

SAMPLE PROJECT ASSIGNMENTS AND EXERCISES



National Science Foundation
Advanced Technological Education
B.E.S.T. Center Winter Workshop 2013



SAMPLE PROJECT & EXERCISES

Courses

BUAS 1010(2): BAS Fundamentals
BUAS 1020(3): BAS Electrical Concepts I
BUAS 1030(3): BAS Electrical Concepts II
BUAS 1040(3): BAS Devices
BUAS 1050(3): BAS Network Architecture
BUAS 1060(3): BAS Advanced Elec. Concepts

BUAS 2010(3): BAS Comm. HVAC/R & Ctrls
BUAS 2020(3): BAS Logic & Programming
BUAS 2030(4): BAS Design & Installation
BUAS 2040(5): BAS Integration
BUAS 2050(5): BAS Internship

Building Technologies Club / ASHRAE

Project

Visit BAS partner / Prezi present.
Basic circuit wiring
Wire basic I/O to controllers
Device selection & presentation
Run & terminate network types
RLC filter & demo w/oscilloscope

PI loop tune project
Assorted programming projects
BAS system design & install
System database creation
On-the job training

Plan industry events / compete

Georgia Piedmont Technical College
BUILDING AUTOMATION SYSTEMS FUNDAMENTALS
COURSE BUAS 1010 CRN 52506 SEMESTER SUMMER 2012
OUTLINE, SYLLABUS, & ORIENTATION INFORMATION

FACULTY INFO

Mr. Brian Lovell

Clarkston Campus Office: C-13

Office Hours: By Appointment Only

Email: lovellb@gpte.edu

Phone: 404-297-9522 Ext.: 1265

Division Chair :Ms. Natalie Kostas

Clarkston Campus Office: Industrial Dept.

Email: kostasn@gpte.edu

Phone: 404-297-9522 Ext.: 1216

CLASS TIMES

Mondays: 5:30 pm - 6:45 pm

CREDIT HOURS & PREREQUISITES

The federal definition of a semester credit hour is one hour of classroom instruction and two hours out of class student work each week.

2 / Advisor Approval

INTRODUCTION & COURSE DESCRIPTION

BAS Fundamentals provides an overview of the BAS industry in general. Topics include history, BAS manufacturers & contractors, industry scope & trends, careers in BAS, overview of point types, required skills, types of BAS systems, and general BAS architecture. .

COURSE COMPETENCIES

History of BAS industry / Scope of BAS industry / Major commercial building systems / Contracting basics / BAS Manufacturers, contractors, service companies, and suppliers / Skill sets required for BAS installers, technicians, and salespeople, Basic BAS inputs & outputs / Types of BAS control systems / General BAS architecture / Trends in BAS industry

STUDENT LEARNING OUTCOMES

Recall major developments of the BAS industry over the last 100 years

Give examples of major technological advances which have impacted the BAS industry over the last 25 years

Predict how emerging technologies and the information age will impact the BAS industry over the next decade

Identify 5 career paths a BAS professional might follow

Discuss the types of systems which are considered to be within the domain of building automation systems

Compare the BAS industry with the IT industry

Cite the major building systems found in commercial facilities

Recognize major building systems as shown on a blueprint

Contrast a 24-hour period energy consumption graph of a well-managed building with that of a poorly-managed building

Discuss the hierarchy of contractors from the BAS contractor through the architectural firm on a typical bid & spec job

Construct a flow diagram depicting how a change order flows from a BAS contracting firm through the engineer and architect to the owner and then back down to the BAS contractor

Compare and contrast the relative merits of bid/spec contracting of a new building vs. design/build contracting of a new building

Argue why design build contracting is better from an owner's perspective to bid & spec

Argue why bid & spec contracting is better from an owner's perspective than design build contracting

Name 10 leading BAS original equipment manufacturers (OEMs) in the United States

List 10 leading BAS service companies in the U.S.

- 5/28 - Memorial Day Holiday - No Class
- 6/4 - Introduction / History of BAS Industry / Careers in BAS
Writing Assignment # 1 - Due 6/10 NLT 11:55 pm
Quiz 1 - Due Sunday, 6/10 NLT 11:55pm (History of BAS / Careers in BAS)
- 6/11 - BAS Companies (Local / National)
Quiz 2 - Due Sunday, 6/17 NLT 11:55pm (BAS Companies)
- 6/18 - Guest Speaker 1
Guest Speaker 1 Writing Assignment - Due 6/24 NLT 11:55 pm
- 6/25 - Required Skills for BAS Professionals / BAS Industry Trends
Writing Assignment # 2 - Due 7/1 NLT 11:55 pm
Quiz 3 - Due Sunday, 7/1 NLT 11:55pm (Required Skills for BAS Professionals / BAS Industry Trends)
- 7/2 - Soft Skills Lectures I & II
Mid-term Assessment - Due Sunday, 7/8 NLT 11:55 pm (All material covered through 7/2)
- 7/9 - Guest Speaker 2
Course Project Assigned
Guest Speaker 2 Writing Assignment - Due 7/15 NLT 11:55 pm
- 7/16 - Overview of Point Types I
Quiz 4 - Due Sunday, 7/22 NLT 11:55 pm (BAS Point Types I)
- 7/23 - Overview of Point Types II
Quiz 5 - Due Sunday, 7/29 NLT 11:55 pm (BAS Point Types II)
- 7/30 - BAS System Architecture
Quiz 6 - Due Sunday, 8/5 NLT 11:55pm (BAS System Architecture)
- 8/6 - Project Presentations
- 8/8 - Final Assessment Due 8/8 NLT 11:55 pm (Cumulative)

COLLEGE POLICIES

Reaffirmation – QEP: iRead...iClick...I'm Ready... *Enhancing Reading Comprehension and Digital Literacy*

Georgia Piedmont Technical College (GPTC) is accredited by the Southern Association of Colleges and Schools Commission on Colleges (SACSCOC). One component of the process of reaffirmation is the identification and implementation of a Quality Enhancement Plan (QEP) designed to improve student learning or the environment in which student learning takes place. The Office of Quality Enhancement conducted surveys and focus groups, the

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SAMPLE PROJECT & EXERCISES

BUAS 1010 – BAS Fundamentals

Assignment # 1

Using the Purdue Online Writing Lab at <http://owl.english.purdue.edu/owl/> read about writing memos under the submenus “Subject Specific Writing” and then “Professional, Technical Writing,” construct a memo which includes sections about the history of the building automation systems industry, at least three career pathways within the industry, and what career pathway you would like to follow in the industry.

Use the dropbox in Angel to submit your assignment in word document format.

***Note:** We will be making use of the Purdue Online Writing Lab throughout this course. Some quiz questions will come from sections which are referenced in the course.

SAMPLE PROJECT & EXERCISES

BUAS 1010 – BAS Fundamentals

Assignment # 2 – Finding a Career with a BAS Company

Using the Purdue Online Writing Lab at <http://owl.english.purdue.edu/owl/> read about writing memos under the submenus “Subject Specific Writing” and then “Professional, Technical Writing,” construct a memo which includes the following items;

- A BAS company you might be interested in working for and why
- Describe some interesting facts about the company you wish to work for
- Describe the types of products you’ll be working with in your chosen company
- A specific job you’d like to do with that company
- The skill set required to acquire the job your interested in
- How you plan to work toward your goal of employment with your chosen company and how you will prepare yourself both inside and outside of DeKalb Tech / GPTC
- List any opportunities for internships / co-ops / or on-the-job training that your chosen company offers

Use the dropbox in Angel to submit your assignment in word document format.

***Note:** We will be making use of the Purdue Online Writing Lab throughout this course. Some quiz questions will come from sections which are referenced in the course.

SAMPLE PROJECT & EXERCISES

BUAS 1010 – BAS Fundamentals

Course Project Assignment – Regional BAS Contracting Companies

Please select one of the following local companies to research and then follow the directions below;

- Convergent
- McKenney's
- Stromquist
- Siemens
- Automated Logic of GA
- Johnson Controls
- Waypoint Systems
- Frazier Service Company
- GA Trane

You will be working in groups of 3 students. You will need to assign someone to contact the chosen company, let them know you're a student at Georgia Piedmont Technical College, and request a brief interview with someone there. You need to let them know that this is an assignment for school and if they have any questions or would like to confirm the assignment, they can contact me, Mr. Lovell, at lovellb@gptc.edu. You should have as many paragraphs as necessary to fully answer the questions that follow. Using the Purdue Online Writing Lab at <http://owl.english.purdue.edu/owl/> read about writing memos under the submenus "Subject Specific Writing" and then "Professional, Technical Writing," construct a memo which includes the following items;

- Description of the company you've chosen.
- When was the company established, by who, and what is their core focus
- What controls product do they represent (Possibly more than one)
- What classifications of jobs do they have in their controls division (Automation specialist / Field technician / controls engineer / controls salesperson, etc?)
- Do they handle jobs totally in-house, or do they sub-contract controls installations?
- Do they strictly do controls, or do they have other divisions of the company? If so, what are they?
- What do they see as the top 3 challenges controls contractors face over the next 5 years
- Do they anticipate hiring new technicians within the next 6 months? Within the next year?
- When you have determined what controls products they use, you need to go the manufacturer's website and identify and list the controllers at the application-specific level, the automation level, and the management level.
- You should be able to describe how many inputs and outputs controllers have at the ASC and automation levels, and what types they are

SAMPLE PROJECT & EXERCISES

- You should also find out what the system architecture is and be able to discuss and explain the system architecture. (It's okay to use a manufacturer's diagram, as long as you can explain it and handle questions about it and properly cite the reference)

There is a presentation component to this assignment as well as follows;

- For this assignment, you will be using Prezi software to do the presentation as a group which will be 10 minutes in length, including questions. Prezi is a free presentation software package and is available to create on-line presentations at www.Prezi.com.

You will have a separate written and presentation drop-box for this assignment which will be due on the same day.

There should be a division of labor among your group as follows;

- Interviewer / Company data collector
- Written portion of assignment person
- Presentation portion of assignment person who also presents for the group
- Editor (Person who checks for proper English grammar / format / reviews presentation for accuracy and proper citing)
- Question and Answer session person

SAMPLE PROJECT & EXERCISES – BUAS 2030

Submittal Package Project Instructions

Please review the submittal package sample that was uploaded to provide you an example of what's expected in this assignment.

The specifications for the project are to be found under the Course Materials tab.

The specifications are for a variable air volume (VAV) system replacement for DeKalb Technical College. You will find the drawing and points listing under the Course Materials tab as well.

I have already selected the BAS devices for you and uploaded a file called "BAS Device Selection for Project" under the Course Materials tab. It is your responsibility to take the Kele product selections part numbers and go to the Kele website at www.Kele.com and put them in a search. When the product comes up, it will come up with four or five tabs. One of the tabs will have the name "Related Documents." You should click on this tab and then click on "catalog page" at the bottom of the next screen that comes up. This will provide you with a cut sheet, or engineering sheet, which details the product and provides a wiring diagram.

You should use this wiring diagram for your detail drawings and connect lines in your MS Visio drawing to the input or output terminals to which the devices will terminate on. Remember that input and output don't matter, but you should keep up with what inputs and outputs are used on the Delta panel so you don't duplicate points.

The total number of the inputs and outputs on this VAV system are much less than the number of points available on the Delta panel itself so there shouldn't be a problem having enough hardware points to cover all the devices. You'll also notice that there are a number of software points as well, but these don't need to be shown in the submittal package. We are only showing detail wiring of the hardware points. Consult the example submittal that is on Angel under "Course Materials" for an example of how detail wiring is shown. You will definitely need to look at the examples shown for fan-proving current switch location and starter wiring for fan start/stop details, among others.

Most of the work for this project is already done for you, but you will need to create the stencils and detail drawings and construct your submittal packages, print them out, and bind them in a presentation binder so they appear like the sample submittal I provided you with. I will accept only hard copy submissions for you course project. No electronic submissions will be graded.

Point Name	Hardware Points				Software Points					Show On Graphic	Kele Product	Quantity
	AI	AO	BI	BO	AV	BV	Sched	Trend	Alarm			
Supply Air Static Pressure	x							x	x	x	T30-030-C	1
Supply Air Humidity	x							x		x	ACI/RH2-D-AN	1
Prefilter Differential Pressure	x							x			T30-002-C	1
Mixed Air Temp	x							x		x	BA-10K3-D8-JB	1
Return Air Carbon Dioxide PPM	x							x		x	GMD20	1
Return Air Humidity	x							x		x	ACI/RH2-D-AN	1
Return Air Temp	x							x		x	ACI/RH2-D-AN	Combo w/ RA Humidity
Supply Air Temp	x							x		x	ACI/RH2-D-AN	Combo w/ SA Humidity
Supply Fan VFD Speed		x						x		x	F1-F-4V-005-B-3-ET	1
Preheating Steam Valve		x						x		x	V5011N1057-KAS-44-M	1
Cooling Valve		x						x		x	V5013N1063-KAS-44-M	1
Heating Valve		x						x		x	V5013N1063-KAS-44-M	1
Mixed Air Dampers		x						x		x	CD50OBOX-24X30 / Actuators: AF24-SR	3 / 3
Humidifier		x						x		x	Provided by others / Show on/off control detail only	
Freezestat			x					x	x	x	Provided by others/ Show NC contact in series with smoke detector NC contact and high static shutdown switch to shut down fan motor	
High Static Shutdown			x					x	x	x	AFS-460-DSS	1
Return Air Smoke			x					x	x	x	SL-2000-N-	1

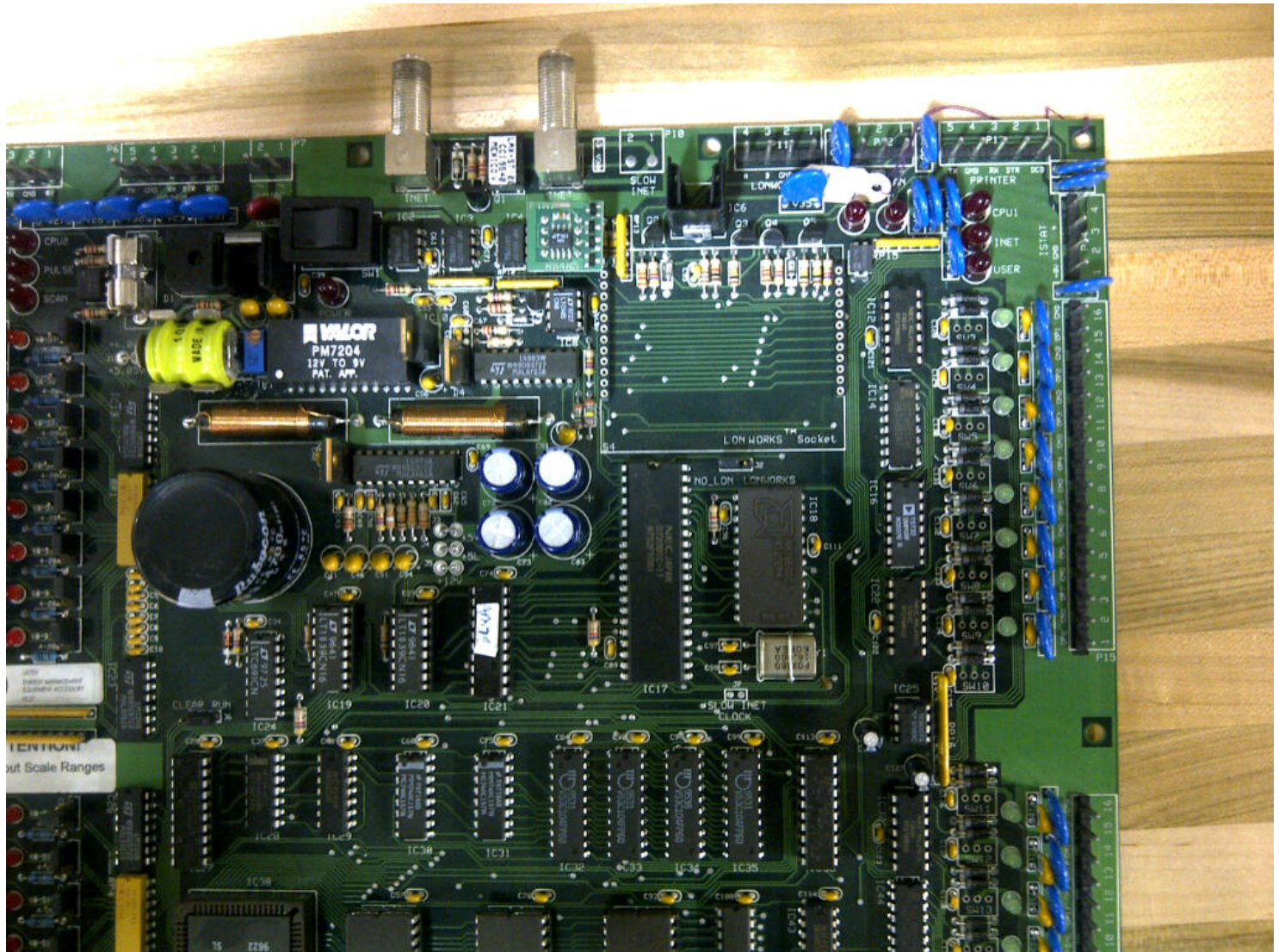
Detector										STN-5.0	
Supply Air Smoke Detector			×				×	×	×	SL-2000-N-STN-5.0	1
Supply Fan VFD Fault			×					×	×	Read from VFD fault output	
Supply Fan Status			×				×		×	A/ASCS-L	1
Return Fan Status			×				×		×	A/ASCS-L	1
Supply Fan Start/Stop				×			×		×	RIBU1C (Relay in a box with 1 SPDT contact)	1
Return Fan Start/Stop				×			×		×	RIBU1C	1
Humidifier Enable				×					×	RIBU1C	1
Supply Air Static Pressure Setpoint					×		×		×		
Preheating Mixed Air Temp Setpoint					×		×		×		
Supply Air Temp Setpoint					×		×		×		
Economizer Mixed Air Temp Setpoint					×		×		×		
Dehumidification Setpoint					×		×		×		
Humidifier Setpoint					×				×		
Emergency Shutdown						×		×	×		
High Supply Air Static Pressure								×			
Low Supply Air Static Pressure								×			
Supply Fan Failure								×			
Supply Fan in Hand								×			
Supply Fan Runtime Exceeded								×			
Return Fan Failure								×			
Return Fan in Hand								×			
Return Fan Runtime Exceeded								×			
High Supply Air Temp								×			
Low Supply Air Temp								×			
High Supply Air Humidity								×			
Low Supply Air Humidity								×			
Prefilter Change Required								×	×		

High Mixed Air Temp									×			
Low Mixed Air Temp									×			
High Return Air Carbon Dioxide Concentration									×			
High Return Air Humidity									×			
Low Return Air Humidity									×			
High Return Air Temp									×			
Low Return Air Temp									×			
High Supply Air Temp									×			
Low Supply Air Temp									×			
Totals	8	6	7	3	6	1	0	28	29	31		

Total Hardware (24)

Total Software (64)

SAMPLE PROJECT & EXERCISES





PROJECT & EXERCISES – BUAS 1030

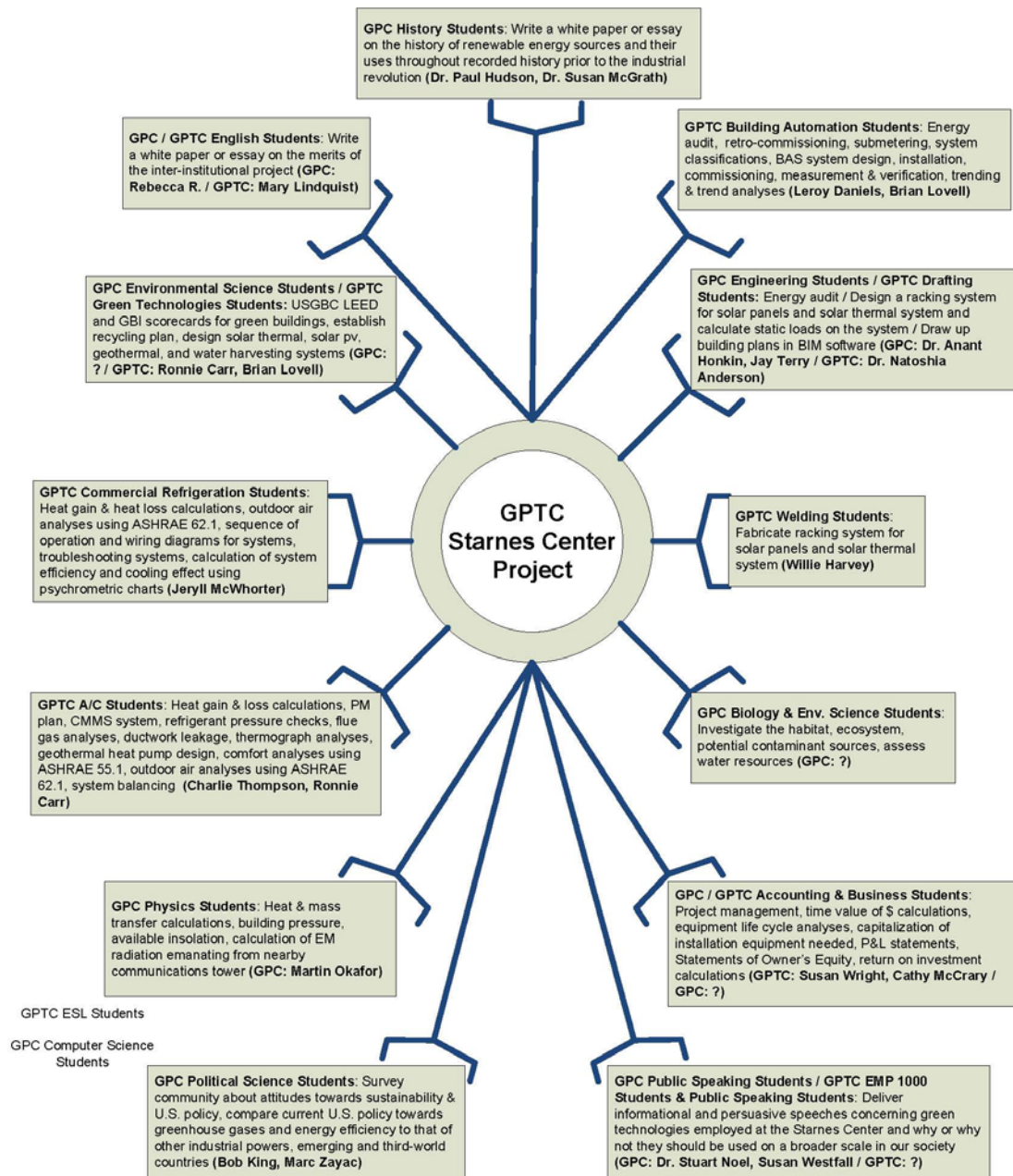
PROJECT & EXERCISES – BUAS 1050



PROJECT & EXERCISES – BUAS 1060



Proposed Student Populations and Learning Outcomes for Involvement in the GPTC Starnes Center Retrofit Project



Programs Involved in Project

GPTC

Accounting Students: Organize a new company which is taking advantage of an emerging market niche for energy auditing and control systems contracting. Complete a market analysis, establish a business plan, and set up a chart of accounts with the Starnes Center as the first project. (BL will provide the student with necessary information and assist in answering questions about the industry and providing materials sourcing information, labor information, etc. for the project)

Air-Conditioning & Commercial Refrigeration Students: Take an inventory of the existing mechanical equipment at the Starnes Center. Make a thorough investigation of air-flow, environmental conditions, interviews of on-site staff, piping practices, electrical practices, system efficiency, temperature differentials across heat exchangers, ambient conditions. Participate in an energy audit of the facility and make a presentation about the findings. (BL will serve as the customer and will coordinate the site visits -- The air-conditioning students will be working as a mechanical sub-contractor to the automation and company being established by the accounting students)

Building Automation Students: Draw the proposed facility in M.S. Visio, assess the existing structure and opportunities for automation. Develop a points list for the facility, develop shop drawings and a submittal package for the project. Participate in an energy audit for the facility and work with accounting students to establish pricing for the project, create a short sales presentation, and calculate payback periods.

Drafting Students: Drafting students will use a building information management (BIM) software package to digitally re-create the building's physical structure to include details on composite walls, mechanical systems, piping, ductwork, electrical systems, major loads, usage groups, and occupancy patterns. The students will present this work at the end of the semester. (Students will act as a subcontractor to the automation and engineering firm being established by the accounting students under the supervision of BL)

Sustainable Technologies Students: Sustainable technologies students will investigate the possibility of attaining a LEED certification for the Starnes Center. Students will be given a budget and will determine whether or not a LEED certification is possible.

Programs Involved in Project

GPC

Computer Science: Create a program in Java which incorporates ambient temperatures, humidity, solar radiation, wind speed, and precipitation to electrical energy consumption and natural gas consumption. Find the single variable which impacts respective utility consumption most closely. Obtain empirical data from trend log information of variables from building automation systems students. Make a presentation of the findings.

Engineering: Present students with the problem of improving the efficiency of the Starnes Center building. The Starnes Center operates very inefficiently, and energy conservation measures (ECMs) need to be proposed which have less than a 10-year payback period and should be presented in ascending order from lowest cost to highest cost. Examples could be increasing the amount of insulation, or making the roof more reflective, shading south-facing windows, or changing schedules of equipment, or adding renewable energy to the facility. (BL will act as the customer and the students will develop a presentation from their findings.)

Physics Students: Assess how energy moves through the Starnes Center. How is heat and mass transferred across the boundary layers of the building. Propose ways in which better control could be exerted over this transfer. (Develop presentation)

Political Science Students: Survey the surrounding community as to their attitudes towards sustainable practices. Compare prevailing attitudes to that of student populations involved in the Starnes Center Project. Compare and contrast findings to current U.S. policy and that of other developed and developing countries. (Make a presentation as to their findings)

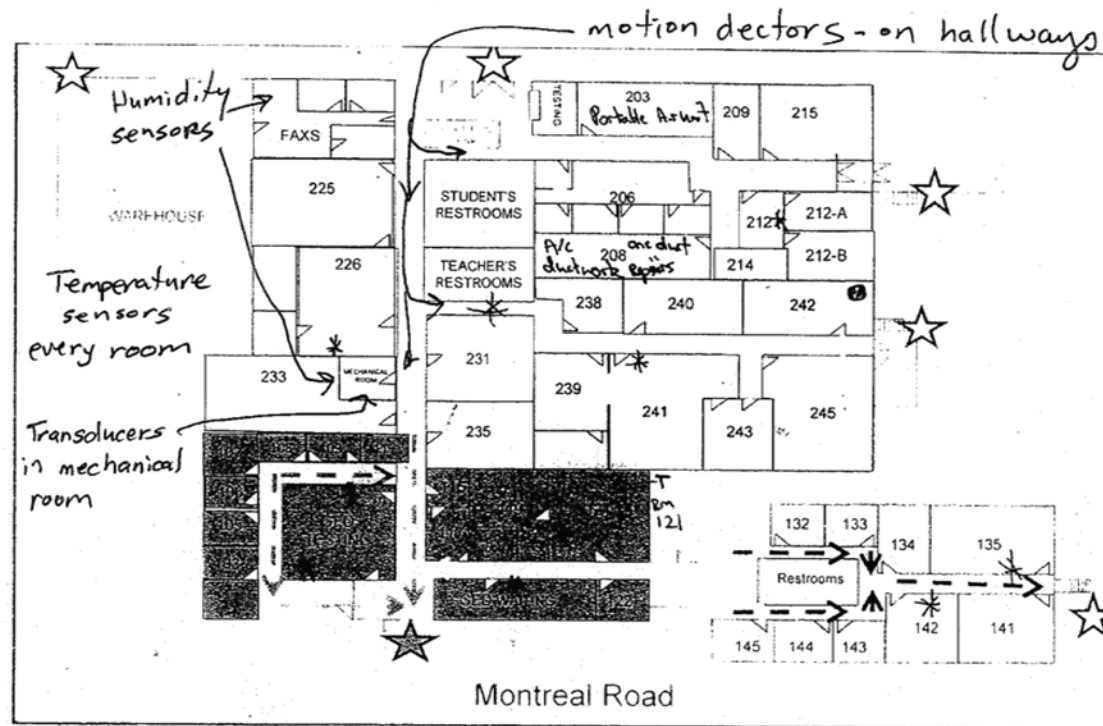
GPTC Starnes Center Project Spring Semester, 2012

Sun., Jan 8	Mon., Jan 9	Tue., Jan 10	Wed., Jan 11	Thu., Jan 12	Fri., Jan 13	Sat., Jan 14
	Classes Begin					
Sun., Jan 15	Mon., Jan 16	Tue., Jan 17	Wed., Jan 18	Thu., Jan 19	Fri., Jan 20	Sat., Jan 21
	MLK Jr. Holiday					
Sun., Jan 22	Mon., Jan 23	Tue., Jan 24	Wed., Jan 25	Thu., Jan 26	Fri., Jan 27	Sat., Jan 28
Sun., Jan 29	Mon., Jan 30	Tue., Jan 31	Wed., Feb. 1	Thu., Feb. 2	Fri., Feb. 3	Sat., Feb. 4
Sun., Feb. 5	Mon., Feb. 6	Tue., Feb. 7	Wed., Feb. 8	Thu., Feb. 9	Fri., Feb. 10	Sat., Feb. 11
Sun., Feb. 12	Mon., Feb. 13	Tue., Feb. 14	Wed., Feb. 15	Thu., Feb. 16	Fri., Feb. 17	Sat., Feb. 18
Sun., Feb. 19	Mon., Feb. 20	Tue., Feb. 21	Wed., Feb. 22	Thu., Feb. 23	Fri., Feb. 24	Sat., Feb. 25
Sun., Feb. 26	Mon., Feb. 27	Tue., Feb. 28	Wed., Feb. 29	Thu., Mar. 1	Fri., Mar. 2	Sat., Mar. 3
Sun., Mar. 4	Mon., Mar. 5	Tue., Mar. 6	Wed., Mar. 7	Thu., Mar. 8	Fri., Mar. 9	Sat., Mar. 10
Sun., Mar. 11	Mon., Mar. 12	Tue., Mar. 13	Wed., Mar. 14	Thu., Mar. 15	Fri., Mar. 16	Sat., Mar. 17
Sun., Mar. 18	Mon., Mar. 19	Tue., Mar. 20	Wed., Mar. 21	Thu., Mar. 22	Fri., Mar. 23	Sat., Mar. 24
Sun., Mar. 25	Mon., Mar. 26	Tue., Mar. 27	Wed., Mar. 28	Thu., Mar. 29	Fri., Mar. 30	Sat., Mar. 31
Sun., Apr. 1	Mon., Apr. 2	Tue., Apr. 3	Wed., Apr. 4	Thu., Apr. 5	Fri., Apr. 6	Sat., Apr. 7
Sun., Apr. 8	Mon., Apr. 9	Tue., Apr. 10	Wed., Apr. 11	Thu., Apr. 12	Fri., Apr. 13	Sat., Apr. 14
Sun., Apr. 15	Mon., Apr. 16	Tue., Apr. 17	Wed., Apr. 18	Thu., Apr. 19	Fri., Apr. 20	Sat., Apr. 21
			M/W Classes End	T/TH Classes End		WkEnd Classes End
Sun., Apr. 22	Mon., Apr. 23	Tue., Apr. 24	Wed., Apr. 25	Thu., Apr. 26	Fri., Apr. 27	Sat., Apr. 28
		T/TH Final Exams	M/W Final Exams			Final Exams - WkEnd

- Phase 1: Faculty Team Meeting / Final Definitions of Objectives / Develop Assessment Tools / Secure I.R.B. Approval / Set Recurrent Meeting Times
- Phase 2: Pre-Assess Participants (Students / Faculty / Customer / Industry) / Introduce Project to Students On-Site After Pre-Assessments
- Phase 3: Cognitive Development (Deliver Classes on Energy Auditing, Equest, BIM, Prezi, Small Business Development, Engineering Design Process)
- Phase 4: Assign Project Teams & Begin Respective Work Under Instructor Supervision
- Phase 5: Project Teams Work on Developing Presentations
- Phase 6: Project Teams Present Their Work at the GPTC Conference Center (Present to Faculty, Industry, Public - Assessed by Industry)
- Phase 7: Post-Assessments of Students, Faculty, Customer, Industry, and Focus Groups / Faculty Meeting Following Assessments (Debriefing)
- Faculty Team Meeting: Video-Conference

SAMPLE PROJECT & EXERCISES

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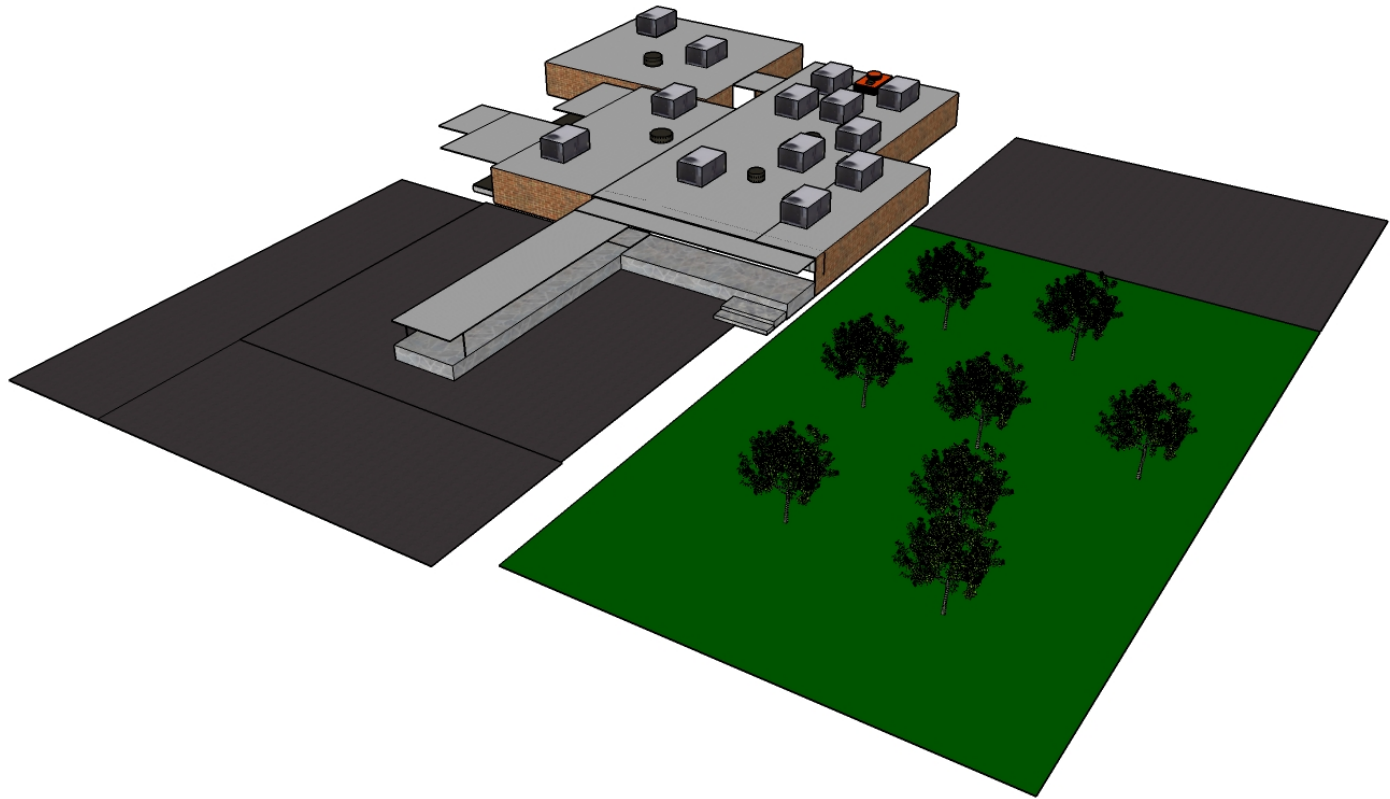


GEORGIA PIEDMONT TECHNICAL COLLEGE
PAUL STARNES CENTER
EVACUATION PLAN



GEORGIA
PIEDMONT

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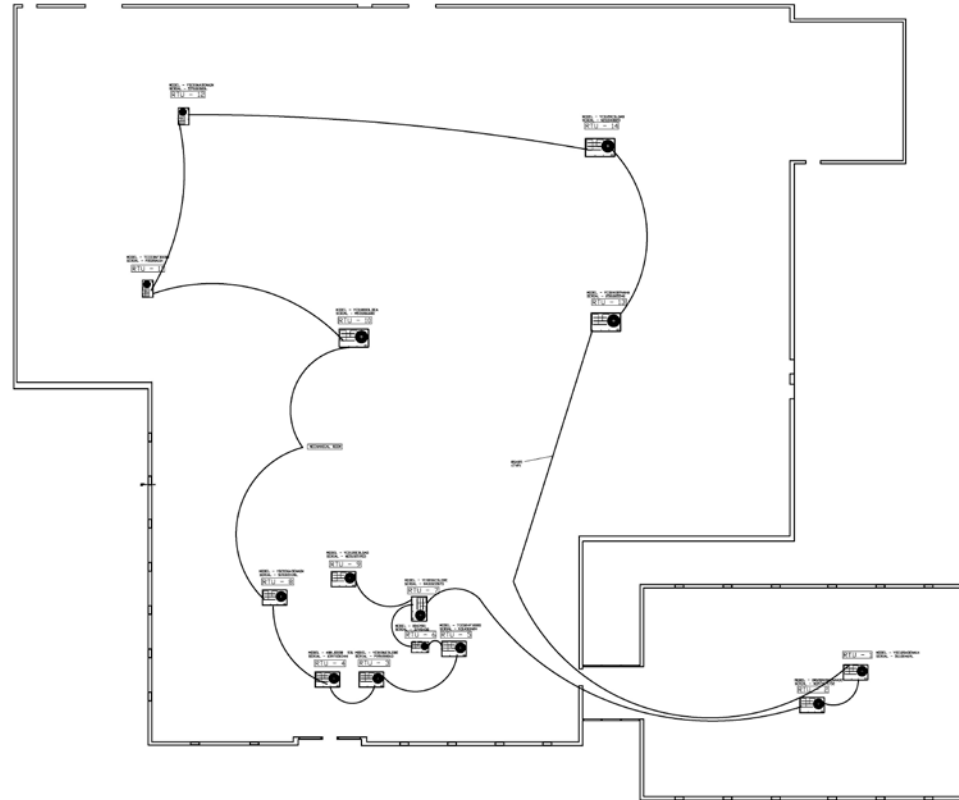
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SAMPLE PROJECT & EXERCISES

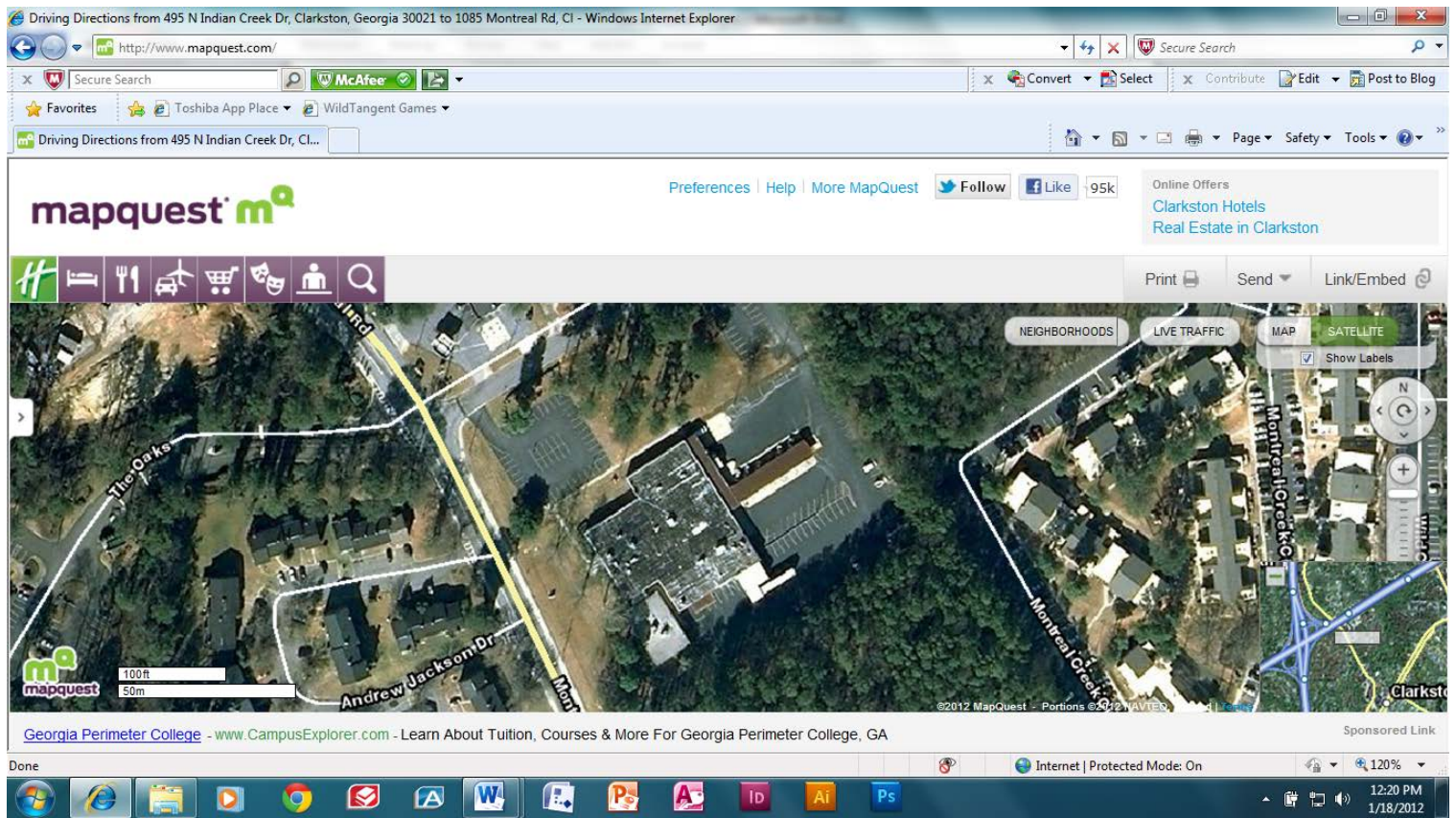
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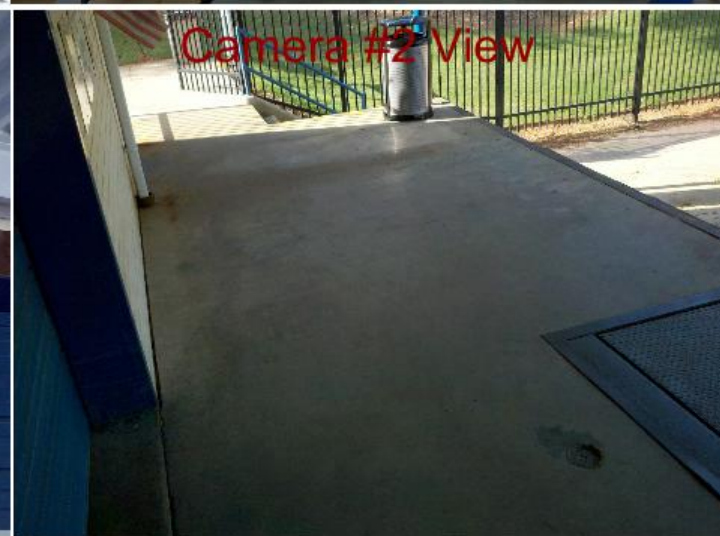


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LIGHTING CONTROLS

WATTSTOPPER OCCUPANCY SENSOR

CI-24

DESCRIPTION

The CI-24 is a ceiling-mount passive infrared occupancy sensor specifically designed to interface with Building Automation Systems through an internal isolated relay. A user-adjustable time delay (30 seconds to 30 minutes) on deactivation may be programmed through DIP switches to prevent unnecessary cycling. The CI-24 includes a built-in override switch. Two levels of sensitivity are also selectable through DIP switches. The four-level patented Fresnel lens allows the CI-24 to cover up to 1200 ft² (111.48 m²).

FEATURES

- Advanced PIR technology
- Adjustable time delay
- Adjustable sensitivity
- Contains isolated relay for use with BAS and other control systems
- Patented Fresnel lens
- 360° coverage up to 1200 ft² (111.48m²)
- Red LED indicates occupancy detection
- Five-year warranty
- Manual override switch



CI-24

WattStopper |



OPERATION

Powered by 24 VAC/VDC, the Model CI-24 uses advanced PIR technology to detect occupancy. Detection occurs when the unit senses the difference between infrared emissions from a human body and the background space. When occupancy is detected, the Model CI-24 transfers an SPDT contact set. The contacts return to their normal state after a user-selectable time delay once the space is unoccupied.

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LIGHTING CONTROLS

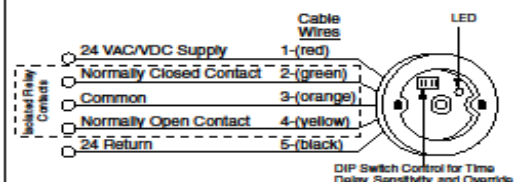
SPECIFICATIONS

Supply Voltage	24 VAC/ VDC± 10% 37 mA
Contact Rating	1A @ 24 VAC/ VDC, 1/2A @ 120 VAC
Coverage Pattern	360 degrees up to 1200 ft ² (111.48m ²)
Time Delay Adjust	Digital (DIP switch setting) for 30 seconds, 10 minutes, 20 minutes, or 30 minutes
Operating Temperature	32° to 98°F (0° to 36°C)
Mounting	2.75" to 3" hole in ceiling
Color	White
Dimensions	3.3" dia x 2.2" deep (8.5 x 5.6 cm), protrudes approximately 0.4 from ceiling surface
Approvals	cUL listed UL Listed, File E101196
Weight	1.0 lb (0.46 kg)

ORDERING INFORMATION

MODEL	DESCRIPTION
CI-24	Ceiling-mount occupancy sensor with SPDT isolated contact

WIRING



DIP SWITCH #	1	2	3	4
TIME DELAYS				
30 sec	X	X		
10 min.	X	O		
20 min.	O	X		
30 min.	O	O		
SENSITIVITY				
Minimum			O	
Maximum			X	
OVERRIDE				
Normal				O
Override				X

Note: Exceeding voltage rating may damage sensor.

THERMOSTATS & CONTROLLERS

ZONE THERMOSTAT AND FCU THERMOSTAT

VT7200, VT7300 SERIES



DESCRIPTION

VT7200 Zone thermostats are digital-display, heating/cooling, with outputs for two-position, floating, and proportional terminal unit control. They are ideal for baseboard heat, unit heaters, radiant panels, reheat, or VAV box (pressure-dependent) control. VT7300 Series Fan Coil Unit (FCU) thermostats are digital-display, heating / cooling, with outputs for two-position, floating, or proportional control. In addition, they include multispeed fan relays for high, medium, and low fan speed control. Both thermostats offer remote temperature sensor and remote digital inputs configured for night setback, filter alarm, motion sensor, door/window switch, or service indication.

FEATURES

- Zone or FCU control models
- Two-position, floating, or proportional models
- Remote room sensor option
- Adjustable deadband
- Setpoint range limits (heating and cooling)
- Three configurable inputs for any of: night setback, setback override, motion sensor, door or window switch, filter alarm, service advisory, heat/cool changeover



VT7305C5031
FCU Thermostat



VT7200C5031
Zone Thermostat



- °F/°C (configurable)
- Display offset
- Adjustable temporary occupied time
- Heat, cool, and reheat time base outputs are configurable
- Direct or reverse acting (proportional models)
- Keypad lockout functions
- Dehumidification control models
- Three-speed fan control (FCU model)
- Selectable system control (FCU model)

SPECIFICATIONS

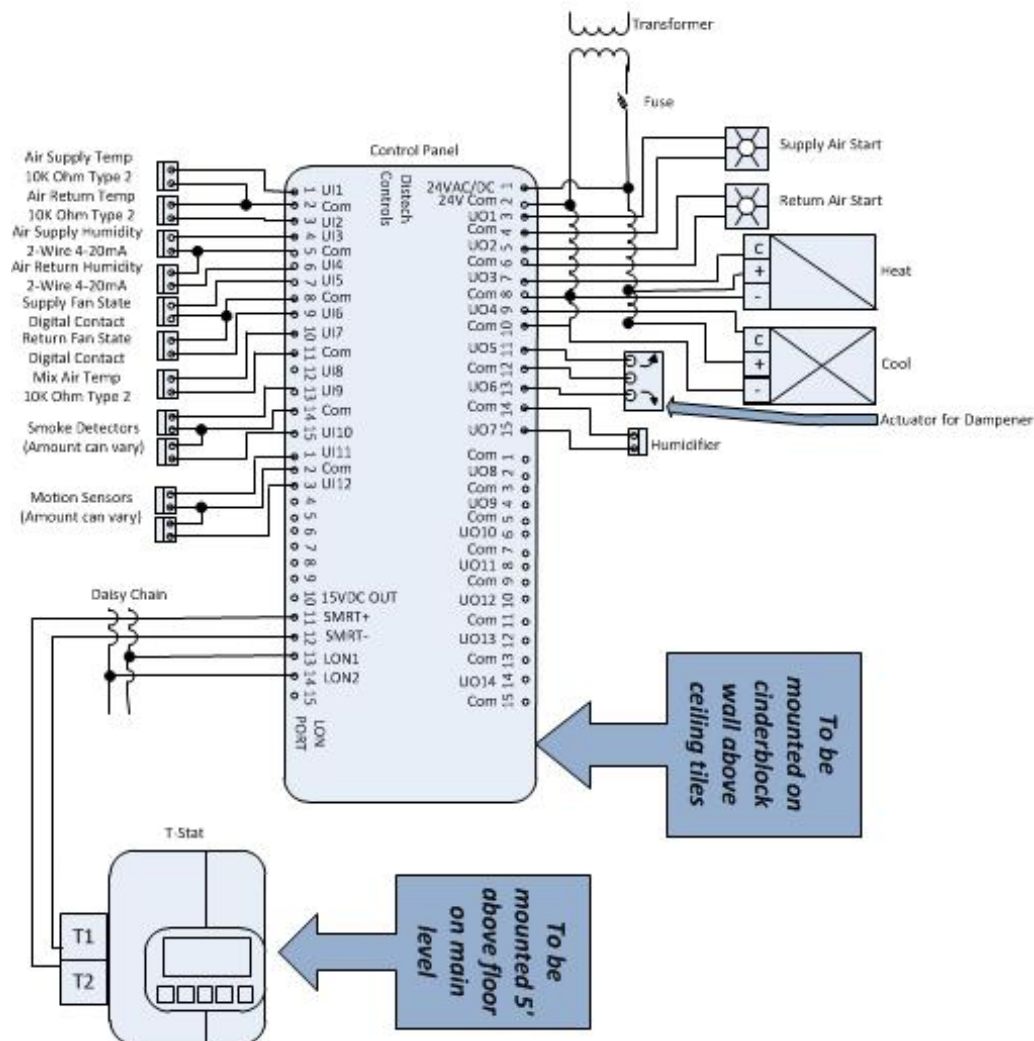
Supply Voltage	10-30 VAC, 50/60 Hz	Remote Sensor	Thermistor, 10 k Type 2 Model 24
Supply Current	2 VA	Control Type	Proportional plus integral (PI)
Display	Two-line backlit LCD, $\pm 0.2^{\circ}\text{F}$ (0.1°C)	Proportional Band	Heating and cooling, 2°F (1.1°C)
Control Accuracy	Temperature, $\pm 0.8^{\circ}\text{F}$ ($\pm 0.5^{\circ}\text{C}$)	Floating Time Base	Adjustable, 0.5 to 8 minutes
VT7355C5011, VT7355F5011		Cycles Per Hour	Adjustable 3 to 8
Thermostat Type	Dehumidification, $\pm 5\%$ RH from 20 to 80%	Override Timer	0 to 24 hours, 1-hour increments, pushbutton reset
Cover Controls	Zone (VT7200) or FCU (VT7300)	Sensor Offset	Adjustable $\pm 5^{\circ}\text{F}$ ($\pm 2.5^{\circ}\text{C}$), $\pm 15\%$ RH (humidity models)
Zone Models	Up/down/override buttons Heat/Cool "on" LEDs	Deadband Setpoint	Adjustable 2° to 5°F (1° to 2.5°C)
FCU Models	Up/down/°C-or-°F/fan/mode buttons Fan/Heat/Cool "on" LEDs		Adjusted depending on heating or cooling mode, heating and cooling setpoints are changed simultaneously with respect to the deadband
Control Outputs	See terminal designation table	Cooling Limits	54° to 100°F (12° to 37.7°C)
VT7200C5031	5 triacs (H/C, 2-position or floating)	Heating Limits	40° to 90°F (4.5° to 32°C)
VT7200F5031	1 triac, 2 analog outputs (H/C proportional 0 to 10 VDC)	Keypad Lockout	Selectable system/fan/unoccupied
VT73(05,55)C5031	3 relays (fan), 5 triacs (H/C, 2-position or floating control)	System Setting	O=off, H=heating, C=cooling, A=automatic changeover
VT73(05,55)F5031	3 relays (fan), 1 triac, 2 analog outputs (H/C proportional 0 to 10 VDC)	FCU Models	O/C, O/H, O/A/H/C, H/O/C
Triacs and Relays	30 VAC, 1A, 3A inrush	Fan Setting	L=low, M=medium, H=high, A=auto
Analog Outputs	0-10 VDC, 2 k minimum impedance, direct or reverse acting	FCU Models	L/M/H, L/H, L/M/H/A, L/H/A, On/A
Auxiliary Inputs	2 digital inputs, 1 universal input, 1 remote sensor	Enclosure	UL FR1, flame retardant plastic
Configurable As	Service/status reminders Door/window/motion sensor switch Filter alarm Central night setback clock Remote occupied override switch Heat/Cool changeover, contact or sensor	Mounting	Standard vertical, 2° x 4° box
Digital Inputs	Dry contact	Wiring	18 AWG maximum, 22 AWG recommended
Universal Input	Dry contact or 10 k Type 2 Model 24 thermistor	Color	White
		Operating Temperature	32° to 122°F (-30° to 50°C)
		Operating Humidity	0-95% RH (non-condensing)
		Dimensions	4.94°H x 3.38°W x 1.13°D (12.5 x 8.6 x 2.9 cm)
		Weight	0.75 lb (0.34 kg)
		Approvals	UL File #E234137, cUL, CE
		RoHS Statement	Yes
		Warranty	1 year

THERMOSTATS & CONTROLLERS

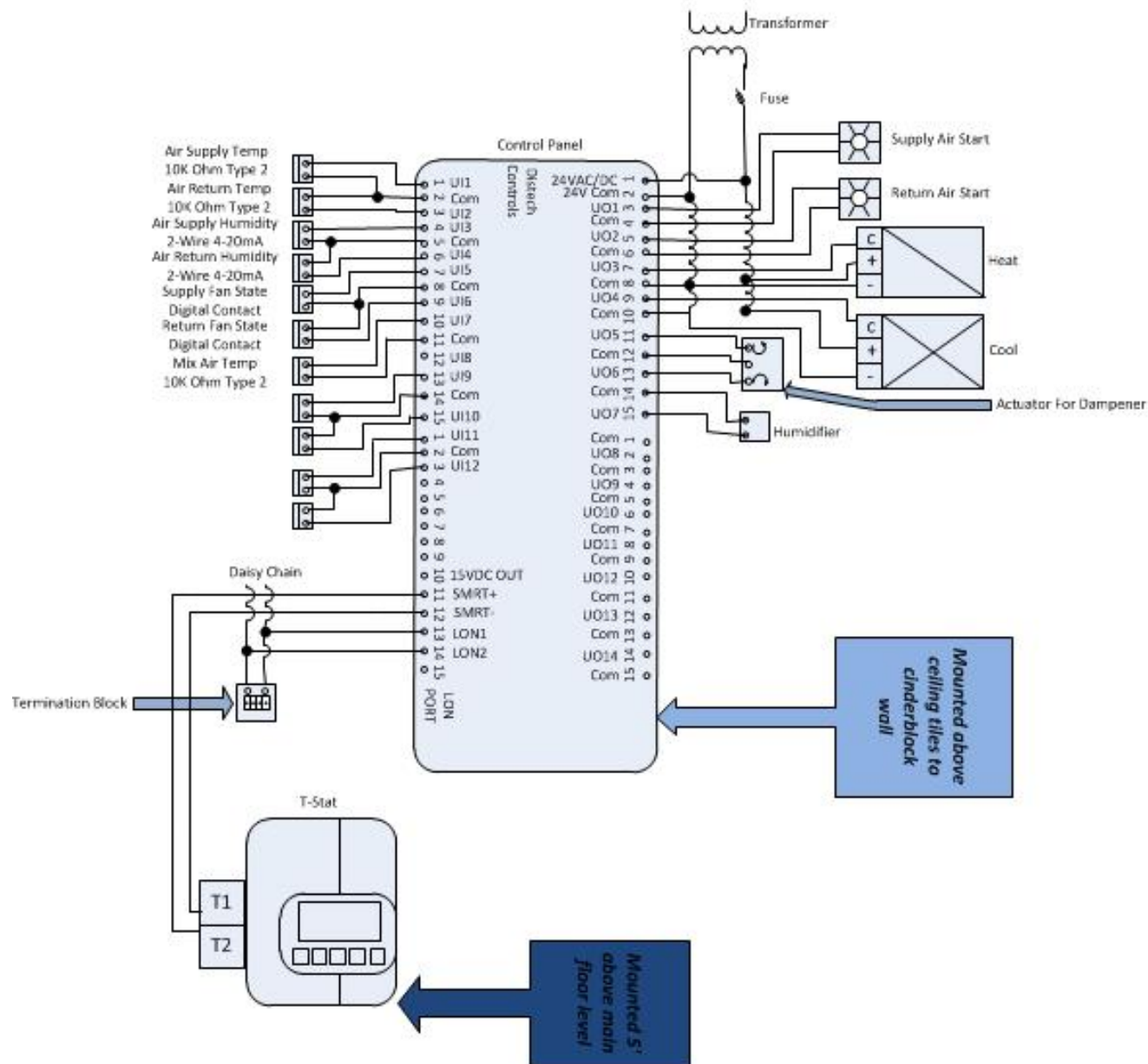
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Control Panels (1 through 13)

Wiring Schematic and Mounting of Panels



Distech Control Panel 14



SAMPLE PROJECT & EXERCISES

Student Reflection

Andrew Brown, Group Coordinator for the Starnes Center Project

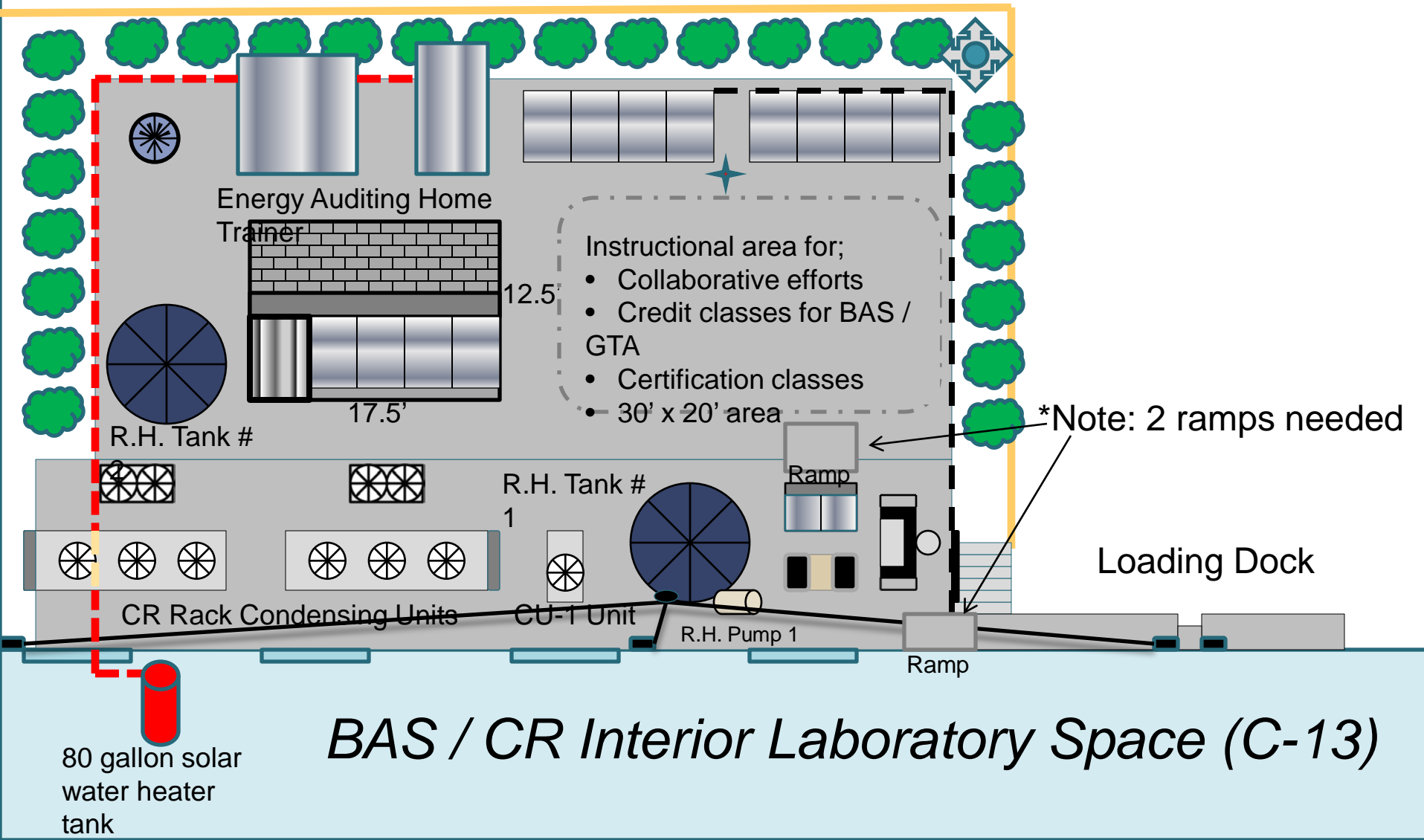
My Summary;

In talking with the four groups I coordinated, I got the sense that a lot had been learned from their time at the Starnes Center. Group members each took on different roles as they collaborated with me and each other to tie this whole project into one proposal. Using pre-existing conditions, measurements and drawings they were able to assess what would be needed to provide a better comfort area for the tenants of the building. They were able to see how a project begins, how its proposal is laid out, how communication networks are set up and how the wiring of each controller would determine its overall effectiveness in the system. They were able to connect with one another while working together to come up with useful methods that would soon be used in a real world setup. The feedback I got from the project was all positive and something that I feel most of the students will continue to build upon.

PROJECT & EXERCISES – BTC CLUB

Future Pad & New Equipment

*Note: Green space surrounds pad and is irrigated by rainwater harvesting system over

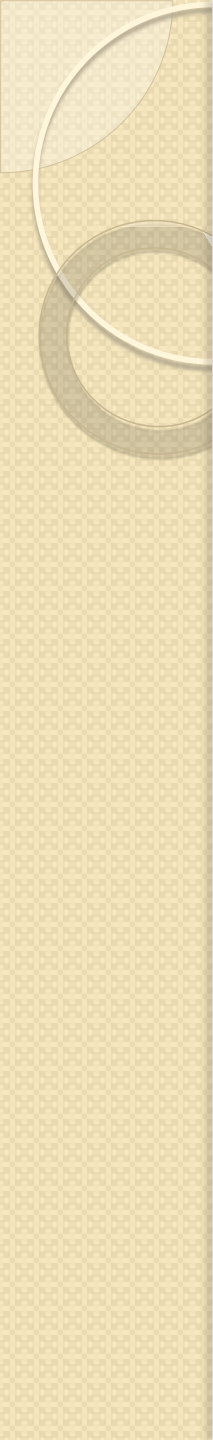


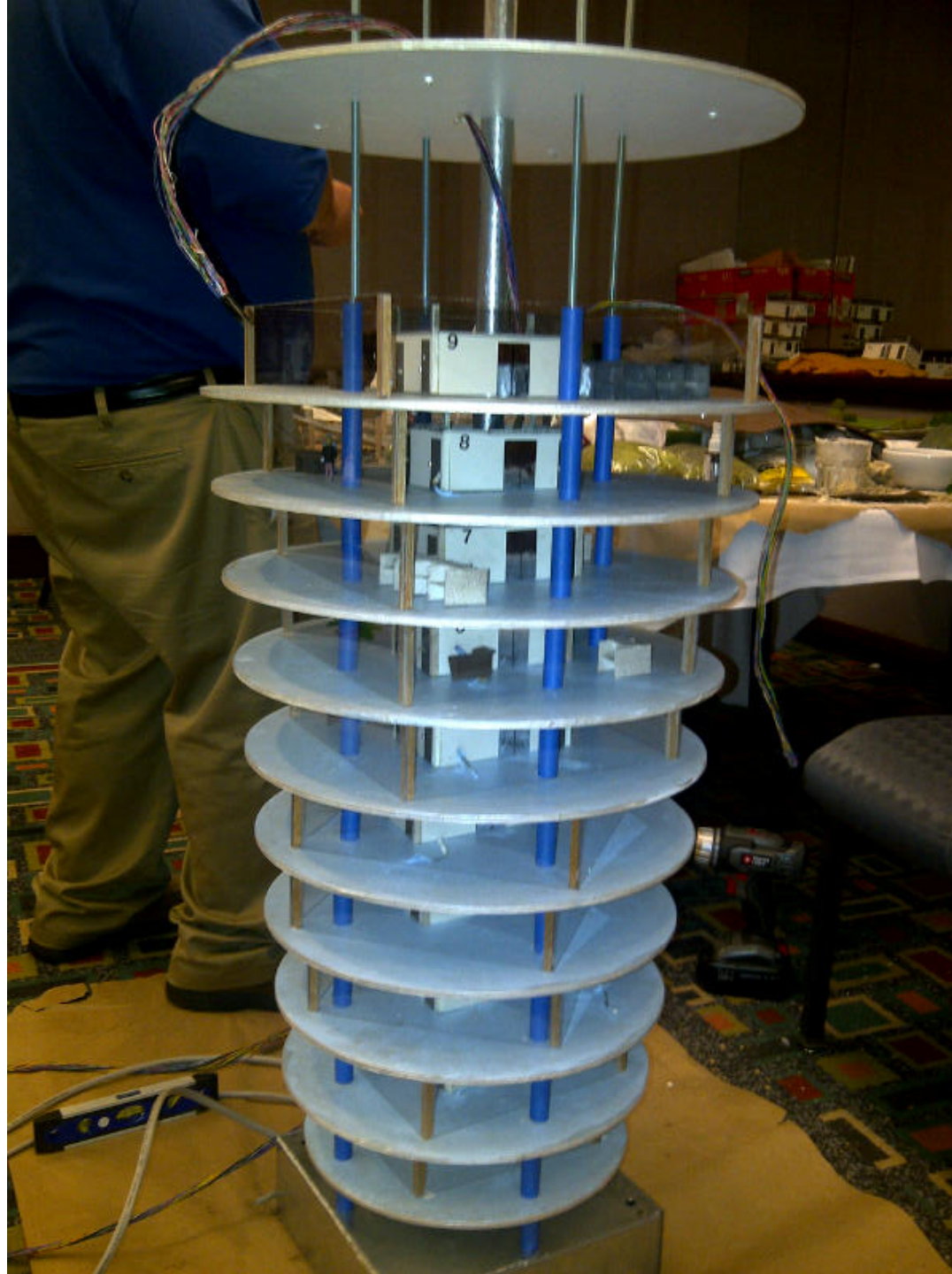


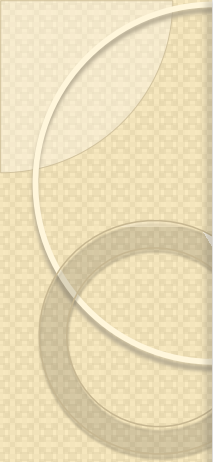












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Retro-Commissioning of Building Systems

GPC / DTC Joint Lecture Series



Guest Speaker;
Mr. John McFarland
P.E., CCP, CEM, LEED-AP

Whether through neglect or normal wear and tear, over time all building systems begin to operate less efficiently. The commissioning process applied retro-actively to existing buildings can result in substantial energy savings and improved occupant comfort.



Presented by: Mr. John McFarland, P.E., CCP, CEM, LEED-AP

Hosted by: DeKalb Technical College

Date: Thursday, October 28, 2010

Place: DeKalb Technical College
Clarkston Campus Conference Center
495 N. Indian Creek Drive
Clarkston, GA 30021-239

Time: 6:00 - 7:30pm

Cost: No charge



John McFarland is the Director of Operations at Working Buildings, a total building commissioning and sustainability consulting firm. John has over 17 years of experience and has served as the commissioning authority on over 80 projects. John is an active member of ASHRAE serving at the national level on the Standard 62.1 committee and recently served as the President of the Atlanta ASHRAE Chapter. John earned his M.S. in Mechanical Engineering from Georgia Tech and holds an MBA from Georgia State University.



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