

INSIGHTS

new trends, new techniques
and current industry issues

Architectural Engineering

What, exactly, is it?

*By Stephen P. Schneider, Ph.D.,
P.E., S.E.*

Steve Schneider is a Senior Project Manager for BergerABAM, Inc. He holds a B.S. ArchE degree from the University of Colorado, Boulder, an M.S. and a Ph.D. in Civil Engineering from the University of Washington, Seattle, and practices structural engineering in the Portland, OR area. Steve is also a member of the STRUCTURE magazine Editorial Board. He can be reached at steve.schneider@abam.com.



I was part of a conversation recently among a group of practitioners where someone wondered about what was studied in an Architectural Engineering (ArchE) program. Earning a Bachelor's Degree in Architectural Engineering myself, this curiosity surprised me. After all, I had presumed, in the several decades since graduating, Architectural Engineering had surely become ubiquitous in the profession in which most of us practice. But it prompted me to realize it had been some time since I thought about the attitude that persisted at the time of my graduation: Engineers hear the word Architect, and Architects hear the word Engineer – therefore, someone with such a degree did not belong to either group.

In a quick internet search, I found that only 37 universities in the U.S. offer a Bachelor's of Science Degree in Architectural Engineering, 9 offer Master's Degrees and, surprisingly, only one offers a Doctoral degree. In comparison, 265 universities offer a B.S. degree in Civil Engineering, and nearly 190 with M.S. and 120 with Ph.D. programs. With this significant disparity in Colleges and

Universities offering the B.S. ArchE degree or higher, I had to admit that maybe the Architectural Engineering degree was not as commonplace as I had come to believe.

In general, only an academic department can confer a degree; thus, an Architectural Engineering Department is recognized by the College of Engineering as an independent academic unit. Among the many criteria required to be an academic department are an authorized faculty and a designated course of study leading to an undergraduate or graduate degree. While the curriculum can often overlap with the CE program, it is neither a discipline within CE or a discipline within Architecture – Architectural Engineering is a recognized field of study on its own.

The courses of study within ArchE can be grouped into 3 general categories:

- Structural,
- Environmental & Building Energy, and
- Infrastructure & Construction Management.

It is perhaps Environment & Building Energy courses and approved electives that distinguish the B.S. ArchE degree over one in Civil Engineering. Environment & Building Energy courses focus on the building environment, having coursework that might include: lighting & electrical systems, HVAC systems, plumbing & fire safety, acoustics, solar energy, renewable energy, and sustainability. ArchE graduates with this emphasis have gone on to successful careers in architectural lighting for building interiors



and exteriors, energy design of the building envelope, and renewable energy resources, to name a few.

Electives in the ArchE curriculum focus on architectural considerations and are the primary link to a course of study in Architecture. These classes are often taught in conjunction with, and by the faculty in, the Architecture program. Coursework can include: architectural history, architectural appreciation, and introductory architectural design courses where the student might go through the full development and design of a building from an architect's perspective. Each topic likely needs a two-course sequence to complete. Architectural history, for instance, is the study of architectural styles throughout the ages and requires a full academic year to cover the topic well.

As for the coursework that emphasizes Structures or Construction Management, many of the classes needed to fulfill these requirements are the same classes taken by CE students with a similar emphasis. In essence, for certain classes there is no difference between the ArchE and CE programs.

As for my ArchE experience, my emphasis was structural engineering. The curriculum was an exceptional way to study the design and construction of the built environment. Because of my interest in architecture, this was better for me than what was offered through a CE program which requires classes in transportation, environmental sciences, and the like. And the program afforded me the flexibility to focus on structural engineering. As an undergraduate, I took graduate-level classes in structural dynamics, framed structural analysis and an introductory course in finite elements. I was taking these classes with a few of my ArchE classmates and CE students studying for their M.S. degree.

So... Architect or Engineer? Undoubtedly, ArchE is an engineering program. Architects focus on building layout and aesthetics while the Architectural Engineer will impact its design, function, and construction. If your work is primarily structural engineering and you are looking for a new hire, you should not discount someone with an ArchE degree because of a lack of understanding about their educational background. If your client base is predominantly architects, someone with an ArchE degree can be an excellent fit. ■