Course Overview

This is an advanced analytics course for students interested in cutting-edge techniques for marketing decision modeling and business research. It intends to help students develop analytical skills valuable for a wide range of business fields. Marketing as well as other business professions are evolving rapidly with new developments of information technology and advancements in analytical tools. The “big-data” revolution is driving a shift away from intuitive decision making to data-analytics based decisions. Companies are increasingly competing on analytics and are in need for people with both managerial expertise and analytical skills. This course intends to help students develop these skills. It provides in-depth coverage on a variety of advanced analytical models and focuses on their applications to real-world marketing decision problems.

This is a hands-on and application-orientated course. It not only introduces students to a variety of marketing decision models, but also teaches them how to estimate these models using statistical software (SAS and Glimmix) and how to apply them for decision recommendations. Students will “get their hands dirty” working on five case projects, each of which requires them to analyze the business problem, select and estimate relevant models, interpret estimation results, and make decision recommendations.

We will cover five key topics in a span of seven weeks of classes: 1) linear and linearizeable regression models, and their applications to sales response models for pricing decisions; 2) Generalized linear models, and their applications to evaluating print ad designs using eye-tracking data; 3) purchase incidence, quantity, and brand choice models, and their applications to the evaluation of sales promotion effectiveness; 4) mixture regression models, and their applications to market segmentation; and 5) choice-based conjoint analysis and mixture multinomial logit models, and their applications to new product development.

Learning Objectives

This course intends to familiarize students with a variety of sophisticated marketing decision models and help them enhance the skill of applying advanced analytical techniques to
improve managerial decision makings. After completing this course, you should:

- Be able to translate strategic decision problems into well-formulated statistical models and to identify the operational components for implementing these models.
- Be familiar with and be able to estimate a variety of important marketing decision models, including linear and nonlinear regression models, generalized linear models (including binary logit and Poisson regressions), mixture regression models, multinomial logit (MNL) models, and mixture MNL models.
- Know how to interpret the model estimation results and derive insights and recommendations that are directly applicable to managerial decisions.

**Course Format and Pedagogy**

This course consists of a combination of lectures and computer sessions. We will cover one group of models and their applications each week, organized into a lecture session on Monday, followed by a computer session on Wednesday. In the computer sessions, students will learn how to estimate the models of the week using statistical software and apply them to a case project assignment based on real-world data and companies. Data analyses and model estimations for the project assignments are expected to be completed in these sessions. This is a very hands-on course. Please be prepared to “get your hands dirty” with data and models!

**Software**

In response to the increasing demand by students and company recruiters, we will use SAS as the primary statistical software for this course. In addition, we will use Glimmix which is a specialized software for estimating advanced mixture models. Both should be installed on your laptop before class starts. Please see the note “Installing SAS and Glimmix” for details on how to download and install the software. I will email the class with more logistic details about the software installation before the term starts.

**Career Relevance**

This is an advanced analytical course for students interested in techniques for marketing research, marketing decision modeling, marketing analytics and marketing engineering. It intends to develop the analytical skills required for marketing professions such as marketing researchers and consultants, marketing intelligence officers, CRM officers, retail consultants and analysts, category managers, retail buyers and planners, advertising/media planners, and brand/product managers. In addition, the decision models covered in this course have direct relevance to a range of analytically-oriented non-marketing professions, such as financial analysts, management consultants, computer information system managers, and web designers.

Please see the Marketing Department’s career-based course catalog for more details.
Prerequisites

BUSI650 “Marketing Management”

In addition, students should be familiar with basic business mathematics and statistics, and/or have taken BUMK701 “Marketing Research”. Although this course is self-contained and all materials will be explained from the basics, a working knowledge of basic statistics is required. It is strongly recommended that students brush-up basic knowledge of Calculus, Probability, and Statistics before taking this course.

Reading Materials

Required: Weekly lecture notes, PowerPoint slides, and other reading materials will be posted on the Canvas course website. There is no required textbook.

Supplementary: I will provide a list of references on supplementary articles, which broadens the managerial perspective of various topics covered in this course. (Since they are copyrighted materials that require royalty payments, I cannot provide free hard copies or post them online. But you can access them via the university’s online databases for free.)

Course Requirements and Grading

- Group projects (4) 15% each, 60% in total
- Final In-class Quiz 25%
- Peer Evaluation 15%

The grade curve of this class is expected to be:
A+, A, A-: 45-50%
B+, B, B-: 45-50%
C+ and lower: up to 10% if necessary

The following is a brief outline of each grading component.

Group projects: There will be three group project assignments for each team, together accounting for 60% of your total grade. In the computer sessions, we will analyze data and estimate models based on five project cases. The first three projects are required for every team. You can choose one of the other two projects as the third group assignment.

Each project requires data analyses, model estimations, and decision recommendations for a case written based on real-world data and companies. The deliverable is a two-page memo plus appendices. Detailed instructions on the project assignments are provided in separate files.

Here is a brief summary of the five projects.
<table>
<thead>
<tr>
<th>Project</th>
<th>Topic</th>
<th>Models Involved</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Retail pricing decisions based on point-of-sales scanner data</td>
<td>Linear, semi-log, log-log regression models</td>
<td>SAS</td>
</tr>
<tr>
<td>2</td>
<td>Analyzing print ad designs using eye-movement data</td>
<td>Generalized linear models: Poisson regression, Binary logit model</td>
<td>SAS</td>
</tr>
<tr>
<td>3</td>
<td>Evaluating the effectiveness of sales promotions based on scanner panel data</td>
<td>Models of purchase incidence, brand choice, and quantity: Binary logit model, multinomial logit model, semi-log regression</td>
<td>SAS</td>
</tr>
<tr>
<td>4</td>
<td>International market segmentation for global retailers</td>
<td>Mixture regression models</td>
<td>Glimmix</td>
</tr>
<tr>
<td>5</td>
<td>New product development using choice-based conjoint analysis for coffee makers</td>
<td>Multinomial logit (MNL) models and mixture MNL models</td>
<td>Glimmix</td>
</tr>
</tbody>
</table>

Final In-class Quiz: The quiz will be open-book and held in the last class. The scope and level of difficulty is less than a final exam. The purpose of the quiz is to push everybody to study the technical details of the models covered in class and to reinforce your understanding and mastery of the topics.

Peer evaluation: Team work is an important component of the learning experience in this class. Each team member is expected to actively contribute to the group project assignments. At the end of the term, a confidential peer evaluation will be conducted by teammates based on one’s overall performance in three aspects: quantity of contribution, quality of contribution, and cooperation. The peer evaluation will account for 15% of your total grade.

Group Formation

Students are free to form their own groups. The expected group size is 4-5. Please form the groups and enter the names of your team members no later than Monday, August 31st.

Academic Integrity

The University’s Code of Academic Integrity is designed to ensure that the principles of academic honesty and integrity are upheld. All students are expected to adhere to this Code. The Smith School does not tolerate academic dishonesty. All acts of academic dishonesty will be dealt with in accordance with the provisions of this code. Please visit the following website for more information on the University’s Code of Academic Integrity:
http://www.studenthonorcouncil.umd.edu/code.html

On each exam or written assignment you submit you should write out and sign the following pledge: “I/We pledge on my/our honor that I/we have not given or received any unauthorized assistance on this examination (assignment).”
**Students with Special Needs**

Any students with special needs should bring them to my attention as soon as possible, but no later than the second week of class.

**Student Information Sheet**

Please fill out the Student Information Sheet (the last page of this syllabus) and provide me with a recent photo of yourself attached to it. The Student Information Sheet should be turned in by **Wednesday, September 2nd**.

**Miscellaneous**

I will initially try to resolve all your questions by email and phone, so you don't have to wait for office hours. But, I can be available to answer questions in person before each class, **Mondays from 12.00-2.00pm, but please make an appointment by email**.

Please do not use the email function in Canvas to communicate with me. Instead, please send emails directly to my email address (mwedel@rhsmith.umd.edu). In addition, please put “BUMK706” at the beginning of the subjective line of your emails. I will respond to all your emails within 6 hours. If I do not respond, please send a reminder, as students emails unfortunately sometimes get quarantined by the school's spam filter.
## CLASS SCHEDULE

### Week 1
**August 24**

**Lecture**
Topics: Course Overview  
Marketing Decision Models  
Recap of A Few Math and Stats Basics
Readings: Syllabus  
“Lecture Notes Week 1”

**August 26**

**Computer Session**
Topics: Introduction to SAS
Readings: “Installing SAS and Glimmix”  
“Supplementary Note 1: Introduction to SAS”

### Week 2
**August 31**

**Lecture**
Topics: Linear and Linearizable Regression Models  
Sale Response Models for Pricing Decisions
Readings: “Lecture Notes Week 2”  
“Supplementary Note 2: The Exponential and Natural Log Functions”
Supplementary articles on pricing

**Deadline:** Groups and members due (Canvas)

**September 2**

**Computer Session**
Topics: Linear Regression Models in SAS  
Model Estimations for Project 1: Pricing Decisions Based on POS Scanner Data
Readings: Project 1 case description and assignment

**Deadline:** Student Information sheet due

### Week 3
**September 9**

**Computer Session**
Group work on SAS computer assignments Project 1.
Week 4
September 14  
**Lecture**  
Topics:  Generalized Linear Models  
Poisson Regression and Binary Logit Models  
Evaluating Print Ads Using Eye-tracking Data  
Readings:  “Lecture Notes Week 3”  
Supplementary articles on eye-tracking research

September 16  
**Computer Session**  
Topics:  Generalized Linear Models in SAS (focus on Poisson Regression and Binary Logit Models)  
Model Estimations for Project 2: Evaluating Print Ads Using Eye-tracking Data  
Readings:  Project 2 case description and assignment  
**Deadline:**  Project 1 Memo due (all groups)

Week 5  
September 21  
**TBD: Q&A Session**  
Topics:  Q & A, Midterm Evaluation  
Readings:  TBA (in response to feedback from students)

Week 6  
September 28  
**Lecture**  
Topics:  Purchase Incidence, Brand Choice, and Purchase Quantity Models to Evaluate Sales Promotions  
Readings:  “Lecture Notes Week 4”  
Supplementary articles on sales promotions

September 30  
**Computer Session**  
Topics:  Semi-log, Binary Logit, and Multinomial Logit Models in SAS  
Model Estimations for Project 3: Evaluating the Effectiveness of Sales Promotions  
Readings:  Project 3 case description and assignment  
**Deadline:**  Project 2 Memo due (all groups)
**Week 7**

**October 5**

**Lecture**

Topics: Mixture Regression Models
Market Segmentation for Global Retailers

Readings: “Lecture Notes Week 5”
Supplementary articles on market segmentation

**October 7**

**Computer Session**

Topics: Mixture Regression Models in Glimmix
Model Estimations for Project 4: International Market Segmentation for Global Retailers

Readings: Project 4 case description and assignment

**Deadline:** Project 3 Memo due (all groups)

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**Week 8**

**October 12**

**Lecture**

Topics: Multinomial Logit (MNL) and Mixture MNL Models
Choice-Based Conjoint Analysis

Readings: “Lecture Notes Week 7”
Supplementary articles on conjoint analysis

**October 14**

**Computer Session**

Topics: MNL and Mixture MNL models in Glimmix
Model Estimations for Project 5: New Product Development via Choice-Based Conjoint Analysis for Coffee Makers

Readings: Project 5 case description and assignment

**Deadline:** Project 4 Memo due (if you choose this one)

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**Week 9**

**October 19**

Topics: Putting It Together: How to Choose Models
Review for the Quiz and Q&A

Readings: “Lecture Notes Week 8”
In-class Final Quiz (1 hour)

**October 21**

**Deadline:** Project 5 Memo due (if you choose this one)