NAU Energy Efficiency

ME476C-001

Project 8

April, 19 2018

Team members:

1-Salem Alharban

2-Faiez Alazmi

3-Abdullah Ben Gheyam

4-Ahmad Mnaei

5- Abdulrahman Alazemi

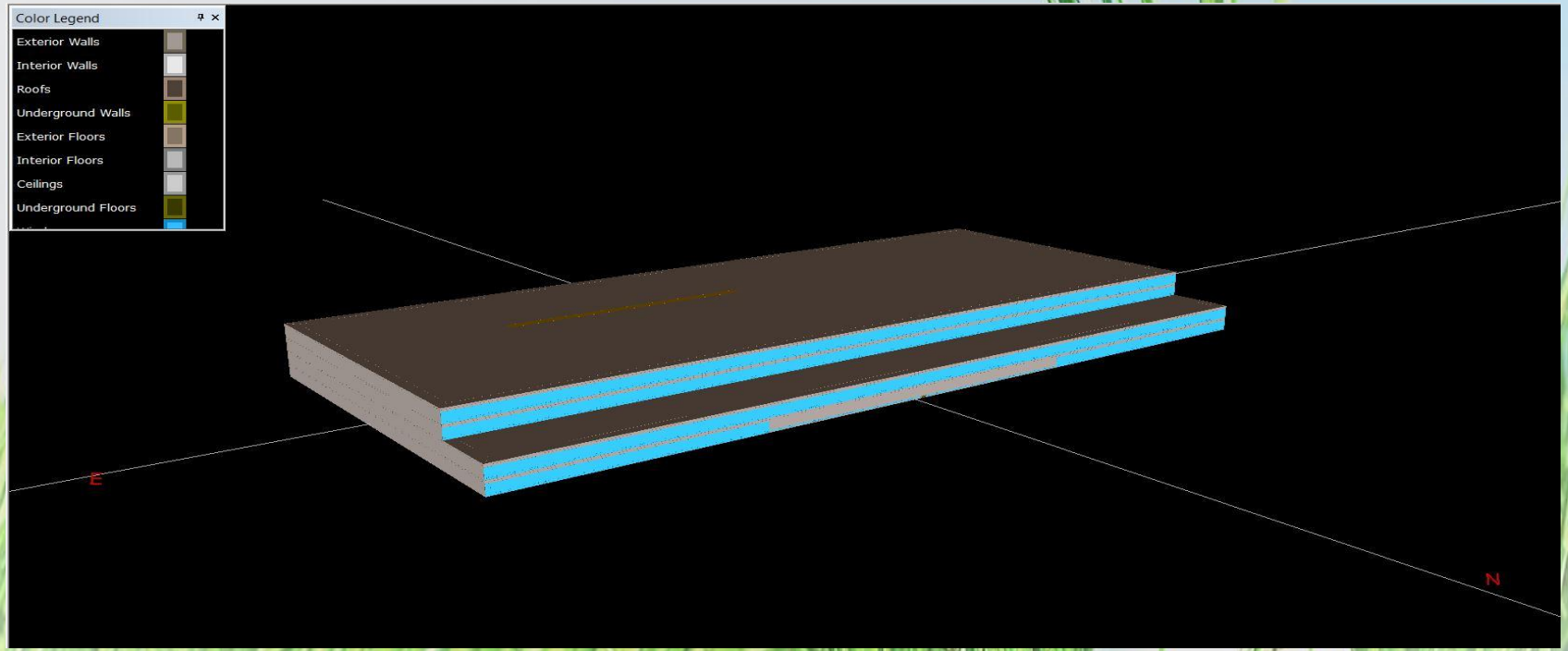
Project Description

The project consists of redesigning the control logic of Student Academic Services building to make it more energy efficient through modifying the HVAC

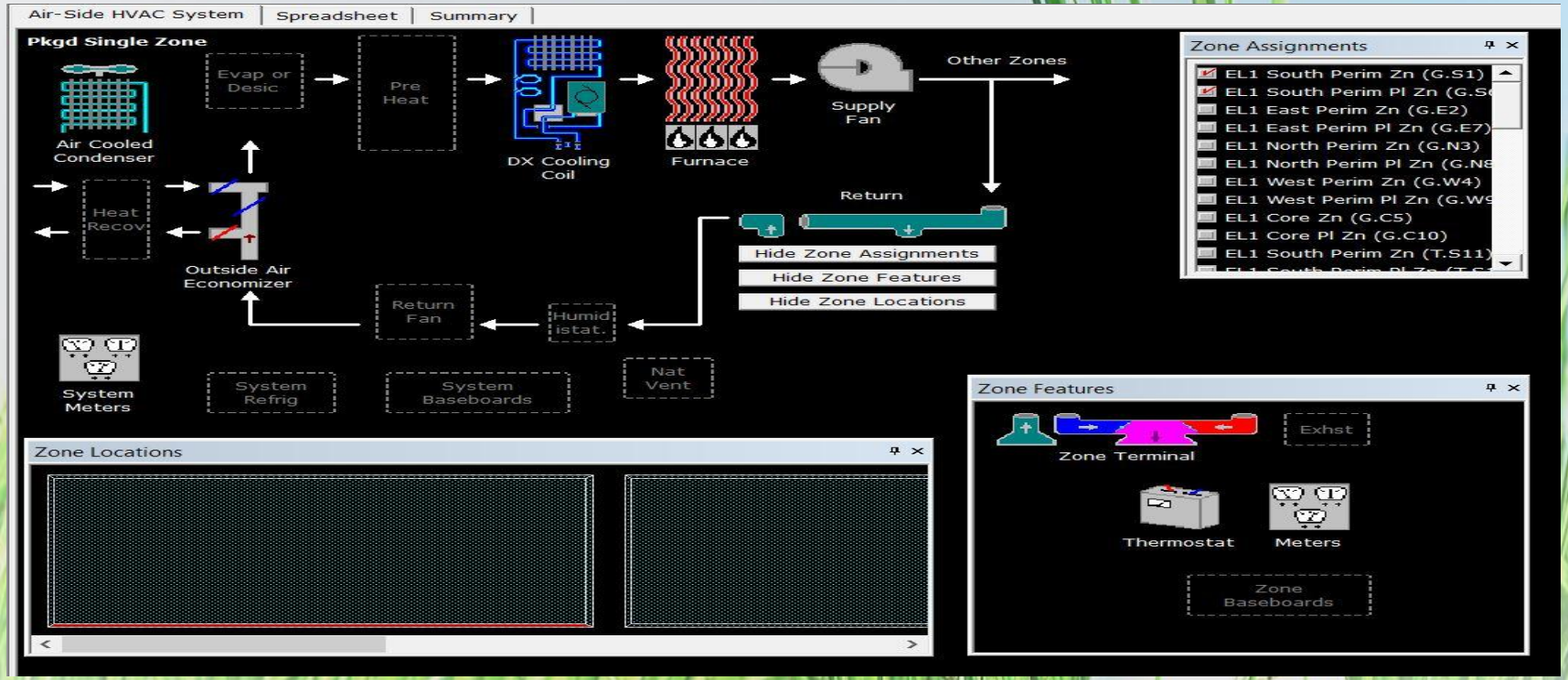
CLIENTS

- Project Sponsor: Dr. Jennifer Wade
- Faculty Advisor: Dr.Brent Nelson
  Jon Heitzinger
- Instructor: Dr. Sarah Oman

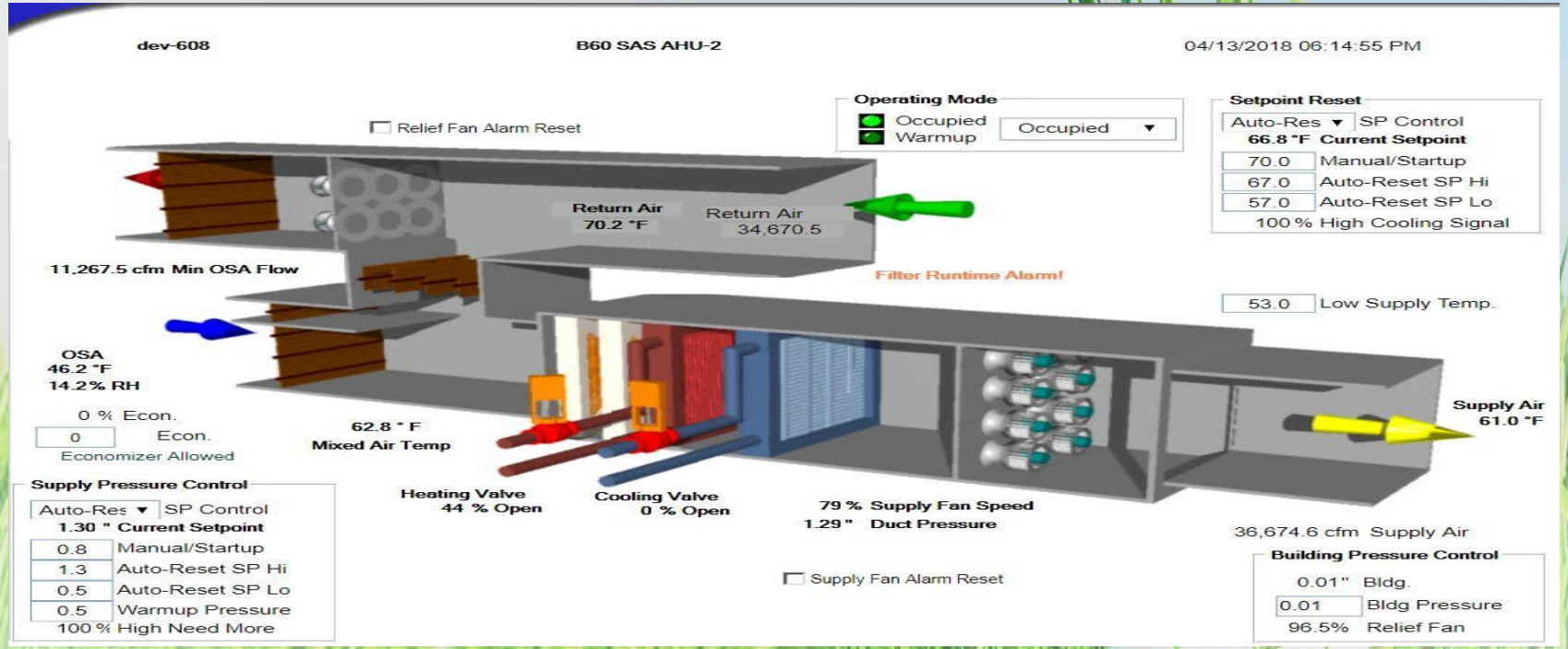
CAD "eQUEST"


Color Legend
Exterior Walls
Interior Walls
Roofs
Underground Walls
Exterior Floors
Interior Floors
Ceilings
Underground Floors
E
N

CAD "eQUEST"


Air-Side HVAC System
Spreadsheet
Summary
Pkgd Single Zone
Air Cooled Condenser
Evap or Desic
Pre Heat
DX Cooling Coil
Furnace
Supply Fan
Other Zones
Heat Recov
Outside Air Economizer
Return
Hide Zone Assignments
Hide Zone Features
Hide Zone Locations
Return Fan
Humid istat.
System Meters
System Refrig
System Baseboards
Nat Vent
Zone Assignments
EL1 South Perim Zn (G.S1)
EL1 East Perim Zn (G.E2)
EL1 East Perim Pl Zn (G.E7)
EL1 North Perim Zn (G.N3)
EL1 West Perim Zn (G.W4)
EL1 Core Zn (G.C5)
EL1 Core Pl Zn (G.C10)
EL1 South Perim Zn (T.S11)
Zone Locations
Zone Features
Zone Terminal
Exhst
Thermostat
Meters
Zone Baseboards

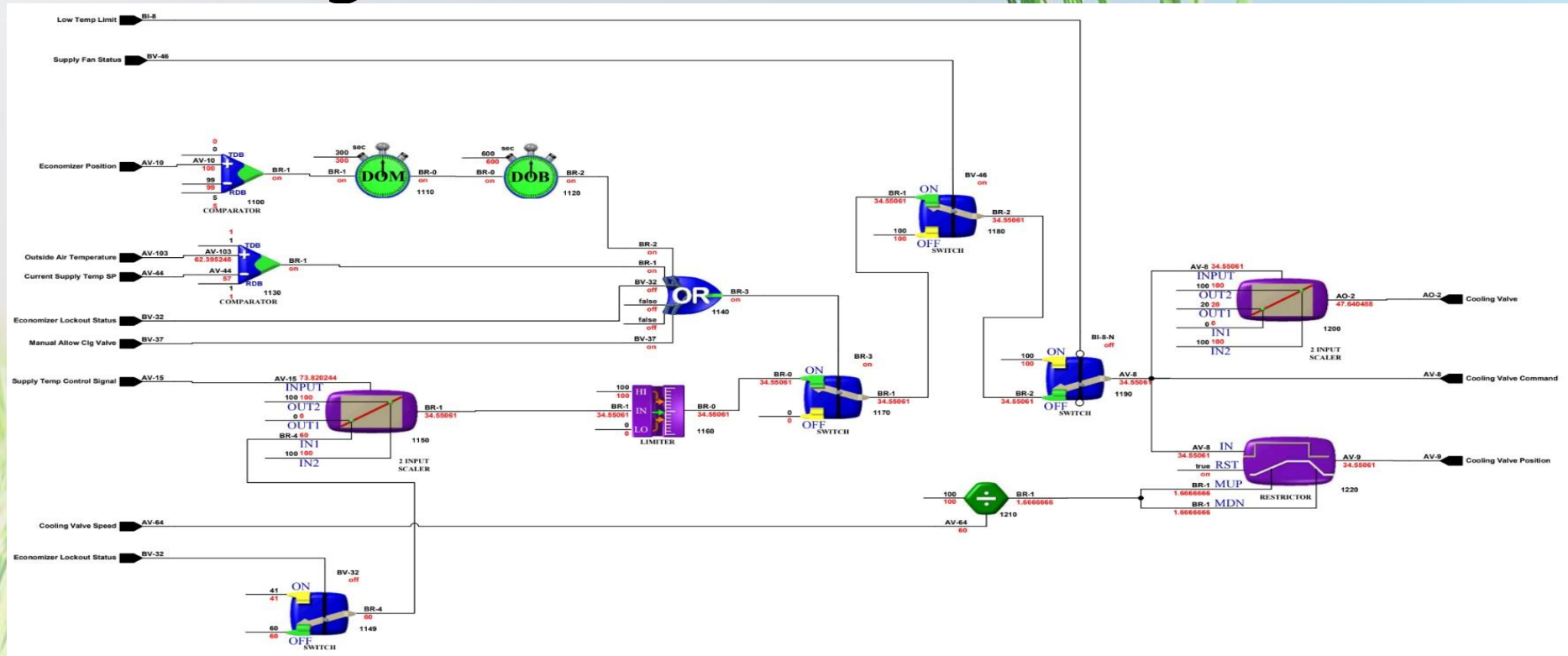
CAD "Alerton"


dev-608
B60 SAS AHU-2
04/13/2018 06:14:55 PM
Relief Fan Alarm Reset
Operating Mode
Occupied
Warmup
Occupied
Setpoint Reset
Auto-Res SP Control
66.8 °F Current Setpoint
70.0 Manual/Startup
67.0 Auto-Reset SP Hi
57.0 Auto-Reset SP Lo
100 % High Cooling Signal
Return Air
70.2 °F
Return Air
34,670.5
11,267.5 cfm Min OSA Flow
Filter Runtime Alarm!
53.0 Low Supply Temp.
OSA
46.2 °F
14.2% RH
0 % Econ.
0 Econ.
Economizer Allowed
62.8 ° F
Mixed Air Temp
Supply Air
61.0 °F
Heating Valve
44 % Open
Cooling Valve
0 % Open
79 % Supply Fan Speed
1.29 " Duct Pressure
36,674.6 cfm Supply Air
Supply Pressure Control
Auto-Res SP Control
1.30 " Current Setpoint
0.8 Manual/Startup
1.3 Auto-Reset SP Hi
0.5 Auto-Reset SP Lo
0.5 Warmup Pressure
100 % High Need More
Supply Fan Alarm Reset
Building Pressure Control
0.01" Bldg.
0.01 Bldg Pressure
96.5% Relief Fan

BOM

For this project the team does not have a bill of material since the logic is not be modified by any person but the vendor

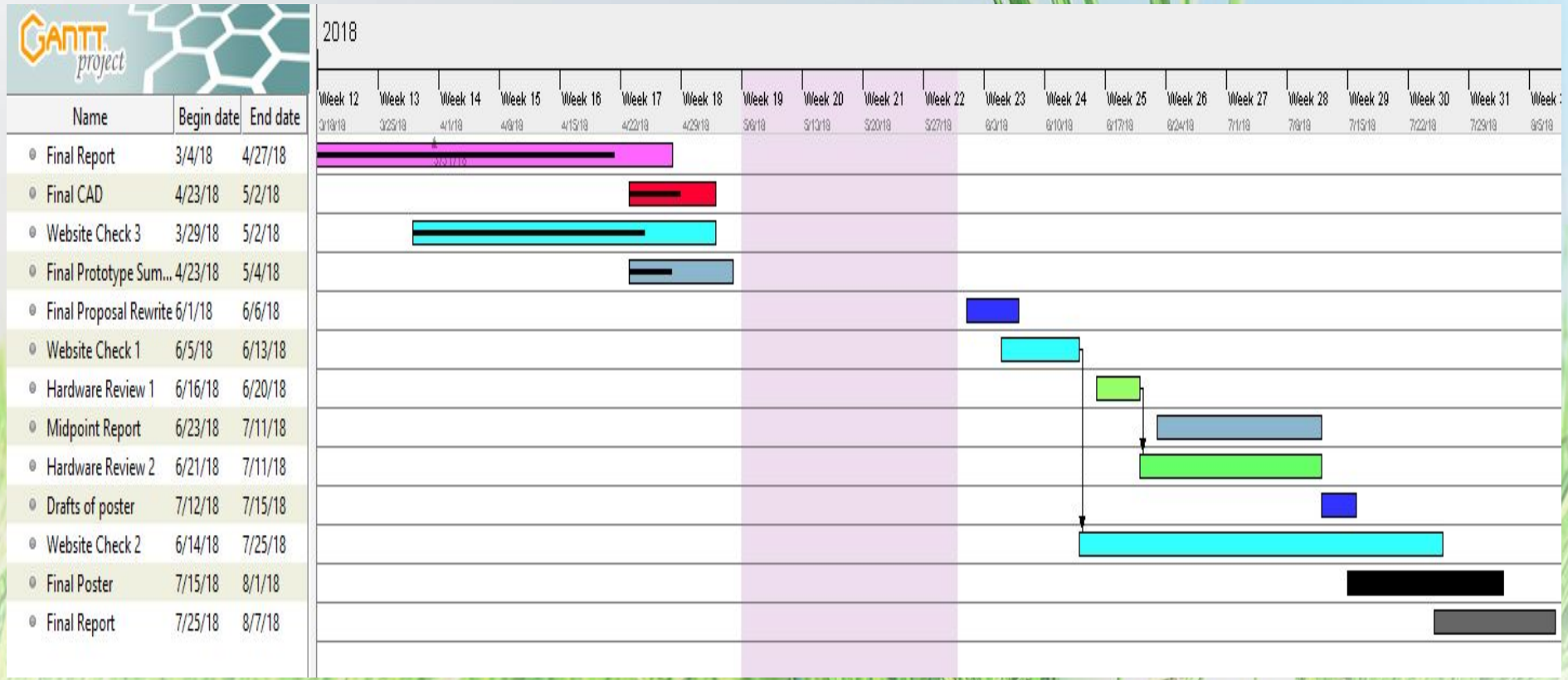
Subsystem


Low Temp Limit
BI-8
Supply Fan Status
BV-46
Economizer Position
AV-10
COMPARATOR
1100
DOM
1110
DOB
1120
Outside Air Temperature
AV-103
Current Supply Temp SP
AV-44
COMPARATOR
1130
Economizer Lockout Status
BV-32
Manual Allow Clg Valve
BV-37
OR
1140
Supply Temp Control Signal
AV-15
INPUT
OUT2
OUT1
IN1
IN2
2 INPUT SCALER
1150
LIMITER
1160
SWITCH
1170
SWITCH
1180
SWITCH
1190
2 INPUT SCALER
1200
RESTRICTOR
1220
Cooling Valve Speed
AV-64
1210
Economizer Lockout Status
BV-32
SWITCH
1149
Cooling Valve
Cooling Valve Command
Cooling Valve Position

CUSTOMER REQUIREMENTS

Customer requirement	Description
Reliability	The design should be efficient in conserving energy.
Maintenance	The design should be easy to maintain.
Foolproof	The design should be able to resist failure.
Affordable	The materials used should be easily affordable.
Save energy	The design should have energy saving devices installed.
Payback in five years	The project should be economically viable such that the payback period should not exceed five years.
Save money	The entire project should be economically viable.
Pollution	The project should be environmentally friendly by ensuring that no pollutants are released to the environment.

Gantt Chart



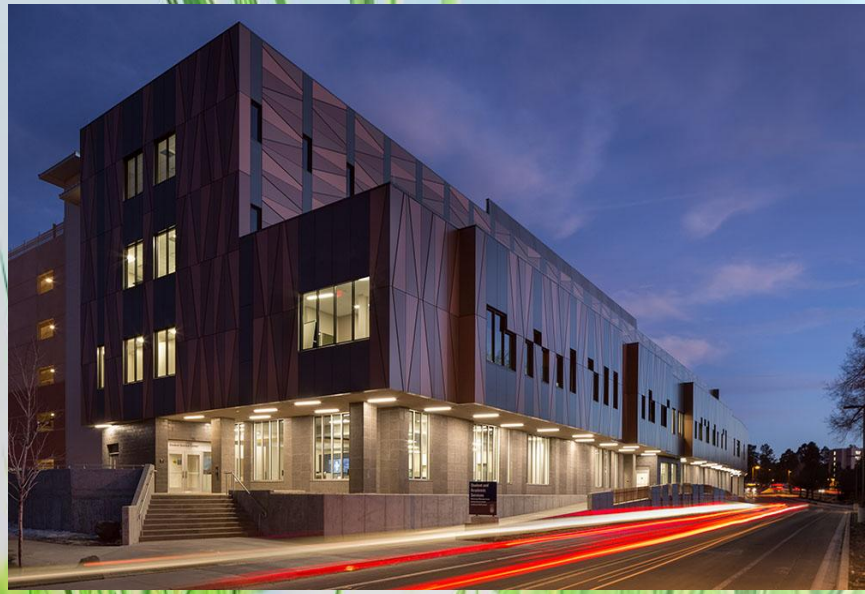
Name	Begin date	End date
Final Report	3/4/18	4/27/18
Final CAD	4/23/18	5/2/18
Website Check 3	3/29/18	5/2/18
Final Prototype Sum...	4/23/18	5/4/18
Final Proposal Rewrite	6/1/18	6/6/18
Website Check 1	6/5/18	6/13/18
Hardware Review 1	6/16/18	6/20/18
Midpoint Report	6/23/18	7/11/18
Hardware Review 2	6/21/18	7/11/18
Drafts of poster	7/12/18	7/15/18
Website Check 2	6/14/18	7/25/18
Final Poster	7/15/18	8/1/18
Final Report	7/25/18	8/7/18

Scope of work

- **eQuest :**
  - Faiez , Abdulrahman and Abdullah
- **Alerton:**
  - Salem and Ahmad
- **Logic:**
  - All team members
- **Analysing:**
  - All team members

Budget

- Cost Max: $500,000.00
- Actual expenses: $0
- Anticipated expenses: Through vendor quotation



ANY QUESTIONS ?