

WG #1 3/13/11
APR approved 12/20/11

1st Bulletin 12-1-11
2nd Bulletin 1-5-12

1112301

COURSE APPROVAL ROUTING CHECKLIST

1. Course Number: ACM653
2. Course Title: Markov Chain Models in Credit Risk Management
(no more than 70 characters)

3. Title Abbreviation: Markov Chain Models
For use in Course Schedule (no more than 19 characters)

4. Action: New Course Revision IF Designation WAC

Requested IF Designation(s): _____

Course Proposal/Revision Checklist

This checklist will help departments avoid some of the more common mistakes made on course proposals and revisions. Your use of the checklist will allow the College Senate Curriculum Committee to focus its review on more substantive issues, thus expediting the approval process.

- Proposal conforms to all guidelines listed in the *Directory of Policy Statements*.
- Proposal has been proofread for spelling, punctuation, grammar, and narrative style.
- If the course is a new course, reasons for the additions are included; if the course is a revision of an existing course, reasons for revision and a copy of the old course are included as well as the IF submission narrative when appropriate.
- Catalog description follows the guidelines in the *College Senate Curriculum Handbook*.
- Student learning outcomes are correlated appropriately with course content and assessment.
- All resources are listed alphabetically and conform to a conventional academic style.
- Cross-listed courses have been checked with all chairs and deans involved in development of the course.

DEPARTMENTAL ACTION

[Signature] _____ 11/3/11
Chair, Department Curriculum Committee Date

Approved with confirmation that all necessary laboratories, studios, resources, facilities, and personnel for support of this course are available.

[Signature] _____ 11/3/11
Signature, Department Chairperson (both Chairs if course is cross-listed) Date

Mathematics
Department

(OVER)

Prefix, Number and Name of Course: ACM 653 Markov Chain Models in Credit Risk Management

Credit Hours: 1

In Class Instructional Hours: 1

Labs: 0

Studio: 0

Field Work: 0

Catalog Description:

Prerequisites: Graduate standing.

Practical introduction to mortgage lending and the practice of measuring and managing consumer credit risk. Introduction to Markov chain theory and transition roll rate modeling through extensive case study of the collapse of the U.S. mortgage industry in 2007 - 2008 and the origins of the Great Recession. Risk reporting and segmenting; probability of default; loss given default; house price dynamics; loss forecasting with consideration of micro and macro-factors. Use of statistical software package SAS to analyze loan-level datasets. Suggested preparation: previous coursework or experience in calculus, linear algebra, linear regression, and introduction to programming.

Reasons for Addition:

To create a one-semester hour practicum class for the graduate Professional Applied and Computational Mathematics (PACM) program that integrates theory with direct applications in banking and finance. This course is designed to attract advanced/upper level students outside the PACM program including advanced/upper-level students from economics and finance. Assessment will include problem sets, in-class quizzes on reading, and a course project involving mortgage loss forecasting that will include both written and oral components.

The PACM curriculum is designed to integrate mathematical theory with real-world applications. This course uses experiential learning to simulate the work environment encountered by technical employees working in the banking and finance industries.

Student Learning Outcomes	Course Content References	Assessment
Students will:		
1. assess the strengths and benefits of transition roll rate modeling for credit risk forecasting using Markov Chain Theory	I, II, IV	Problem Sets, Examination, Course Project
2. analyze credit risk and forecast losses on a portfolio of loans using SAS and Excel models.	I, II, IV, V	Problem Sets, Course Project, Class Labs and Discussion
3. analyze the U.S. mortgage industry and the origins of the subprime mortgage crisis and the Great Recession.	II, III, IV	Problem Sets, Examination, Course Project

System; Arlington, VA October 25, 2010

<http://www.fdic.gov/news/news/speeches/chairman/spoct2510.html>

Breeden, Joseph L. *Portfolio Forecasting Tools: What You Need To Know*. Strategic Analytics. 2003.

Bhutta, Neil, et. al. "The Depth of Negative Equity and Mortgage Default Decisions." Federal Reserve Board of Governors Working Paper. May 2010.

Delwiche, Lora D. and Susan J. Slaughter. *The Little SAS Book: A Primer, Third Edition*. SAS Publishing 2003. <http://www.amazon.com/Little-SAS-Book-Primer-Third/dp/1590473337>

Dungey, Doris. "The Complete UberNerd". August 2007. (Especially articles on mortgage servicing, FICO, MBS, delinquency and default, and REO and foreclosure).

<http://www.calculatedriskblog.com/2007/07/compleat-ubernerd.html>

Foote, Christopher L., et. al. "Negative Equity and Foreclosure: Theory and Evidence". Federal Reserve Bank of Boston Working Paper. June 2008.

Frankel, Allen, et. al. "The Danish Mortgage Market". BIS Quarterly Review, March 2004.

Jozoff, Matthew, et. al. *JPMorgan Mortgage Backed Securities Credit Monthly*. 2011.

Ross. *Introduction to Probability Models*. 4th Edition. Chapter 13 – Markov Chain Models.

Schuermann, Til. "What Do We Know About Loss Given Default?" Wharton Financial Institutions Center Working Paper. February 2004

Searle, S.R. and W. H. Hausman. *Matrix Algebra For Business and Economics*. 1970. Chapter 2 – Matrix Arithmetic.

Searle, S.R. and W. H. Hausman. *Matrix Algebra For Business and Economics*. 1970. Chapter 8 – Markov Chains.

Sinkey, Joseph. *Commercial Bank Financial Management*. 6th Edition. 2002. Chapter 12 – Consumer and Small Business Lending.

"The Supervisory Capital Assessment Program: Design and Implementation." Board of Governors of the Federal Reserve System. April 24, 2009.

"The Supervisory Capital Assessment Program: Overview of Results." Board of Governors of the Federal Reserve System. May 7, 2009.

Yezer, Anthony M. "A Review of Statistical Problems in the Measurement of Mortgage Market Discrimination and Credit Risk". Research Institute for Housing America. September 2010.

College Senate Curriculum Committee
Revisions for Final Approval
Curricular Item

111230

Course: New X Revised Number ACM 653

Program: New Revised Hegis Code

Title: Markov Chain Models in Credit Management

Requested Revisions:

Course Description

Revise initial expression "Hands on" to read "Practical."

*switched docs
12/20/11*

Michael C. Lay Date 12/15/11
Chair, College Senate Curriculum Committee

Karen O'Leary Date 12/20/11
Dean's Office, SNSS, SOE, SAH, SOP

Please attach a copy of the newly revised curricular item and return with this form to the College Senate Office, Cleveland Hall 211 (878-5139). Also, send electronic copy to csc@buffalostate.edu.