

**RARITAN VALLEY COMMUNITY COLLEGE  
ACADEMIC COURSE OUTLINE**

**CEMT 204 – Building Automation II**

**I. Basic Course Information**

- A. Course Number and Title: CEMT 204 – Building Automation II
- B. New or Modified: New
- C. Date of Proposal: Fall 2016
- D. Effective Term: Fall 2017
- E. Sponsoring Departments: Business and Public Service Department
- F. Semester Credit Hours: 4
- G. Weekly Contact Hours: 6      Lecture: 3  
   Laboratory: 3  
   Out of class work per week: 6 hours
- H. Prerequisite: CEMT 203 – Building Automation I
- I. Laboratory Fees: Yes
- J. Name and Telephone Number or e-mail Address of Department Chair:  
     Anne Marie Anderson, [AnneMarie.Anderson@raritanval.edu](mailto:AnneMarie.Anderson@raritanval.edu)

**II. Catalog Description**

Prerequisite: *CEMT 203 – Building Automation I*. This is the second of two advanced courses on building automation for students in the Commercial Energy Management Technology field. Recent emphasis placed on increased energy efficiency and occupant comfort, in particular on commercial buildings, has given way to the development of technologies that allow for smart communication amongst various building systems such as HVAC, Lighting, Fire Prevention and Occupant Security/Safety. Networked building automation, in particular, has become a field in high demand because it allows for precise and reliable communication between control devices, whether they are from the same or different manufacturers.

This course starts with an introduction to the various commercially available network platforms, with special emphasis on LonWorks: an overview of the technology, its architecture and infrastructure, nodes, programming, testing and maintenance. It then continues with an introduction to Communications Protocol BACnet: an overview of its architecture, testing and

certification standards, transport and interoperability, objects and core services, applications, installation and configuration. Finally, the course addresses System Integration.

### **III. Statement of Course Need**

- A. Technicians in the Commercial Energy Management Technology field have very important roles to play in society. This course is vital for all students wanting to become a building automation applications engineer, programmer, service technician, new construction technician, new construction sales associate, project engineer or project manager. Employment opportunities in building automation technology exist with HVAC controls companies, physical plant departments in colleges, universities, hospitals, government buildings, as well as commercial and industrial facilities.
- B. Extensive hands-on work in the form of computer-based and field-related activities is necessary to advance technical know-how in students to a higher level of understanding. This new knowledge will, in turn, help them master critical thinking and troubleshooting skills. Lab activities will include, but not be limited to: field trips around campus to deepen the students' understanding of how control panels in different buildings and the equipment they control integrate their functions. Training will be supplemented with in-class lab work on advanced hardware setup, physical connections and network problem diagnosing. Advanced programming, as well as system integration work will also be continued in this course.
- C. This course generally transfers as a free elective, but may transfer as a program elective to Pennsylvania College of Technology for those students graduating with the AAS in Commercial Energy Management who are interested in pursuing B.S. degree at that institution.

### **IV. Place of Course in College Curriculum**

- A. Free elective
- B. This course meets a program requirement for the A.A.S. Commercial Energy Management Technology Program, and the Commercial Energy Management Technology Certificate.
- C. Course transferability: a) for New Jersey schools, go to the NJ Transfer website, [www.njtransfer.org](http://www.njtransfer.org); b) For all other colleges and universities go to their individual sites.

### **V. Outline of Course Content**

- A. LonWorks Systems:  
Architecture, Infrastructure, Nodes, Programming, Testing Maintenance
- B. BACnet Systems:  
Transport/Internetworking, Objects & Core Services, Alarming/Scheduling/Trending, Installation/Configuration and Troubleshooting

- C. Building System Integration  
Cross-protocol implementation, Control Strategy, Industry Trends
- D. Mastering proprietary Software and Hardware applications  
Automated Logic's WebCTRL

## **VI. General Education and Course Learning Outcomes**

### **A. General Education Learning Outcomes**

At the completion of the course, students will be able to:

1. Explain basic System Integration Concepts. (GE - NJ 1).
2. Apply the various programs associated with WebCTRL's software (GE - NJ 4).

### **B. Course Learning Outcomes**

At the completion of this course, students will be able to:

1. Create basic control programs using micro blocks.
2. Build a simple network tree in the lab.
3. Download simple programs onto DDC controllers.
4. Perform basic troubleshooting on Building Automation networks.

### **C. Assessment Instruments**

The following assessment methods may be used:

1. Projects.
2. Exams.
3. Lab Performance.
4. Demonstrations.

## **VII. Grade Determinants**

- A. Lab performance.
- B. Exams.
- C. Class participation.
- D. Projects.

Modes of Teaching and Learning used in the Course:

- A. Lecture/discussion.
- B. Small-group work.
- C. Laboratory work.
- D. Student collaboration.

## **VIII. Text and Materials**

Suggested Text: Building Automation – System Integration with Open Protocols,  
Latest Edition, by American Technical Publishers  
ISBN 978-0-8269-2012-6

Please note: The course outline is intended only as a guide to course content and resources. Do not purchase textbooks based on this outline. The RVCC Bookstore is the sole resource for the most up-to-date information about textbooks.

**IX. Resources**

- A. Reference books/manuals
- B. Safety equipment
- C. Testers used for HVAC troubleshooting
- D. Campus facilities used as a living lab
- E. Instructional videos/DVDs
- F. Various energy auditing tools and testers available in the lab

**X. Honors Option**

Not applicable