

## 40056 Actuarial Mathematics II (4)

### **Knowledge**

Students will develop background in benefit premiums, and benefit reserves for a variety of life insurance products. They will also learn the basic concepts of multiple decrement theory and multiple life functions, and will be introduced to certain non-homogeneous Markov processes that arise in the insurance context.

### **Comprehension**

Students will be able to calculate premiums and reserves for a variety of insurance products, and will be able to derive standard formulas for these quantities. Students will acquire a level of knowledge that enables them to prove basic theorems regarding reserves and premiums for individuals and for typical entities associated with joint life and last survivor statuses.

### **Application**

Students will demonstrate knowledge of the underlying theory by calculating reserves and premiums for both continuous-time and curtate future life models.

### **Analysis**

Students will apply methods of probability theory and differential equations to model premiums and reserves for individual lives and more complex entities. They will also learn conventional methods of incorporating costs and profit into premium calculations.

### **Synthesis**

The heavy dependence of the of life contingency theory on probability theory and ordinary differential equations provides the students with opportunities to integrate these tools into the formulation of practical models that arise naturally in the study of risk. Key methods of ODE and probability will be reviewed as necessary and appropriate.

### **Evaluation**

Students are evaluated based on homework assignments and midterm and final examinations. Both homework and examinations will include the numeric solution of applied problems as well as the derivation of theoretical results.

### **Class Activities**

Students are required to present both theoretical derivations of important theorems and numerical solutions of practical problems in class. Their presentations are critiqued both for mathematical correctness and for clarity of presentation.

### **Out of class Activities**

Out of class activities include the solution of numerical applied problems and proof of theoretical results.