

SIMON FRASER UNIVERSITY
Master of Financial Risk Management Program

Course:	Business 864	Semester:	Spring 2006
Title:	Credit Risk Modeling and Management	Instructor:	Robert Jones Anton Theunissen

This course introduces students to the measurement, management, valuation and hedging of exposure to credit risk. Continuous time contingent claim ('option pricing') methods form the basis for most of the analysis. Credit scoring and ratings transition methods will be touched upon.

The intent is that, by the end of the course, you will be able to apply these methods — at least in rudimentary fashion — to realistic quantitative problems. Consequently there will be considerable emphasis on numerical implementation. This will be done in Excel and VBA. Homework assignments will require use of these tools.

Principle text for the course is *Credit Risk Modeling* by David Lando. All chapters of this book will be covered to some degree. Some of the more technical sections will be omitted. Further readings will be drawn from other books plus industry materials put on the course website.

Course grade will be based on homework assignments (approximately one per week), a midterm exam and a final exam.

1. Background theory:

- discussion of credit risk, risk management, regulation
- overview of risk models and methods
- introduction to stochastic processes
- arbitrage based pricing: valuation pde
- empirical vs. risk-neutral processes: risk premiums
- Monte Carlo valuation and simulation: Feynman-Kac
- introduction to finite difference methods: Crank-Nicholson

2. Structural models:

- Black-Scholes-Merton
- asset value jumps: Zhou
- default barriers: Black-Cox
- asset correlation

3. Intensity models:

- constant intensity
- calibration to yield curves
- stochastic intensity: Cox process
- interactions: correlation and copulas
- market crash risk: extreme value statistics

4. Ratings transition models:

- agencies and their ratings
- discrete time transition
- continuous time transitions
- transition matrix estimation

5. Single name credit derivatives:

- credit default swap
- asset swap
- total return swap
- recent innovations

6. Portfolio products:

- n^{th} to default swap
- securitizations
- synthetic CDOs
- large portfolios
- recent innovations

7. Counterparty risk:

- equity options
- forex and interest rate swaps
- collateral, LCs, guarantees

8. Scoring models:

- logit and probit regressions
- Altman Z-score
- credit card application: FICO

9. Risk capital measurement and allocation:

- BIS regulatory capital requirements
- VaR and RAROC capital measures
- Merton-Perold risk capital measures