

## KEY POINTS ABOUT Policy Statement 465 Academic Prerequisites for Licensure & Professional Practice

From ASCE's Committee on Academic Prerequisites for Professional Practice (CAP<sup>3</sup>) ♦

1. Policy Statement 465 (PS 465) outlines the preparation required for entry into **tomorrow's** practice of civil engineering at the professional level. Civil engineers face an increasingly complex world requiring more **professional breadth** and **specialization**.
2. PS465 advances the concept of a profession. A profession can be defined by cooperative organization, an ethic of professional service, and a body of knowledge.
3. For more than a decade, ASCE has been presenting to, talking with, and hearing from many stakeholders. As a result, we have been progressively refining our proposed program to "raise the bar" in engineering education. The National Society of Professional Engineers (NSPE), the National Academy of Engineering (NAE), and the National Council of Examiners for Engineering & Surveying (NCEES) have joined in this advocacy.
4. The "**bottom-line**" issue addressed by PS 465 is that "It is evident that the exploding body of science and engineering knowledge cannot be accommodated within the context of the traditional four year baccalaureate degree" (*Educating the Engineering of 2020, National Academy of Engineering 2005*). PS 465 is in a ten to fifteen year **implementation stage**.
5. The Civil Engineering Body of Knowledge (BOK) is the **foundation**—everything builds on it. The BOK defines the knowledge, skills, and attitudes necessary to **enter** the practice of civil engineering at the professional level -- and is described in *Civil Engineering BOK for the 21st Century: Preparing the Civil Engineer for the Future* (see [www.asce.org/raisethebar](http://www.asce.org/raisethebar)).
6. To develop professionals, the BOK embraces 5 big ideas: (1) fundamentals in math, science, and engineering science, (2) technical breadth, (3) breadth in the humanities and social sciences, (4) professional practice breadth, and (5) technical depth or specialization.
7. The First Edition of the BOK consists of **15 outcomes**. Those entering the profession should be able to::

### Technical

- Apply knowledge of math, science and engineering.
- Apply knowledge in a specialized area related to civil engineering.
- Design and conduct experiments as well as to analyze and interpret data.
- Design a system, component or process to meet desired needs.
- Identify, formulate and solve engineering problems.
- Use techniques and modern engineering tools necessary for engineering practice.
- Understand the elements of project, construction and asset management.

### Professional

- Function on multidisciplinary teams.
- Understand professional and ethical responsibilities.
- Communicate effectively.
- Know contemporary issues.
- Understand the impact of engineering solutions in a global and societal context.
- Recognize the need for and engage in lifelong learning.
- Understand business, public policy and administration fundamentals.
- Understand the role of a leader and leadership principles & attitudes

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♦ Various reports from CAP<sup>3</sup> are available on [www.asce.org/raisethebar](http://www.asce.org/raisethebar). Members of CAP<sup>3</sup> are available to work with interested stakeholders. Some primary contacts include Jeff Russell (PhD, PE, CAP<sup>3</sup> Chair, [russell@engr.wisc.edu](mailto:russell@engr.wisc.edu)) and Tom Lenox (PhD, CAP<sup>3</sup> Staff Leader, [tlenox@asce.org](mailto:tlenox@asce.org)).

8. ASCE PS 465 states that the BOK should be fulfilled by obtaining (1) a Bachelor's degree, (2) a Master's degree or approximately 30 acceptable credits, and (3) experience. This is referred to as "B + M/30 & E." "B + M/30" represents several different, but related methods to fulfill the formal educational component of the BOK (see next section). The "E" refers to progressive, structured engineering experience which, when combined with the educational requirements, **results in attainment of the requisite Civil Engineering Body of Knowledge.**

9. **The primary path** for fulfilling the BOK in the near future can be symbolized as the following:

$$B^{ABET^*} + (M/30)^{Validated} \& E$$

The "B" refers to an ABET/EAC accredited baccalaureate degree in civil engineering. The "M/30" refers to a master's degree or approximately 30 semester credits of acceptable graduate-level (or upper-level undergraduate) courses in a specialized technical area and/or professional practice area related to civil engineering. The "M" signifies a program leading to a master's degree; the "30" program does not have to lead to a master's degree. In either case, the "M/30" program will be validated by an approved outside entity.

10. **A secondary path** for fulfilling the BOK in the future can be symbolized as the following:

$$B + M^{ABET^*} \& E$$

While it is not required that the baccalaureate degree associated with this path be an ABET/EAC accredited degree in civil engineering, the master's degree must be ABET/EAC accredited in civil engineering and must validate the attainment of the body of knowledge by the degree recipient. ASCE has pursued important modifications to ABET accreditation criteria and policies to make this a viable alternative path in the future.

11. There is consistency between ASCE's BOK fulfillment paths and the NCEES Model Law paths for the licensure of all engineers. The NCEES Model Law states that (as of January 1, 2015) admission to an 8-hour written examination in the principles/practice of engineering will require:

- (1) An engineer intern with a bachelor's degree, with an additional 30 credits of acceptable upper-level undergraduate or graduate-level coursework from approved course providers, and with a specific record of an additional 4 years or more of progressive experience on engineering projects of a grade and a character which indicate to the board that the applicant may be competent to practice engineering.
- (2) An engineer intern with a master's degree in engineering from an institution that offers EAC/ABET-accredited programs, or the equivalent, and with a specific record of an additional 3 years or more of progressive experience on engineering projects of a grade and a character which indicate to the board that the applicant may be competent to practice engineering.

The Model Law defines an engineer intern as a graduate of an engineering program of four years or more accredited by EAC/ABET, or the equivalent, who has passed the fundamentals of engineering (FE) exam. NCEES includes two additional paths for individuals with doctorates in engineering. See [http://www.ncees.org/licensure/licensure\\_exchange/le\\_2006\\_10.pdf](http://www.ncees.org/licensure/licensure_exchange/le_2006_10.pdf) for the details.

12. The First Edition of the BOK is being reviewed by a new BOK Committee. The committee is refining the educational outcomes and has developed an approach that states the level of learning expected for each outcome and provides detailed explanations of the outcomes. The committee will distribute a draft of the Second Edition of the BOK for comment by the civil engineering community in July 2007 – to be released in final form in February 2008.

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\* Within the context of this document, "ABET" degrees refer to programs accredited by the Engineering Accreditation Commission of ABET, Inc. – and programs considered to be equivalent. Typically, "equivalent" has included "Washington Accord" programs, "Substantially Equivalent" programs, and individual transcripts evaluated by services endorsed by NCEES. Please see <http://www.abet.org> and <http://www.cpees.org> for more information related to equivalency.