

BOC 2002 Instructor Notes & Metrics

Overview

A goal of the BOC program is to increase learners’ ability to identify areas for reductions in energy and natural resource consumption and to design projects to accomplish this. The competency basis of the Building Operator Certification adds responsibilities to the instructors to ensure appropriate material coverage and effective delivery so that participants are successful on the test and any related project assignments. To the degree possible, instructors should encourage and maintain an interactive classroom environment to enable learners to learn from each other and apply the information back on the job in their facilities. Metrics are defined for Class Exercises, Project Debrief, Presentation Skills, and Proctorship of BOC Tests to ensure quality of program delivery. Instructors should familiarize themselves with these metrics and seek assistance from the BOC program administrator or the BOC office if questions arise.

What is the objective of BOC Level II?

Level II prepares operators to evaluate the operational performance of their buildings with a focus on improving energy efficiency. Operators will learn how to collect and analyze building data in order to prepare a building walk-through plan to identify low and no-cost opportunities to improve performance. They will apply the data collection and analysis steps to their own building through a 5-part set of project assignments completed between class sessions. They will also practice presenting their findings, a valuable skill to employers. This exercise is also important to help prepare them to convince financial decision-makers within their organizations to implement energy-efficiency measures. A list of the 6 core classes that comprise the Level II course series is in the table below.

BOC Level II Course Series Class List
2001-A – Scoping Your Building for Operational Improvements (Part 1)
2001-B - Scoping Your Building for Operational Improvements (Part 2)
2002 – Optimizing HVAC Controls for Energy Efficiency
2003 – Preventive Maintenance Principles & Practices
2004 - Advanced Electrical Diagnostics
2005 - Project Peer Exchange Day: <i>Improving your building’s performance</i>
2000 series – Supplemental Class
Level II Project Workbook

Who is the audience?

Level II learners are building operating engineers and maintenance personnel with responsibility for optimizing building operations, maximizing cost savings, or are involved in energy management or sustainability programs to improve their building’s

performance. These learners may not have a high performance building but are interested in knowing more about the technologies and practices to improve performance. Others may have a high performance building that isn't working correctly and are looking for ways to improve performance.

Does a building need to have a certification to be a high performance building?

The curriculum emphasizes that a building does not need to be certified in order to be high performing. All buildings have the opportunity to improve performance. We encourage BOC learners to make their buildings high performers, regardless of whether they pursue certification.

Preparation

Instructors who teach BOC 2002 should be familiar with writing a Sequence of Operation (SoO) for a simple and complex HVAC system, and with writing a functional test procedure for the written SoO for these two systems.

Review the class outline, suggested activities, and checklist. They provide criteria for effectively engaging learners, promoting discussion on key topics, and helping learners review and check for understanding. Class activities are a required component of BOC training. Instructors have the latitude to implement activities suggested or develop their own activities. Self-developed activities should satisfy the learning objective for the activity it replaces. In making your decision, remember that the ultimate goal is to facilitate the learning by adults who prefer experienced-centered and problem-centered instruction.

Speak with your BOC program manager to determine who is sponsoring the BOC course. The BOC program helps connect participants to local resources including utility programs that can assist them with their energy efficiency projects. Check the www.dsireusa.org website. DSIRE is a comprehensive source of information on state, local, utility and federal incentives and policies that promote renewable energy and energy efficiency. Research and become familiar with utility rebate and incentive programs, state energy office initiatives, and local energy efficiency trends and initiatives relevant to the class subject matter. Use the research to supplement discussion and tailor/adapt BOC curriculum to support sponsor interests. For example:

1. Describe how the BOC sponsor's EE initiative and/or DSM program benefits building owners. For example, if you are teaching the topic of Efficient Lighting Fundamentals, describe the sponsor's rebate and incentive programs for efficient lighting.
2. Provide one or more examples of how their initiative/program relates to the topic you are teaching. What would a building operator need to know about this relationship? How would you tailor the instruction to share this information with the participants?

Curriculum Materials

Each BOC class curriculum is comprised of the following components. Instructors are encouraged to review all of the materials in preparation for teaching. Questions or concerns, if any, about the content or application of the curriculum should be addressed with your course manager two or more weeks in advance of your scheduled teaching date.

- Outline
- Instructor notes
- Slide presentation
- Glossary
- Appendices
- Learner activities
- Test booklet, answer sheet and key
- Student handbook (provided to learners)

The curriculum materials listed above complement the Student Handbook to help you prepare learners for the tests and exercises. We encourage you to enhance the slides with your own teaching aides provided these do not confuse coverage of the basic materials nor create any ambiguity in the minds of the learners. These aides might include additional slides (be sure to clarify to students that these are not in the student handbook), case studies, demonstration props and specialty equipment, videos, and in-class exercises. Instructors are also encouraged to note current changes and developments in the topic they are presenting. See the suggested props/specialty equipment in the checklist below.

Learner Materials

Learners receive a Student Handbook that complements the presentation slides. The handbook may contain illustrations, tables, charts, and other documents that support activities. Instructors should reference the handbook during class and refer participants to specific pages when giving instructional cues.

Class Activities & Discussions

Metric: integrate a minimum of 2 hours of non-lecture, participant-centered activity into the training class.

What is activity-based learning?

Level II emphasizes teaching and learning through learner activities led by the instructor throughout the day. A full 2.3 hours (of 6 hours total) are devoted to learner activities in BOC 2002. Instructors should review the file titled Activities and give thought to setting up the activity in a way that ensures value for learners.

Class activities led by the instructor enable learners to practice skills and concepts taught. The average retention rate for lecture mode of instruction is 5% compared to 50% for discussion group and 75% for practice by doing. Additionally, activities break up a long day of presentations and offer participants an opportunity to network with and learn from each other's experiences. Most classes in BOC Level I and II have several suggested in-class exercises for the instructor to administer. Review the 2001 Activities file for suggested activities.

Answer Sheets to Activities & Discussions

Use the Activities PDF to identify the class discussions and activities. Answers to class discussions and activities are provided in Appendix of the student handbook for students to reference following completion of the activity. We discourage students from reviewing the answers before completing the activity as prior review will diminish the value of the learning experience from the activity. As such, we encourage instructors to direct students to the Appendix at the appropriate time following the activity.

Project Assignment

Metric: allot a minimum of 10 minutes of class time facilitating a debrief on the project assignment from the class taught before yours (if applicable).

Successful completion of all project assignments is required for the Level II certificate credential. It is therefore important to ensure participants understand the assignment and are comfortable completing it. Participants return the completed projects to the following class where it is reviewed and graded by the training coordinator.

Review the Project Workbook to familiarize yourself with the project assignments. Review the project specific to the class taught before yours (ask your administrator for the schedule). Develop three questions you would use to facilitate the discussion keeping in mind the goal of providing participants with the opportunity to share their experiences and create action steps for implementing energy efficiency improvements.

The instructor is responsible for reviewing the next project assignment before administering the test. This could be included after the lunch break or at the end of class. Refer participants to their Project Workbook and grading rubric when reviewing the assignment.

Presentation Skills Module

Metric: allot 20-30 minutes at the end of class for the presentation skills slides and activities included in the slide deck and in the student handbook.

The presentation skills modules help prepare students for their final presentation of their scoping report in the 2005 Project Peer Exchange class. Please see more detailed guidance included in a separate document, "Instructor Notes for Presentation Skills Curriculum."

BOC Test Proctor Procedure

Metric: follow the BOC test procedure.

The BOC test is designed as an assessment of a participant's grasp of the material and it is essential that the integrity of the test be maintained. The following test procedure maintains the integrity of the test by preparing participants to be successful in the absence of coaching to the test.

TEST PROCEDURE: For in-person classes, the instructor is responsible for administering the test; for virtual classes, it will be administered via a learning management system (LMS). The instructor will be present throughout the test to answer questions. The instructor is permitted to clarify the questions, if needed, but may not provide the answers to any questions under any conditions.

At the beginning of the class session, the instructor will review the day's agenda, including the timing of the test and general points concerning its administration. The instructor will review the test procedures and restrictions with participants prior to taking the test.

The exams are open-book and any notes or handout materials may be used as a reference. A period of one hour is available for the test, but it will not be strictly timed.

Coaching of participants about material that appears on the test is not permitted during instruction of BOC classes. Directing participants to highlight or put post-it notes at specific points in the Participant Handbook is also not permitted.

The instructor is responsible for ensuring a quiet test environment, which includes no use of cell phones and no unnecessary conversation of any kind while the test is underway.

For in-person classes, when finished, the TEST BOOKLET and the COMPETED ANSWER SHEET should be turned in to the instructor or the site coordinator, as appropriate.

Test takers finish at much different times. A test review after the test isn't generally practical. We recommend instructors review the test with learners at the start of the next class day in the course.

Evaluation

At the end of class, all participants will complete a *Class Evaluation* form after taking the test. The evaluation is designed to collect information about the class content, instruction, and future interest in topics. The information is used by NEEC to make

improvements to the curriculum, to share with instructors, and to plan future classes offered in the BOC program.

How to Start the Class Day

- **Room Set Up**

Instructors will need to give some thought to arranging the classroom to maximize group activity. Also, they need to come up with an effective strategy to mix up the groups over the course of the class to get people working with others they don't know.

- **Review the Schedule**

The instructor is responsible for scheduling breaks and lunch with input from the class. The instructor may adjust break points and timing based on how the material is progressing. Every class is different.

- **Set the Context**

BOC 2002 is the second class of 6 classes in the Level II course series. Students will have met each other in prior classes and know more about each others' job responsibilities and areas of expertise. We encourage instructors to provide students the opportunity to tell each other and the instructor about their experiences and interests in the BOC 2002 topic of optimizing HVAC controls by using the following components of the slide deck.

- There is a slide titled "Agenda" in the slide deck. After reviewing the agenda, we recommend exploring with students what they would like to learn about the topic. Begin by prompting students with the question: "What would you like to learn in this class on HVAC controls?" You can manage the discussion by asking them to raise their hand and take themselves off mute (if a virtual class) to share their answer. Call on students with raised hands to share their answer. You may also ask students to type their answer(s) in chat. If the latter, you should plan to read the chat answers aloud and comment on them. You may use an introductory activity of your choice to achieve this learning outcome.
- A short Level II project assignment debrief activity is provided. The activity provides students with an opportunity to talk about their experience completing two assignments – a scoping interview guide, and a building operations map – for their building.
- Reference the slide titled "Class Discussion: Example Test Procedure". With this slide, the instructor will take students through the steps of a test procedure for the SoO for the exhaust fan from the previous class activity. For this activity to be effective, we recommend instructors use a whiteboard or the virtual equivalent (e.g., a blank slide or Zoom whiteboard) to outline the steps for students. They will have an easier time following along if the steps are visually outlined in this way. Begin the activity by first calling students' attention to the sample example

SoO and FTP in the Appendix of their 2002 Student Handbook. Have them find the pages in the appendix before proceeding with the activity.

- Reference the two slides titled "Peak Demand and Load Shedding" and "Utility Demand Response Load Profile." When reviewing these slides, it's helpful to emphasize that these strategies support the goals of utility electrification initiatives by helping manage supply and demand on the electric grid. Electrification involves replacing technologies and systems that run on fossil fuels with alternatives like electric vehicles, heat pumps, and induction stoves that run on clean electricity. It is a proven way to reduce pollution and decarbonize the economy.

Instructor Checklist (For in-person classes)

- Number of people expected: _____
- Classroom set-up confirmed?
- Instructor(s) bio
- Learner Ids
- Sign-up sheets and pens
- Evaluation forms
- Student handbooks
- Test booklets
- Test answer sheets
- Duct tape
- Extension cord
- Laptop speaker for in-class video presentations
- Props: _____

**Be sure to review with participants all of the material covered on the test.
Forward all test booklets and answer sheets to NEEC within two weeks of the class.**

**Collect these evaluations at the end of the class and return the completed
evaluations to the training coordinator.**