



## **SCOPE OF WORK FOR A SELF-DIRECTED LEARNING COURSE**

### ***DDC Control Systems***

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#### **I. Purpose and Description of a Self-Directed Learning Course**

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The purpose of a self-directed learning (SDL) course is to provide the student with information that is timely, practical and presented at a fundamental level. The course has a defined content outline to provide structure and organization to achieve the stated learning objectives.

The course includes basic principles, example problems, case studies and self-test skill development exercises. Because the students do not have the benefit of a live instructor, the material is presented in a self-contained home study format. The course is designed so that no reference material beyond the text (and appendixes) is required. Additional references may be cited in the chapter bibliographies, but these are not necessary to complete the course.

Courses are written with self-test skill development exercises at the end of each chapter. After studying the material, students answer the chapter exercises and return their answers to ASHRAE. ASHRAE will not grade the work, but will send a set of solutions to each student. The purpose of returning completed answers to ASHRAE is to provide evidence of completing the work required for awarding continuing education credit. If students have technical questions, they can call ASHRAE and will be referred to an "Instructor." The Instructor is a subject matter expert who is identified by ASHRAE to handle these questions.

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## **II. Specific Scope of DDC Control Systems SDL**

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The ASHRAE Self-Directed Learning Course, entitled *DDC Control Systems*, shall contain multiple chapters and cover materials from basic to advanced concepts of building environmental controls as per the Course Outline (See appendix A). The course includes skill development exercises so that students can evaluate their progress in learning the material. The course contains practical applications by including example problems and case studies. The purpose of this RFP is to develop a new SDL on *DDC Control Systems* covering the topics outlined in this RFP.

This contractor shall provide single versions of the SDL in both IP and SI (rational conversion) and in the electronic format as explained in section IV. The contractor should incorporate material reflecting current best practices.

### **Course Outline**

The course will follow the outline provided (see Appendix A). The contractor is encouraged to propose revisions, deletions, additions, or a rearrangement of the outline that will improve the learning objectives.

### **B. Target Audience**

Design, maintenance, machinery and plant engineers, supervisors and technicians as well as operations personnel involved in the operation, condition assessment, troubleshooting and maintenance of buildings in the public and private sectors.

### **C. Prerequisites**

One year of high school physics or algebra or equivalent experience.

### **Expected Proficiency After Completing the Course**

The student successfully completing the SDL should understand the fundamentals involved in the design, application and operation of non-residential building DDC Control Systems.

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## **III. Work Statement for Course Author/Developer**

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- A. Draft specific learning objectives for each chapter. These are components of overall objectives, which constitute discrete steps building towards overall learning objectives.
- B. Draft Chapters 1-5 for technical review and approval. Each chapter should include the following:
  1. Introduction
  2. Learning Objectives
  3. The Next Step – transition into the next chapter

4. Summary
  5. Bibliography
  6. Skill Development Exercises
- C. After approval of Chapters 1-5, draft remaining chapters in groups of 2 - 3 for technical review and approval.
  - D. Draft and submit for review, 5 - 10 questions for each chapter in multiple choice, short answer or true/false format with solutions.
  - E. Revise all draft materials to comply with all reasonable responses from the submitted drafts (as judged by the revision author). There will no further reviews, except by the author. Any changes not made shall be clearly documented. Provide a summary of changes not made to the review team. Include reasons for not including specific changes in the summary.
  - F. Add a detailed table of contents.
  - G. Provide documentation of permission to use copyrighted material. Provide final proofreading of all course materials.
  - H. After final approval of the IP version provide a separate SI version (rational conversion) of the full course (including all text, figures, appendices, equations, problems and solutions).
  - I. Provide a series of PowerPoint slides that can be used as an aid to classroom instruction with the textbook, using an approved format. The slides should closely follow the book's structure, providing outline and graphical elements as needed to supplement presentation of all important materials in the book.

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#### **IV. Deliverables from Course Author/Developer**

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- A. Technical consulting and writing necessary to produce the course materials.
- B. Printouts of all text and visuals in draft form.
- C. Electronic files of all text in Microsoft Word 2000 or higher using "Track Changes" feature for all revisions and edits.
- D. Electronic files of all graphics in .eps, .gif, .jpeg, .jpg, .tiff or .tif formats (other formats including non-electronic may be considered).
- E. Electronic file(s) of all PowerPoint slides.

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#### **V. Special Instructions**

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Bidders should specify the minimum dollar amount required to support their work on the project and provide details to support their budget request. The proposal should include:

- A. Experience in the subject matter, technical writing, course presentation and course design.
- B. If more than one person is involved in the project, a breakdown of individual responsibilities should be included.
- C. Resumes of all individuals involved in the project.
- D. Professional references.
- E. Sample chapter from a similar course.

Please note that preference will be given to bidders with a practicing mechanical engineer (with PE license) on the team. All material shall become the property of ASHRAE.

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**VI. Project Schedule**

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Project Start Date: **TBD**

Project Completion Date: **6 months from award for IP version; 1 month later for SI version**

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**VII. Proposal Submittal**

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Those interested in performing the technical writing services specified in the Work Statement and Deliverables should submit their proposal in either electronic format or provide two copies of their proposals to:

Karen Murray  
Manager of ASHRAE Professional Development  
ASHRAE  
1791 Tullie Circle, Atlanta, Georgia 30329  
Tel.: 678-539-1146  
Email: [kmurray@ashrae.org](mailto:kmurray@ashrae.org)

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**VIII. Appendices**

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Appendix A: Course Outline.

# APPENDIX A

## Course Outline *DDC Control Systems*

1. *Introduction: Course Objectives and Prerequisites.* Describe building environmental control concepts and use of DDC Control Systems to accomplish required temperature control operational sequences.
2. *Explain the concepts and application of;*
  - DDC Control Basics
  - Input and Output Points
  - I/O Point Characteristics
  - Basic Control Sequences for HVAC Systems
  - Programming System Features and Parameters
  - Scheduler, Reports and Trending
  - System Integration
  - Commissioning
  - Operator Terminal
  - Interoperability
  - Hardware Architecture
  - Network Standards
  - BACnet
  - LonWorks
  - Specifications
3. Without promoting specific commercially available products, review the applicability, features, principles, implementation and attendant costs of DDC Control Systems
4. Heating, Ventilating and Air Conditioning Controls. Instruct the student on the effective use of control technology and strategies to improve indoor environmental quality and occupant comfort.
5. Discuss the features and integration of building HVAC, Security, Lighting and Fire Alarm systems within buildings.