

School of Natural Sciences and Mathematics

Actuarial Science (M.S.) (36 minimum hours)

The Master of Science in Actuarial Science (AS) Program at the University of Texas at Dallas is administered through the Department of Mathematical Sciences.

The objective of the program is to educate future leaders of the actuarial industry with training in actuarial theory and methods in a wide spectrum of actuarial applications involving probabilistic and statistical models. All students will be prepared to take five actuarial preliminary exams and will take two advanced actuarial classes to prepare for professional accreditation. Furthermore, students who did not take classes required for VEE (Validation of Educational Experience) credits in statistics, finance, and economics will have such opportunity. With this combined knowledge of mathematics – particularly of probability, statistics, and decision theory – together with knowledge of financial mathematics and insurance, the expected passing of five actuarial exams, and the three required VEE credits, graduates of the program will be able to work as senior actuaries in insurance, consulting, finance, government, and emerging markets.

The minimal total required number of classes for graduation is 36 SCH. Among them, 27 SCH of required courses and 9 of elective.

Prefix and Number	Required Courses	SCH	Affiliation with actuarial exam
STAT 5351	Probability and Statistics I	3	Exam 1/P
STAT 5352	Probability and Statistics II	3	Exam 1/P
ACTS 6301	Theory of Actuarial Models: Life Contingencies I	3	Exam 3L/MLC, Part I

ACTS 6302	Theory of Actuarial Models: Financial Economics	3	Exam 3F/MFE
ACTS 6303	Theory of Actuarial Models: Life Contingencies II	3	Exam 3L/MLC, Part II
ACTS 6304	Theory of Actuarial Methods I	3	Exam 4/C, Part I
ACTS 6305	Theory of Actuarial Methods II	3	Exam 4/C, Part II
ACTS 6306	Advanced Actuarial Applications	3	Exam 5/FAP
ACTS 6308	Advanced Actuarial Financial Mathematics	3	Exam 2/FM

For the prescribed elective courses student chooses three of the following.

Prefix and Number	Prescribed Elective Courses	SCH	Affiliation with actuarial exam
STAT 6337	Advanced Statistical Models	3	VEE, Applied Statistical Methods
STAT 6329	Applied Probability and Stochastic Processes	3	
STAT 6338	Advanced Statistical Methods II	3	
STAT 6343	Experimental Design	3	
STAT 6347	Applied Time Series Analysis	3	VEE, Applied Statistical Methods
STAT 7338	Time Series Modeling and Filtering	3	
STAT 6348	Applied Multivariate Analysis	3	
STAT 6390	Topics in Statistics – Level 6	3	
STAT 7334	Nonparametric and Robust Statistical Methods	3	
MATH 6313	Numerical Analysis	3	
STAT 6331	Statistical Inference I	3	
FIN 6301	Financial Management	3	VEE, Corporate Finance
FIN 6308	Regulation of Business and Financial Markets	3	
FIN 6310	Investment Management	3	
FIN 6314	Fixed Income Securities	3	

FIN 6360	Options and Future Markets	3	
FIN 6382	Numerical Methods in Finance	3	
OPRE 6335	Risk and Decision Analysis	3	
MECO 6303	Business Economics	3	VEE, Economics
ACCT 6305	Accounting for Managers	3	
POEC 7306	Macroeconomic Theory and Policy	3	VEE, Economics
POEC 6321	Economics for Public Policy	3	

Preparation for Actuarial Exams

Exam 1/P: **STAT 5351**

Exam 2/FM: **ACTS 6308**

Exam 3L/MLC: **ACTS 6301**

Exam 3F/MFE: **ACTS 6302**

Exam 4/C: **ACTS 6304**

Exam 5/FAP: **ACTS 6306**

Validation by Educational Experience (VEE) Credits

Applied Statistical Methods: **STAT 6337** and **STAT 6347**

Corporate Finance: **FIN 6301**

Economics: **MECO 6303** and **POEC 7306**

Actuarial Science Course Descriptions

ACTS 6301 Theory of Actuarial Models: Life Contingencies I (3 semester hours) The purpose of this class is to develop the student's knowledge of the theoretical basis of life contingent actuarial models and the application of those models to insurance and other financial

risks. Life contingencies, survival models, life insurances, annuities and premiums will be studied. This class covers parts of CAS Exam 3L and SOA Exam MLC. Prerequisite: **STAT 5351** or instructor consent required. (3-0) T

ACTS 6302 Theory of Actuarial Models: Financial Economics (3 semester hours) This 3 semester hour course develops the student's knowledge of the theoretical basis of certain actuarial models and the application of those models to insurance and other financial risks. The topics discussed include interest rate models, rational valuation of derivative securities, mathematical and probabilistic foundation of risk management. This class covers parts of CAS exam 3F and SOA exam MFE. Prerequisite: STAT 5351 or instructor consent required. (3-0) T

ACTS 6303 Theory of Actuarial Models: Life Contingencies II (3 semester hours) The purpose of this class is to develop the student's knowledge of the theoretical basis of life contingent actuarial models for multiple lives and the application of those models to insurance and other financial risks. Reserves, life contingencies for multiple lives, expenses and stochastic processes will be studied. This class covers parts of CAS Exam 3L and SOA Exam MLC. This class covers parts of CAS Exam 3L and SOA Exam MLC. Prerequisite: ACTS 6301 or instructor consent required. (3-0) T

ACTS 6304 Construction and Evaluation of Actuarial Models I (3 semester hours) Introduction to useful frequency and severity models beyond those covered in Theory of Actuarial Models. Discussion of the steps involved in the modeling process and how to carry out these steps in solving business problems. At the end of the course the students 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. This class also provides an introduction to a variety of tools for the calibration and evaluation of the models. This class covers parts of CAS Exam 4/SOA Exam C. Prerequisite: STAT 5351 or instructor consent required. (3-0) T

ACTS 6305 Construction and Evaluation of Actuarial Models II (3 semester hours) Introduction to useful frequency and severity models beyond those covered in Principles of Actuarial Models. The topics

discussed include parametric models, credibility and simulation. This class covers parts of CAS Exam 4/SOA Exam C. Prerequisite: STAT 6304 or instructor consent required. (3-0) T

ACTS 6306 Advanced Actuarial Applications (3 semester hours)

Special topics in actuarial science will be discussed. This class covers parts of CAS Exam 5 (Basic Techniques for Ratemaking and Estimating Claim Liabilities)/SOA Exam FAP (Fundamentals of Actuarial Practice). Prerequisite: Instructor consent required. (3-0) R

ACTS 6308 Actuarial Financial Mathematics (3 semester hours)

The purpose of this 3 semester hour course 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. The students will also be given an introduction to financial instruments, including derivatives, and the concept of no-arbitrage as it relates to financial mathematics. This class covers topics of Exam 2/FM. Prerequisite: Instructor consent required. (3-0) R

Following is a Sample Degree Plan for a student starting in the all semester.

Semester	Courses
F 1	STAT 5351 ACTS 6308 ACTS 6301
SP 1	MECO 6303 ACTS 6303 STAT 5352
F 2	ACTS 6302 ACTS 6304 STAT 6337
SP 2	FIN 6301 ACTS 6305 ACTS 6306