Last revised 10/4/04

Architectural Engineering Program
Assessment of Student Learning Plan
Kansas State University

☒ Check the box if your program's student learning outcomes have been modified since November 2003. If so, please email (apr@ksu.edu) or attach a hard copy to this document.

A. College, Department, and Date

College: College of Engineering
Department: Architectural Engineering & Construction Science
Date: October 18, 2004

B. Contact Person(s) for the Assessment Plans

David R. Fritchen, Dept. Head and Associate Professor

C. Degree Program

B.S. in Architectural Engineering
B.S./M.S. in Architectural Engineering

D. Assessment of Student Learning Three-Year Plan

1. Student Learning Outcome(s)

A. An ability to **identify, research** and **solve engineering problems**.
B. An ability to **design a system** to meet program criteria
C. An ability to **communicate** effectively with oral presentations, written documentation and graphic depiction.
D. An ability to work on **cross-disciplinary teams**.
E. An ability to apply the **fundamentals of engineering**, science and mathematics.
F. An ability to **use the computer as a tool** for analysis and communication.
G. Demonstrate self-directed inquiry as a basis for **life-long learning**.
H. An ability to understand the **cost and engineering economic fundamentals** as applied to building system engineering.
I. Demonstrate an understanding of **statistics and experimental design** in the context of building performance.
J. Demonstrate an understanding of **ethical and professional behavior** in preparation for effective industry careers.
K. An ability to place building engineering problems in a **contemporary, social and global context**.

Special rationale for selecting these learning outcomes (optional):

The Architectural Engineering program is accredited by the Accreditation Board for Engineering and Technology (ABET). The ABET Criteria 2000 for accrediting engineering programs requires that each program must have an assessment process which documents that their graduates have achieved the educational objectives and program objectives of architectural engineering. The Student Learning Outcomes listed above have been determined by the department faculty and college to satisfy ABET requirements and are adapted to the context of learning objectives for the architectural engineering program.

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Relationship to K-State Student Learning Outcomes:

	University-wide SLO's (Undergraduate Programs)					Program SLO is conceptually different from university SLOs
Program SLOs	Knowledge	Critical Thinking	Communication	Diversity	Academic / Professional Integrity	
A. An ability to **identify, research** and **solve engineering problems**	X	X			X	
B. An ability to **design a system** to meet program criteria	X	X				
C. An ability to **communicate** effectively with oral presentations, written documentation and graphic depiction.	X		X			
D. An ability to work on **cross-disciplinary teams**	X	X	X	X	X	
E. An ability to apply the **fundamentals of engineering**, science and mathematics	X	X				
F. An ability to **use the computer as a tool** for analysis and communication	X	X	X			
G. Demonstrate self-directed inquiry as a basis for **life-long learning**	X	X				
H. An ability to understand the **cost and engineering economic fundamentals** as applied to building system engineering.	X	X				
I. Demonstrate an understanding of **statistics and experimental design** in the context of building performance	X	X			X	

J. Demonstrate an understanding of **ethical and professional behavior** in preparation for effective industry careers.			X	X	X	
K. An ability to place building engineering problems in a **contemporary, social and global context**	X		X	X		

Note: The Undergraduate program in Architectural Engineering is a 5-year, 158 credit hour program. As such, a combination B.S./M.S. degree program is also offered, which challenges top students with research experiences, faculty mentoring and advanced course work. The B.S./M.S. program allows accepted students to reduce their undergraduate program by 15 upper level credit hours and replace them with 15 credit hours of graduate level course credit. The Program SLO's are identical to the Undergraduate SLO's so as to remain consistent with ABET accreditation criteria.

	University-wide SLOs (Graduate Programs)			Program SLO is conceptually different from university SLOs
Program SLOs	Knowledge	Skills	Attitudes and Professional Conduct	
1. Same as for Undergraduate program	X	X	X	

2. **How will the learning outcomes be assessed? What groups will be included in the assessment?**

The learning outcomes are mapped by a curricular overlay matrix integrated through the entire curriculum to assure both the fundamental engineering competency and design application ability components of our educational objectives. The outcomes developed are across the disciplines of the program, as stated in the program educational objectives, to ensure a broad and balanced building systems engineering education. Additionally, we assure the breadth of our educational objectives and the universities general education requirements are incorporated into the curriculum to prepare our graduates for the challenges and opportunities for life in general.
The program objectives and learning outcomes are reviewed and revised on a three year cycle according to an assessment process timeline. The department Instructional Programs Team provides the leadership for the continuous educational process improvement and oversees the implementation of program assessment and curricular improvement.
The assessment process utilizes a variety of sources and multiple methods of obtaining data. This data provides a broad base of information relative to performance and achievement of our educational objectives and desired program and learning outcomes. The sources and methods include the following:

1. **Architectural Engineering Advisory Board** – the members of the advisory board come from all facets of the building engineering and construction industry. The board convenes two times annually to provide valued feedback and input for program improvement and department support.

Specifically, the board provides input in establishing departmental goals and plans, program objectives and outcomes, and curriculum/course content. [Indirect measure]

2. Graduating Senior Exit Survey – all seniors are required to fill out and exit survey prior to graduation which addresses their self assessment of achievement for the eleven Student Learning Objectives. [Direct measure]

3. Alumni Surveys – in conjunction with the university, one and four year alumni are surveyed for evaluation of their educational programs in the context of the SLO's. [Indirect measure]

4. Employer Feedback – systematic surveys and year round conversations with employers to provide feedback in regard to graduate performance relative to program and learning outcomes. [Indirect measure]

5. ABET Accreditation Review – a national peer review is made every six years by the Accreditation Board for Engineering and Technology (ABET), which establishes national standards for engineering education programs. [Direct measure]

6. Academic Performance and Classroom Assessment – faculty are involved in assessing and progressively developing program outcomes in courses and throughout the curriculum. [Direct measure]

7. Fundamentals of Engineering Examination – upper-class students take this comprehensive, national, standardized examination, and the results are compared at a national level. [Direct measure]

8. Employment Opportunities – the department actively follows employment opportunities of graduating seniors as well as summer employment, internships and co-op learning experiences to help measure application of learning. [Indirect measure]

The department faculty are responsible for implementation of the assessment plan through the department team structure outlined below:

1. **The Instructional Programs Team** provides leadership in establishing educational objectives and program outcomes, developing assessment plans and instruments, reviewing and summarizing data and coordinating curriculum and course improvements.
2. The **Student Team** oversees communication of the program outcomes for the students, coordinates academic advising, and monitors student performance relative to maintaining minimum standards and rewarding excellence.
3. The **Industry Partnership Team** coordinates exchange with advisory boards, review of senior exit, alumni, and employer surveys.

3. When will these outcomes be assessed? When and in what format will the results of the assessment be discussed?

The team responsibilities and assessment inputs are summarized on a life-long learning continuous feedback diagram "Assessment Process Flowchart" developed by the faculty. The assessment instruments are considered as "sensors" in a closed loop control process with the three faculty teams listed above reviewing data and the instructional programs team recommending any necessary corrective action. The department "Assessment Process Timeline" identifies the semesters in which each of the six critical elements of the educational improvement process must take place. The "Assessment Process Timeline" for the Department programs schedules assessing outcomes every three years (one critical element per semester for 6 semester = one complete cycle every 3 years). The critical elements on the "Assessment Process Timeline" include:

1. Outcomes/Objectives (Fall 2001, Fall 2004, etc.)
2. Curriculum Matrix (Spring 2002, Spring 2005, etc.)
3. Course Sequence Overview (Fall 2002, Fall 2005, etc.)
4. Course Content Review (Spring 2003, Spring 2006, etc.)
5. Department Mission Statement (Fall 2003, Fall 2006, etc.)
6. Department Goals (Spring 2004, Spring 2007)

4. **What is the unit's process for using assessment results to improve student learning?**

The Department "Assessment Process Flow Chart" graphically outlines the continuous process for educational improvement. In summary, the Industry Relations Team will oversee, administrate and summarize advisory board interaction, employment records, employer surveys, senior exit survey and 1 and 4 year alumni survey. An annual summary report with recommendations will be provided by the end of the fall semester to the Instructional Program Team. The Student Team will track the academic performance of individual students, administer the enrollment to the professional program and oversee student advising. An annual summary report with any recommendations from the Student Team will be made to the Instructional Programs Team by the end of the fall semester. The Instructional Programs Team will be responsible for tracking Fundamentals Examination (F.E.) results and follow up on ABET review. The Instructional Programs Team will be responsible for reporting ongoing assessment plan implementation and curriculum improvement recommendations. This process recognizes that all department faculty must participate and understand the overall program assessment plan. The responsibilities are an integral part of the department organizational plan/team overlay and individual annual performance review.