

# MA (ST) 413 Short-Term Actuarial Models

Summer II, 2019

MTWHF 8:00am-9:30am

SAS1218

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**1. Instructor:** Tao Pang                      **Office:** SAS 4116  
**Telephone:** 513-2110                      **Email:** tpang@ncsu.edu  
**Office hours:** Tu, Th 4-5pm, or by appointment.

## 2. Prerequisites:

MA 421 or equivalent is preferred but not required. However, the student should be familiar with basic probability concepts and distributions. Knowledge of long-term models as developed in MA 412—Long-Term Actuarial Models is not assumed.

## 3. Textbooks:

- *Loss Models: From Data to Models (4th Edition)* by Klugman, Panjer and Willmot, required.
- *Actuarial Mathematics* by Bowers, Gerber, Hickman, Jones and Nesbitt, 2nd Ed. /1997, optional.

## 4. Course Objectives:

This course introduces students to risk management systems by developing some short-term probability models for potential losses. Short-term probability models are appropriate for most traditional property, liability, health and group insurance systems.

## 5. Outline of Course:

- *Characterizing frequency distributions and loss distributions:* Characterize distributions in terms of their parameters and moments; techniques for creating new families of distributions; applications for which these distributions are used.
- *Frequency and severity with coverage modifications:* Deductible, policy limits and coinsurances and their impacts on loss and frequency distributions.
- *Aggregate loss models:* Probability distribution of an aggregate loss modeled as the sum of a random number of individual losses; compound distributions and their properties; tabulating a distribution by exact and approximate methods; applications; individual risk models.

## 6. Grade Policy

- **Homework: 20%**
  - Homework will be assigned on weekly basis (total of five). Late homework will not be accepted.
  - Homework assignments will be given in course moodle.

- **Tests: 50%**
  - Two in-class 90-minute tests will be given on July 8th, Monday and July 19th, Friday.
  - Each test will cover the topics studied in classes before the test and after the previous test, if any.
  - **No make-up test will be given.**
- **Final Exam: 30%**
  - Exam time: July 30th, Tuesday, 8:00am-11:00am.
  - It will cover the work of the entire semester.

**7. Attendance Policy:**

The attendance policy is consistent with the Academic Regulations which can be found at <http://policies.ncsu.edu/regulation/reg-02-20-03>

**8. Disability Services for Students:**

Students with a disability must contact the NCSU Disability Services.  
Additional information: <http://dso.dasa.ncsu.edu/>