

Financial Risk Management ENG MGT 6215 (co-listed with SYS ENG 6615)

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Contact Information

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 - <http://www.mst.edu/~enke/>
- Course information
 - <http://canvas.mst.edu/>
 - <http://web.mst.edu/~enke/courses/ENGMGT6215/>

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Course Information

- Meet on Tuesday/Thursday afternoons
 - 12:30-1:45 pm central
 - January 22nd to May 7th
 - No class/lecture on:
 - March 12th and 14th (Spring recess - St. Pats)
 - Test 1 is due on March 12th
 - March 26th and 28th (Spring break)
 - May 7th (Test 2 due)
- Class Location: Library, Room G-14

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Course Textbook Online Resources

- No formal textbook is assigned for the *Financial Risk Management* course
- Instructor notes available on Canvas
- Students can refer to the following:
 - "Risk Management and Financial Institutions," 5th Edition, John C. Hull, *Prentice Hall*, 2018
 - "Options, Futures, and Other Derivatives," 10th Edition, John C. Hull, *Prentice Hall*, 2017
 - "Investments," 11th Edition, Zvi Bodie, Alex Kane, Alan Marcus, *McGraw Hill*, 2017

Homework and Tests

- Four homework assignments
 - 15% each (60% total)
 - Calculation problems and computer assignments (at times using Excel)
- Two tests
 - 20% each (40% total)
 - Take home, open book, open notes
 - Based on note problems, homework problems, and lecture material
- All assignments due by 12 pm noon central

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Homework and Tests

- Homework assignments will be made in class
- Late homework will be accepted for a maximum of two days after the original due date (weekend days count)
- 10% will be deducted for each day the homework assignment is late
- Makeup tests that result from schedule conflicts must be approved by the instructor at least one week prior to the test

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Course Resources

- Instructor homepage
 - <http://web.mst.edu/~enke/>
- Course homepage and lecture schedule
 - <http://web.mst.edu/~enke/courses/ENGMGT6215/>
 - Students will be notified of major changes to the lecture schedule (test and homework due dates, topic coverage), both in class and by email

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Course Resources

- Canvas
 - <http://canvas.mst.edu/>
- Canvas will contain:
 - Class lecture notes (presentation slides)
 - Class handouts
 - Any practice problems/solutions (if provided)
 - Homework assignments and solutions
 - Tests and solutions

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Course Resources

- Canvas notifications and content release
 - With the proper settings selected in Canvas, students can be notified of changes to the availability of course content (notes, test and homework assignments, grades, etc.)
 - Students can set the updating frequency
 - Tests and homework assignments will become available at 12:30 pm central on the date defined on the lecture schedule

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Course Resources

- The lecture notes are in Adobe Acrobat pdf format
 - One, two, three, and six slide per page formats are available
 - Adobe Acrobat Reader can be used to view the lecture notes
 - <http://get.adobe.com/reader/>

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Main Course Concepts


- Volatility and its Estimation (EWMA, GARCH, Maximum Likelihood Estimation),
- Correlation and its Estimation (EWMA, GARCH, Copulas)
- Value-at-Risk (VaR): Model and Simulation
- Liquidity, Model, and Operational Risk
- Diversification, Portfolio Theory and Portfolio Construction/Management
- Credit Risk and Credit Derivatives

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Course Topics

- Estimating Volatilities and Correlations
 - Definition of volatility and implied volatilities
 - Estimating volatility from historical data
 - Monitoring daily volatility
 - Exponentially weighted moving average model
 - The GARCH(1,1) model
 - Choosing between the models
 - Maximum likelihood methods
 - Using GARCH(1,1) to forecast future volatility


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Course Topics

- Estimating Volatilities and Correlations cont.
 - Definition of correlation
 - Monitoring correlation
 - Multivariate normal distributions
 - Using EWMA and GARCH
 - Copulas
 - Application to loan portfolios


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Course Topics

- Value at Risk (VaR)
 - Definition of VaR
 - VaR versus expected shortfall
 - Properties of risk measures
 - Choice of parameters for VaR
 - Marginal VaR, incremental VaR, and component VaR
 - Back testing


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Course Topics

- Value at Risk (VaR) cont.
 - Market Risk VaR - Historical Simulation Approach
 - VaR historical method
 - Accuracy
 - Extensions
 - Extreme Value Theory
 - Applications using historical simulation for VaR


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Course Topics

- Value at Risk (VaR) cont.
 - Market Risk VaR - Model Building Approach
 - The linear model
 - Handling interest rates
 - Applications of the linear model
 - The linear model and options
 - The quadratic model
 - Monte Carlo simulation
 - Using distributions that are not normal
 - Model building versus historical simulation


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Course Topics

- Liquidity Risk
 - Liquidity trading risk
 - Liquidity funding risk
 - Traditional view of liquidity risk
 - Liquidity black holes
 - Problems with Long-Term Capital Management
 - Liquidity versus profitability


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Course Topics

- Model Risk
 - Marking to market
 - The nature of models in finance
 - Models for nonlinear products
 - Physics versus finance
 - How models are used for pricing products
 - Hedging
 - Models for actively traded products
 - Models for structured products
 - Dangers in model building, detecting problems


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Course Topics

- Operational Risk
 - What is operational risk?
 - Determination of regulatory capital
 - Categorization of operational risks
 - Loss severity and loss frequency
 - Forward looking approaches
 - Allocation of operational risk capital
 - Use of the power law
 - Insurance
 - Sarbanes-Oxley


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Course Topics

- Diversification, Portfolio Theory, Portfolio Construction, and Evaluation
 - Notions of Risk, Risk and Uncertainty
 - Portfolio Risk, Systematic Risk, Non-Systematic Risk, CAPM
 - Mean-Variance Framework/Procedure
 - Diversification of Stock and Bond Portfolios
 - Recommendations for Diversification


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Course Topics

- Credit Risk
 - Estimating Default Probabilities
 - Credit ratings, credit indices
 - Historical default probabilities, recovery rates
 - Estimating default probabilities from bond prices
 - Comparison of default probability estimates
 - Using equity prices to estimate default probabilities


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Course Topics

- Credit Risk cont.
 - Credit Risk Losses and Credit VaR
 - Estimating credit losses
 - Credit risk mitigation
 - Credit VaR
 - Vasicek's model
 - Credit Risk Plus
 - CreditMetrics


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Course Topics

- Credit Derivatives
 - Credit default swaps (CDS)
 - Valuation of CDS
 - Credit indices
 - CDS forwards and options
 - Total return swaps
 - Basket credit default swaps
 - Collateralized debt obligations (CDO)
 - Valuation of a basket of CDS and CDO products

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Disclaimer

- Nothing presented or discussed in this course should be considered a recommendation to buy or sell a security or other financial product
- The instructor is not a registered financial analyst

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