Objective:
- Create a recipe and brew the beer
- Survey beer preferences
- Develop a business plan
- Market the beer with a name and label

Final Result:
- A recipe for a honey orange blonde ale was developed and called ‘Bond on Blonde’
- Four different five gallon batches were brewed
- A cost analysis, Hysys schematic, and label were developed

Survey Results

Preference of Bitterness

<table>
<thead>
<tr>
<th>Level</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slightly</td>
<td></td>
</tr>
<tr>
<td>Fairly</td>
<td></td>
</tr>
<tr>
<td>Moderately</td>
<td></td>
</tr>
<tr>
<td>Very</td>
<td></td>
</tr>
</tbody>
</table>

Interest in Sweet/Citrusy Ale

<table>
<thead>
<tr>
<th>Level</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all</td>
<td></td>
</tr>
<tr>
<td>A little bit</td>
<td></td>
</tr>
<tr>
<td>Neutral</td>
<td></td>
</tr>
<tr>
<td>Interested</td>
<td></td>
</tr>
<tr>
<td>Very</td>
<td></td>
</tr>
</tbody>
</table>

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Ton Trieu

Denotes team leader
* Denotes subgroup leader
¥ Denotes technical expert

Acknowledgment
We would like to thank our IPRO adviser Vijay Ramani for all of his knowledge and guidance.
**Production Schematic**

**Coiled Heat Exchanger**

Cold water in tube extracts heat from the 150°F wort in the container. Cools beer quick for optimal result.

**Beer Specifications**

**Coiled Heat Exchanger**

- **Batch 1**
  - Original Gravity: 1.065
  - Final Gravity: 1.014
  - Alcohol per Volume: 6.68%

- **Batch 2**
  - Original Gravity: 1.066
  - Final Gravity: 1.010
  - Alcohol per Volume: 7.37%

- **Batch 3**
  - Original Gravity: 1.066
  - Final Gravity: 1.014
  - Alcohol per Volume: 6.82%

- **IPA**
  - Original Gravity: 1.082
  - Final Gravity: 1.018
  - Alcohol per Volume: 8.36%

**Sugar Profile Using Mass Spec**

Beer was analyzed over course of fermentation. Sugar profile revealed the sugars that decreased and increased over the fermentation period. Dextrose was one of the main sugars used in fermentation by the yeast. The beer showed higher levels of potassium then other beers.

**Costs**

- **Sales**
  - Sell craft beer for $3.50/bottle x 130 bottles of beer

- **Capital Costs**
  - Cooling coils, Boiling Vats, Thermocouples, Burners, Carboys

- **Future**
  - Capital investment can be used for continuing IPRO, have a small scale brewery for years to come

- **Other Costs**
  - Bottles, Caps, Lables, Ingridents

- **Promotion**
  - Bottled beer given to at IPRO day to promote IIT school pride