

# University and Industry Education and Collaboration in LEED® Professional Accreditation

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Many Construction management students are looking for help to prepare for and to pass the U.S. Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED) Accredited Professional (LEED AP) exam. The same can be said for construction industry professionals. This paper details how the author developed an elective course in Green Building Practices and LEED Certification for construction management students that led to a fast-paced LEED AP training course for construction professionals. The results created a collaborative and exciting relationship between academia and industry.

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## Introduction

The U.S. Green Building Council's (USGBC) LEED rating system is one of the most recognized and followed building rating systems used to certify projects as "Green". The number of projects requiring LEED Certification are increasing as owners realize the benefits that result, ranging from more energy efficient buildings to promoting mass transit use by building occupants. More than 2,400 commercial and residential buildings worldwide are LEED certified, and nearly 14,000 are under way (Block, 2008). The LEED rating systems, such as, LEED for New Construction (LEED NC), are based on satisfying specific requirements for credits to earn points towards certification levels of Certified, Silver, Gold, and the highest rating of Platinum. The LEED Accredited Professional (LEED AP) title has earned recognition as a measure of a building industry professional's thorough understanding of green building and the LEED green building rating system.

To earn the LEED AP credential it is required that candidates take and pass the U.S. Green Building Council's LEED Accreditation exam. There are a number of ways one can choose to prepare for the exam: online through the USGBC Web site, instructor-led courses, or self study. Regardless of the approach one takes, the desired outcome is to master the material, pass the exam, and become a LEED AP.

## LEED Professional Accreditation

### *Construction Management Students*

"Though academic qualifications are likely to weigh heavily in recruiter evaluations, there is ample reason to expect that applicants' extracurricular activities will also exhibit a strong, positive association with recruiters' employability ratings" (Cole, et al, 2007). Undergraduate construction management students are being questioned by recruiters about their interest in managing LEED projects and the recruiters are impressed when a student's resume indicates that they have already accomplished the LEED AP credential. Distinguishing themselves from their peers as an individual who takes on additional professional development challenges could be the one fact on their resume that makes the difference in receiving job offers from prospective employers. "As educators we should keep our standards high and encourage students to stretch to reach goals. This will build the personal leadership skills needed to succeed in the construction industry" (Bain & Bender, 2006). Students in construction management who have taken on extra activities beyond the basic requirements consistently report that their college education and preparation for working in the construction industry was enhanced. Earning the LEED AP credential strengthens their green building qualifications and enables students to market their green building knowledge to recruiters. For

students who want to be employed with companies that have embraced green building practices, having the LEED AP credential could significantly improve their chances of being hired by green builders.

### *Construction Industry Professionals*

Having LEED APs within an organization is an indicator of a company's commitment to, and understanding of, green building practices. Recognizing that the "built environment has a vast impact on the natural environment, human health, and the economy more and more building owners are adopting green building strategies to maximize both economic and environmental performance" (Environmental Protection Agency, 2008). Construction companies have been encouraging their employees to become LEED APs so that they can keep up with demand and market their company's green building knowledge to owners and clients. Construction management professionals earning the LEED AP credential are strengthening their green building qualifications and can help owners achieve green building objectives. They can be relied upon to help support green design, follow LEED standards, and to facilitate the rating of buildings with the various LEED systems. Knowing what the requirements and documentation are for achieving each credit is one of the most important steps towards earning LEED points and building certification.

LEED credit documentation responsibilities are being delegated to all project team members from the architect to the engineers and project managers. "The most significant benefits can be obtained if the design and construction team takes an integrated approach from the earliest states of the building project" (Environmental Protection Agency, 2008). Putting professionals with LEED AP credentials on a project is one way to ensure owners that team members from all areas have a thorough understanding of the LEED certification process. Following the LEED integrated team approach improves employee teamwork skills.

### **LEED AP Exam Preparation: Construction Management Students**

"Undergraduate Construction Management (CM) curricula need to be evaluated frequently to meet the requirements of an ever-changing construction industry" (Souder & Gier, 2006). Trends in the construction industry are constantly shaping and changing what construction management programs are teaching. Occasionally important changes in course offerings originate from the bright ideas of ambitious students willing to do more and asking a faculty member to help. At the beginning of the spring 2007 semester a group of about five students came by the author's office to ask about the LEED program. They explained that they had heard about the LEED AP "certification" exam and wanted to know if it would be possible to form a class to study together to prepare for the LEED AP exam. It was a thrill to see the students take the initiative, and of course, the answer was yes. A special topics course number was created for them to enroll in, and immediately the group began to meet weekly for two hours with the author as their instructor. The first two weeks this maverick group and their instructor sat around a conference room table and tried to map out a plan and direction to take. The students and the author learned that buildings are certified and people are accredited. Meanwhile the five student class grew to ten. Sometime around the fourth or fifth week of the semester a student in the study group mentioned that there is this book called the "reference guide" and that everyone in the class needed to read it. A USGBC student discount number was obtained and students were able to purchase copies of the US Green Building Council's LEED NC v2.2 (2<sup>nd</sup> Edition) reference guide for a reduced price. The entire class, using their own personal credit cards, signed up to take the exam on the same date at the end of the semester at the non-member cost of \$400 each.

The class continued to meet weekly to discuss each section in the reference guide, hoping they were working in the right direction towards passing the exam. Very unstructured goals to read the guide were set. Knowing undergraduates, and having experience with what they consider having read the material means, it was easy to determine that they really needed weekly quizzes to test their knowledge and retention of the material. With only six weeks left in the semester they were assigned to read the five environmental categories in the LEED NC reference guide and quizzes were developed to measure their understanding of each category. Starting with the first section, Sustainable Sites, questions that required them to match, fill-in the blank, and select multiple choice answers were prepared. The result of the first quiz was a disaster. The students scored way below 50% and a cold chill of realization could be felt around the table when they realized there is more to learning the LEED material than they had thought and they might be out \$400. The next section, Water Efficiency, was assigned, and it was decided that

they would ask questions about the information before taking the quiz. The results were better and their confidence improved.

During a visit to the department by a recruiter from Clark Construction Company, a conversation started about the group of students who were trying to learn about the LEED NC rating system. When it came up that they were scheduled to take the LEED AP exam in a couple of weeks, it may have been the desperation in the author's voice that prompted him to offer to see if they could send two Clark employees to provide a full day training session to help the students pass the exam. He made a few calls, confirmed that the trainers were available and willing to come, and an all day Saturday review was scheduled. Each student was personally called and given strict instructions to show up on time and to plan on staying the entire day. The Clark workshop was a thorough review of the LEED NC credits and an overview of the LEED certification process. The students absorbed as much information and insight for passing the LEED AP exam as they could and they were overwhelmed by the generous support shown to them by Clark Construction. It was a big confidence builder to have two workshop presenters who had passed the LEED AP exam go over the material and provide tips for successfully passing.

On Friday, May 11, 2007, nine students and the author sat for the USGBC LEED NC exam at an out-of-town testing center. A passing score is 170 or over out of 200. Two passed. Three missed passing by one point. Everyone felt it was a valuable learning experience, and not one of the participants regretted putting in the effort and attempting the exam. Nearly all of the original group members that did not pass that day have since retaken the exam and passed.

It was from this experience that the idea for creating a new elective course called *Green Building Practices and LEED Certification* was conceived. "Building green", "sustainable design", and "LEED AP", were all becoming frequently heard terms in the department and in the industry. Faculty were being asked to include topics on sustainability in their courses. *Green Building Practices and LEED Certification* was offered the following semester and construction management majors were allowed to use it to count as their restricted business elective. The course has since been added to the construction management department course offerings as an elective.

### *Course Content*

The main focus of the course is to introduce students to green building technologies and sustainable building design alternatives. This is accomplished by utilizing the LEED NC rating system and case studies of actual LEED NC construction projects. The course content follows the five environmental categories outlined in the LEED NC reference guide and also covers the LEED building certification process. Students are assigned different LEED NC credits to document, perform calculations for, and prepare the required submittal documentation specified by the rating system. All of the course handouts and lectures are accessible from the department Web site and interested readers can obtain the latest material at, <http://cm.csuchico.edu/lbrown/gogreen.htm>. The course catalog description is reproduced below:

#### Green Building Practices and LEED Certification

The purpose of this course is to understand how new buildings are designed and constructed using green building strategies. Also covered is how LEED® Accredited Professionals manage the building certification process and the documents required for submittal to the USGBC to verify that the requirements for LEED® certification are met. This course also prepares students to take the US Green Building Council (USGBC) LEED® AP Accreditation exam.

### *Course Assessment*

Student's perception of the elective course is overwhelmingly positive. Eighty-five students have enrolled in the course since the first spring 2007 study group, and fifty-six are currently enrolled for the spring 2009 semester. Over sixty students that have taken the course have passed the LEED AP exam. Students are sharing their excitement about studying for the LEED AP exam with recruiters during their interviews, and recruiters are making a point to come by to discuss how impressed they are that students are learning about the LEED rating system. After graduating, students have written to tell report how significant it has been for their careers to have prepared for and passed the LEED AP exam before graduating. This message was received from a recent graduate, "*Being an AP is the next most important thing to a Bachelor's in getting a job in this market. Tell them if they don't already have it*

*and do get a job, they can pretty much count spending long hours at the onset of their professional career studying to take an incredibly hard and detail oriented test. A pre-con manager who used your practice sheets passed with a 191 the first time. I helped put a checklist together for a job where we had to assess where we could attain LEED points on a potential project, turns out it was an important aspect of the presentation. I mean, just open any ENR and count how many times on one page that you see the acronym L-E-E-D. You're doing a great thing with that class Lori!"*

The original focus of the course to help students to take and pass the USGBC LEED AP exam has changed as the course has developed over the past two years. Using the rating system credits as a guide the course discussions are more about the strategies and technologies of green building design and the responsibilities of the construction manager in the LEED certification process. Another exciting outcome has been the development of memorization techniques and lessons are included to help students progress with memorizing the rating system. Students that choose to take and pass the USGBC LEED AP exam sometime during the semester and/or have already passed it are given a 200 point bonus towards their course grade.

### **LEED AP Exam Preparation: Construction Industry Professional**

The major support for connecting the Construction Management Department to construction industry companies wanting LEED training came from a grant proposal submitted to the Construction Employers' Association (CEA). CEA is a Northern California association that represents union commercial building contractors. The CEA, through their Construction Management University Grant Program, has for several years generously provided funds to six universities in the Northern California area. Grant awards are based on several factors, including impact on the building industry and the quality of the grant request. When preparing the proposal, and while thinking how tremendously supportive the CEA has been to promoting construction education the idea developed that instead of only asking them for funds the grant proposal would be based on giving back to the Association's members by offering to provide LEED AP exam workshops. The collaboration with industry, and the opportunity to interact with construction professionals who shared a common interest with our students to become LEED APs, presented a perfect situation. The original proposal included funding for the author's travel to the companies interested in taking advantage of the "free" training. The CEA Construction Management University Grant Program Committee funded the proposal, but changed the requirement so that each company would pay the author's personal expenses. The workshop is referred to as a "Power Jam Study" geared for busy professionals. The first company to accept the offer to bring the LEED training workshop to their employees was Overaa Construction in Richmond, California. Since then more than 10 companies have taken advantage of the training and several have had more than one Power Jam Study workshop for different groups of employees. Cupertino Electric headquartered in San Jose, California, recruits employees to join the company "Green Team" and is presently preparing Green Team 4 to become the next company LEED APs.

#### *Workshop Content*

The industry workshop is presented in two consecutive eight hour days. Day one is a thorough review of the LEED NC credits and day two is a review of the LEED certification process. A self-authored workbook is provided to all participants. The attendees are required to come to the Power Jam Study prepared by having 1) read the entire LEED NC reference guide and 2) completed the activities and quizzes provided to them in advance. Participants are encouraged to leave cell phones and other distracting devices turned off and to focus on the material. Many of the workshops have been held on weekends with exams scheduled for Monday. A description of the workshop and the daily schedule is provided in Appendix A.

#### *Workshop Assessment*

The feedback from industry is that the Power Jam Study approach works. It allows busy professionals to self-study the material over a period of time and to test their LEED knowledge in advance of the workshop. The advanced self-study is followed up by the instructor led intense two day workshop where participants become fully immersed in reviewing and memorizing the material. This final crash course review boosts their confidence going into the test and improves their test scores. Bovis Lend Lease is a good example of the instant results and success of the fast-

paced workshop approach. In one day they were able to double the number of LEED APs in their Los Angeles office after 6 out of 7 who attended the Power Jam Study Workshop passed the exam immediately following the workshop. Number 7 only attended half the workshop, but managed to score better than 70% on his first attempt. One week later he took the exam a second time and passed. The goal of the workshop is to have everyone pass on the first attempt. After a recent workshop the Senior Project Manager of the company received this message from the Vice-President of another company, “I understand that congratulations are in order! Ellen tells me that you guys all passed your LEED AP exams. Good stuff, and clearly the way of the future. I have a few people in my team I would like to get through the exam too, and I understand that you had a great teacher. Would you be so kind as to forward her contact details to me?? Thanks”

## Future Plans

According to the U.S. Green Building Council Strategic Plan: 2009-2013, there is a lack of green building and sustainability curriculum for schools and universities, and both facility plant managers and the building trades lack targeted and accessible educational opportunities about green building (2008). The department curriculum committee will be considering whether or not to change the Green Building Practices and LEED Certification elective course to a required course and revising the content to address sustainability topics that apply to green building, the work environment, and personal lifestyle.

Industry requests for training, fueled by word of mouth from both past workshop attendees and students who took the college course and have since graduated; continue to come in at a rapid pace. Plans are to continue to expand the industry training, not only because of the importance of LEED APs in construction, but because it allows the author to build relationships with companies that can provide more LEED opportunities and internships for our students. Students will also be included in an industry Power Jam Study workshop in the next month to create a collaborative atmosphere of students working together with industry professionals to achieve the same goal.

## Conclusions

This paper provided a look at how an idea to give back to an organization for generously providing funds to help construction education turned into an educational and collaborative experience for both the industry and the department. The process could be used by other university faculty to create educational and collaborative relationships sharing teaching expertise in other emerging topics that have importance to their programs and to the industry. Providing students with professional development opportunities is an important addition to an undergraduate education. Academia is where experts in emerging trends are developed. Finding a two-way approach to teach both the up and coming construction executives and the current leaders is a win-win for everyone.

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## Appendix A

### LEED-NC v2.2 Rating System & LEED Accredited Professional Fundamentals

This workshop will cover the LEED for New Construction rating system and the process for certifying buildings. In addition, this workshop will help anyone interested in preparing to take and pass the LEED AP exam to earn the LEED AP credential.

Topics covered will include the four major categories tested by the USGBC LEED AP exam:

1. Knowledge of LEED for New Construction Credit Intents and Requirements
2. Coordinate Project and Team
3. Implement LEED for New Construction Process
4. Verify, Participate In, and Perform Technical Analyses Required for LEED for New Construction Credits

Scenarios, case studies, activities, memorization techniques, and practice exams will be provided.

#### Schedule

##### Day 1 - LEED-NC v2.2 Credits

8:00 AM	Introduction US Green Building Council - LEED-NC v2.2 Rating System
8:30 AM	Sustainable Sites (SS)
10:15 AM – 10:30 AM	Break
10:30 AM	Water Efficiency (WE)
12:00 PM - 1:00 PM	Lunch
1:00 PM	Energy & Atmosphere (EA)
2:15 PM - 2:30 PM	Break
2:30 PM	Materials & Resources (MR)
3:30 PM	Indoor Environmental Quality (EQ)
4:30 PM	Innovation & Design Process (ID)

##### Day 2 - LEED AP Fundamentals

8:00 AM	Review Credits
9:00 AM	Coordinate Project and Team
10:15 AM – 10:30 AM	Break
10:30 AM	Implement LEED for New Construction Process
12:00 PM - 1:00 PM	Lunch
1:00 PM	Verify, Participate In, and Perform Technical Analyses Required for LEED for New Construction Credits
2:15 PM - 2:30 PM	Break
2:30 PM	Practice Problems & Practice Exams
3:30 PM	Case Studies
4:30 PM	Wrap Up