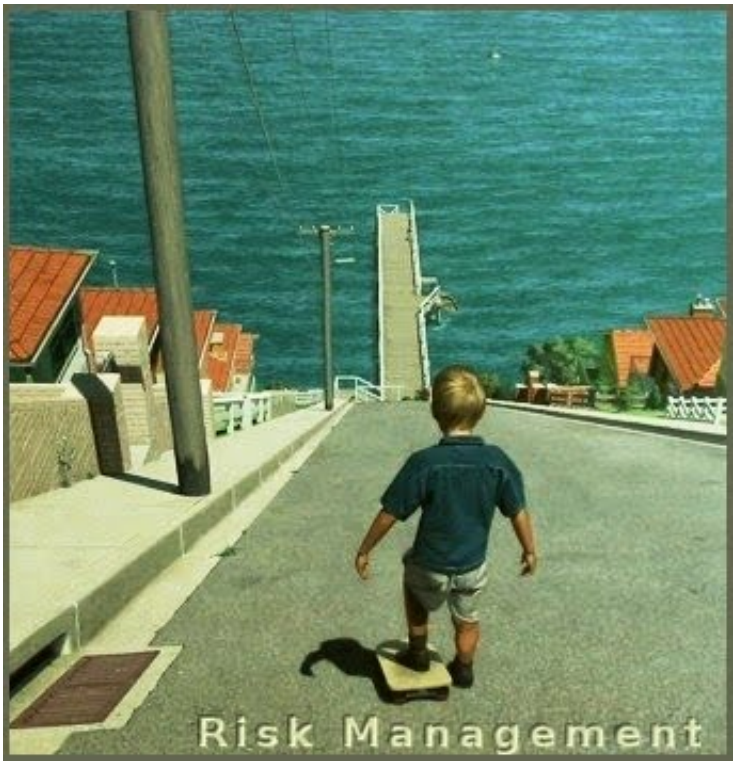
Actuarial Studies Certificate Program Guide

March 3, 2010



by Trevor Aeschliman and Daniel Heffron

Contents

1 Introduction

So you just heard the word "actuary" and you're not sure how to take it. Don't worry; you are just like everyone else, except that the profession has become a lot more relevant to your future.

Actuaries do several things, but what you really need to know at this point is that they work in risk management. Actuaries use probability, interest theory, and various other high-level mathematical and financial topics to forecast risk and plan high cash-flow events accordingly. In general, one will hear of actuaries in the insurance or retirement industries, constructing and working with insurance or pension plans. They also work in property and casualty, enterprise risk management, and financial consulting among other areas. Really, any time a thorough understanding of the expected financial effects of current statistics is needed, an actuary is the person for the job.

Now, you need to ask yourself what you are doing here. Have you always found yourself near the top of your math classes? Do you have an interest in economics, probability, or finance? Would you consider yourself a good communicator with a genuine interest in other people? If any of these fit you, you are off to a good start. If all of them, you're probably in the right place. The actuarial profession runs on strong problem solving skills, a wide and deep understanding of business concepts, and the ability to explain and communicate difficult ideas to others.

The most characteristic aspect of the actuarial profession is the exam process. In order to become certified as an actuary you must complete several extraordinarily challenging and time-consuming exams, covering many layers of difficult mathematical, economic, and financial theory. The good side: You are rewarded very well (both financially and personally) for the work that you will be putting in. The bad side: The exams are HARD. More detail on the exams will be given in Sections 3 and 4.

This short guide is intended to aid you in your decision to become an actuary, and if that indeed is the path you choose to follow, to help you get there with as little confusion as possible. Inevitably, you will run across some frustration here and there that isn't covered by this guide. The profession requires both brains and perseverance; understanding *and* work ethic. However, if you can carefully consider the information in this manual, as well as put in the work to sit for at least one exam, you will hopefully have a solid grasp on whether being an actuary is right for you.

If indeed you do decide that the actuarial profession is right for you, you have a lot of work ahead of you, but also a lot of opportunity. If you can graduate with 2-3 exams, a good GPA (above 3.4/4.0), and 1-2 internships, you will have a *very* good chance of getting a job as an actuary. If you can also interview well, you're set. Thus, this guide will largely focus on getting through the first few exams, getting internships, and getting a job.

2 Starting Off

Instead of attending three years of law school, or six to eight years of medical school, actuaries take exams while working. In the United States, these exams are administered through the Society of Actuaries (SOA) and the Casualty Actuarial Society (CAS) and are required in order to officially be considered an actuary. Here are a few reasons why taking these exams is such a good deal (these are true for most companies):

- Salary increases for each exam passed, and for reaching A.S.A. and F.S.A. designations
- Bonuses for passing exams on the first and sometimes second try
- Paid study hours
- Reimbursement for study materials

All of this can be incredibly appealing, because the $100,000+ that would otherwise have been spent on tuition for graduate work, medical school, etc. becomes $100,000+ of salary and bonuses. So, in effect, you are a couple hundred thousand dollars ahead of someone who just graduated from law or medical school. The downside to this is that you will be working 40-60 hour weeks while attempting to study an average of 3 hours per night for exams (during study season).

There are several actuarial exams that you can potentially take, with later exams focusing on a specific area within the actuarial profession. Every actuary, however, needs to take the preliminary exams. These exams are as follows:

- Exam P/1: Probability
- Exam FM/2: Financial Mathematics and Interest Theory
- Exam MFE/3F: Actuarial Models – Financial Economics
- Exam MLC/3L: Actuarial Models – Life Contingencies
- Exam C/4: Construction and Evaluation of Actuarial Models

The letters in the exam names are their designated names through the Society of Actuaries, while the numbers on the right side of each slash represent their names in the Casualty Actuary Society, which is the organization you need to become certified in if you want to work in Property and Casualty. Most of the preliminary exams are interchangeable, so taking them all through the SOA will qualify you within the CAS as well. This manual will mostly cover certification through the SOA.

The first designation that you should understand is the Associate of the Society of Actuaries (A.S.A.) designation. This designation is achieved upon completion of the five exams listed above, Fundamentals of Actuarial Practice e-learning courses (FAP), an Associateship Professionalism Course (APC), and the following Validation by Educational Experience (VEE) courses:

- VEE in Applied Statistics
- VEE in Economics
- VEE in Corporate Finance

These VEE courses will be explained more thoroughly in Section 5.

You will also need to at least be familiar with the Fellow of the Society of Actuaries (F.S.A.) designation. After reaching A.S.A., there are two 6-hour written exams to be taken in one of five areas: Finance or Enterprise Risk Management, Investment, Individual Life and Annuities, Retirement Benefits, and Group and Health. There are also a few modules, and a Fellowship Admissions Course (FAC).

If you happen to go the retirement route, you will eventually come across the term "Enrolled Actuary." You need to achieve the E.A. designation to sign off on certain pension work in the U.S. This designation is achieved by passing exams EA-1, EA-2A, and EA-2B.

Finally, a new designation that was created in 2007 (the first new actuarial designation since 1949) called the Chartered Enterprise Risk Analyst (C.E.R.A.) is achieved by passing Exams P, FM, MFE, C, an Operational Risk Module, the Economics VEE, and the Advanced Finance/ERM exam that is taken on the Investment track to F.S.A. Most notable about this is that MLC is NOT required, though you will simultaneously earn both the A.S.A. and C.E.R.A. credentials. Thus, if you would like to be more involved in business and corporate risk management than actuarial work, this is a possibility. However, if you want to become an actuary, you will almost certainly end up taking Exam MLC and the remaining F.S.A. exam/s.

3 The Preliminary Exams

Now, on to the important stuff: the exams themselves. Attempting to describe the exams to someone who has not taken them is difficult. Almost everyone taking the exams has excelled in college, often even in the most difficult undergraduate math courses. Consequently, the difficulty of the actuarial exams is very frequently underestimated by first-time exam-takers. **The best thing that you can do before taking an exam is to over-prepare.**

One common rule to go by when preparing for these exams is to spend 100 hours of studying for each hour of the exam you will be taking. For example, Exam P is a 3-hour exam with 30 multiple choice questions (at the date of this writing), so you should put in 300 hours of studying to have a good shot at passing. More on how to study will be mentioned in Section 4.

Currently, exams P, FM, and C are offered through computer-based testing, while MFE and MLC are pencil and paper. With computer-based tests, you will know whether you passed immediately afterward (though the official results won't be known until later), while with paper and pencil you must wait for the full 8-10 weeks that it takes to complete the thorough grading process.

The exams are scored on a scale of 0-10. A score of 6 is the minimum passing score, or the pass mark, and is set by the SOA. The SOA usually determines a specified number of correct answers as the pass mark, and this pass mark can vary by exam and even by each administering of the exam. For Exam P the pass mark is usually about 19/30, for Exam FM it's about 25/35, and for Exam MFE it's about 15/25. A score of 6 means you met the pass mark and answered the exact number of questions (100% of what you needed to get correct) required for a passing score. A 7 is 110% of the passing score, and a 3 is 70% of the passing score. Generally, each exam has about a 40% passing rate, or roughly 40% of those who sit for an exam end up passing (Exam P is usually lower because it is so frequently underestimated).

Very few universities have actuarial science majors available, so unless you are attending one of these, you need to figure out how to get started in the profession mostly on your own. The University of Colorado has an actuarial certificate available, which is a great start. Graduating with the certificate will ensure that you finish college with your VEE requirements met, which can be a huge hassle to get out of the way once you've graduated and started working. Even so, the exams are almost 100% an individual pursuit. Following is a quick overview of the preliminary exams and a strategy to use within CU's curriculum.

3.1 Exam P

The first exam (though you are allowed to take them in any order you choose) covers probability. It is a 3-hour, 30-question multiple choice exam. The learning objectives for each exam can be found at *www.soa.org*, after clicking the Education tab, and by clicking on the exam you want to know about within the A.S.A. or F.S.A. requirements sections. For Exam P, an overview of the main learning objectives is below:

- General Probability (set functions, combinatorial probability, conditional probability, Bayes' Theorem, etc.)
- Univariate Probability Distributions (binomial, geometric, Poisson, exponential, etc.)
- Multivariate Probability Distributions (joint probability functions, moments, the Central Limit Theorem, etc.)

Before you take Exam P (or while you prepare for it), we highly recommend you take Applied Probability through the Applied Math department, APPM 3570, or the equivalent Mathematics department course, MATH 4510. The course will give you a very good introduction to the type of thinking you will need for the actuarial profession. We would also estimate that it will count for about 125 hours of studying toward the exam; some of the only studying for which you will be provided an instructor for the material and homework for practice.

It is important to understand that the course will not fully prepare you for the first actuarial exam. It will get you familiar with many of the concepts, but will only cover about 60% of the material for Exam P and not as deeply as you will need to know it. You will learn to attack problems one way in APPM 3570, yet teach yourself a different attack style while studying for Exam P. This attack style should include proficient use of an approved calculator, and a list of these can be found on the SOA's website.

We also suggest that you begin studying for Exam P while taking the course. If you can put in 10-20 hours per week reading through a manual and doing all of the problems in the manual for the second half of the semester, you can be prepared by the time the exam rolls around. You will need a manual.

3.2 Exam FM

The second exam is a 3-hour, 35-question exam and covers Financial Mathematics–specifically interest theory, annuities, loans, bonds, immunization, and an introductory look at financial derivatives.

For this exam, you will need a business calculator, and the TI BA-II Plus/Professional calculator works very well. Becoming proficient with a good calculator is a must on any actuarial exam, but it's also a side effect of studying, so don't worry about not knowing how to use one when you start; you will figure it out quickly while working through your manual.

Exam FM deals a lot with the concepts of present and future value. You will learn how to do this in your Introduction to Finance and your Corporate Finance classes (currently BCOR 2200 and FNCE 3010, respectively). However, these courses will do little to aid you, and you can start studying for Exam FM whenever you like. Exams FM and P are fairly equivalent in difficulty, so you can actually take whichever one you like first. The analytical thinking required for understanding probability is essential to having success as an actuary, and knowing interest theory and how to discount cash flows is something that will pop up on a daily basis on the job. Both contribute to a good basis for a future as an actuary.

3.3 Exams MFE, MLC, and C

Surprisingly enough, the exams get more difficult as you progress. Once you have learned how to study well and feel confident with your mathematical prowess, you are again thrust into an intense challenge. Once you have gotten through the Exams P and FM, you can decide for yourself what you would like to do next.

Exam MFE covers the pricing of financial derivatives, and this will involve extensive use of the interest theory that you learn in FM. The financial derivatives course in the business school (currently FNCE 4040) covers what derivatives are, how to use them, and it somewhat covers pricing them. However, this exam is mostly on the pricing of derivatives, and the course only covers a small fraction of what you will need to know. We each took Exam MFE before taking the course, and believe that it will make an

extremely difficult course significantly easier. However, the course on derivative securities will give you a solid foundation for continued learning on some very confusing concepts. If you can't take Exam MFE until after you graduate, the derivatives course will give you a great start.

Exam MLC involves discounting cash flows while including the probabilities of the cash flows occurring. Exam MLC is often considered to be more difficult than MFE, and it is also a 3-hour exam while MFE is a 2.5-hour exam. A decent portion of the exam covers Markov Chains, which you will learn about in APPM 4560, Markov Processes and Queues. Neither of us has taken the exam, though, so we can't tell you how helpful the course is. It certainly will provide some benefit, but likely will only serve as an introduction for material that will be covered in much more depth.

Exam C is 3.5 hours and covers a wide range of material, including several methods for fitting models to statistics; this exam is almost always described as the most difficult of the preliminary exams. Most people say that it is the immense amount of material that makes this exam so difficult, rather than an equivalent level of intensive analytical problem-solving as is required for Exam MLC.

To conclude this section we offer you a rather dramatic yet surprisingly accurate way of describing the exams to someone else (from a post on *www.actuarialoutpost.com*):

"Tell them you're taking a graduate-level course and: 1. There is no teacher. 2. You never have class. 3. Your classmates are some of the top analytical minds in the world. 4. There is only one exam. 5. 60% of the class will fail. 6. The class is only offered [twice] a year. 7. Repeat that very same process 10 times. 8. Oh, and you're competing against the top 40% from the previous class."

4 Studying for the Exams

4.1 Manuals

Different actuarial students (anyone who has started taking exams) use many different methods in their attempts to learn the material and pass the exams. There are many different companies that create manuals (BPP, ASM, Actex, and Actuarial Brew to name a few) and tons of different books, flashcards, study guides, etc. So where does one start?

As has been stated before, it's really up to you to find what works best for yourself. That said, the majority opinion does seem to support a few specific choices. ASM is often the preferred company from which to purchase a study manual, followed by Actuarial Brew, BPP, and then Actex.

A study manual can be a huge help, but is not 100% necessary. The authors of this college guide highly recommend that you start with a study manual, as each manual will give you a comprehensive walkthrough of the material that will be on the exam and nothing more. If you spend your time solely studying books, some material will be covered either more or less thoroughly than you need, and you also might end up studying material that you don't need at all.

For many people, supplementing the manual with textbooks or other manuals can be very helpful. Though the manual that you purchase will cover almost all of the required material (not all because the SOA will inevitably ask you a couple of absurd questions), it is useful to see the material presented in another way. Different writers and mathematicians learn and teach differently. Your goal should be to find which authors present the material in a way that you can best learn from.

We recommend starting with the ASM manual for the exam that you are planning to take, and supplementing it with a book or a different manual if you feel that you should be grasping the material better. This is another place where it comes in handy to know other people who are studying for exams; you can ask questions about the material and possibly share study materials (and expenses). Another resource, *Actuarial Outpost*, is a good place to read about preferred manuals for certain exams.

4.2 Study Advice

As we said before, the goal is to be over-prepared when you take the exam. There is a lot resting on the outcome. So, overdetermine success. When it comes to choosing a start date, you may hear to be wary of starting too early. This is for the most part untrue; its a matter of keeping the material fresh in your mind, and you can do this with consistent review. If you apply even a few of the following suggestions to your study schedule, your chances of passing will increase significantly:

1. Start 16-20 weeks before the exam. This will allow you to study a more comfortable 20 hours per week.
2. Try to understand every detail your first time through. This will make things much easier to remember, and you will be able to see connections in the material that you might otherwise miss without a good foundation.
3. Think about the material when you're not staring at a book. If you keep some of the ideas in your mind as you go about your daily activities, you will be surprised at how much better you remember them. For example, if you are studying for Exam P, try to think of each distribution, its name, and how it works when you get bored somewhere or while you're walking around.
4. Keep track of problems that you had difficulty with (and write down why you found them difficult and what you learned) so that you can redo them once you finish the manual.
5. As you go through the material, keep a running sheet of equations and things you will need to know. They add up, and this will help you keep track.
6. After every two weeks of studying, set aside 3-4 hours to go back and do a few difficult problems from each previous section. The repetition will drill the information into your brain.
7. Try to finish the manual with 4-6 weeks left. Spend a couple weeks reviewing each section and doing problems.
8. For the last month, take many practice exams. Practice, practice, practice doing problems. This is where you truly prepare yourself.
9. Try to be prepared to take the exam with a week or so left. It's best to not make that last week a scramble.
10. Get adequate sleep and eat well the few days before the exam. Take at least the afternoon off before the exam; clear your mind and relax, knowing that you are ready to pass.

Make sure to read over the syllabus for each exam so you know which topics to focus on. The syllabi as well as example questions can be found on the SOA website. Also, check out some of the forums on *Actuarial Outpost* under the section for the exam you are studying for. Students will often discuss which topics under the syllabus are covered most on exams, as well as offer suggestions and answer questions for the material.

5 Actuarial Certificate Program and VEEs

This section will attempt to cover the courses that should be taken at CU in order to meet the VEE requirements and to prepare for the exams.

Getting the VEE credits finished before graduating is beneficial for several reasons. First, the courses that satisfy the VEE requirements simultaneously satisfy some of the requirements for the Actuarial Studies Certificate given by CU. Second, since you already have to take the majority of these courses and are paying to get a degree, why not get these courses out of the way and avoid spending extra time and money later? On top of that, it will put you even closer to having your A.S.A., and employers will appreciate (reward you for) that.

Below is a list of the courses through CU that satisfy the VEE requirements if a grade of B- or higher is obtained (from the SOA website, 12-28-09; the following list was found on the Applied Math website, under Recommended Options, and Actuarial Option).

Directory of Approved Courses for VEE (August 13, 2009)
University of Colorado at Boulder

Course 1 Code	Course 1 Name		Course 2 Code	Course 2 Name	Approval Code
Applied Statistical Methods					
MATH 4520, or MATH 5520, or APPM 4520, or APPM 5520	Introduction to Mathematical Statistics	AND	MATH 4540, or MATH 5540, or APPM 4540, or APPM 5540	Introduction to Time Series	3-0613-0696-2-2010
		-OR-			
ECON 6818	Econometric Methods and Applications	AND	An approved time series course Note: approved for regression component only		3-0613-0691-2-2010
		-OR-			
ECON 4818	Econometrics	AND	ECON 3818	Intro to Statistics with Computer Applications	3-0613-2880-2-2010
		-OR-			
ECON 7828	Econometrics	AND	An approved time series course Note: approved for regression component only		3-0613-4083-2-2013
Corporate Finance					
BCOR 2200	Introductory Finance	AND	FNCE 3010	Corporate Finance	2-0613-0694-2-2010
Economics					
ECON 3070	Intermediate Microeconomic Theory	AND	ECON 3080	Intermediate Macroeconomic Theory	1-0613-0698-2-2010

Once you have completed the two courses for each VEE credit with a grade of B- or better, you are done with the necessary coursework for the A.S.A designation and can focus on the exams and then the FAP modules and the APC. It is important to note, however, that you can not apply for your VEE credit until you have passed two SOA examinations. You should talk to your advisor during your senior year about what you will need to do to verify with the SOA that you have completed the VEE requirements.

In order to receive the Actuarial Studies Certificate at the University of Colorado, you will need to take certain courses. The necessary and suggested courses are listed on the next page.

A. The courses listed below are the minimum required in order to complete the Actuarial Studies track of the CU program. Please note that you must score a "B+" or better in Calculus 1, 2, and 3. You must score a "C-" or better in all other courses (you also need a "B-" or better in all VEE courses to get credit through the SOA).

Required Mathematics Courses

1. MATH 1300/APPM 1350 Calculus 1 5/4 cr.
2. MATH 2300/APPM 1360 Calculus 2 5/4 cr.
3. MATH 2400/APPM 2350 Calculus 3 4 cr.
4. MATH 3130/APPM 3310 Linear Algebra 3 cr.
5. MATH 4510/APPM 3570 Probability 3 cr.
6. MATH 4520/APPM 4520+ Statistics 3 cr.
7. MATH 4540/APPM 4540+ Intro to Time Series 3 cr.

Required Economics Courses

1. ECON 1000 Intro to Micro/Macro 4 cr.
2. ECON 3070 Intermediate Micro 3 cr.
3. ECON 3080+ Intermediate Macro 3 cr.
4. ECON 4070+ Topics in Microeconomics 3 cr.

Required Finance/Accounting Courses

1. BCOR 2000*+ Intro to Accounting 4 cr.
2. BCOR 2200 Intro to Finance 3 cr.
3. FNCE 3010+ Corporate Finance 3 cr.

* BCOR 1020, Business Statistics, is a prerequisite for BCOR 2200. Students are advised to substitute a Math or Applied Math prob/stats course for this prerequisite.

+ The Society of Actuaries requires students to take certain college courses which will earn the Validation by Educational Experiences (VEE). Credit Courses marked with a + satisfy this requirement, provided a grade of B- or better is obtained.

B. **Recommended courses:**

1. APPM 4560 Markov Processes 3 cr.
2. MATH 4120/APPM 4120 Operations Research 3 cr.
3. MATH4650/APPM 4650 Numerical Analysis 3 cr.
4. FNCE 3020 Financial Markets & Institutions 3 cr.
5. FNCE 4030 Investment Management 3 cr.
6. ECON 3818 Computational Methods in Statistics 3 cr.
7. ECON 4818 Econometrics 3 cr.
8. APPM 4580 Applied Statistics 3 cr.
9. FNCE 4040 Derivative Securities 3 cr.

Students wishing to take courses in the College of Business cannot register until the first day of classes. Students may also take BCOR/FNCE courses in summer sessions. Alternatively, students may apply for admittance to the Actuarial Studies and Quantitative Finance Certificate Program which requires grades of B+ or better in their three semesters of Calculus. Students accepted into this program receive preferential treatment with respect to other non-business students when registering for business courses.

The last paragraph is important to note. If you choose to endeavor on this path to becoming an actuary through CU, it is very wise to earn the Actuarial Studies Certificate. In order to enter the program, you must have a B+ or better in all three semesters of Calculus (alternatively, you are granted admittance if you pass one of the exams). Once you enter the program, you are allowed to register for classes in the business school at the same time or even before business students. You can find the requirements for the Actuarial Certificate at: *www.colorado.edu/asqf/index.html*.

6 Resumes and Cover Letters

When applying online to companies, the first thing that HR or the email recipient will see will be your cover letter and your resume. A good resume is extremely important, and a cover letter, though not necessary, may be very helpful. When emailing a representative for a company, attach your resume and cover letter, but also write a pleasant and brief introduction about yourself saying you look forward to speaking with someone from the company (try to use a different phrasing than you do in your cover letter). ALSO, copy and paste your resume at the bottom of the email, as this will allow the recipient to very quickly see your qualifications.

6.1 Resumes

When it comes to getting an internship or a job, the first thing that you absolutely need to do well is to construct a good resume.

The resume is basically your 30-second explanation to a company of why they should consider you for employment. This is where it all starts. Companies often dig through stacks of resumes, sometimes hundreds of them. The goal is to stand out as a good candidate.

1. First, keep the presentation simple and not too wordy, and try to keep it to one page early on. If you end up eventually needing two pages, it's fine as long as what you are presenting is relevant. Don't use flashy pictures or font, because your resume will come off as cheesy: a company is looking to hire a professional, so their first look at you should assure them that they have found one.

2. Start off with your name, address, and phone number (this might be obvious), but after that you want to organize the information in order of importance. Often, the first thing a company will consider is the reputation of your college, your major, and your GPA. Thus, put this information first, perhaps bolding information such as a strong GPA, major, or minor. Early in your college career, you can also put a little bit about your high school GPA and achievements after your college information.

3. Next, it is highly suggested that you display your progress with the exams. Even if you sat for the first one and failed, employers want to know how dedicated to becoming an actuary you are, so tell them what you've done. Scores, however, are unimportant for passes, so unless you happened to get a couple 10's, you shouldn't worry about mentioning them. It would also be useful to mention that you will have completed your VEEs when you graduate, if that happens to be the case.

4. After your exams, put any significant coursework and skills that you have developed that might be relevant to the profession you seek. Experience with any type of computing program such as Matlab or Mathematica is useful, because it signifies that you are capable of constructing things such as loops and other basic algorithms. In the actuarial profession, you will be working extensively with Microsoft Excel, a little bit with Microsoft Access, and also quite a bit with whatever proprietary software the company uses. Always be prepared to explain your proficiency with Excel and/or Access.

5. After expressing your skills, display any relevant work experience, or any jobs that helped you to develop any important skills such as leadership or communication. If you've only worked a few jobs, you could probably write them all down; if many, pick out the important ones. If you happened to have an internship in the actuarial field, it may be wise to place information about this internship directly below your exam information.

6. Finally, display any honors you have received, and then any extracurricular activities such as intramural sports, clubs, newspaper writing, mentoring or tutoring, etc. As we said earlier, always be able to explain how each experience made you into a better candidate for the position.

This list is not very strict. Depending on what you've done, you may want to arrange some parts differently, or add in some sections such as "Leadership," "Volunteer," or "Affiliations." Just remember that you want the details that will most-please potential employers to be mentioned earlier, and to stand out. If your description of an internship is too wordy, they may not spend as much time reading it as you would like them to.

Once you've finished documenting your experiences, skills, and achievements, have an advisor, some friends, Career Services, and others look through it and do any editing that they feel it may need. Errors on a resume quickly make you appear sloppy and careless.

One good way to buy some time during the viewing of your resume is to construct a good cover letter. If you put together an excellent cover letter, the resume-sorter might give yours a more thorough look-through.

6.2 Cover Letters

A cover letter needs to be a concise and engaging explanation of why the organization wants to hire you for the particular position that you are applying for. In other words, you want to make sure that it's of a comfortable length so that the reader can finish it quickly, as well as that it is interesting to read. Three to four paragraphs should be sufficient. You should try to split the cover letter up as follows:

- First paragraph: Describe the position you are applying for, and why you think the position is available. Express an understanding of both the position and the company itself.
- Second paragraph (and possibly third): This is where you sell yourself. In this middle section, you need to convince the reader that you're qualified for the job; talk about exams passed, internships, VEEs, and relevant skills. Make sure that you back up any of your abilities with examples. Don't make claims without support: i.e. If you're going to say "I'm very good at communicating," you need to exemplify good communication, as well as talk about how you became a good communicator.
- Final paragraph: Use the last paragraph to request either a meeting or to be considered for an opportunity. Express your excitement and optimism about the position as well as for hearing back from them. This paragraph should also be brief.

Remember to keep the letter short and easy-to-read. Make sure you show a lot of personality; again, you want it to catch their attention. Bullet points are also a good way to separate paragraphs and bring attention to your abilities and strong points. Actuaries need to be good with computers, specifically using Excel, taking initiative, quick-thinking, and communication. Talk about ways in which you have proven these qualities. Also, let it be known that you are capable of making it in the profession by highlighting your exam progress, and show that you know what you are getting into by talking about internships in the field and related experience. Convince them that you are the person for the job.

7 How to Get an Internship

7.1 Benefits of Internships

An internship is a great way to gain experience and insight into the actuarial field. Although not necessary for landing a job, internships are a huge help for several reasons. First of all, internships are essentially a two-way interview: you get a chance to find out if you like the field and the employer, and the company gets a chance to learn about your abilities and work ethic before making an expensive commitment. Summer internships are generally considered by the company to be a three-month interview. Personally, we think having three months to impress a company is a lot easier than trying to sell yourself in a thirty-minute job interview. Take advantage of internships as they are a great resource for learning how everyday work in the actuarial field could turn out for you in the future.

A few more of the many benefits to internships are that you gain valuable experience in the field, get a better idea of the type of work you'll be getting into, and get the opportunity to start off before you graduate rather than starting fresh right out of college. Having an internship under your belt going into your senior year of college will give you a HUGE advantage over other job applicants who are similarly qualified yet lack an internship.

Remember, an internship isn't required for getting a full-time job, but it is highly desirable, as we will continue to try to convince you. Internships look great on resumes, especially when you place them near the top next to your exam results. Internships will often provide a lot of material to talk about during full-time job interviews, which makes them a great tool to use to impress the interviewers and convince them of how much you learned during your internship. If you happen to get an internship, make sure to document all of the things you do and learn throughout the experience, to better prepare you for discussing these things in job interviews.

And of course, there are numerous perks to internships during the internship itself. You get the opportunity to establish relationships with your co-workers which will often result in good references for future jobs, or as useful resources for information on other companies or other areas of the actuarial field. Most summer internships will provide temporary housing or a housing stipend during your summer, and almost all internships in the actuarial field are paid. You can expect an hourly wage of anywhere between $15 and $25 an hour, which is double or triple what some of your friends will be making at their typical summer jobs.

Finally, an internship will be the best way to decide whether you really want to be an actuary. The only way to truly get a good basic grasp on the profession is to spend three months practicing it. It took our entire first internship to learn just the basics of what actuaries in our respective areas do. By the way, we may have forgotten to mention: internships are very, very good things to have.

7.2 Getting an Internship

By now you might be asking yourself how you can get in on this action. Don't worry, we've got you covered. The following are a few ways to find that perfect first step in the door.

1. The first thing you should do is attend one of CU's actuarial open house meetings. These occur once per semester and consist of a panel of actuaries in the Denver area who come and talk about their experiences in the actuarial field. Typical topics include the actuarial exams, internships, and

different areas of actuarial science. These panels are fairly informal, but you should come dressed in business casual with five or six copies of your resume and cover letter. Contact the Applied Math department for the date and location of the actuarial open houses. This information is also normally sent out by email to Applied Math majors, so be on the lookout for this great opportunity.

2. Another good resource is CU's Actuarial Science and Quantitative Finance website. It's somewhat out of date as far as the right exam data and course numbering, but under the Actuarial Studies Track tab on the left hand side, there is an Internships link. This should take you to a pdf list of Denver companies who employ actuaries or offer internships. Check it out at: *www.colorado.edu/asqf/actuarial_studies/documents/internships.pdf* You should try to contact several of these companies while you are in college.

3. Start talking to companies **as early as possible** in your college career. Above all else, if you can make and maintain a contact within an organization, your resume will quickly rise to the top of the pile next year. Another reason the open houses are so useful is that they allow you to directly communicate with several representatives from different organizations. If you physically meet and communicate with an individual working at a company during your sophomore year, then in your junior and senior years you'll already have a contact at the company whom you can ask to forward your resume. This is significantly better than dealing with Human Resources or communicating solely by phone or email.

4. When it comes to contacting a company, try to avoid contacting Human Resources at the company, as they will quickly make a college student looking for an internship a low priority. Instead, go to the company website and try to find the contact information for an actuary at the company, and if possible, make it the chief actuary at the firm. They will likely have a secretary that will hang on to your resume and cover letter much longer than HR will. If this isn't successful, call up HR and ask for a department you would be willing to work in that employs actuaries, and you will likely find an actuary that way. Whatever you do, always call first and email second, never the other way around. A typical employee at a large company might go through about 50 emails a day, and it is very easy for your email to go unnoticed.

Start early in your search for an internship. Companies that employ actuaries or offer summer internships typically start looking earlier for potential candidates than other professions. At least that has been the case in our experience. You should set up your search for a summer internship this way: start looking for companies online in September and email some of them, attend the Actuarial Open House and start applying in October, and hopefully get through some interviews in November. It is always better to start earlier rather than later.

One thing you don't really need to worry about when you are applying for internships is your previous job experience. It is obviously optimal if you have had some summer jobs before as they show that you are capable of handling responsibility. But don't worry about whether they're professional enough. Our previous jobs before we got internships consisted of power washing and preserving fences, parking rental cars, and construction work. Employers don't care what you've done as long as you are willing to continue working.

Most of all, while looking for that internship that will get you through the door and into the actuarial field, keep in mind the qualities that employers of actuaries are looking for. They seek people who can think

quickly, communicate effectively, and solve problems efficiently and in a variety of ways. Of course, good grades don't hurt either.

7.3 Acing the Interview

Interviews can make or break your chance of landing an internship, so read ahead for some tips we've learned on our quest to ace the interview for an internship.

Typically the interview process will start with a simple phone interview. This step should be pretty easy as the employer is most likely trying to determine if you can communicate and get a better idea of who you are beyond your resume and cover letter. Some tips on how to fare well during a phone interview include:

- Make a list of good words that describe you so you don't end up using the same ones over and over.
- Practice talking about yourself before the interview out loud so you can hear how you sound; this will also make the phone call easier.
- Have your resume in front of you as the interviewer will likely have it in front of them as well.
- Have the company website pulled up so you can look through it in case of an emergency answer to a question, although you should already have read their website the day before the interview.
- Sometimes it helps to stand while doing the interview as this projects your voice more and increases confidence.

After you succeed with the phone interview, you will likely get an email or another call asking you to come into the office for an onsite interview. These can be rather extensive and will likely consist of multiple 20-30 minute interviews with people from different actuarial departments. This is where those communication skills come in handy. Try not to tell the same stories to each interviewer, and whatever you do, do not forget their names. Think about a few of the following topics that we've found will provide good points of discussion during these interviews:

- Courses that have helped you
- Courses where you learned something significant outside of the syllabus
- Times in your life when you faced a challenge and how you overcame it
- Times when you had to lead others and problems you ran across
- Your strengths and weaknesses (the latter is a frequent trap question, so be wary and avoid any weaknesses that would make you an undesirable employee, and always mention possible solutions to your weaknesses)
- How others would describe you

Also, look up some testimonials or "Why should I be an actuary" sections in the careers area of a company's website. The individuals will talk about the challenge of the work, the skills required, what they like about the job, etc. When you go to an interview, be adamant about your possession of these skills as well as your interest in the type of work that you expect it to be.

7.4 Extra Advice

On top of simply answering questions and talking about yourself, you need to appear friendly and easy to talk to.

- Be confident, happy, and excited. Dont forget to smile.
- Look them in the eye during the interview.
- Ask the interviewers questions about themselves. Try to discover something that the interviewer likes, and if you can get them to talk about it and also be genuinely interested in what they are saying, they will likely remember you as an enjoyable person to talk to. Being genuine is key; we'll leave achieving that up to you.
- Never be modest about something you have accomplished or achieved.
- Always express a sincere interest in their company.
- Write down questions you have about the company or the field or the work you will be doing, and bring them to the interview and sit them right in front of you. Always ask a few questions at the end of the interview when they give you the opportunity. This shows you have interest, which will in turn increase their interest in you. It is also a great chance to learn from someone who already knows what it's like to be an actuary.
- Finally, follow up with a call or email thanking them for their time; this will also show you are still interested. Of course, in order to do this you will need their contact information, which you can get at the end of your interview.

So you've landed an internship, and you are pretty much set. Don't worry about knowing anything on your first day. They expect you to know absolutely nothing. Your first day will likely consist of meeting lots of people (and trying to remember their names), and filling out paperwork. During the internship, it is very important to keep track of, or at least remember, all of the things that you do. Write down projects and assignments that you work on, difficulties that you have, and situations in which you needed to take initiative. When you're applying for jobs, this documented information will be extraordinarily helpful.

Now that you have had an internship, you are well on your way to getting a job, which we will cover in the next section.

8 How to Get a Job

Much of the information in the previous section still applies, but there are a few differences.

If you have had an internship, the questioners will want to know about it. They will quiz you on what you know about the profession now and why you are still interested in it. They will also want to know a little about the work you did, not because they are actually interested, but because they want to see how well you understand what you did and what you learned. Be prepared to discuss situations where you discovered something or took some initiative to solve a problem on your own instead of asking. Be able to describe things you learned about the job that you didn't foresee and express them in a positive light. We repeat: they want to know that you can think quickly and analytically, communicate effectively, and work hard. Try to come up with situations from your job in which these qualities were exhibited.

It is a good idea to come up with around 15 situations before the interview and think about what you will say about them. During the interview you can use these situations as examples and responses while they quiz you.

If you have not had an internship, the questions will likely be very similar to those mentioned in the previous section. As before, recall situations in which you exemplified desirable qualities and situations that you learned from, and prepare to answer the usual questions.

Organizations looking for entry-level workers may want to know about your plans for the future and your ability to handle the specific tasks that are required for your chosen area. For example, if you choose to become a consultant in the retirement field, the company will want to hear about how you handle a more volatile work schedule, and what would make you a good consultant. Be prepared to explain exactly why you expect to do well with every requirement as well as your unwavering interest in doing so. It is also good to somehow sneak in some long-term goals such as when you hope to reach your A.S.A or when you will take your next exam.

Finally, location is now an issue. If you limit yourself to one area, getting a job may be a bit more difficult. If you are willing to relocate, be prepared to explain how you will handle a change of scenery and distance from the people who are close to you. As with every other question, you need to be able to fully explain your decisions and to do so clearly and concisely.

Here are a few good lists about how to get an interview and then the job. The list comes from a forum in the Careers section from the *Actuarial Outpost*.

These get you an entry-level interview:

1. Exams passed.
2. Reputation of college attended, according to "best schools" list or its actuarial department.
3. Grades.
4. Well-organized resume.
5. Successful internships.
6. Close distance from the job.

These get you the job offer:

1. Oral communication skills.
2. Your knowledge of the company as perceived by interviewers.
3. Answering simple questions correctly.
4. Answering the unusual questions correctly.
5. Putting up with HR.
6. Appearance.

Remember to go to several company websites for companies that employ actuaries and find testimonials of employees. Read them and try to remember as much of what they say as you can. Then, in your interview, keep these remarks in mind. Knowing how to BS is a communication skill, and what will really make you stand out is being able to think quickly and turn any question into something that effectively communicates the idea that the organization will benefit from hiring you.

9 Being an Actuary

Now that you have a good topical understanding of the actuarial profession, as well as an idea of where to start, you're probably asking, "Why would I spend all of that time and effort?" In fact, there is a multitude of reasons that a person would want to pursue a career as an actuary. It does, however, take a certain type of personality.

Actuaries tend to be perfectionists. You need to be able to find enjoyment in working very hard to achieve a goal. If you are very good at math and communication and are willing to put in the effort, the actuarial profession could be the perfect challenge.

If you are reading this manual, you probably fit the necessary criteria. But why be an actuary rather than an engineer, a doctor, or a lawyer? It's up to you. The actuarial profession provides much steadier work hours than doctors, many lawyers, and probably many engineers. It has excellent job security once you've managed to land a job, and the pay is excellent.

Life after college will be different than you expect. Many people turn away from the actuarial profession because they don't immediately see the great career for what it can be. With any job after college, life is going to change. After erratic sleep schedules, homework assignments, and different classes every four months, routine and repetition can be disconcerting. Whatever you end up doing, you are going to have to make some unpredictable adjustments.

Finding the perfect profession can be frightening and confusing. You should constantly be asking yourself how you feel about the possibilities you are considering. On the journey, be aware that the appreciable qualities of an experience are often things that you aren't even looking for; it's easy to come up with a paradigm of a good experience and close yourself off from enjoying new things that initally seem pointless. Always be open to discovering a different way of enjoying the world. We all grow up mocking our parents for drinking tea and listening to Beethoven, but with an open mind we can eventually uncover what it is that others have found so enjoyable.

Actuaries spend a lot of time at computers, at least for the first few years. They have to take many difficult exams, and especially when things like marriages, kids, or family problems show up, exams combined with the job can be stressful. However, few careers will challenge your intellect constantly, surround you with friendly and intelligent people, provide a comfortable working environment, and compensate you so well for it. Not only that, but the exams don't last forever. The actuarial profession has consistently been ranked as one of the top jobs by most major surveys for the past few years–there is a reason that many actuaries are happy.

Brief as it was, the information in these 20 pages took a few years to come to understand. We truly hope that this guide will allow you to get a good running start at becoming an actuary. The University of Colorado is an incredible place to earn a degree, but makes becoming an actuary more difficult than a university with a full actuarial science major. However, independent thinking will carry you very far in life, and the individual effort that you put into progressing through the exam process will undoubtedly be noticed by employers–not only that, but you will learn many things that you otherwise might have missed out on. The challenge of becoming an actuary has been incredibly rewarding, and we wish you the best in finding the same satisfaction with your college experience and future career.

10 Author Biographies

TREVOR AESCHLIMAN

I grew up in the small town of Burlington, Colorado, riding horses and participating in the school's wrestling program. After graduating from high school, I spent a year at the Colorado School of Mines. Engineering was not my thing, so I transferred to CU and spent the next four years in philosophy and applied math courses. During college, I engaged in several extracurricular activities, considered being a lawyer for a little while, and spent two and a half years as president of the CU Philosophy Club. I graduated from the University of Colorado in May 2010 with a B.S. in Applied Mathematics, the Actuarial Studies Certificate, and a minor in philosophy.

As for becoming an actuary, I passed Exam P at the end of my second year at CU, passed Exam FM my third year, and had an internship with Towers Perrin (now Towers Watson) the summer before my final year of college. Currently, I am incredibly excited about the actuarial profession, perhaps even too excited, and hope to spend at least the first few years out of college working in retirement and benefits.

DANIEL HEFFRON

I spent my childhood and high school years in Rogers, Arkansas and graduated with the intention of attending college in the great state of Colorado. I entered CU knowing I wanted to major in Applied Mathematics, but with no idea of what I wanted to apply it to. I quickly discovered my dislike for solving engineering problems and just as quickly turned to the economics and business fields for other options. I graduated in May 2010 with a B.S. in Applied Mathematics with the actuarial option and an economics minor.

Before college, I held typical summer jobs as a wood preserver and cleaner, and as a shuttle driver for a car rental company. During college, I had two summer actuarial internships: one with Great-West Life & Annuity and one with CIGNA. I passed Exams P, FM, and MFE during college. As for the immediate future, I will continue to pursue the A.S.A. designation until I find something more interesting or just as challenging. GO BUFFS!!!!