Lectures
Course Number: ORIE 4154
Class time: TR 11:40am-12:55pm
Class location: Thurston 205

Course Communication:
Piazza:
http://piazza.com/cornell/spring2017/orie4154
Website:
http://people.orie.cornell.edu/sbanerjee/ORIE4154/orie4154s17.html
Blackboard:
http://blackboard.cornell.edu (Search for ORIE 4154)
Essential Course Information

**Instructor**

**Sid Banerjee**  
Office: 229 Rhodes Hall  
E-mail: sbanerjee@cornell.edu  
Website: people.orie.cornell.edu/sbanerjee/  
Office hours: Tuesday 3pm-5pm (or by appointment)

**Teaching Assistants**

**Alberto Vera** (email: aav39@cornell.edu)  
**James Dong** (email: jd748@cornell.edu)  
Office hours: Monday, Wednesday 3-5pm  
Room no: TBD
Why study revenue optimization?
A canonical example

What is RM?

- Consider the decisions faced in selling a house?
  - When should we put it on the market?
  - What price should we ask?
  - Given an offer, should we accept it?
  - If there are no offers, should we lower the asking price? If so, by how much? When?

Courtesy: Huseyin Topaloglu
Why study revenue optimization??
Canonical example ++

Courtesy: www.guesty.com
What is this course about?

Analytic techniques for optimizing the “firm-market interface”
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- **Demand management**: determining how to sell “the right product to the right customer at the right time for the right price”

- **Marketplace design**: determining “who gets what and why (and at what price)” in two-sided platform marketplaces.
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Demand management vs. marketplace design

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  Travel websites (Kayak/Tripadvisor/etc.): market design
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- car2go pricing (subscription, p2p): demand management
  Dynamic pricing in Uber/Lyft: marketplace design
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- **Hilton Honors program**: demand management
  AirBnB Reputation mechanisms: market design
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- **Hilton Honors program**: demand management
  AirBnB Reputation mechanisms: market design
  AirBnB price recommendation tool: ?
Additional Course Details

Prerequisites:
- **Probability**: at the level of ORIE 3500
- **Optimization**: at the level of ORIE 3300
- **Programming**: (Ideally in Python)

Reference: Course notes posted online; no required textbook
(refer to syllabus for textbook suggestions)
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- **Optional project:**
  - Used in place of either 3 assignment grades (after dropping lowest) OR the prelim grade
  - Used for determining A+ grade
  - Ideally groups of 2-3
Warmup

Want to sell a single item to a single buyer

- What price should we charge?
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2. Seller’s constraints and objectives
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In particular, we need three pieces of information:

1. Model of buyer behavior
2. Seller’s constraints and objectives
3. Structure of available information
First example

Want to sell **single item to single buyer:**

• Buyer behavior: Buyer has reservation value $V$ for the item (unknown to seller) – will buy only if price is below value

• Seller constraints: Only one item; if unsold, has value $0$ (i.e., no reservation cost); wants to maximize profit.

• Information structure: Buyer value $V$ is publicly known to be distributed as $V \sim \text{EXponential}(\lambda)$. 
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