

Actuarial Mathematics at Kent State University

Darci L. Kracht
Professor

Actuarial Mathematics Program Coordinator

Department of Mathematical Sciences
Kent State University

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What is an Actuary?

Actuaries are professionals who

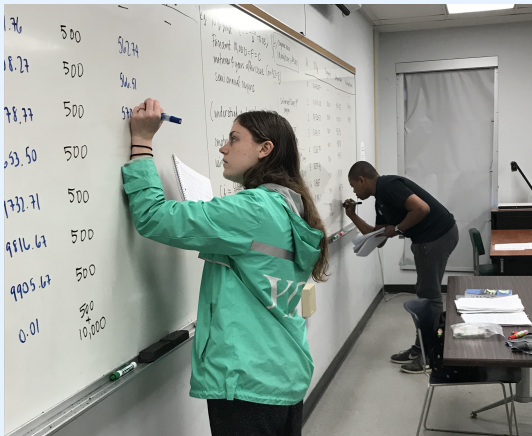
- ▶ Manage risk
- ▶ Predict the likelihood of future events and model the financial impact of future scenarios
- ▶ Find creative ways to mitigate the undesirable effects of future events

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 beginning with 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

- ▶ Max 3 MATH courses per semester
- ▶ Spread Kent Core courses across whole 4 years
- ▶ Spread Business courses, but start early if considering minor or double major
- ▶ CS requirement early— first semester is best
- ▶ 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 Course Timing

- ▶ MATH 30055 (Theory of Interest) is offered in Fall
 - ▶ Actuarial Math students should take it Fall of sophomore year
 - ▶ Then take Exam FM in spring

- ▶ MATH 40011 (Probability) is offered both Fall and Spring
 - ▶ 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
 - ▶ Exam LTAM has been replaced by FAM and ALTAM

Sequencing Recommendations

- ▶ MATH 40059 Stochastic Actuarial Models is probably hardest course in Actuarial Math curriculum— take Spring of senior year
 - ▶ Exam IFM has been eliminated
 - ▶ Some material moved to Exam FAM and others

- ▶ ECON 32050 Applied Econometrics I
 - ▶ Prerequisites
 - ▶ MATH 12002 (Calc I)
 - ▶ MATH 20011 (Decision Making Under Uncertainty)
 - ▶ ECON 22060 (Microeconomics)
 - ▶ 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
 - ▶ 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!

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

- ▶ Exam P–Probability
 - ▶ Exam FM–Financial Mathematics
 - ▶ Exam IFM–Investment and Financial Markets
(last sitting Nov 2022)
 - ▶ Exam FAM–Fundamentals of Actuarial Mathematics
(first sitting Oct 2022)
 - ▶ Exam ALTAM–Advanced Long-Term Actuarial Mathematics
(first sitting Spring 2023)
 - ▶ Exam ASTAM–Advanced Short-Term Actuarial Mathematics
(first sitting Spring 2023)
 - ▶ Exam SRM–Statistics for Risk Modeling
 - ▶ Exam PA–Predictive Analytics
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- ▶ VEE Mathematical Statistics
 - ▶ VEE Economics
 - ▶ VEE Accounting and Finance

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

- ▶ Exam P–Probability: MATH 40011
- ▶ Exam FM–Financial Mathematics: MATH 30055
- ▶ Exam FAM–Fundamentals of Actuarial Mathematics: MATH 40055–56; 40059 (*covers half*)
- ▶ Exam ALTAM–Advanced Long-Term Actuarial Mathematics: MATH 40056 (*covers some*)
- ▶ Exam ASTAM–Advanced Short-Term Actuarial Mathematics
- ▶ Exam SRM–Statistics for Risk Modeling
- ▶ Exam PA–Predictive Analytics

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- ▶ 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)

ASA Pathway Requirements and Transition Rules

- ▶ Several other modules and elearning courses are required for the ASA
- ▶ New requirements and exams will be phased in over a few years.
- ▶ For full details:

<https://www.soa.org/education/exam-req/edu-asa-req/>

- ▶ Exam 1/P –Probability: MATH 40011
- ▶ Exam 2/FM–Financial Mathematics: MATH 30055
- ▶ MAS-I–Modern Actuarial Statistics I
- ▶ MAS-II–Modern Actuarial Statistics II
- ▶ Exam 5–Basic Ratemaking and Estimating Claim Liabilities
- ▶ Exam 6–Regulation and Financial Reporting

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- ▶ VEE Economics: ECON 22060-1
 - ▶ VEE Accounting and Finance: ACCT 23020, FIN 36063
(Grade of B- or better required for VEE credit)

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- ▶ Several other modules and elearning courses required
 - ▶ For full details:

<https://www.casact.org/credential-requirements>

Actuarial Exams

- ▶ Goal:
 - ▶ Pass 2 exams before graduating
 - ▶ Earn credential within 5 years of graduating
- ▶ Pass rates typically approx 50%
- ▶ 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)
 - ▶ ASM (Actuarial Study Materials) Manuals (Inexpensive)
 - ▶ ACTEX Learning Manuals (Inexpensive)
 - ▶ ACTEX GOAL Software
 - ▶ The Infinite Actuary (TIA) on-line materials (Expensive)
 - ▶ Coaching Actuaries on-line materials (Expensive)
- ▶ Register for exam on SOA site, then reserve time on Prometric Test Center site
- ▶ Fees will be reimbursed if you pass!

Internships: Start applying in the fall for the following summer



Independent Research Project

RESULTS

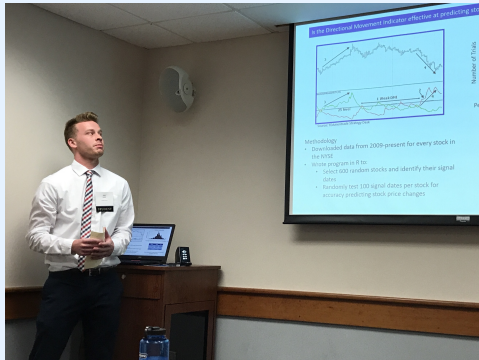
- Results are given in a range from low APV of expenses to high APV of expenses
- Estimates are for semi-private room costs in Ohio, and are sorted by male and female
- Females can consistently expect higher APV compared to male counterparts
- Lowest APV of costs would be for a male over the age of 95 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	338,800	447,200
85-84	218,800	288,800	268,800	357,200
95+	141,700	188,800	198,800	268,200

SURE: Summer Undergraduate Research Experience

Apply in spring for summer 2023.



Actuarial Math Club: Student presentations



Actuarial Math Club: Recruiters



Actuarial Math Club: Officer Elections

- ▶ President
- ▶ Vice President
- ▶ Secretary
- ▶ Treasurer
- ▶ At-Large

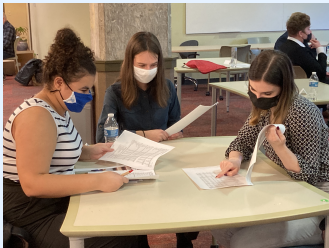
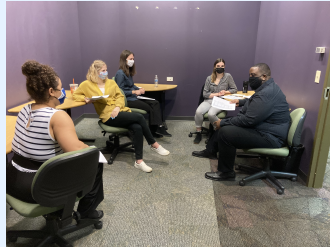
Candidates:

- ▶ Joey Weller
- ▶ Alexis Lytle
- ▶ Grace Lahrmer
- ▶ Nominations from the floor...

YSU PME Student Conference: Saturday, February 25, 2023



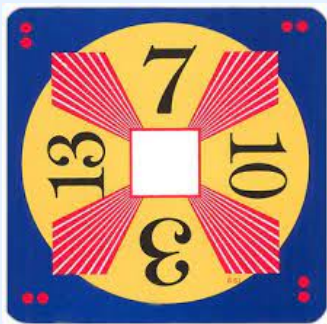
MAPFRE Insurance Simulation Competition



Math 24 Challenge: Portage County Schools

Request for volunteers:

- ▶ Thursday, February 23, 9:30 am – 1 pm
- ▶ www.24game.com



Your Future!

