Instructor: Ram Gopalan
E-mail: ram.gopalan@rutgers.edu

Office: BSB439. Office Hours: Students can set up appointments for 5-6 p.m. Tue. at the class location.

Class Meetings: Cherry Hill, Tuesdays 6 – 8.40.

Required course material:


2. In addition to the textbook, you will need *HBS course material*, available at the following hyperlink:

   https://cb.hbsp.harvard.edu/cbmp/access/44359240

3. The course also requires several *HBR articles (see page 6 for details)*, available online (at no cost) at the library. Please view the HBR Video under the Resources tab on Sakai to see how to access these articles.

**Course Description:**
Analytic competency is becoming tremendously important in the business world and is often the factor that distinguishes leading firms in any industry. Companies like Netflix, Marriot International, Capital One and Progressive Insurance have succeeded in their industries mainly due to their distinctive analytic competencies. This course is intended to provide an introductory overview of how firms implement data-driven decision making. Students will learn statistical concepts, use spreadsheet modeling and learn through a mix of lectures, cases and class discussion. Students are required to bring the textbook to class in the event we cover problems from the book chapters. It’s also helpful for every team to bring a laptop loaded with some variant of spreadsheet software (e.g. Microsoft Excel). The primary goal of the course is to coach students on “**fact-based decision making**” and to enable them to carefully plan and run “**business experiments**” in order to make managerial decisions (i.e., implement a “test and learn” philosophy).

**Prerequisites:** Basic knowledge of probability and statistics, e.g., material in chapters 1-6 in the book.
Grading Rubric:
Examination I 20%
Examination II 35% (comprehensive exam)
Team Semester project 20%
SPSS Assignments (individual) 10%
Leading class discussions (team) 10%
Class Participation/Attendance 5%


Guidelines for Team Project:
Further details on the semester project are provided in Appendix 1. Students will provide peer evaluations on their team members at the end of the term and the project grade may vary by team member based upon individual contributions.

SPSS Assignments: To be completed (either in the labs, or in the classroom if SPSS is available) and turned in individually. Further details will be provided during the semester.

Class Participation:
Attendance and class participation are extremely important in this course. You are required to bring your energy to the classroom and participate in enhancing the instructor’s and students’ learning. As such, mere presence in the classroom is insufficient to earn a good class participation grade. Please work hard to make the environment pleasant and enjoyable for everyone around you.

Forms due:
Turn in an accurate student information form by class 2 and a team composition form by class 3. Students must submit a peer evaluation form during the last class meeting. All these forms are required in hard copy format, signed where applicable (Appendix 2).

Academic Integrity:
“Academic integrity requires that all academic work be wholly the product of an identified individual or individuals. Joint efforts are only legitimate when the assistance of others is explicitly acknowledged. The principals of academic integrity entail simple standards of honesty and truth. Each member of the university has a responsibility to uphold the standards of the community and to take action when others violate them. Students are responsible for knowing what the standards are and for adhering to them. Students should also bring any violations of which they are aware to the attention of their instructors.” Students are expected to know, understand and adhere to the policies on academic integrity outlined above. Procedures for violation of these policies outlined in the University Code of Academic Conduct will be followed.

Exam Makeup Policy:
Alternate exam dates will be provided only for exceptional and unavoidable circumstances, e.g., medical emergencies. If you miss an exam due to medical reasons, you will be required to provide appropriate documentation to the university.
COURSE OUTLINE (read assigned pages from book chapters – see following page)

<table>
<thead>
<tr>
<th>Class</th>
<th>Date</th>
<th>Material</th>
<th>Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tuesday, January 19</td>
<td>Data analysis &amp; probability distributions review</td>
<td>Read HBR #1. This lecture will also briefly review and summarize Chapters 1 – 6 (pre-requisites)</td>
</tr>
<tr>
<td>2</td>
<td>January 26</td>
<td>Sampling &amp; Interval Estimation</td>
<td>Chapters 7, 8, Student Information form</td>
</tr>
<tr>
<td>3</td>
<td>February 2</td>
<td>Hypothesis testing</td>
<td>Chapter 9, Project team form due – one sheet per team, Pilgrim Bank case (HBS)</td>
</tr>
<tr>
<td>4</td>
<td>February 9</td>
<td>Hypothesis testing, Customer Analytics and LTV Modeling</td>
<td>Chapters 10, Pilgrim Bank case (cont’d) (HBS)</td>
</tr>
<tr>
<td>5</td>
<td>February 16</td>
<td>Regression modeling I</td>
<td>Chapter 14</td>
</tr>
<tr>
<td>6</td>
<td>February 23</td>
<td><strong>Examination I</strong></td>
<td>All material from <strong>classes 1-4</strong></td>
</tr>
<tr>
<td>7</td>
<td>March 1</td>
<td>Regression modeling II</td>
<td>Chapters 15 &amp; 16</td>
</tr>
<tr>
<td>8</td>
<td>March 8</td>
<td>Logistic Regression</td>
<td>Chapter 15</td>
</tr>
<tr>
<td>9</td>
<td>March 22 (no class on March 15 – Spring Break)</td>
<td>Text Mining</td>
<td>HBS #2 - Apollo Hospitals case, Text mining book chapter.</td>
</tr>
<tr>
<td>10</td>
<td>March 29</td>
<td>Experimental Design, Analysis of Variance, Applications of Experimental Design</td>
<td>Chapter 13, HBR #2, #3</td>
</tr>
<tr>
<td>11</td>
<td>April 5</td>
<td>Web Analytics, Big Data</td>
<td>HBS #3 - Quality Alloys case, HBS #4 (Big Data article), web mining book chapter</td>
</tr>
<tr>
<td>12</td>
<td>April 12</td>
<td>CHAID segmentation, Talent Analytics, Retail Analytics</td>
<td>Handout to be provided, HBR # 4, Market Basket Analysis</td>
</tr>
<tr>
<td>13</td>
<td>April 19</td>
<td>Discussion of information security &amp; Social Media Analytics, Class time to finalize project reports</td>
<td>HBR #5 (Boss) and HBS #5 Peer Influence Analysis - Bernoff, Schadler</td>
</tr>
<tr>
<td>14</td>
<td>April 26</td>
<td>All teams to submit final project presentations.</td>
<td>All Project Presentations. Peer evaluations due.</td>
</tr>
<tr>
<td>15</td>
<td>May 10</td>
<td><strong>Examination II</strong></td>
<td>Comprehensive - All material from Classes 1 – 14.</td>
</tr>
</tbody>
</table>

Note: Changes may be made to this tentative course outline if needed.
Individual Book Chapter Readings/HW Problems/Video Resources

Class 1: Review of pre-requisites - Chapters 1 - 6
Chapter 1 – pp. 6-7, 15, 16; Chapter 2 – 33-35, 39-44, 49-51, 53-54, 56-57; Chapter 3 – 87 – 91, 97 – 99, 106, 110, 119, 144-145; Chapter 4 – 155, 165-166, 171-174; Chapter 5 – 198-199, 203; Chapter 6 - 235-236, 238-248. Of these readings, the chapter 6 reading is the most important.


Useful Excel Functions: MAX(), MIN(), AVERAGE(), STDEV(), MEDIAN()

Class 2: Chapters 7-8
Chapters 7, 8: Read full chapters

Class 2 HW Problems: #27, page 288, #39, page 294, #51, page 303, #10, page315, #11, page 323, #29, page 328, #34, page 332, #36, page 332

Useful Excel Functions: NORM.DIST(), NORM.INV(), NORM.S.DIST(), NORM.S.INV()

Class 3: Chapter 9
Chapter 9 – 349 – 385.

Class 3 HW Problems: problems 17 (p369), 30(p375), 40(p380) and 48(p386)

Useful Excel Functions: NORM.DIST(), NORM.INV(), NORM.S.DIST(), NORM.S.INV(), T.DIST, T.DIST.2T(), T.DIST.RT(), T.INV(), T.INV.2T()

Class 4: Chapter 10
Chapter 10 – Read full chapter

Class 4 HW Problems: problems 5(p413), 15(p421), 26(p428) and 36(p435).

Class 5: Chapter 14

Class 5 HW Problems: Page 613 - #47 (add appendix 14.2 correlation test to this problem), Page 620 - #52.

Useful Excel Functions: SLOPE(), INTERCEPT(), CORREL(), RSQ()

Class 7: Chapters 15-16
Class 7 HW Problems: Page 650 - #4, Page 656 - #13, Page 663 - #19, Page 726 - #3.

**Class 8: Chapter 15 (Logistic Regression)**
Chapter 15 – pages 683 – 691 (logistic regression).

Class 8 HW Problems: page 692, problems 44-45 (use SPSS instead of Minitab).

**Class 10: Chapter 13**
Chapter 13 – 508-520, 530-534.


**Other Resources:**
- Students should also familiarize themselves with the Insert ➔ Pivot Table function for obtaining cross tabulated summaries of data.
ADDITIONAL COURSE MATERIAL (besides textbook)

I. Harvard Business School cases (HBS #1, #2, .., #5) case material (purchase this material at link https://cb.hbsp.harvard.edu/cbmp/access/44359240)

The course uses three Harvard cases, one HBS book chapter and one Sloan Management Review article:

1. Pilgrim’s Bank (case)
2. Apollo Hospitals (case)
3. Quality Alloys (case)
4. Sloan Management Review article: Why Big Data is different?, Thomas Davenport et al., Vol. 54, Fall 2012.
5. Social Media Analytics (book chapter) - Peer Influence Analysis: Using Social Technologies to Identify Your Business's Most Influential Customers, Josh Bernoff; Ted Schadler

II. Harvard Business Review (HBR #1, #2,...#5) Articles (access FREE at libraries.rutgers.edu – see HBR VIDEO under RESOURCES in Sakai if you have not accessed Rutgers libraries online before)


III. Additional book chapters/handouts (to be provided during class):

1. Text Mining (book chapter).
2. Web Mining (book chapter)
3. CHAID segmentation (handout)
Appendix 1: Business Analytics
Guidelines for Semester Project & Grading Rubric
You will work in a team of 4-5 people and complete a project. All teams must turn in both a soft copy and a hard copy of the final presentation by the due date stated in the syllabus. (For the hard copy, you may print “handouts” to reduce the number of pages).

In this project, you will perform some “field research” and collect some real data from customers (most likely through a questionnaire, but use of secondary data sets is acceptable if you justify it to the instructor). The collected data should enable you to run TWO business experiments and reach a suitable conclusion that enables you to make a managerial decision (e.g., online bank customers are more profitable than regular customers and therefore the bank should vigorously start a campaign to migrate all customers online). Given the short time available during the semester, your tested hypotheses should be succinct, require very simple data collection and most importantly lead to some managerial action. The project enables you to showcase your understanding of the “test and learn” approach. Use of statistical modeling is encouraged in this phase, but do not let statistical wizardry subsume the underlying business questions. Carefully design the data collection form as a team (ask the instructor for help if needed) and each person should collect data from at least 10 people (i.e., about 40 respondents for a team of 4, to make the results statistically meaningful).

Project Grading Rubric (20% = 4% + 5% + 4% + 5% + 2%):
1. Clarity and Impact of Managerial Question # 1: 4 points.
2. Data collection and analysis for Managerial Question # 1: 5 points.
3. Clarity and Impact of Managerial Question # 2: 4 points.
4. Data collection and analysis for Managerial Question # 2: 5 points.
5. Finally, the style and slickness of your presentation is worth 2 points. (2 points).

Contact the instructor if you need further clarifications. Students will provide peer evaluations on their team members at the end of the term and the project grade may vary by team member based upon individual contributions. Good citizenship and teamwork are strongly encouraged.
APPENDIX 2
INFORMATION FORMS REQUIRED

Forms are available in this appendix. All forms are required in hard copy format. Please submit the student information form and team composition form during the first couple of meetings. The peer rating form is due at the end of the class.
1. Student Information Form
   (Hard Copy due from ALL students at start of Class)

Your Name: __________________________

Major(s): __________________________

1) What are your 5 and 10 year career goals? (Use the back if you run out of space.)

2) What is your recent work experience?

3) What do you expect to get from this course? How does this course fit in with your career goals?

4) Identify one or two of your extra-curricular activities:
## 2. TEAM COSTITUTION FORM

<table>
<thead>
<tr>
<th>Member No.</th>
<th>Name</th>
<th>Email ID</th>
<th>Signature</th>
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<tbody>
<tr>
<td>1</td>
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</table>
3. **PEER EVALUATION FORM**  
(HARD COPY DUE FROM ALL STUDENTS AT END OF CLASS)

Date:

Your Name:

Class Number & Title:

Team Number:

Specific project/deadline for which peer evaluation is being submitted:

On a scale of 1 – 10, (with 10 being the BEST rating), please provide a peer rating for your team mate(s) on this project. *You also need to include a self-evaluation in this chart.*

Please use the following guidelines:

10 – Superb contributor, really energized the team and went beyond the call of duty.
9 – Excellent team participation and contribution.
8 – Good
7 – Fair/Average
6 – Below expectations, did not participate as a team member
1 – 5 Really poor contributor, regularly failed to show up for team meetings

<table>
<thead>
<tr>
<th>Team member name</th>
<th>My peer rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME</td>
<td></td>
</tr>
<tr>
<td>member # 2</td>
<td></td>
</tr>
<tr>
<td>member # 3</td>
<td></td>
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<tr>
<td>…</td>
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Signed,