Actuarial Science Program (Mathematics, WSU)

Description: Actuaries are the leading professionals in finding ways to manage risk, and they are the analytical backbone of our society's financial security programs. With specialized training in mathematics and business, most actuaries are employed in the financial services sector, including insurance companies, commercial banks, investment banks, consulting firms, and retirement funds. Actuaries are also employed by large corporations as well as the state and federal government. Actuarial responsibilities involve research, planning, forecasting, and decision-making as regards risk and contingency in financial and insurance programs. Actuaries use mathematical and computational methods to define, analyze and solve complex financial and social problems. They apply their knowledge to all aspects of insurance, financial and pension operations and are found wherever insurance-related problems arise. The actuary's primary work is to design risk management programs that will meet specific financial and social needs and operate on a sound financial basis. The programs may involve life insurance, health insurance, pensions and other employee benefit plans, property and liability insurance, social insurance (such as social security), or insurance on financial investments.

To become a Fellow in the Society of Actuaries, it is necessary to pass a series of actuarial exams. The entire process of becoming an actuarial Fellow can take 3 to 7 years of study and work experience beyond the bachelor's degree. For the first actuarial exam, a student needs a substantial background in calculus -based probability. Additional courses in economics, probability and statistics, insurance and finance provide further preparation and background for subsequent exams. However, even though their training is basically in mathematics, business, and economics, practicing actuaries must have good understanding on human behavior and deal with people with greatly varying educational backgrounds, and so must be able to explain and communicate complicated concepts effectively. Communication skills, both written and oral, are essential for success as an actuary.

Job Market and Salary Information: Employment of actuaries is expected to grow at a stable pace in the future. Recently, new employment opportunities arose from the need to analyze risks related to complex financial instruments, health-care costs, and climate change. Annual salaries for actuaries compare favorably with those of other professionals with comparable education and experience. According to recent salary surveys, in 2013 new actuarial associates with passing five actuarial exams earned between $81,000 and $109,000, whereas actuarial fellows with 4-6 years of experience averaged between $122,000 and $181,000. The average annual starting salary for graduates with a bachelor's degree in actuarial science and passing one actuarial exam was approximately $46,000-$65,000 in 2013. For those who successfully pass subsequent exams, salary increases come rapidly. Along with salaries, most actuaries receive excellent fringe benefits from their employers.

Suggestions: A broad range of training is needed to become a skilled actuary. Students need broad training in mathematics, business, economics and finance as well as development of their communication skills. Additional experience (e.g. summer internships) or skills (e.g. computer programming) will be attractive to employers. Job prospects for entry-level positions are tremendously improved for those who have passed at least one or two of the initial actuarial exams.

Resource People: Professors Haijun Li, Charles Moore, and Jave Pascual.

Required Courses: Math 360, 416, 423, 443, and one of 456 and 490 (Introduction to Stochastic Calculus).

Suggested Courses: Acctg 230 and 231, EconS 101 and 102, Fin 325, and Stat 516 provide additional background for actuarial exams. Math 499 (1-2 credits) provides additional preparation for the first two actuarial exams.

Note: You may need certification in the College of Business in order to register for Business courses. A minor in Accounting or Business, for example, is recommended.

Information about the actuarial exams and review materials can be downloaded from the Society of Actuaries web site at http://www.soa.org.

Actuarial Science Option Checklist and Schedule Worksheet

Mathematics BS Checklist

Credits			Completed
Core Math			✓
4	Math	171	_____
4	Math	172/182	_____
2/3	Math	220/230	_____
2	Math	273/283	_____
3	Math	300	_____
3	Math	301	_____
3	Math	315	_____
3+3	Math	360+443	_____
1	Math	398	_____
3	Math	401	_____
3	Math	402	_____
3	Math	420	_____
3	Math	421	_____
Actuarial Science Option			
3	Math	416	_____
3	Math	423	_____
3	Math	456 or 490	_____
1~2	Math	499	_____
Communication			
3	Engl	101	_____
3	Engl	402	_____
	Writing Portfolio		_____
World Civilizations			
3	Gen Ed	110	_____
3	Gen Ed	111	_____
	Foreign Language		_____
Other			
4	Cpt S	121/251	_____

Credits		Completed
Arts, Humanities, Soc Sci		✓
3	[H,G]	_____
3	[S,K]_____	_____
3	[I, K,G]_____	_____
3	[H,G,S,K]_____	_____
3	[H,G,I, S,K]_____	_____
3	[H,G,I, S,K]_____	_____
0	[D]: one above _____	_____
Sciences		
4	Phys 201_____	_____
4	[B, P, Q]_____	_____
3	[B, P, Q]_____	_____
1	Lab [B, P, Q] _____	_____
Electives		
3	Tier III_____	_____
VEE Requirements		
VEE1	Acctg 230+231_____	_____
__	EconS 101+102_____	_____
__	_____	_____
VEE2	Fin 325_____	_____
__	_____	_____
VEE3	Stat 423+516_____	_____
__	_____ _____	_____
__	_____	_____
__	_____	_____
__	_____	_____
__	_____	_____
__	_____	_____

Note: At least 120 credits are required with 40 of these credits in courses numbered 300 or above. At least 15 credits must be Tier I courses, 22 credits must be Tier II courses, and 3 credits must be a Tier III course. Arts, Social Sciences, Humanities, Diversity and Intercultural Studies courses must be chosen to satisfy the criteria set out in the Checklist under Arts, Hum, and Soc Sci (see WSU Catalog for which courses satisfy which designations). Science courses must include Phys 201, one biological Science [B], one lab in addition to Phys 201 (students often take this with their biology class), for 12 credits total. All Mathematics Options, except the Secondary Teaching Option, require Cpt S 121 or 251. The four courses listed under Math Option must be chosen from one of the lists on the following page. For non-native English speakers, Engl 403 may be substituted for Engl 402. Additional courses may also be required or recommended for each option, and these are also listed on the following page.

Required and Suggested Courses

Actuarial Science Option

Required: Math 360, 416, 423, 443, and one of 456 and 490 (Introduction to Stochastic Calculus).

Suggested: Acctg 230 and 231, EconS 101 and 102, Fin 325, and Stat 516 provide additional background for actuarial exams. Math 499 (1-2 credits) provides additional preparation for the first two actuarial exams.