Mathematics Department
Brooklyn College, City University of New York
Math 2601 (Introduction to Financial Mathematics)
4 hours lecture; 4 credits

Suggested Textbooks:
- Mathematics of Investment and Credit, by Samuel A. Broverman
- Mathematical Interest Theory, by Stephen Kellison
- Interest Theory: Financial Mathematics and Deterministic Valuation, by Joe Francis and Chris Ruckman
- Financial Mathematics for Actuaries, Wai-Sum Chan and Yiu-Kuen Tse

1. Time value of money
   - Interest rate, simple interest and compound interest
   - Accumulation function
   - Future value, current value, present value and net present value
   - Discount factor and discount rate
   - Nominal rate, convertible m-thly rate, and effective rate
   - Inflation and real rate of interest
   - Force of interest
   - Equation of value

2. Annuities/cash flows with non-contingent payments
   - Annuity-immediate, annuity due, and perpetuity
   - m-thly payable and continuously payable annuities
   - Level payment annuity, arithmetic annuity and geometric annuity

3. Loans
   - Principal, interest and term of loan
   - Outstanding balance and final payment (drop payment, balloon payment)
   - Amortization

4. Bonds
   - Price, book value, amortization of premium, and accumulation of discount
   - Redemption value and par value/face value
   - Yield rate
   - Coupon and coupon rate
   - Callable/non-callable bonds

5. General cash flows and portfolios
   - Yield rate/rate of return
   - Dollar-weighted rate of return, time-weighted rate of return
   - Current value
   - Duration (Macaulay and modified) and convexity (Macaulay and modified)
   - Spot rate and forward rate
   - Yield curve
   - Stock price and dividend

6. Immunization
   - Cash flow matching
   - Immunization (including full immunization)
   - Redington immunization.

<u>The order in which the topics are covered is at the discretion of the instructor.</u>