

Becoming an Actuary:

An Analysis of Auburn's Curriculum and General Advice to Prospective Actuarial Students

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Table of Contents

A Brief Overview of the Actuarial Career

Qualification and Certification Process

Society of Actuaries vs. Casualty Actuarial Society

Actuarial Exams and VEE Credits

Overview

Exam 1/P

Exam 2/FM

Exam 3/MFE

Exam 3/MLC

Exam 4/C

Validation by Educational Experience Credits (VEE)

Study Techniques

Recommended SOA/CAS textbooks

Actuarial Exam Study Manuals

Online Seminars

Analysis of Auburn's Curriculum Structure and Program Goals

Auburn Recommended Curriculum Model

Candid Advice and Miscellaneous Commentary from an Actuarial Science Major Graduate

Closing Remarks

Works Cited

A Brief Overview of the Actuarial Career

Actuaries are business professionals who specialize in risk management and understanding the financial impact of uncertain events on individuals, companies, and governments. More specifically, actuaries are concerned with risk mitigation, the minimization of the negative impacts of specific risks on an institution. While they have traditionally been utilized in the insurance industry where company clients pay monetary premiums in order to receive financial coverage against certain negative life events, more and more actuaries are being hired by consulting firms and corporations who are concerned about the financial impact of various events. Approximately fifty-five percent of all actuaries are employed by insurance carriers according to the Bureau of Labor Statistics, but this number is changing as “greater job growth will occur in other industries such as financial services and consulting” (Bureau 1). Fortunately for prospective students, as long as a desire to quantify an individual, company, or government’s financial exposure to an event exists; there will be a demand for actuaries.

Qualification and Certification Process

The path to a career in actuarial science is less about the degree one holds and more about the skill sets that are acquired and developed over time. In order to become a successful actuary, one must pass a series of certification exams and professionalism modules in one of the two credential granting societies: the Society of Actuaries (SOA) or the Casualty Actuarial Society (CAS). These examinations test actuarial students regarding specific knowledge of mathematics, finance, modeling, and risk management. Upon completion of different sets of exams, actuaries receive credentials that certify their mastery of the aforementioned topics.

Presently, there are two major titles that can be awarded within each society—the title of Associate or Fellow. These titles come with letter designations that serve as recognizable credentials (eg. an Associate in the Society of Actuaries would be granted ASA credentials while an Associate in the Casualty Actuarial Society would be granted ACAS credentials). These credentials are important and serve

not only as a gauge of actuarial ability but are also a part of the recognition needed to sign Statements of Actuarial Opinion or to testify in court concerning financial matters of risk. It is important to note the hierarchy of the actuarial world; Fellows rank above Associates in number of exams passed.

Society of Actuaries vs. Casualty Actuarial Society

The two governing bodies of the actuaries within the United States are the Society of Actuaries and the Casualty Actuarial Society. These two organizations represent the two subdivisions of the actuarial world: the Society of Actuaries focuses primarily on matters of Life/Health Insurance related actuarial work while the Casualty Actuarial Society focuses primarily on Property/Casualty Insurance. As a student, the difference is not particularly important to you early in the examination process as you are likely to select your society based on your individual job prospects following college graduation. An interesting fact with which to be aware, however, is that the Society of Actuaries with 22,201 members at time of writing (“Analysis of Membership”) is significantly larger than the Casualty Actuarial Society with 5,417 members as of November 2010 (“Membership Statistics”).

Actuarial Exams

Passing society established examinations is the driving factor behind actuarial education. The path to becoming an actuary may have multiple options as far as collegiate majors and degrees are concerned, but the common thread among all actuaries is actuarial exams. Fortunately, both the Society of Actuaries and the Casualty Actuarial Society have joined together to make the examination process relatively straight forward for the first four examinations by writing jointly administered actuarial exams that will award credit in both societies. Essentially, joint actuarial examination credit will count towards both societies’ respective credentials. For the purposes of this paper, we will discuss the exams that would be needed in order for an actuarial student to become an Associate in the Society of Actuaries. These exams include Exam 1/P, Exam 2/FM, Exam 3/MFE, Exam 3/MLC, and Exam 4/C. Presently, Exams 1/P, 2/FM, 3/MFE, and 4/C are jointly administered by both societies and successful completion of these

exams would serve as a starting point for a career in either society. As a note to the reader, all of the following information is correct as of the Fall 2011 semester.

Exam 1/P

Actuarial Exam 1/P is 3 hour, 30 multiple choice question joint exam that is generally the first exam taken by many actuaries. Currently, Exam 1/P is offered during six testing windows throughout the year. The subject matter for Exam 1/P focuses on basic probability theory and covers topics such as general probability, conditional probability, Bayes Theorem, selected univariate probability distributions, and selected multivariate probability distributions.

Students in Auburn's actuarial science major are encouraged to take STAT 3600 Probability and Statistics I in combination with the exam focused MATH 4820 Actuarial Seminar in Probability as preparation courses for this exam. These two courses work together in order to build a foundational knowledge needed to support a student's preparation for Exam 1/P.

Exam 2/FM

Actuarial Exam 2/FM is a 3 hour, 35 multiple choice question joint exam that many actuaries attempt following the completion of Exam 1/P. Exam 2/FM is offered during four testing windows throughout the year. The subject matter for Exam 2/FM focuses on the time value of money, annuities, loans, bonds, portfolio analysis, and immunization, as well as financial economics topics including basic derivatives, options, and hedging strategies.

Students in Auburn's actuarial science major are encouraged to take MATH 2790 Mathematics of Interest Theory in combination with the exam focused MATH 4790 Actuarial Seminar in Finance as preparation courses for this exam. These two courses work to build the foundational knowledge needed to support a student's preparation for Exam 2/FM.

Exam 3/MFE

Actuarial Exam 3/MFE is a 3 hour, 30 multiple choice question joint exam that represents the first part of the two part Exam 3/M series in the Society of Actuaries and the Casualty Actuarial Society. Part two of the Exam 3/M series is Exam 3/MLC for the Society of Actuaries and Exam 3/L for the Casualty Actuarial Society. The subject matter for Exam 3/MFE focuses on an extension of the financial economics topics covered by Exam 2/FM and surveys topics including interest rate models, derivative security valuation, stock price simulation, and selected risk management techniques.

At the present time, no specific coursework is in place to prepare actuarial students for Exam 3/MFE. One course suggested by the actuarial department that introduces some of the topics on Exam 3/MFE is FINC 5680 Financial Engineering.

Exam 3/MLC

Actuarial Exam 3/MLC is a 3 hour, 30 multiple choice question SOA exam that serves as the second part of the two part Exam M series in the Society of Actuaries. At the time of this writing, the Casualty Actuarial Society awards credit for this exam in place of Exam 3/L (the second part of the Exam 3 series in the CAS). It is important to note, however, that the Society of Actuaries does not presently award credit for Exam 3/L in place of Exam 3/MLC. The subject matter for Exam 3/MLC focuses on survival models, Markov chains, life insurances and life annuities, and Poisson processes.

Students in Auburn's actuarial science major are introduced to the subject matter tested in Exam 3/MLC by taking MATH 5800 Actuarial Mathematics I and MATH 5810 Actuarial Mathematics II. These two courses expose students to a large portion of the topics tested on Exam 3/MLC.

Exam 4/C

Actuarial Exam 4/C is a 3.5 hour, 35 question multiple choice joint exam, and the last of the four jointly administered actuarial exams. The subject matter for Exam 4/C focuses on actuarial models—

primarily severity models, frequency models, aggregate models, empirical model construction, parametric models, credibility, and simulation methods.

At the present time, Auburn does not offer undergraduate coursework specifically designed to prepare students for the contents of this examination. Students seeking to prepare themselves for Exam 4/C should look to the Society of Actuaries syllabus for guidance.

Validation by Educational Experience Credits (VEE)

VEE credits are credits awarded by the two actuarial societies (SOA and CAS) to certify that a candidate has received background coursework in three distinct areas: Applied Statistics, Economics, and Corporate Finance. VEE credits are less challenging to obtain than passed actuarial exams and credit can be received via online classes administered by the Society of Actuaries or by completing SOA approved courses at Auburn University with a grade of B- or higher.

Presently, Auburn actuarial students have the opportunity to earn VEE credit in all three areas. In order to receive credit for the Economics VEE credit, students should complete ECON 2020 Microeconomics and ECON 2030 Macroeconomics. For Corporate Finance VEE credit, students need to complete FINC 3630 Advanced Business Finance. In order to receive credit for the VEE in Applied Statistics students have a number of options. They can complete coursework in ECON 7320 Econometrics II or they can pair AGE 7590 Introduction to Agricultural Econometrics I and ECON 6600 Business and Economic Forecasting or they can take the most common route by pairing STAT 4610 Applied Regression Analysis and STAT 4630 Applied Time Series Analysis. One important note regarding the VEE credit in statistics is that STAT 4610 and STAT 4630 are run based on student demand and may not be offered every year.

Study Techniques

Studying for an actuarial exam is far different than studying for a collegiate exam. Actuarial exams test a vast amount of knowledge and are quite challenging—only 35 to 40 percent of exam takers pass on a given attempt. The Society of Actuaries recommends a benchmark of 100 study hours per exam hour. Thus, based upon the recommendation of the Society of Actuaries, a 3 hour exam will require approximately 300 hours of preparation work.

While there is no replacement for dedicated study, dividends will likely be paid to those students who use multiple resources to increase their probability of success. There are three primary sources of information available for actuarial exams: the recommended SOA/CAS textbooks, actuarial exam study manuals, and online seminars.

Recommended SOA/CAS Textbooks

The recommended SOA/CAS textbook is the official text(s) used in designing each actuarial exam. It is important for students to be familiar with the terminology used in the recommended text because this terminology has the potential to be used on an actuarial exam. Auburn students who enroll in Actuarial Mathematics I and Actuarial Mathematics II use the SOA recommended text for Exam 3/MLC as the course textbook.

Actuarial Exam Study Manuals

Actuarial exam study manuals are a strong contender to be considered the backbone of exam preparation. Study manuals are tailored specifically to the official exam syllabus and combine lessons to teach the material, examples to practice the material, and sample exams to simulate taking the actuarial exam. Two major competitors in the actuarial exam study manual market are Actex and ASM. It is important to note that some manuals require purchase of the recommended SOA/CAS textbooks as an accompaniment while other manuals include the terminology within the study manual. The Actuarial

Seminar in Probability and Actuarial Seminar in Finance classes currently use Actex study manuals as the course textbooks.

Online Seminars

Online seminars are comparable to digital classrooms. In order to learn the material, downloadable .mp4 files are available for viewing. The files often contain a “whiteboard” type atmosphere with a voice overlay. One is able to view the notes to take and hear the lecture; in essence, this learning style simulates sitting in a college classroom. One example of an online seminar is TIA, The Infinite Actuary.

Analysis of Auburn’s Curriculum Structure and Program Goals

The Actuarial Mathematics program at Auburn University is a well-designed program that seeks to prepare students to sit for the three actuarial exams— Exam 1/P, Exam 2/FM, and Exam 3/MLC.

According to the program’s website,

The Actuarial Mathematics program within the Department of Mathematics and Statistics at Auburn University offers a well-balanced curriculum in applied mathematics with advanced preparation for the actuarial profession. It boasts a dedicated group of faculty experienced in passing actuarial exams offered by the professional societies and recognized by the insurance industry. Auburn University is accredited by the Society of Actuaries to offer courses to satisfy the Validation by Education Experience (VEE) requirements in Applied Statistical Methods, Corporate Finance, and Economics. (“Actuarial Mathematics at Auburn”)

The table on the following page illustrates the current actuarial science curriculum model:

Applied Mathematics: Actuarial Science						
Auburn Recommended Curriculum Model						
FR	F	S		F	S	
	ENGL	1100	1120	English Composition I & II	3	3
				Core Philosophy	3	**
				Core History I & II	3	3
				Core Science I & II	4	4
	COMP		1200	Intro to Computer Engr. & Sci.	**	2
	MATH	1610	1620	Calculus I & II	<u>4</u>	<u>4</u>
					17	16
SO	ENGL	2200	2210	World Literature I & II	3	3
	ECON	2020	2030	Prin. Of Micro- & Macroeconomics	3	3
	ACCT	2910		Fundamentals of Accounting	3	**
	MATH		2790	Mathematics of Interest Theory	**	3
	MATH	2630		Calculus III	4	**
	MATH		2650	Linear Differential Equations	**	3
	MATH	2660		Topics in Linear Algebra	3	**
	MATH		3100	Introduction to Advanced Math	**	<u>3</u>
					16	15
JR				Core Fine Arts	3	**
				Core Social Science Group I	3	**
	FINC		3610	Principles of Business Finance	**	3
				Statistics Requisite	**	3
	STAT	3600		Probability and Statistics I	3	**
	MATH		4820	Actuarial Seminar in Probability	**	3
	MATH	4790		Actuarial Seminar in Finance	3	**
				Math Elective	**	3
				Electives	<u>4</u>	<u>4</u>
					16	16
SR	FINC	3630		Advanced Business Finance	3	**
	MATH	5000		Modeling	3	**
	MATH	5800	5810	Actuarial Mathematics I & II	3	3
				Math Elective	**	6
				Electives	3	3
	UNIV		4AA0	SM1 Undergraduate Graduation	**	<u>0</u>
					12	12
				Total	120	

Table 1: Auburn Recommended Curriculum Model

Based on the curriculum model on the previous page, the program is designed to provide students with the opportunity to pass actuarial exams and complete VEE credits required by the Society of Actuaries and Casualty Actuarial Society. Logically, students should sit for Exam 2/FM following the completion of the Actuarial Seminar in Finance and Exam 1/P following the completion of the Actuarial Seminar in Probability. Students willing to supply extra effort would be well-suited to sit for Exam 3/MLC following the completion of their senior year.

Candid Advice and Miscellaneous Commentary from an Actuarial Science Graduate

The contents of this paragraph do not represent the official opinion of Auburn University, the Department of Mathematics and Statistics, or its faculty. The statements made are my own and stem from my personal experiences.

Becoming an actuary is an exciting career choice, and one that I am extremely excited about pursuing. However, becoming an actuary is hard work. If you, as a prospective student, are not committed to putting in extra hours of studying once your class work is done or after work ends if you are a graduate in the workforce, then you may want to reconsider your career choice. Most of the actuaries that I have met enjoy their job and especially the work-family balance that they are able to achieve post-FSA or post FCAS. However, getting to that point requires years of commitment up front in order to obtain certification.

The closest thing that I can compare studying for exams for is studying for a final exam for a class where the professor teaches you the basics but you have to be prepared for much more difficult questions. The same holds true for actuarial exams; if you are studying the exam material, you may have a solid grasp of the basics, but you will need a deeper understanding of the material in order to successfully pass the exam.

Personally, I used a combination of study manuals, Auburn's foundation courses, and The Infinite Actuary (TIA) online seminars. I would like to say up front that this is a relatively expensive way to learn

the material, but I have found that, for me, this combination was particularly effective and has led me to pass two actuarial exams entering my senior year. The study manuals have been the primary source of information for me, with Actex manuals being my personal choice. The core classes taught by Auburn professors were well designed, and definitely create a positive environment with which to learn the basics. The TIA online class truly functions like a college class on a given actuarial exam, and I really enjoy using it as a secondary resource because, for me, it simulates extra class time.

Aside from passing exams, another important goal is obtaining an actuarial internship. To a potential employer, an actuarial internship shows dedication to the profession and a continued interest in the actuarial profession on your part. From a psychology standpoint, employers want a guarantee that the investment that they make in you as an employee will pay dividends in the future. Therefore, they want to make smart investments in employees that they will believe will add value to their companies later.

Closing Remarks

Becoming an actuary is an exciting new career opportunity that has come to light recently due to its continued presence in the top 10 “Best Jobs to Have” by Forbes (Smith 4). With its rising popularity and exposure to the public eye, actuarial science programs around the country have seen increased enrollment. Students who want to graduate as a top actuarial student with the most lucrative job offers will likely need two or more exams and an internship in order to be competitive. Presently, Auburn’s curriculum model provides an opportunity to do just that by providing the opportunity for students to study the background material for the first three actuarial examinations. Furthermore, students who pass exams early in their junior year will have the opportunity to compete for internships during the summer between their junior and senior years. At the present time, Auburn’s curriculum is doing an outstanding job of providing graduates with a solid education. Many Auburn grads have gone on to become Vice Presidents of Insurance companies, upper level actuarial managers, and successful

associates. The Auburn education has definitely prepared many students for a successful career in actuarial science; your author included.

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