Tennessee Technological University
Mathematics Department

MATH 4550/5550-4560/5560: Mathematics of Investment I-II

Topics include derivative securities, mathematical models of financial risk management, and corporate finance. Lec. 3. Cr. 3.

V. TOPICS TO BE COVERED:

MATH 4550/5550 Topics
1. Interest Theory: Accumulation function, discount function, interest rate, discount factor, discount rate, time value of money, force of interest, equation of value.
2. Non-contingent Annuities: Annuities immediate, annuities due, perpetuities, deferred annuities, continuous annuities, annuities with general payments, annuities with different payment and conversion periods.
3. Loan Repayment: Amortized loans and amortization schedules, sinking fund method, loan repayment with other patterns, final drop and balloon payments, replacement of capital.
4. Bonds and Stocks: Bond pricing formulas, bond amortization schedules, valuing a bond, callable bounds, floating-rate bonds, yield rate, coupon and coupon rate, stocks and terminologies.
5. Advanced Analysis: Rate of return, yield curves, rates, arbitrage, duration, convexity, measures of price sensitivity, immunization, determinants of interest rates.
6. Interest Rate Swaps: Swap rate, market value of a swap, deferred swap, amortizing swap, and related calculations.

MATH 4560/5560 Topics
1. Risk and Return: project analysis, competitive and efficient markets, capital markets and pricing of risk, portfolio optimization and capital asset pricing models, cost of capital, capital market efficiency, behavior of investor, sensitivity analysis, simulation, real options.

VII.   POSSIBLE TEXTS AND REFERENCES:

MATH 4550/5550

    Required:

1. Kellison, S.G., The Theory of Interest (Third Edition), 2009, Irwin/McGraw-Hill.

    Supplementary:

1. Broverman, S.A., *Mathematics of Investment and Credit* (Seventh Edition), 2017, ACTEX Publications.
2. Vaaler, L.J.F., Harper, S.K., and Daniel, J.W.,