IPRO 321
Introduction to Zymurgy

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Problem Statement

- Zymurgy, or beer brewing, is a multi-billion dollar industry, making it a significant part of the American economy
- Design a process for small-scale production (10-15 gallons)
- Understand regulations and marketing of beer

Beer…in IPRO?

- One of the oldest chemical processes known to man
- Allows for a variety of design solutions
- Sanitation is crucial, quality control
- Marketing is key
- Viability

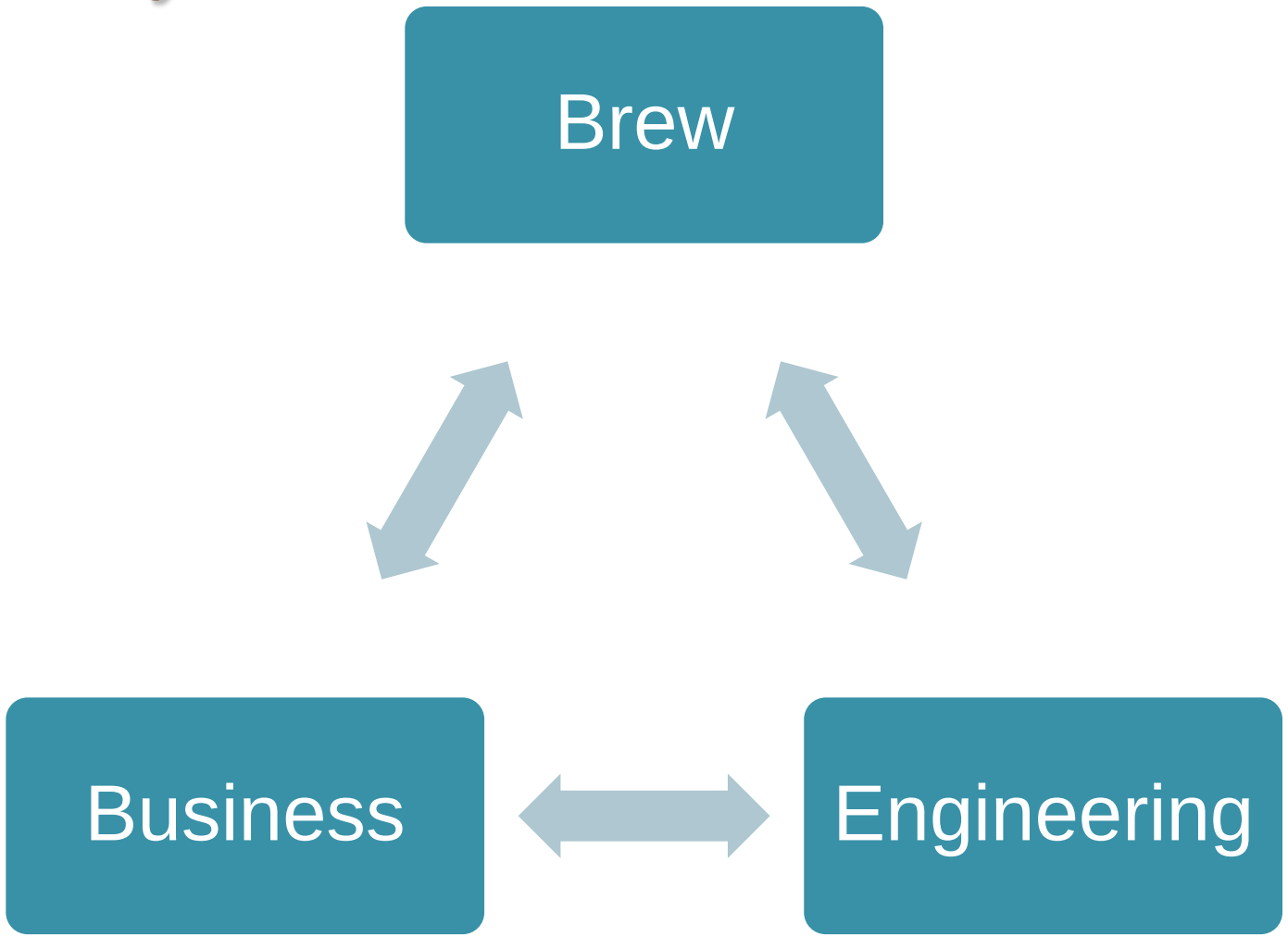
Objectives

- Design brew process
- Assure quality
- Economic analysis of brewing
- Market beer to IIT staff/students
- Samples for IIT staff

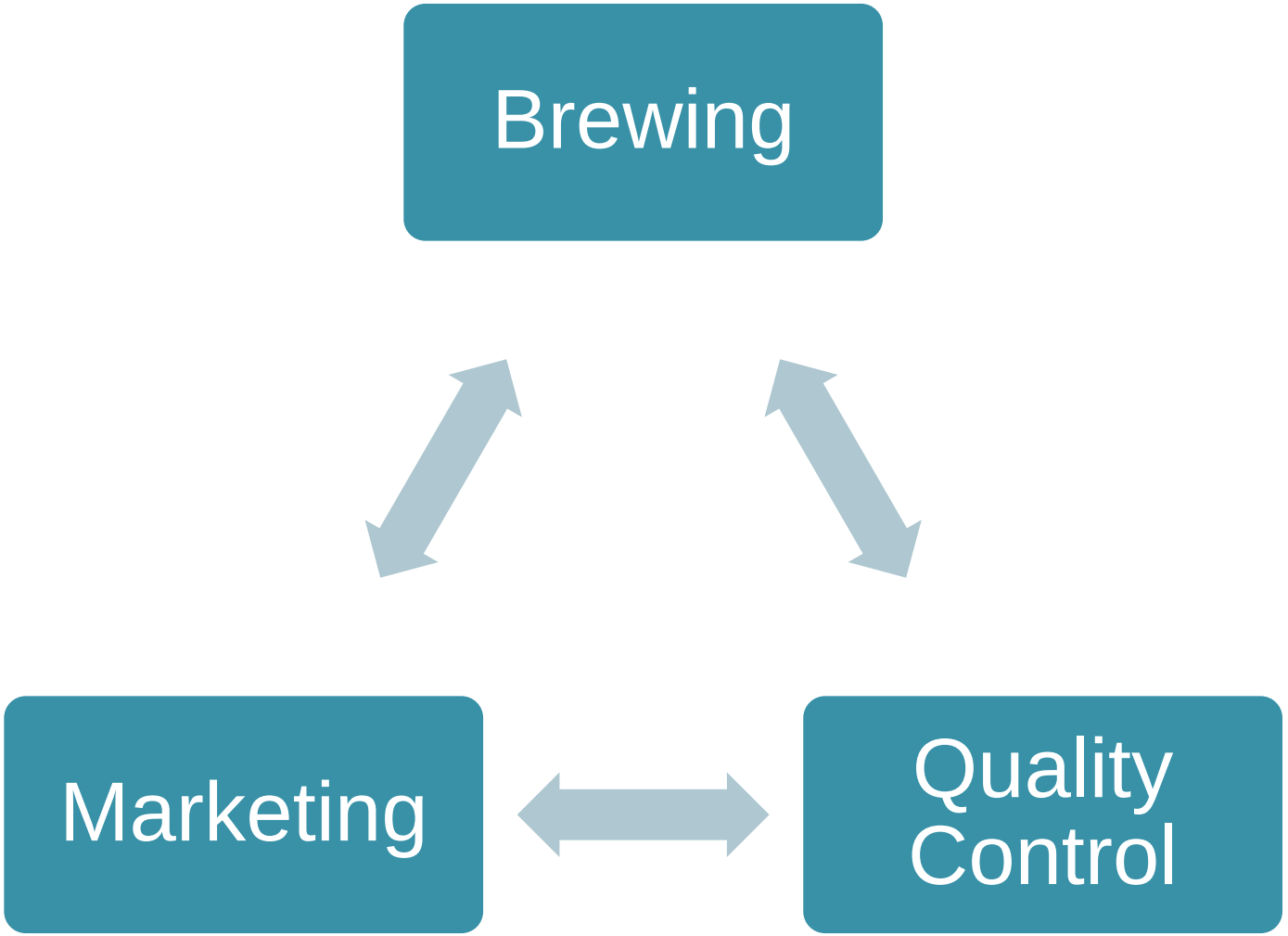
Development and Performance

- Team Logistics and Communication
- Tasks, timeline and goals
- In-class updates
- Adapted to change
  - Fermentor explosion
  - Equipment purchasing delays
  - Bad batch of beer

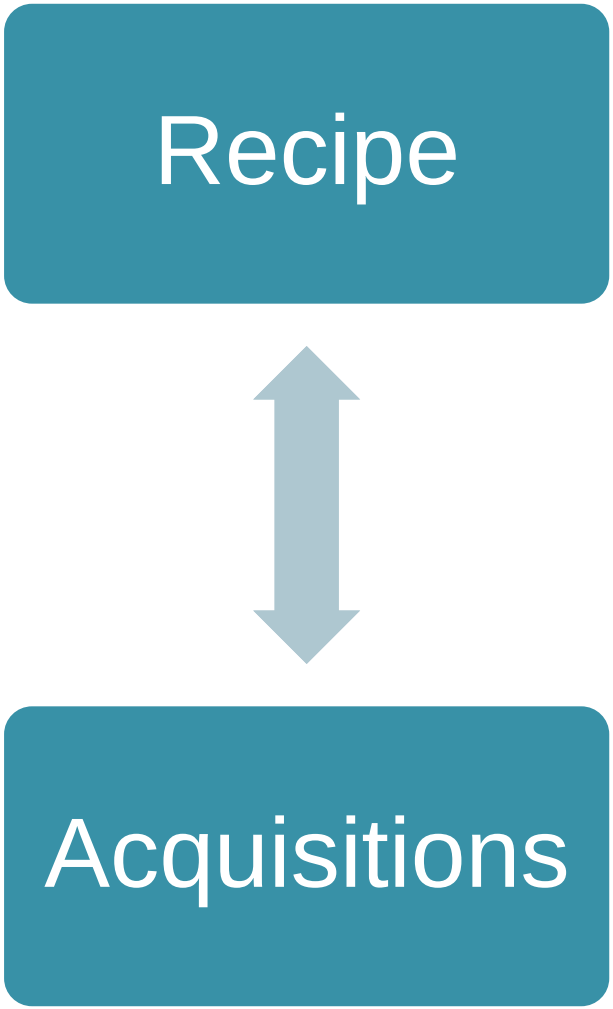
Team Organization - Funky Brewsters



Team Organization - Know-IIT-Ales

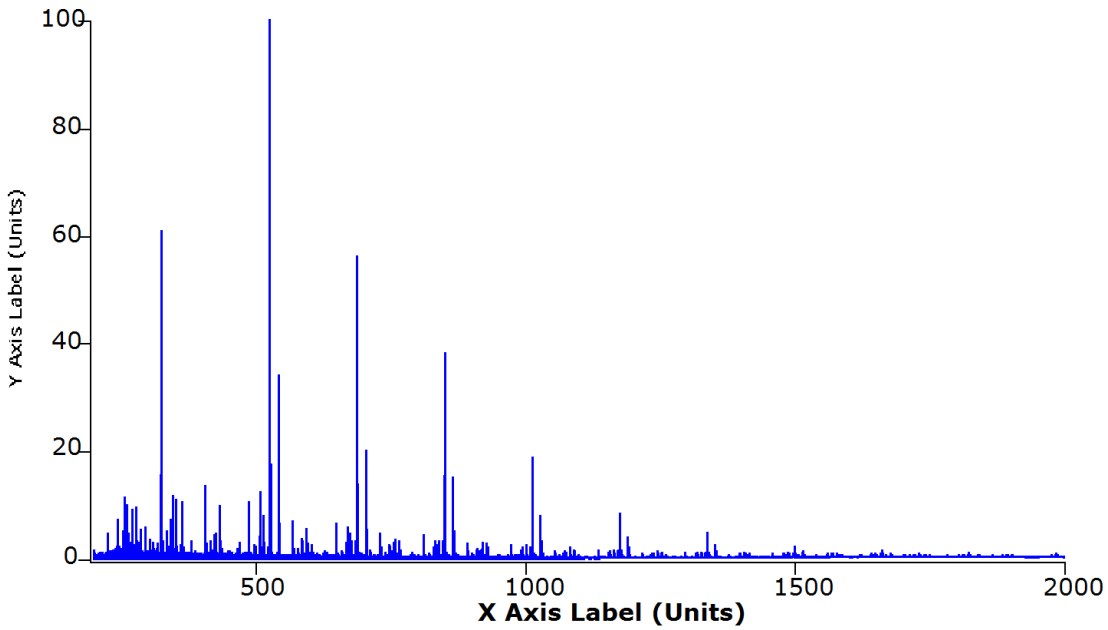


Team Organization - Blood, Sweat, and Beers



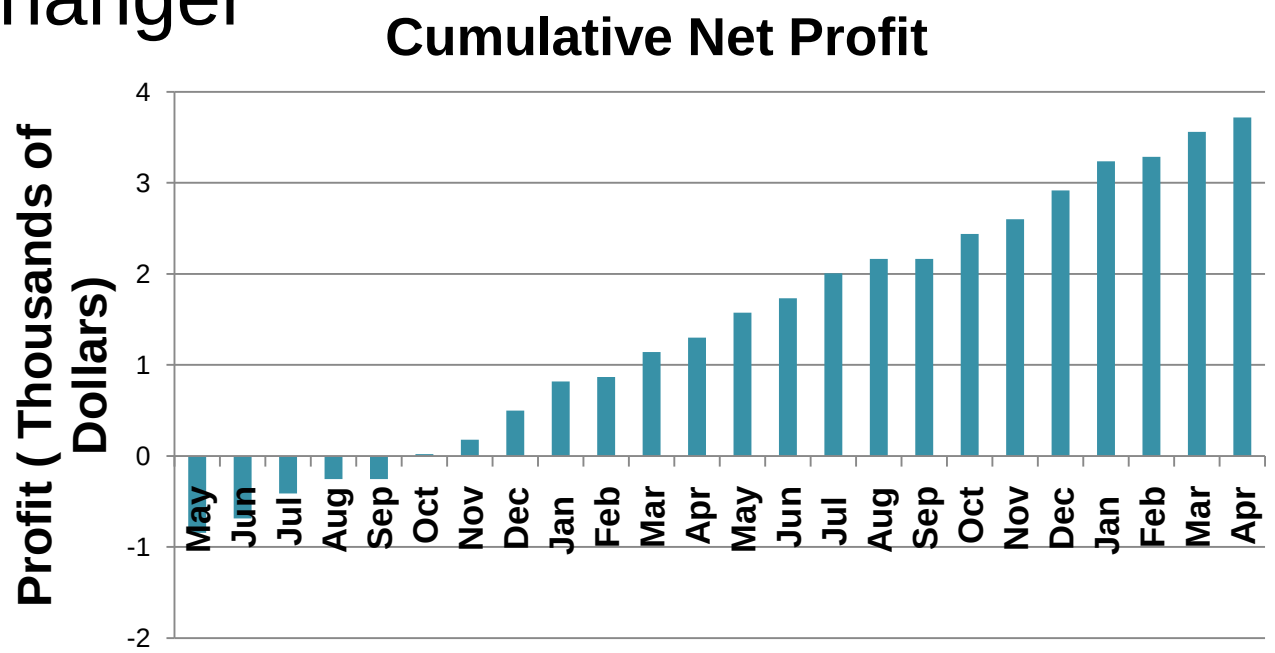
Project Work – Funky Brewsters

- Brewing
  - 3 blond ale batches and 1 IPA batch
  - Sugar content analyzed
- Engineering
  - HYSYS model
  - Heat Exchange
  - Cost Analysis
- Marketing
  - Surveys
  - Logo
  - Business Plan



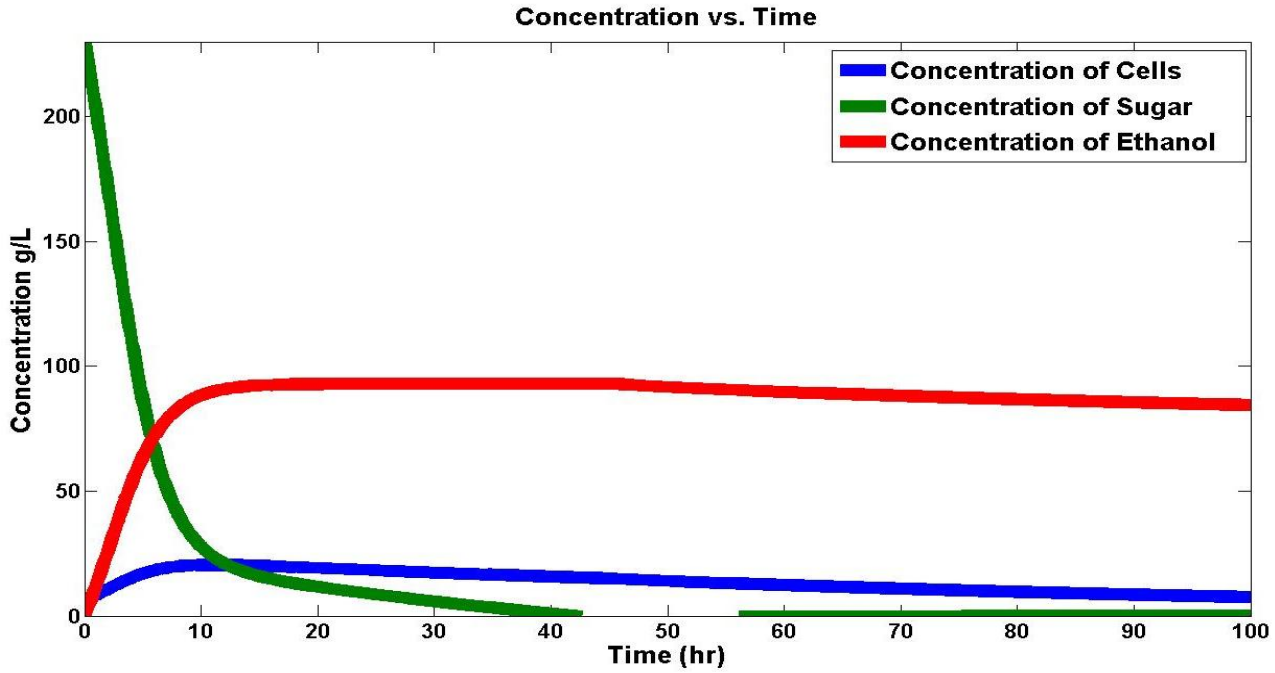
Project Work – Know-IIT-Ales

- 3 Batches of Altbier
- Applied concepts learned in class.
- Fit kinetic model to experimental data
- Determine cooling efficiency of heat exchanger

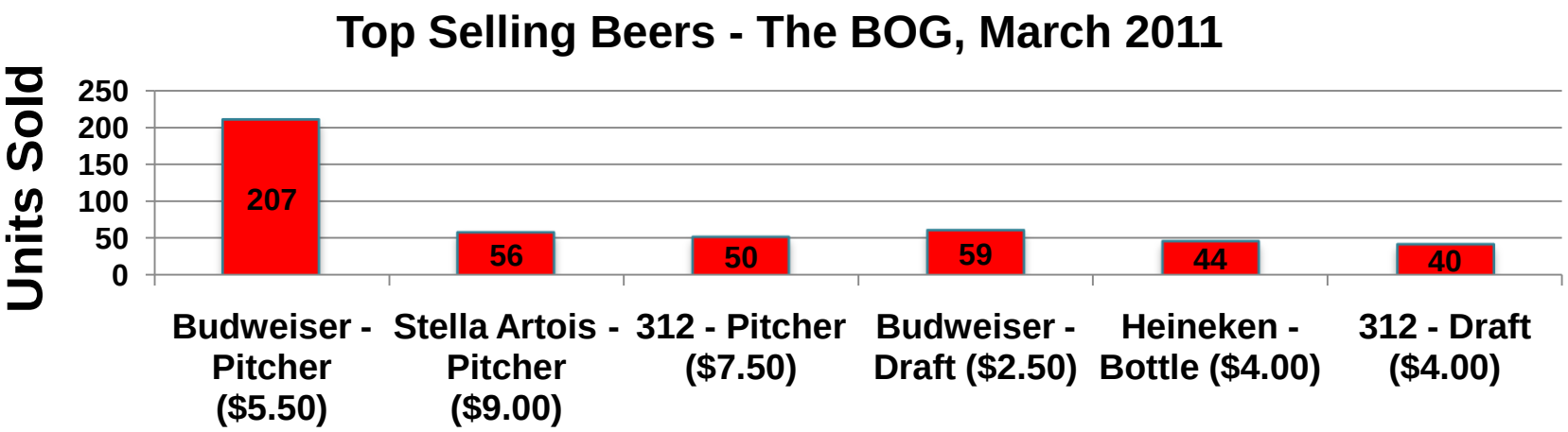


Project Work – Blood, Sweat, and Beers

- Brewing
  - 3 batches of Bavarian Weissen
- Engineering
  - Monitored/modeled reaction kinetics
- Marketing
  - Determined feasibility of on-campus microbrewery



Cost Analysis



Reusable Equipment Cost (Capital Investment)	$737.50
Operation Cost Not Including Labor (Ingredients, Non-reusable material)	$229.20 / 15 gal
Estimated Labor Cost ($8.25/hr – 2 people – 15 hrs/ea.)	$247.50

Total Cost

$1214.20

Conclusions

- Better quality product made by students
- Beers are competitive
  - BOG
  - Increased production
- Ethical considerations incorporated
- Hands on experience for students

Recommendations

- Smaller teams
- Earlier budget approval
- Advertisements
- Collaboration with IPRO 340
- Implement business plan

Acknowledgements

- Professor Ramani
- Chris Arges
- Professor Teymour
- Professor Abbasian
- Joe Luciani
- IPRO Office

Questions?

Please come taste the fruits of our labor from 3-4 pm!