

## **A Graduate Seminar In Construction**

**Neil Opfer, Jaeho Son**  
**University of Nevada, Las Vegas**

**John Gambatese**  
**Oregon State University**

### **Abstract**

At our University, with our graduate program in construction, we looked for a vehicle to accomplish certain goals. Our construction program is in a major metropolitan area with an extremely active construction market. We wanted to expose graduate students to the broad spectrum of this market ranging from residential and commercial through to heavy construction. In addition, we wanted students to gain insight into construction problems faced by firms in these markets. These insights might help students to focus on areas of exploration in completing thesis or project requirements for their particular degree study plan. Also, we wanted to expose students to research that involved our construction faculty members. A further goal was to encourage student presentations on their selected topics.

In order to address these above concerns, it was decided to implement a graduate seminar in construction. This is a two-course one-credit (two total credits) sequence spread over two consecutive semesters. Currently, we are in the second year of offering this graduate seminar.

The subject paper explores the relevant issues and problems in successfully conducting this seminar program. One advantage we had as a graduate program is that we could add the two credit requirement on top of the existing program without having to reduce credit numbers devoted to other topics. Hopefully the lessons learned from our experience will prove useful for other university programs in construction.

### **Introduction**

Construction programs whether at the graduate or undergraduate level are always faced with coursework constraints when considering additional degree requirements. Most programs have system-imposed constraints on hours required for a degree.

At the University of Nevada, Las Vegas, when initially developing the M.S. in Construction Management and M.S. in Engineering (Construction Specialization), we were faced with a credit limit constraint of 30 semester credit hours for the M.S. thesis option program and 33 semester credit hours for the M.S. project option program. These credit-hour limits were considered as hard caps beyond which additional coursework could not be mandated of students. We had developed a core of 30 hours that we thought were essential for a student's graduate

education. This included (thesis option) 18 hours of required graduate construction coursework, 6 hours of required graduate management coursework and 6 hours of targeted electives (students choose 6 hours from a list of 34 hours).

We still thought that the course sequence was missing some elements. From our own graduate education experiences and those of others, the largest barrier that graduate students confront is when it comes to completing their thesis or project. These barriers range from initial concept through to completion and presentation. That significant numbers of students exist with coursework complete but lacking the completion of a thesis or project are legendary in higher education. Students often lack the knowledge of the research process, research information resources, and literature review. In addition, students may be familiar with only a limited segment of the construction industry from their prior background. With the addition of a two semester one credit graduate seminar, it was our intent to address these issues. This graduate seminar thus increased our requirements for both the thesis and the project option by two credits above the perceived maximum credit hour limit. However, fortunately we were able to quickly gain approval for this proposal from the various approval levels within the University of Nevada, Las Vegas campus. The additional credit hour approval was very important because otherwise including the seminar would mean deleting classes or reducing credit hours in the balance of the graduate program. This would be anathema to ourselves since, from our perspective, every included core class in the graduate program is mission critical. The other alternative would have been to reduce elective choices which would also create certain problems.

#### Graduate Seminar Format

The format for the graduate seminar is one class meeting per week over the entire semester. The class meetings are for seventy-five minutes for both the Fall and Spring semesters. Students in the seminar receive a letter grade. We want students to take this seminar seriously so letter grades rather than some pass/fail or satisfactory/unsatisfactory system were felt to be the preferred route. The grading basis consists of mandatory attendance, written assignments, and student's own presentations. While only counting for one credit each semester for a two credit total over the two semesters, since it counts in the grade point average, students take the mandatory attendance requirement seriously. Course attendance is kept by the coordinating faculty member. A continual stream of written assignments on a weekly basis including summaries of speaker presentations is another requirement. These speaker assignments force students to pay attention and take notes rather than merely occupying a chair. Short student presentations are assigned each semester for students to report on their research progress concerning their thesis or project topic.

#### Literature Search

Most graduate programs include the requirement that the students complete a thesis or project report. This requirement ensures that the students learn the ability to think independently and conduct an objective evaluation of a topic. Part of this process is the search for existing knowledge and information on the topic, an activity which typically requires long hours in the school library. Scheduled into the Fall semester seminar is a presentation from the university library staff regarding the resources available at the library for conducting literature searches. The presentation includes a discussion of what resources are available and how to use the resources. The class meeting for this presentation is actually held in the library so that the students can see first hand the location and use of the resources. This presentation provides the students with a head start for conducting the literature search as part of their thesis or project

report. Making the students conduct a literature search as an assignment for the class also gives them the impetus to begin the search for their thesis or project report. The assignment is of great benefit to faculty who no longer have to hold a “hold a student’s hand” when conducting a literature search.

### Conducting The Seminar

Since the start of the M.S. program approximately two years ago, seminars have been conducted each semester. Minor changes have been made with each successive offering, with several suggestions coming directly from the students, until a preferred format was developed. Table 1 shows a representative schedule of topics taken from the course syllabus in a recent semester. The development of the seminar has led to the realization of several issues that needed attention and benefits that have come about. These issues and benefits are described in detail in the sections that follow.

**Table 1. Typical Seminar Schedule for Semester**

<b>Week</b>	<b>Topic</b>	<b>Presenter</b>
1	Class Introduction And Research Process	UNLV Faculty
2	Residential Construction	Top 10 U.S. Homebuilder
3	Construction Estimating	ENR Top 25 Industrial Contractor
4	Construction Scheduling	Scheduling Consultant On DOE Yucca Mountain Project
5	Database & Searches In UNLV Library	UNLV Library
6	Clark County Multi-Year Multi-Billion Dollar School Construction Program	Clark County School District (8 <sup>th</sup> Largest School District in U.S.)
7	Project Management Software	Leading Software Project Control Firm
8	Airport Construction	ENR Top 25 Heavy/Highway Contractor
9	Construction Safety	State of Nevada Safety Consultation & Training Division
10	Construction Partnering	ENR Top 400 Heavy/Highway Contractor
11	Commercial Construction	ENR Top 200 Commercial General Contractor
12	Construction Management Process Improvement	Principal, Construction Consulting Firm
13	Construction Defects Research	UNLV faculty
14	Optimization in Construction Research	UNLV Faculty
15	Student Presentation	Graduate Students
Extra	Out-Of-Class Field Trip To Water Resources Project	Public Agency

### Guest Speakers

In terms of guest speakers and topics for the graduate seminar, UNLV is fortunate to be located in a large urban area with a dynamic construction market. These two factors help to provide outside speakers to the two semesters of this program. However there are some significant problems in dealing with guest speakers.

Some of these problems that we have encountered include the fact that in the current construction industry environment there is a significant scramble for talent. At UNLV and other institutions job boards are full of recruitment ads seeking construction personnel. Faculty phones ring off the hook with calls from construction companies and search firms seeking construction talent as well. If construction students, whether graduate or undergraduate are interested, there are a plethora of opportunities available. Unfortunately, a minority of speakers have tried to turn their presentations to the graduate students into a straight recruiting pitch.

It is consistently emphasized to guest speakers that we are not seeking recruiting pitches aimed at our students. The speakers can talk about their firms to provide context for their talks but a recruiting pitch is not welcome. In this context at UNLV we have two responsibilities to students to not waste their time and not waste their tuition dollars. Moreover, many students are receiving partial or full tuition reimbursement from their employers. The old adage about paying for employee's continuing education is, "what if we train them and they leave?" If employers feel that we are providing opportunities to other firms to recruit their employees, it leaves our graduate program with a diminished reputation.

Besides the discouragement of recruiting sometimes the most difficult problem is in getting speakers to show up once they have committed to a concrete date. Sometimes the best speakers are the busiest and occasionally their work responsibilities may require them to be out of town. Or a developer may find a conflict that occurs with a government agency meeting. If we get adequate notice, these conflicts can be scheduled around and the speaker's date rearranged. Unfortunately, we have had guest speakers cancel on very short notice. Our technique in dealing with this is to loosely schedule other activities. We have a few faculty presentations scheduled during the semester. We as construction faculty realize the inherent problems that speaker cancellation imposes and try to work around this with our own presentations. This guest speaker cancellation issue is critical to this graduate seminar format since unlike a standard class, a faculty member can not just have students pull out their textbooks and start a lecture. Therefore we make it a point in scheduling guest speakers to emphasize that they are a key element of this seminar format.

Selection of guest speakers is based on a number of factors. Two key factors are whether they have useful information to present and then can they present it in a coherent fashion? In addition, over the course of the two semester graduate seminar we want to avoid duplication of content by the guest speakers. One goal is to expose graduate students to a broad cross section of the construction industry. Many of these students already have some construction experience however their perspectives may be limited. Thus we seek out speakers from all industry segments whether residential, commercial, heavy/highway, and industrial. We look for firms operating under a variety of contracts from unit price, lump sum, prime contract, subcontract, general contractor, and design-build to construction management. Moreover, we look for a blend between field and office and a diversity of specialties such as estimating, scheduling, cost control, project management, quality control, and business development. In addition to construction contractors, we also look to owners, designers, and governmental entities including

those with large capital construction and/or maintenance/renovation budgets. Since we, as do many programs, have an industry-advisory board, this avenue provides a source for some of our speakers. Other speaker sources utilized have been representatives for certain construction industry-specific computer software packages. With software vendor presentations, one key caveat is that the software package not be one that is already utilized in the program such as an estimating or project scheduling package. Again, we want to avoid duplication of other material. Other speaker perspectives from construction industry suppliers and manufacturers can also be useful. Unfortunately vendor representatives are often ignored by both the industry and the academic sector as a valuable source of current information. However, the typical vendor representative by the very nature of their business visits more contractors, designers, owners, and job sites in a brief period than the typical construction contractor or other does in a year. Moreover, it must be realized that much of the innovation in the construction industry has come from vendors/manufacturers developing a product to sell into construction projects.

However, it should be noted that duplication of speaker areas is sometimes beneficial. Two of the seminar speakers highlight this benefit. Both of these speakers are presidents of their own commercial general contracting organizations. Their firms build the same types of projects and in fact are competitors of each other in the Southern Nevada construction market. Yet their approach to business and how they manage their firm are diametrically opposed to each other. This is valuable exposure for the students and many have commented on the sharp contrasts between these two speakers.

From the broad variety of guest speakers supplemented by faculty and other university resources, students come to better understand and appreciate the complexity of the construction industry. Moreover, attendance of all construction-area faculty is encouraged at these seminars. Faculty keep current in the construction field by reading, conducting research, seminar/conference attendance and consulting. This graduate seminar provides another avenue to keep current which is often particularly valuable since many of these speakers provide current local and regional information. In many cases this is information that is not published or available through other means.

Faculty in other graduate coursework may have guest speakers into the classroom on occasion. Obviously we try to avoid duplication thus a speaker utilized in the graduate seminar will not also be a classroom speaker for another course. The only time that this would occur would be when the speaker would talk on two distinct and discrete subject areas.

#### Faculty Presentations

Construction area faculty presentations are another useful element of the graduate seminar. Faculty are involved in a wide range of funded and unfunded research and publication. This faculty work is typically on a narrow specific level that does not by its nature have a useful outlet in undergraduate education coursework. The faculty material is more appropriate for graduate coursework. However the faculty member may not be teaching the particular graduate course where this material would be applicable since it is taught by another faculty member. In addition, the faculty material may not fit a presentation into any other existing graduate construction course. The graduate seminar by its very nature of not being topic-limited provides a venue for these faculty presentations. As noted previously, faculty presentations are loosely scheduled during the semester to help fill in gaps left by guest speaker cancellations. While it should go without saying, again, as with guest speakers faculty members should avoid

duplication of material that may have been covered by one of their lectures in another course. Industry speakers tend to be more practice-oriented while faculty speakers are obviously more research-oriented.

### Student Presentations

Students presentations in the first and second semesters of the graduate seminar are scheduled towards the end of the semesters. By the end of the first semester, the requirement of graduate students is to have selected a topic for their thesis or project. The first semester-end presentation for the students is on this topic. By the end of the second semester students should have completed more in-depth work on their topic and thus the presentations typically reflect this. During both sets of student presentations, the classroom atmosphere is very interactive between students and faculty. Feedback and questioning is encouraged in both directions. In these student work presentations students find certain problems that need solution. This interactive process with its give and take is a valuable experience for the students. It brings to light certain issues that they may not have thought of and also provides ideas for the other students in conducting their own research.

The practice in giving an oral presentation to the student's peers is of great benefit as well. So often the feedback from Industry Advisory Board members and from employer surveys is of the need for students to have good communication skills. Effective communication skills, both written and oral, are often the one of the most important criteria considered by construction industry employers. This is especially true for construction management graduate students who are often working professionals themselves going to school part-time. These types of students are rising in their professional careers and need to be able to give quality presentations to prospective clients. The requirement that the students give oral presentations to the class gives them the chance to practice their technical presentation skills. This type of individual presentation is not necessarily learned during undergraduate curricula where many if not all presentations are done in a group setting. Presentations of a technical nature and in an academic setting allow for practicing for the student's oral exam and thesis defense as well.

### Conclusions and Recommendations

For a properly-situated graduate program, we feel that, based on our experiences, that a graduate seminar such as described above provides a valuable educational segment. Those programs that are geographically isolated due to university location may find this aforementioned format difficult to implement. Those programs located away from population centers may find that a guest speaker has to travel four hours or more each way in addition to making the presentation. Thus this is a full day's assignment for the potential guest speaker in this situation. However, with adequate recruiting and the assistance of industry advisory boards, these isolated programs may be able to adequately staff a seminar program. As an example, if an industry advisory board meets twice a year on campus in the Fall and Spring, "bunching" up the seminar with rescheduling for two meetings in that particular week may allow for four speaker opportunities from the advisory board. Construction personnel in their periodic recruiting trips to campus provide additional opportunities with the previously-mentioned caveat about avoiding recruiting presentations within the seminar. Thus while it requires more effort, even isolated campuses may find a graduate seminar workable. For those programs not currently utilizing this seminar venue, based on our experience, we would strongly recommend it as a useful adjunct to graduate construction programs. As noted above, we at UNLV were able to implement this without detracting from the core credits of our base graduate program.

Currently, the UNLV coordinating faculty member for the seminar does the bulk of the work in scheduling speakers and managing the other aspects of the graduate seminar. There is some assistance from other construction-area faculty in recommending guest speakers and obvious assistance in terms of UNLV faculty presentations.

At some universities, students have been placed with the responsibilities of coordinating and scheduling the seminar speakers. While this course of action is contemplated, currently this has not taken place. The obvious benefits are that it gets students more involved in the seminar and frees up faculty time for other tasks. The hope is that we are developing a capable roster of speakers and that once these speakers are established, the workload of the faculty member will be reduced substantially. The negative of having students involved with the speaker recruitment is that duplication can occur more easily in subject matter.

We have thought about videotaping graduate seminars and having them available as a permanent resource for the construction program. However, one of the most valuable aspects of the guest speakers' involvement is that they talk freely and often reveal sensitive information. This information is of a nature where they would probably not want to be quoted. Thus the idea for videotaped segments has not been implemented for the seminar.

#### NEIL OPFER

Neil Opfer is an Associate Professor with the Construction Engineering & Management Program, Department of Civil and Environmental Engineering at University of Nevada, Las Vegas. Prior to UNLV, he was with Western Michigan University and prior to that in the construction industry. His interests include construction estimating, project control, and construction defects. He is a licensed general contractor in the State of Nevada.

#### JAEHO SON

Dr. Jaeho Son is an Assistant Professor in the Department of Civil and Environmental Engineering at the University of Nevada, Las Vegas. Prior to his academic career at UNLV, he worked as a visiting assistant professor in Civil and Environment Engineering Department at Polytechnic University. His current professional interests focus on construction optimization, resource management, and management information systems.

#### JOHN GAMBATESE

Dr. John Gambatese, P.E. is an Assistant Professor, Department of Civil, Construction and Environmental Engineering at Oregon State University. He has held design and construction positions in industry. Prior to Oregon State he was with University of Nevada, Las Vegas and the University of Washington. His research has included construction worker safety, project constructability, life cycle properties, and construction dust control.