

Actuarial Mathematics at Kent State University

Darci L. Kracht
Professor

Actuarial Mathematics Program Coordinator

Department of Mathematical Sciences
Kent State University

August 27, 2019

Actuarial Math Club: Student presentations



Actuarial Math Club: Recruiters



Actuarial Math Club: Officer Elections

- ▶ President
- ▶ Vice President
- ▶ Secretary
- ▶ Treasurer
- ▶ Historian

What is an Actuary?

Actuaries are professionals who

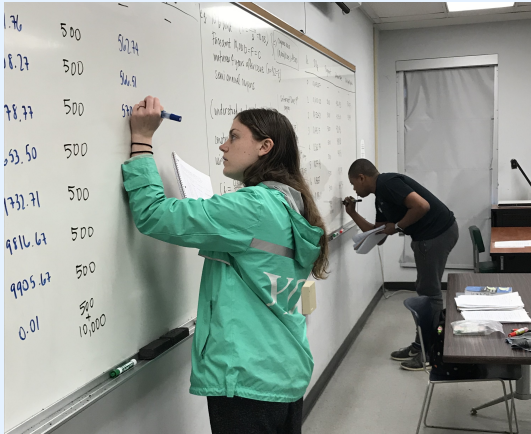
- ▶ Manage risk
- ▶ Predict the likelihood of future events and model the financial impact of future scenarios
- ▶ Find creative ways to mitigate the undesirable effects of future events

Employment

- ▶ Most are employed in the insurance and financial industries
- ▶ Others work in the transportation, environmental, medical, and manufacturing industries and in government
- ▶ Number of jobs in this field is increasing at a rate of 18% (much faster than average)
- ▶ 2016 median annual salary of actuaries was \$100,610
- ▶ Always highly ranked in job satisfaction surveys

Actuarial Mathematics at Kent State University

- ▶ BS in Actuarial Mathematics new in the 2019-20 catalog
- ▶ Previously Concentration under BS in Mathematics
- ▶ **If you are on an old catalog, your requirements have NOT changed.**



Sequencing Recommendations: General Principles

- ▶ 2–3 MATH courses per semester MAX
- ▶ Spread Kent Core courses across whole 4 years
- ▶ Spread Business courses, but start early if considering minor or double major
- ▶ CS requirement early
- ▶ Summer MATH classes very challenging
- ▶ Remember that all MATH prereqs require C or better (really should have B or better)
- ▶ Two issues in prerequisites:
 - ▶ Content
 - ▶ Mathematical maturity

Sequencing Recommendations

- ▶ Take in sequence without skipping a semester:
 - ▶ MATH 12002 Analytic Geometry and Calculus I
 - ▶ MATH 12003 Analytic Geometry and Calculus II
 - ▶ MATH 22005 Analytic Geometry and Calculus III
 - ▶ MATH 32044 Ordinary Differential Equations (“Calc IV”)

- ▶ Can take concurrently with MATH 12003 (Calc II)
 - ▶ MATH 21001 Linear Algebra
 - ▶ MATH 20011 Decision Making Under Uncertainty

- ▶ Can take concurrently with MATH 22005 (Calc III)
 - ▶ MATH 30055 Mathematical Theory of Interest
 - ▶ MATH 31011 Proofs in Discrete Mathematics

Highlights of Timing Changes

- ▶ Moved Act Math courses earlier in the curriculum
 - ▶ Students can see if they like it
 - ▶ Take more SOA exams before graduating
 - ▶ Get internship earlier
- ▶ MATH 30055 (Theory of Interest) to be offered Fall (not Spring) beginning Fall 2019
 - ▶ Actuarial Math students should take it Fall of sophomore year
 - ▶ Then take Exam FM in spring
- ▶ MATH 40011 (Probability) to be offered both Fall and Spring (not Summer) beginning Spring 2019
 - ▶ Actuarial Math students should take it Spring of sophomore year
 - ▶ Then take Exam P in summer
- ▶ MATH 40055-6 (Act Math I-II) can then be taken junior year
 - ▶ Prereqs are MATH 30055 and MATH 40011
 - ▶ Then take Exam LTAM following fall

Sequencing Recommendations

- ▶ MATH 40059 Stochastic Actuarial Models is probably hardest course in Actuarial Math curriculum— take Spring of senior year

- ▶ ECON 32050 Applied Econometrics I
 - ▶ Prerequisites
 - ▶ MATH 12002 (Calc I)
 - ▶ ECON 22060 (Microeconomics)
 - ▶ MIS 24056 (Business Analytics I): typically waived for our students who have taken MATH 40011-12
 - ▶ ECON 32051 Applied Econometrics II is a good course for our students, so maybe take ECON 32050 earlier than indicated on roadmap

See your advisors each semester!

- ▶ Professional Advisor: College of Arts & Sciences
 - ▶ University and College graduation requirements
 - ▶ Can lift your pin to register for classes
- ▶ Faculty Advisor: Dr. Kracht: drkracht.youcanbook.me
 - ▶ Mathematics requirements
 - ▶ Advice on which course to take when
 - ▶ **New!** Can lift your pin to register for classes
- ▶ Additional advisors for other majors, minors
 - ▶ How many courses can be double-counted?

Typical/Recommended Second Major or Minor

- ▶ Finance
- ▶ Economics
- ▶ Data Analytics
- ▶ Computer Science
- ▶ Insurance Studies
- ▶ Foreign language
- ▶ Anything the you love!

Credentialing of Actuaries in the US

Society of Actuaries: www.soa.org

- ▶ Associate of the Society of Actuaries (ASA)
- ▶ Fellow of the Society of Actuaries (FSA)
- ▶ Chartered Enterprise Risk Analyst (CERA)

Casualty Actuarial Society: www.casact.org

- ▶ Associate of the Casualty Actuarial Society (ACAS)
- ▶ Fellow of the Casualty Actuarial Society (FCAS)
- ▶ Chartered Enterprise Risk Analyst (CERA)

Be An Actuary: beanactuary.org

SOA Credentialing: ASA (Associate of the Society of Actuaries)

Current ASA requirements:

Exam P–Probability

Exam FM–Financial Mathematics

Exam IFM–Investment and Financial Markets

Exam LTAM–Long-Term Actuarial Mathematics

Exam STAM–Short-Term Actuarial Mathematics

Exam SRM–Statistics for Risk Modeling

Exam PA–Predictive Analytics

VEE Mathematical Statistics

VEE Economics

VEE Accounting and Finance

(Grade of B- or better required for VEE credit)

Fundamentals of Actuarial Practice (FAP) eLearning Course

Associateship Professionalism Course (APC)

SOA Credentialing: ASA (Associate of the Society of Actuaries)

KSU is designated **UCAP-Advanced Curriculum** by the SOA.

Exam P–Probability: MATH 40011

Exam FM–Financial Mathematics: MATH 30055

Exam IFM–Investment and Financial Markets: MATH 40059

Exam LTAM–Long-Term Actuarial Mathematics: MATH 40055-6

Exam STAM–Short-Term Actuarial Mathematics

Exam SRM–Statistics for Risk Modeling

Exam PA–Predictive Analytics

VEE Mathematical Statistics: MATH 40012

VEE Economics: ECON 22060-1

VEE Accounting and Finance: ACCT 23020, FIN 36063

(Grade of B- or better required for VEE credit)

Fundamentals of Actuarial Practice (FAP) eLearning Course

Associateship Professionalism Course (APC)

- ▶ Goal:
 - ▶ Pass 2–3 exams before graduating
 - ▶ Earn credential within 5 years of graduating
- ▶ Pass rates typically 49%
- ▶ Students grossly underestimate time and effort needed to pass
- ▶ Approx 100 hours of study per hour of exam
- ▶ Download syllabus and readings from SOA website
- ▶ Exam prep materials:
 - ▶ Sample questions and solutions on SOA website (Free)
 - ▶ ACTEX Learning Manuals (Inexpensive)
 - ▶ ASM (Actuarial Study Materials) Manuals (Inexpensive)
 - ▶ The Infinite Actuary (TIA) on-line materials (Expensive)
 - ▶ Coaching Actuaries on-line materials (Expensive)
- ▶ Register for exam on SOA site, then reserve time at Prometric Test Center

Internships: Must apply in the fall for the following summer



Independent Research Project

RESULTS

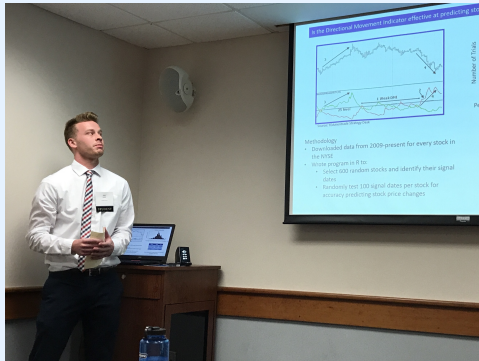
- Results are given in a range from low APV of expenses to high APV of expenses
- Estimates are for semi-private room costs in Ohio, and are sorted by male and female
- Females can consistently expect higher APV compared to male counterparts
- Lowest APV of costs would be for a male over the age of 95 at \$141,700

Low and High Cost Estimates

Age	Male Low	Male High	Female Low	Female High
65-64	317,800	411,800	378,800	508,200
65-74	269,800	359,800	329,800	438,200
75-84	278,700	368,800	339,800	447,200
85-84	219,800	288,800	269,800	357,200
95+	141,700	188,800	191,800	258,200

SURE: Summer Undergraduate Research Experience

Apply in spring for summer 2020.



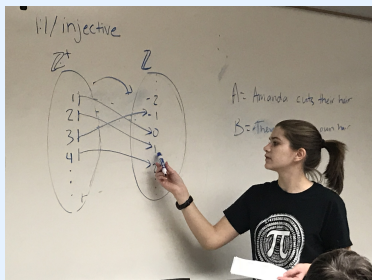
YSU PME Student Conference: Saturday, February 22, 2020



MAA MathFest: July 29–August 1, 2020, Philadelphia, PA



Math Club: Meetings 5:00–6:00 alternate Tuesdays



Your Future!

