AC 2011-90: ESTABLISHING A CONSTRUCTION MANAGEMENT TRACK WITHIN AN ARCHITECTURAL ENGINEERING TECHNOLOGY PROGRAM

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Abstract

The current recession has had a dramatic impact on all aspects of the construction industry. According to many studies a great percentage of architects are currently unemployed or employed in a different capacity while the remaining ones have suffered pay cuts, reduced work weeks, and other hardships.

It is our opinion, that when the industry emerges from this recession it will look drastically different than it did before the recession. We feel that while the construction industry will require professionals with architectural educations, it will employ those people in less traditional and new capacities. The industry is employing fewer people in a conventional architectural office setting and more people in progressive owner representative, program manager and construction manager capacities. The current recession and new technologies have accelerated the shift in this direction.

We have outlined the following tasks as we embark on our effort to establish a Construction Management (CM) Track within our Architectural Engineering Technology (AET) Program.

**CM Track:** Research and develop a track for architecture students interested in pursuing a CM track and careers in a more construction related capacity.

**CM Track Curriculum:** Research and develop the curriculum for the CM track students without jeopardizing our ABET and NAAB accreditations.

**CM Track Advisor:** Advise undergraduate students on CM track. Help CM track students find employment and/or pursue graduate study in construction.

**CM Track Clubs and Organizations:** Encourage and coordinate student involvement in Construction related organizations and clubs, example: Construction Institute (CI) and American Institute of Architects (AIA). Invite professionals to campus to discuss the CM industry.

Objective

We hope to develop three track options for our AET students within a program accredited by both the Accreditation Board for Engineering and Technology (ABET) and the National Architectural Accreditation Board (NAAB). The three tracks would include a General Studies (GS) Track, a Construction Management (CM) Track and an Architectural Design (AD) Track. Our approach has always been to prepare our students for all aspects of the construction industry. We plan to continue this, but add an emphasis on specific aspects of the construction industry to better prepare our graduates for a very competitive industry.

The CM track is an intensive track designed for students wishing to pursue a position with a construction related firm or graduate study in construction management and ultimately a
professional construction management license. The AD track is an intensive track designed for students wishing to pursue a position with an architectural firm or graduate study in a NAAB accredited architecture program and ultimately a professional architectural license. The GS track is an all-purpose track design for students wishing to pursue a position in design and construction but are not interested in pursuing a professional license in construction management or architecture.

All three tracks would provide our students with the design and technical skills necessary for working on construction projects, from beginning to end. Students would develop construction industry expertise with emphasis on team building. Career opportunities in construction are found throughout the world and include the following industries: construction companies, government agencies, architectural/engineering/environmental firms, industrial firms and manufacturing/materials suppliers.

**Reason**

The current recession has had a dramatic impact on all aspects of the design and construction industry. “There are some very serious challenges facing the construction industry that are motivating new approaches to how we design, build, operate, and maintain buildings and infrastructure.” (Geoff Zeiss article) Beyond the recession, “new technologies are (being) designed to address challenges in the construction industry that are going to profoundly affect other sectors such as operations and maintenance, emergency planning, first response and urban planning.” (Geoff Zeiss article)

According to many studies a great percentage of architects are currently unemployed or employed in a different capacity while the remaining ones have suffered pay cuts, reduced work weeks, and other hardships. In our opinion, when the industry finally comes out from this devastating recession, the effects of the economy and the emerging new technologies will cause the industry to look drastically different than it did before the recession. The current recession has greatly accelerated the shift in this direction.

We feel that while the construction industry will require professionals with architectural educations, it will employ those people in a less traditional and new capacities. The industry is employing fewer people in a conventional architectural office setting and more people in owner representative, program manager and construction manager capacities.

**Next Steps for CM Track**

**CM Track:** Research and develop a track for architecture students interested in pursuing a CM track and careers in a more construction related capacity. We have already started this process.

**CM Track Curriculum:** Research and develop the curriculum for the CM track students without jeopardizing our ABET and NAAB accreditations. We have already started this process.

**CM Track Advisor:** Advise undergraduate students on the CM track. Help CM track students find employment and/or pursue graduate study in construction. We are beginning this process now.
CM Track Research: Attend ASEE and/or construction industry conferences with CM related divisions and research other institutions that have CM tracks. We have already started this process, but need to increase the effort.

CM Track Clubs & Organizations: Encourage and coordinate student involvement in Construction related organizations and clubs, for example: Construction Institute (CI) and American Institute of Architects (AIA). Invite construction professionals to campus to discuss the CM industry. We have already started this process, but need to increase the effort.

CM Track LEED Opportunities: Research and explore options for working sustainability into the CM curriculum. We need to start this process very soon as sustainability has become an integral part of every industry but especially the design and construction industry.

Curriculum

We have modified our existing AET Program track to create three tracks. The existing track has become the GS track. The CM and AD tracks have clustered electives and created new courses to deliver the necessary education for these more focused tracks. The decision of what track to take is made after the students completes their fourth semester, or second semester second year. Students apply for the CM and AD tracks by submitting an application form, essay, portfolio, reference letter and transcript. Students that are not accepted into their desired track will remain in the program on the GS track.

The first four semesters of study will be the same for all tracks. However we have made some minor modifications to these semesters and they are as follows:

Starting the math sequence with MTH 122 instead of MTH 121

Our students are coming to us with improved math skills and are better prepared to start our math sequence at a higher level, but if students are not prepared for this course they could take a course during the summer or over a winter term.

Moving EN 241, English II, to the fourth semester

This class would stress the importance of technical writing skills and help the students present themselves with their program track and graduate school applications.

Creating a new introductory course, AET 112, about construction profession

This course is designed to present the array of different career path options within the construction industry. Professionals from different aspects of the industry will come to class to present their speciality and answer questions.

Making AET 362 a required course and moving it to the third semester

Technology has had a significant impact on the construction industry, so this course is designed to introduce industry applications of computer and other technologies.

Making AET 481 Architectural Profession a required class and moving it to the fourth semester

This class would be a professional practice class that would go into greater detail than AET 112 and help the students make their final decision on which track to pursue.

Making AET 473, Portfolio Development a required class and move it to the fourth semester

This course would prepare the students with creating their own portfolios, as portfolios are a part of all construction related professions and help the students present themselves with their program track and graduate school applications.

General Studies Track: Curriculum
Modifications to the GS track after the fourth semester include the following:

Making the previously required design classes after the fourth semester electives

Design courses AET 352 Design IV and AET 367 Design V would be elective choices.

Repositioning some of the technical specialties and professional electives

In order to balance the number of credits per semester and provide required courses in an appropriate sequence, we had to rearrange our technical and professional electives.

Making an elective thesis course a required capstone project course

Previously our thesis course was not required and only our graduate bound students would take it. It would now be required by all and renamed AET 489 Senior Capstone Project and help us with our ABET reviews.

Introducing an elective study abroad course
This would be a course that could be taken during the winter semester between the third and fourth year.

Construction Management Track: Curriculum

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<th>Course Name</th>
<th>Credit Hours</th>
<th>Class</th>
<th>Lab</th>
<th>Lecture</th>
<th>Year</th>
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<td>3</td>
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<td>AET 367 Design V</td>
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<td>3</td>
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<td>4</td>
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</table>

Modifications to the CM track after the fourth semester include the following:

Making the previously required design classes into construction classes

- Design courses AET 352 Design IV and AET 367 Design V would be replaced with CE/AET 250 Intro to Surveying & Geographic Information and CE/AET 300 Engineering Economics.

Creating two more required courses for CM students

- Construction courses CE/AET 340 Construction Management and CE/AET 442 Construction Planning & Scheduling would be required.
Repositioning some of the technical specialties and professional electives
In order to balance the number of credits per semester and provide required course in an appropriate sequence, we had to rearrange our technical and professional electives.

Making an elective thesis course a required capstone project course
Previously our thesis course was not required and only our graduate bound students would take it. It would now be required by all and renamed as AET 489 Senior Capstone Project and help us with our ABET reviews.

Introducing an elective study abroad course
This course that could be taken during the winter semester between the third and fourth year.

Design Track: Curriculum
Modifications to the AD track after the fourth semester include the following:

**Keeping the previously required design classes after the fourth semester**
- Design courses AET 352 Design IV and AET 367 Design V would continue to be required courses.

**Creating one more required courses for AD students**
- Design courses AET 371 Urban Design would be required.

**Repositioning some of the technical specialties and professional electives**
- In order to balance the number of credits per semester and provide required course in an appropriate sequence, we had to rearrange our technical and professional electives.

**Making an elective thesis course a required capstone project course**
- Previously our thesis course was not required and only our graduate bound students would take it. It would now be required by all and renamed as AET 489 Senior Capstone Project and help us with our ABET reviews.

**Introducing a required study abroad course**
- This would be a course that could be taken during the winter semester between the third and fourth year and prepare students for their AET 371 Urban Design course.

**Flexibility Still Exists**

As designed, our program will require our students to make an important decision at the end of their fourth semester. But this decision, while affecting a student’s undergraduate education, is not a final decision. Even if a student decides to pursue our CM track it does not preclude their decision to pursue graduate study in architecture. It may require up to an additional year of architecture study on the graduate level to receive a NAAB accredited Master’s degree in architecture. The same is true of a student who decides to pursue the AD track, as it will require some additional study on the graduate level to obtain an accredited Master’s degree in construction.

**Conclusion**

A greater incorporation of construction instruction into architectural education is not a new concept. In fact at its origins, architectural training included a far greater understanding of construction. Over the years we have wandered away from construction to an over emphasis of design education. Architecture is a multidisciplinary field of study that draws on many areas of study. While architectural education must successfully involve the integration of many disciplines, the time has come for some focused specialization within it to better prepare our students for their future.

**References**

Zeiss, Geoff; “Worldwide Challenges Facing the Construction Industry”
Wentworth Institute of Technology; Construction Management Program Information
University of Hartford; Architecture Program Information