input type="checkbox"/> Credit Card		
If paying by credit card, please indicate the card: <input type="checkbox"/> American Express <input type="checkbox"/> MasterCard <input type="checkbox"/> Visa		<b>Payment Information</b>	
Account Number: _____		Exam Fee(s)	
Expiration Date: _____ Cardholder's Name: _____		Translation Fee	
Cardholder's Address: _____		<b>TOTAL</b> Amount Enclosed	
Cardholder's Signature (Required)			
<b>Translation Service</b>	<input type="checkbox"/> To answer exam questions in a language other than English, check here and indicate language:		
<b>Mail check or money order payments to:</b> Casualty Actuarial Society P.O. Box 425 Merrifield, VA 22116-0425 U.S.A.		<b>Mail credit card payments (and all overnight/courier deliveries) to:</b> Casualty Actuarial Society 4350 N. Fairfax Drive, Suite 250 Arlington, Virginia 22203 U.S.A.	
"I have read the rules and regulations concerning the examination(s) for which I am applying and agree to be bound by them. I have read the CAS Code of Professional Conduct and agree to abide by it. I also agree that the results of any examination(s) which I take, and any action taken as a result of my conduct may, at the sole discretion of the Casualty Actuarial Society, be disclosed to any other bona fide actuarial organization that has a legitimate interest in such results and/or actions."			
<b>Signature</b>	_____		<input type="checkbox"/> Check here if you have attached a written request for accommodation to meet a special need.
Your signature is required for this application to be valid.			

# Instructions For Completing Fall 2006 Exam Application

Registration Deadline: **SEPTEMBER 21, 2006**

All applications must be received at the CAS Office by September 21, 2006. No late applications will be accepted.

Please allow **TEN WORKING DAYS** for the application to arrive; otherwise, the use of an overnight courier is strongly recommended. Postmark dates will **NOT** be considered. Applications received after the deadline will **NOT** be accepted. Late applications will be returned to the candidate with a full refund. When using an overnight courier, send application directly to the CAS street address (see directions for credit card payments) as a courier will not deliver to a post office box.

## CANDIDATE NAME and PREFERRED ADDRESS

- Indicate if you have registered previously for an exam with the CAS by checking yes or no.
- If you used a different name on your last application (e.g., a maiden name), print that name in the space provided.
- Print your full name (include middle name), your date of birth, address, daytime telephone number, and e-mail address. All CAS correspondence will be sent to your preferred address.
- Employment date is your **FIRST** full-time job in the property and casualty industry (month and year) where taking and passing actuarial exams is an expected part of the job. Do not count internships.

## PRELIMINARY EDUCATION

- Indicate the preliminary actuarial exams and Validation by Educational Experience (VEE) requirements for which you have credit.

## INFORMATION FOR FULL-TIME STUDENTS

- In order to pay the discounted exam fee for full-time students, the candidate must complete this section.

## EXAMINATION REGISTRATION and EXAMINATION CENTER

- Indicate the exam(s) you wish to write by placing an "X" in front of the desired exam.
- Refer to the list of examination centers on page 159. Print the center name in the space provided. If a test center is cancelled or filled to capacity, candidates will be reassigned to the nearest available center.

## EXAMINATION FEES

- Registration is not valid until the account is paid in full. Fees listed in U.S. dollars. Write fees in appropriate boxes.

Fall 2006 Exam Fees	Candidate	Full-Time Student
Exam 3	\$375	\$300
Exams 6 and 9 (for <i>each</i> exam)	\$525	\$420

## OTHER FEES

- **Translation Service:** All exam questions are in English. For Exams 5-9, if you plan to respond to exam questions in a language other than English, check this box and indicate the language. A fee of \$50 per exam must be submitted along with the exam fee for non-English languages other than French. Responses must be in English unless this service is used.
- **Center Change Request:** A non-refundable \$60 administrative fee is required from candidates who request a change in center from their initial application. Requests for a center change will not be considered after the registration deadline.
- **Refund Request:** A \$60 administrative fee will be assessed to all refunds. Candidates must submit a written refund request to the CAS Office within three weeks (21 days) of the exam date.

## PAYMENT INFORMATION

- Exam fees may be paid by check, money order, or credit card (American Express, MasterCard, or Visa). Checks should be payable to "Casualty Actuarial Society." Send applications to the appropriate address listed on the front of this application. Fees must be in U.S. funds (or Canadian equivalent). Credit card payments will be processed in U.S. funds. The amount billed to an individual's credit card will be automatically adjusted when the amount due is miscalculated. Fees are not transferable from one session to another. A \$20 fee will be assessed on any checks returned due to insufficient funds.
- If paying by credit card, the completed application form may be faxed to the CAS Office at 703.276.3108.

**SIGNATURE:** In order for this application to be valid, your signature must appear on the front of this application (lower left corner).

**CONFIRMATION/RECEIPT:** A confirmation will be sent that contains your Candidate Number for this session. It serves as your receipt. Use the bottom half to request refunds or to make changes to your name, address, or examination center location.

**CHANGE OF ADDRESS:** Report any change of address to the CAS Office promptly (fax: 703.276.3108; e-mail: office@casact.org).

**SPECIAL NEEDS:** Candidates with special needs must submit a written request with their application that details the requested accommodation. Documentation of the disability and the need for special arrangements are required. Documentation is requested as early as possible but must be submitted prior to the registration deadline.

**Retain your Candidate Number. Candidate Numbers will not be given over the telephone.**

For Approval of Course or Educational Experience

# Application for Approval of Course/Experience for Validation by Educational Experience Credit



Canadian Institute of Actuaries



Casualty Actuarial Society



Society of Actuaries

Details for completing this application for approval of Course/Experience for VEE credit are included on the reverse side. Please **PRINT** all information.

For Office Use Only (Approval Code)

**Educational Institution**

Name of Educational Organization

Street or P.O. Box

City State/Province Zip/Postal Code Country

Organization Telephone Organization Fax Organization Web Site

Contact Person at Institution Institution Contact Telephone Institution Contact E-Mail

Candidate Name (if candidate is submitting application) Candidate Telephone Candidate E-Mail

**VEE Credit**

The course(s)/experience(s) is being submitted for the following: *(Please submit a separate form for each VEE subject.)*

VEE-Economics  VEE-Corporate Finance  VEE-Applied Statistical Methods

**Course/Experience Information**

Name(s) of Course(s) or Experience(s)

Course Number(s), if applicable

Since when (semester and year) has the course been offered under this name and with essentially the same syllabus?

Are there plans to change the course in the next three years? If yes, when (semester and year)?

Option 1:

Option 2:

Option 3:

Type of educational experience:  College/University Course  Standardized Exam (specify) \_\_\_\_\_  
 Other Experience (specify) \_\_\_\_\_

Grading Structure:

A, B, C, etc.  4.0 scale  
 Other: (specify) \_\_\_\_\_

A grade of at least **B-** is required for candidates to receive VEE credit. If your institution does not issue letter grades (A, B, C, etc.), please indicate the equivalent of a grade of **B-** on your course/experience:

**Documentation**

**The following required documentation must be included with this application:**

1. Course/Experience Description (Official Catalog Description) for Course(s)/Experience(s) and Prerequisites
2. Course(s)/Experience(s) Syllabus or Outline specifying detailed topic coverage

If you wish to include other information, please specify: \_\_\_\_\_

**Submit this application with the required documentation to:**

VEE Administration Committee  
 Society of Actuaries  
 475 N. Martingale Road, Suite 600  
 Schaumburg, IL 60173  
 Telephone: 847.706.3500

## Instructions for Completing Application for Approval of Course/Experience for Validation by Educational Experience Credit

Please PRINT all information.

Please submit a separate application for each Validation by Educational Experience (VEE) subject.

### NAME AND CONTACT INFORMATION

- Indicate the name and contact information of the educational institution. The telephone and fax numbers should be for the appropriate department that is responsible for the courses that are being submitted.
- Indicate the name, telephone number, and e-mail address of the contact person (faculty member or administrator).
- If the application is being submitted by a candidate, indicate the name, telephone number, and e-mail address of the candidate.

### VEE CREDIT

- Indicate the subject for which you are submitting course(s)/educational experience(s) for VEE credit. Please submit a separate application for each VEE subject.

### COURSE/EXPERIENCE INFORMATION

- If a combination of courses/experiences is being submitted to fulfill the requirements of a single VEE subject, list all of the required courses/experiences in the combination together under one option. If applicable, use the second and third option fields to list other courses or combinations of courses/experiences.
- For each course/experience, indicate the name and course number (if applicable).
- Indicate the type of education experience that you are submitting. If it is not a college course or standardized examination, please provide documentation about the type of educational experience, how it is administered, and how candidates are evaluated.
- Indicate the grading structure. A grade of at least a B- is required for candidates to receive VEE credit. If your institution does not issue letter grades (A, B, C, etc.), please indicate the grading structure as well as its equivalence of a grade of B- in your structure.

### DOCUMENTATION

- Attach both the official course/experience description(s) that appears in your institution's catalog as well as a copy of the syllabus or outline for the course(s)/experience(s). The syllabus/outline must include detailed topic coverage information.
- A catalog description of all prerequisites also must be attached.

### EVALUATION CRITERIA

- The course(s)/experience(s) must substantially meet the objectives listed in the VEE guidelines for the specific VEE topic. The VEE guidelines for Economics, Corporate Finance, and Applied Statistical Methods are available at <http://www.soa.org/ccm/content/exams-education-jobs/education-redesign/process-for-validation-by-educational-experience/> Additional information may be requested during the review process.

### SUBMITTING THE APPLICATION

- Please submit your application, with the required documentation, to the VEE Committee at the address at the bottom of the application form.

### RESPONSE

- The educational institution's contact will receive a written response to each application within approximately eight weeks. Approved courses/educational experiences will be added to the Directory of Approved Courses/Experiences or the Standardized Exams and Other Educational Experiences list available at <http://eande.soa.org/vee/approved-courses-experiences-for-vee.html>

### GUIDELINES

- The guidelines for approval of educational experiences for VEE credit are available at <http://www.soa.org/ccm/content/exams-education-jobs/education-redesign/process-for-validation-by-educational-experience/>

Updated: 21.IV.2005

# Application for Validation by Educational Experience Credit



Canadian Institute of Actuaries



Casualty Actuarial Society



Society of Actuaries

Details for completing this application are on the reverse side. Please **PRINT** all information.

For Office Use Only:

<b>Name</b>	Prefix (check one): <input type="checkbox"/> Mr. <input type="checkbox"/> Ms. <input type="checkbox"/> Mrs. <input type="checkbox"/> _____	<b>Date of Birth</b>	Month-Day-Year
Last Name/Family Name		First Name	Middle Name
Suffix		I work in the property/casualty field: <input type="checkbox"/> Yes <input type="checkbox"/> No	

**Contact Information** If a **different name** was used on a previous application, print it here: \_\_\_\_\_

Organization Name (only if a company address) \_\_\_\_\_

Street or P.O. Box \_\_\_\_\_

City	State/Province	Zip/Postal Code	Country
------	----------------	-----------------	---------

Business Telephone	Home Telephone	E-Mail
--------------------	----------------	--------

**Actuarial Exams** I have credit for:  Exam P/1  Exam FM/2  Exam M/3  Exam C/4  Exam \_\_\_\_ (list exam)  Exam \_\_\_\_  
**NOTE:** Only the applications of those with credit for at least two actuarial examinations will be processed.

**VEE Credit** I am applying for credit for: (Please submit a separate form for each VEE subject.)  
 **VEE-Economics**  **VEE-Corporate Finance**  **VEE-Applied Statistical Methods**

**Educational Experience** Type:  College/University Course  Standardized Exam (specify) \_\_\_\_\_  
 Other Experience (specify) \_\_\_\_\_

Name of educational institution	Address
---------------------------------	---------

City	State/Province	Zip/Postal Code	Country
------	----------------	-----------------	---------

Course(s)/Experience(s) (include course number)	Date(s) of completion	Grade(s) received	Approval Code(s)

**Documentation** I have arranged to have the following type of authenticated verification sent to the VEE Administration Committee:  
 Certified Transcript (with specific passing grade)  Other (specify) \_\_\_\_\_

**Signature (Required)** "I verify that the information that I am submitting for VEE credit is accurate."  
**Signature:** \_\_\_\_\_

**Payment Information** **Method of Payment** (Indicate One):  Personal Check  Company Check  Money Order  Credit Card

**Amount Enclosed:** \_\_\_\_\_  
 The processing fee must be included with the application(s). Make checks payable to "Preliminary Actuarial Examinations."  
**If paying by credit card, please indicate the card:**  American Express  MasterCard  Visa (65-405001-04901-101)  
 Account Number: \_\_\_\_\_  
 Expiration Date: \_\_\_\_\_ Cardholder's Name \_\_\_\_\_  
**Cardholder's Signature (Required):** \_\_\_\_\_

**Mail check or money order with VEE application to:**  
 VEE Administration Committee  
 Preliminary Actuarial Examinations  
 P.O. Box 95600  
 Chicago, IL 60694-5600

**Mail VEE application with credit card payments to:**  
 VEE Administration Committee  
 SOA/Preliminary Actuarial Examinations  
 475 N. Martingale Road, Suite 600  
 Schaumburg, IL 60173

**TRANSCRIPTS: If enclosing transcript(s), please use Schaumburg mailing address.**

## Instructions for Completing Application for Validation by Educational Experience Credit

Please PRINT all information.

1. Please submit a **separate** application form for each Validation by Educational Experience (VEE) subject. Multiple application forms for the same person may be submitted together.
2. Only candidates who have passed at least two actuarial examinations may apply for VEE credits.
3. All courses/experiences submitted for individual VEE credit must first be approved and appear on the Directory of Approved Courses/Experiences or the Standardized Exams and Other Educational Experiences list available at <http://eande.soa.org/vee/approved-courses-experiences-for-vee.html>

### NAME AND CONTACT INFORMATION

- Indicate your full legal name, complete mailing address, telephone number(s), and e-mail address.
- Indicate your date of birth (using month-day-year format).
- If you used a different name on your last application (e.g., a maiden name), print that name in the space provided.
- Indicate whether or not you work in the property/casualty industry.

### ACTUARIAL EXAMS

- Only those who have passed at least two actuarial examinations may submit an application for VEE credit. Please indicate at least two actuarial exams sponsored by the Canadian Institute of Actuaries, Casualty Actuarial Society, and/or the Society of Actuaries that you have passed.

### VEE CREDIT

- Indicate the subject for which you are applying for VEE credit. Please submit a separate application for each VEE subject. Multiple applications for the same person may be submitted together if complete.

### EDUCATIONAL EXPERIENCE

- Indicate the name and address of the educational institution that sponsored your educational experience.
- Indicate whether the educational experience you are submitting is a college/university course, an examination of the CAS or SOA, a standardized exam (please specify the name of the exam and the topic), or describe the other approved educational experience.
- Write the name and course number, if applicable, the date that you successfully completed the course experience, and the grade. A grade of at least a B- (or its equivalent) is required for VEE credit. **Please note:** Candidates may not submit VEE credit applications for partial credit (e.g. an approved regression course may not be submitted alone, but must be accompanied on the same application by an approved time series course). Candidates may not submit for VEE credit for a topic until they have completed all requirements for that topic.
- Provide the Course/Experience Approval Code(s) for the course(s) that you are submitting. **Your application will not be processed without the Approval Code(s).** Approval codes can be found on the Directory of Approved Courses/Experiences or the Standardized Exams and Other Educational Experiences list. These are available at <http://eande.soa.org/vee/approved-courses-experiences-for-vee.html> (Candidates may combine two approved courses/experiences to complete a VEE topic requirement. In these cases candidates should include approval codes from both approved courses.)

### DOCUMENTATION

- The candidate must arrange to have the educational institution send authenticated verification (e.g., an official transcript) that the candidate has successfully completed the course/educational experience with a grade of at least B- (or the accepted equivalent). The documentation must include the candidates full name and be sent to: VEE Administration Committee, Society of Actuaries, 475 N. Martingale Road, Suite 600, Schaumburg, IL 60173. (If the institution will not send a transcript directly to the SOA, the candidate should include a sealed transcript with their application form and submit it to the Schaumburg address.)

### SIGNATURE

- Your original written signature verifying the accuracy of the information that you are submitting is required for this application to be valid.

### PAYMENT

- Payment of the processing fee must accompany the application for VEE credit(s) according to the following fee schedule:

**\$50** (U.S.) for one VEE topic submission

**\$75** (U.S.) for two VEE applications submitted together for one person (e.g., VEE-Economics and VEE-Corporate Finance)

**\$100** (U.S.) for three VEE applications submitted together for one person

Made checks payable to "Preliminary Actuarial Examinations." If paying by credit card, please provide the appropriate information on the application form. The processing fee is non-refundable.

### SUBMITTING THE APPLICATION

- If you are paying by check or money order, please mail the application to the VEE Administration Committee at Preliminary Actuarial Examinations, P.O. Box 95600, Chicago, IL 60694-5600. If you are paying by credit card, please send the materials to the VEE Administration Committee at: SOA/Preliminary Actuarial Examinations, 475 N. Martingale Road, Suite 600, Schaumburg, IL 60173. **(If enclosing transcript(s), please use the Schaumburg mailing address.)**

### RESPONSE

- Candidates will receive a written response to each application. The processing time is approximately six weeks.

Updated: 21.IV.2005