SPECIAL TOPICS: CONSUMER NEUROSCIENCE
MKTG 850-001, Spring 2017
The Wharton School, University of Pennsylvania

PRELIMINARY COURSE SYLLABUS
(10/12/2016)

Instructor: Dr. Wes Hutchinson  
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Office Hours: by appointment.

Reading Materials:

Text: Available through Amazon.com.


Course Pack: Available through Penn Library Course Reserves (Canvas) and Study.Net (www.study.net).

Included in the course pack is (1) the Journal of Marketing Research Special Issue on Neuroscience and Marketing, plus (2) a variety of readings from the marketing and neuroscience literatures (see Reading List).

Recommended books (optional):


¹ WARNING: This book has excellent content and awful copy editing.


Recommended audiobooks (optional):


**Course Description and Objectives:**

Basic neuroscience made steady progress throughout the 20th century with only small areas of application outside of medicine. Over the past 30 years, however, breakthroughs in measurement and computation have accelerated basic research and created major applications for business and technology. Currently, applications to marketing research and product development are experiencing explosive growth that has been met with both excitement and skepticism. This mini-course provides an overview of these developments.

The course follows a straightforward theory/application format for each major area of cognitive neuroscience and is divided into three modules: (1) Overview, (2) Attention, perception, and emotion, and (3) Thinking, learning, and deciding. Some classes focus on the basics of neuroscience simultaneously with illustrative applications. A key take-away from these classes is to gain the elementary scientific knowledge that is necessary to separate "neuro-reality" from "neuro-hype." In other classes, we cover application areas in greater detail. There are three general types of applications. First, there are applications of neuroscience in marketing research. Topics will range from well-known and widely used applications, such as eye-tracking measures in the lab and the field, to emerging methods and measures, such as mobile EEG, face reading
algorithms, and fMRI predictors of market response. Application areas include, packaging and shelf display, copy testing for television and print advertisements, video games, product usability studies, and simulators. Second, there are applications of neuroscience in the development of new products. Product development applications include wearable physiological devices and apps, sensory branding for foods and fragrances, pharmaceuticals and medical devices (especially prosthetic devices), and neuroscience-based "edutainment" designed to enhance cognitive functions. Special attention will also be paid to changes in brain anatomy and function over the lifespan. Key markets are children (mainly for enhancement products), seniors (mainly for remediation/restoration products), and working adults (both enhancement and remediation/restoration products). Finally, at the broadest level there are the implications of neuroscience for society, including social networks and the legal system.

Who should take this course:

This course is self-contained and has no prerequisites. That said, students with some background in business, industrial design, psychology, or neuroscience are likely to find the material covered in this course complementary to the knowledge they already have.

Grading: Typical grade distributions are given below.

<table>
<thead>
<tr>
<th>Component</th>
<th>Maximum Points</th>
<th>Expected Average</th>
<th>Expected Range</th>
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<tbody>
<tr>
<td>Participation (individual)</td>
<td>50</td>
<td>45</td>
<td>40-50</td>
</tr>
<tr>
<td>Eye-tracking Project (group)</td>
<td>500</td>
<td>360</td>
<td>400-500</td>
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<tr>
<td>Take-Home Exam (individual)</td>
<td>450</td>
<td>405</td>
<td>350-450</td>
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<tr>
<td>TOTAL</td>
<td>1,000</td>
<td>900</td>
<td>800-1,000</td>
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Class Participation/Homework (Individual): Class participation includes attendance, preparation, and discussion during lectures. **No laptops, tablets, or smartphones.**

Eye-tracking Project: Groups of 3 - 5 students will complete a project that identifies consumer insights based on eye-tracking data. There are two potential sources of eye-tracking data: (1) small sample (N < 10) original data collected during the term that compares advertisements (magazine or television), store shelf displays, or product designs, or (2) archived data from several commercial and academic consumer eye-tracking projects. The primary deliverable will be a science-style poster, and participation is a poster session during the last class. Details for this assignment will be distributed in class.

Take-Home Exam (Individual): The take-home exam covers the basic concepts presented in the lectures and associated readings. It is an open-book, open-notes test with objective and short essay questions that is done individually. The goal of the exam is to reveal to students any concepts or readings that were not adequately comprehended, and the open-book, open-note format allows students to easily fill in any such gaps in knowledge.
## Course Schedule*

<table>
<thead>
<tr>
<th>Tuesday</th>
<th>Thursday</th>
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<tbody>
<tr>
<td><strong>Module 1: Overview</strong></td>
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</tr>
<tr>
<td>TOPICS: The psychological/behavioral and innovation/product development perspective. Behavioral models &amp; measures (judgments, choices, decision times, errors). Innovation and evaluating ideas for new products, including trial/repeat studies/models for new products.</td>
<td>TOPICS: The measurement/computational perspective. Physiological (eye movements, pupil size, skin conductance, heart rate) and neural measurement (EEG, PET, fMRI, single cell recordings) procedures; neuroscience &amp; commercial marketing research. The basics of quantitative modeling: process models, modular production systems and neural networks.</td>
</tr>
<tr>
<td>READ: Day (2007); Hutchinson (2011 abc)</td>
<td>READ: INCN (ch. 3); Kable JNPE (2011); Karmarkar &amp; Plassmann (2015); McClure et al (2004);</td>
</tr>
<tr>
<td><strong>24-Jan 4. Vision, attention, &amp; eye-tracking</strong></td>
<td><strong>26-Jan 5. Sensory branding</strong></td>
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<tr>
<td>TOPICS: The visual system, including the eye, retina, midbrain, visual cortex, and related association areas; visual attention, including goal-directed and stimulus-driven pathways in the parietal and frontal lobes; locating and identifying objects.</td>
<td>TOPICS: Transduction by sense organs, primary brain structures, and the role of experience/learning for hearing, taste, smell, skin sensations, and pain; muscle movements, reflexes, skilled movements; sensory restoration/enhancement &amp; prosthetics.</td>
</tr>
<tr>
<td>READ: INCN (ch. 4, pp. 62-68; ch. 5); Chandon et al. (2009);</td>
<td>READ: INCN (ch. 4, pp. 69-80); Bensmaia (2015)</td>
</tr>
<tr>
<td><strong>31-Jan 6. Point of purchase marketing &amp; usability studies</strong></td>
<td><strong>2-Feb 7. Sensorimotor processes (continued)</strong></td>
</tr>
<tr>
<td>GUEST: Scott Young, President, Perception Research Services Int. Michael Smith, VP, Nielsen Consumer Neuroscience</td>
<td>TOPICS: Transduction by sense organs, primary brain structures, and the role of experience/learning for hearing, taste, smell, skin sensations, and pain; muscle movements, reflexes, skilled movements; sensory restoration/enhancement &amp; prosthetics.</td>
</tr>
<tr>
<td>READ: Chandon et al (2007)</td>
<td>READ: INCN (ch. 10)</td>
</tr>
<tr>
<td><strong>7-Feb 8. Emotion, arousal, advertising &amp; branding</strong></td>
<td><strong>9-Feb 9. Neuroscience and society - marketing &amp; regulation issues for NS products</strong></td>
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<tr>
<td>TOPICS: Amygdala, hippocampus, cingulate, orbitofrontal cortex, hypothalamus; intensity and valence of emotion; measures of emotion. Hierarchy of effects models; evaluative conditioning; neural correlates of brand preferences and brand loyalty.</td>
<td>GUEST: Roy Hamilton, Dawn Mechanic, Penn Memory Center, HUP</td>
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<tr>
<td>READ: INCN (ch. 4); Yoon et al (2006); Chen Nelson Hsu JMR (2015); Venkatraman et al JMR (2015); Cerf et al JMR (2015); Pozharliev et al JMR (2015)</td>
<td>READ: INCN (ch. 10)</td>
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<tr>
<td><strong>14-Feb 10. Valuation, intertemporal choice, self-control, reward, and reinforcement learning</strong></td>
<td><strong>16-Feb 11. open</strong></td>
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<tr>
<td>TOPICS: Dopaminergic system and prediction errors; ventral striatum, medial prefrontal cortex, and posterior cingulate cortex.</td>
<td>GUEST/ TOPIC: TBD</td>
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<tr>
<td>READ: INCN (ch. 8); Reimann et al JCP (2010); Platt &amp; Plassmann (2014)</td>
<td>READ: TBD</td>
</tr>
<tr>
<td>TOPICS: Michael Platt PIK Professor of Marketing, Neuroscience, Psychology</td>
<td>TOPICS: Explicit/declarative memory (medial temporal lobe, mid-brain, association cortex); implicit/non-declarative memory (basal ganglia, perceptual &amp; association cortex, cerebellum, reflex pathways); hemispheric specialization.</td>
</tr>
<tr>
<td>READ:</td>
<td>READ: INCN (ch. 7); Karmarkar Shiv Knutson JMR (2015);</td>
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<tr>
<td><strong>28-Feb 14. Executive control, decisions, &amp; behavioral game theory</strong></td>
<td><strong>2-Mar 15. Project presentations - poster session</strong></td>
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<tr>
<td>TOPICS: Working memory and prefrontal cortex; goals &amp; parietal/frontal pathways; connections to valuation, learning, and attention; neuroscience; behavioral game theory.</td>
<td>TOPICS:</td>
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<tr>
<td>READ: Cascio et al JMR (2015); Platt &amp; Huettel NN (2008); Kurth et al BSF (2010)</td>
<td>READ:</td>
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<tr>
<td>DUE: Personal essay due.</td>
<td>DUE: Group project due.</td>
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* Most readings may be done before or after class. This schedule is likely to change during the term; check Canvas for updated versions. Some scheduling/logistical issues remain for some guest speakers.
Reading List *(To be revised for Spring 2017)*

*Introduction to Neuromarketing and Consumer Neuroscience (INCN)*

Chapter 1: Introduction  
Chapter 2: The Brain  
Chapter 3: The Neuromarketing Toolbox  
Chapter 4: Senses and Perception  
Chapter 5: Attention and Consciousness  
Chapter 6: Emotions and Feelings  
Chapter 7: Learning and Memory  
Chapter 8: Wanting, Liking, and Deciding  
Chapter 9: Consumer Aberrations  
Chapter 10: Epilogue

*Journal of Marketing Research Special Issue on Neuroscience and Marketing*


**Individual readings**


Hutchinson (2011a) *The Profit Strategy Checklist*, Teaching Note.

Hutchinson (2011b) *The Concept Statement*, Teaching Note.

