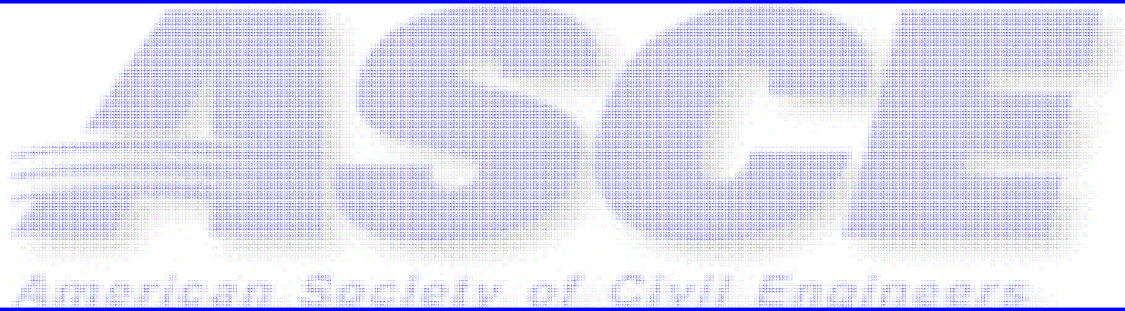




Preparing
THE Professional
Engineer
of the Future



Jeffrey S. Russell, Ph.D., P.E.
Ernest T. Smerdon, Ph.D., P.E.

Outline

1. Our Profession
2. The Concern
3. The Needs
4. A Solution
5. Summary

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1. **Our Profession**
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*Our Profession**

Organization

**Ethic of
Professional Service**

Body of Knowledge

* Lawson, W.D. (2004). "Professionalism: The Golden Years." *Journal of Professional Issues in Engr.*



Knowledge, skills, and attitudes
necessary to enter into the
practice of engineering at the
professional level.

BOK – The **BIG** Picture

1. Fundamentals -- math, science, and engr science.
2. Technical breadth.
3. Breadth in the humanities & social sciences.
4. Professional practice breadth.
5. Technical depth (specialization).

Civil Engineering Body of Knowledge

TECHNICAL

Technical core

Experimentation

Design

Engineering problems

Engineering tools

**Specialized area of civil
engineering**

**Project management,
construction, and asset mgmt.**

PROFESSIONAL

Inter-disciplinary teams

Professional & ethical standards

Communication

Impact of engineering

Life-long learning

Contemporary issues

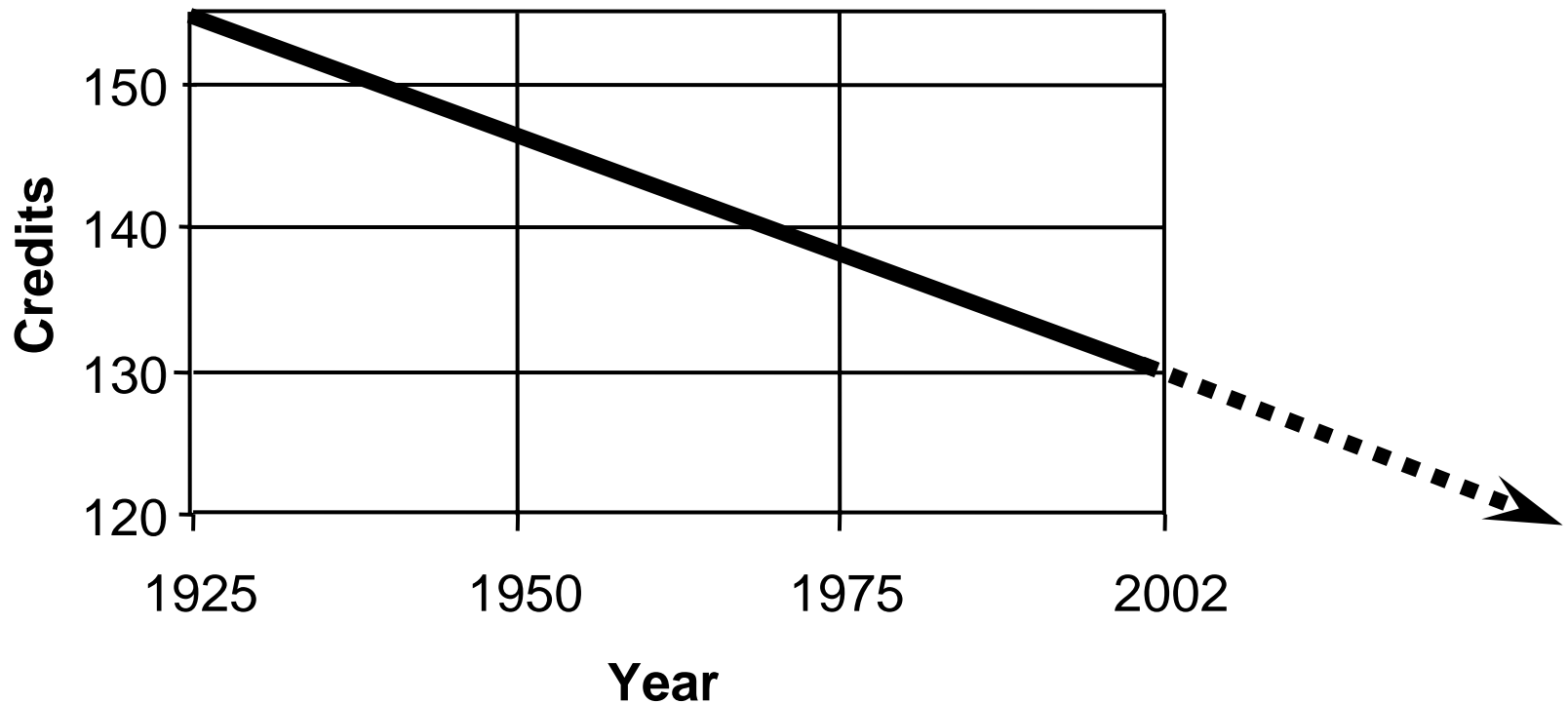
Business & public policy

Leadership

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Trend in Reduced Total Credit-Hours



The “Bottom Line” Problem Statement

“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 Engineer of 2020

NAE Report 2005

**“BOK cannot
fit into
today’s BS.”**

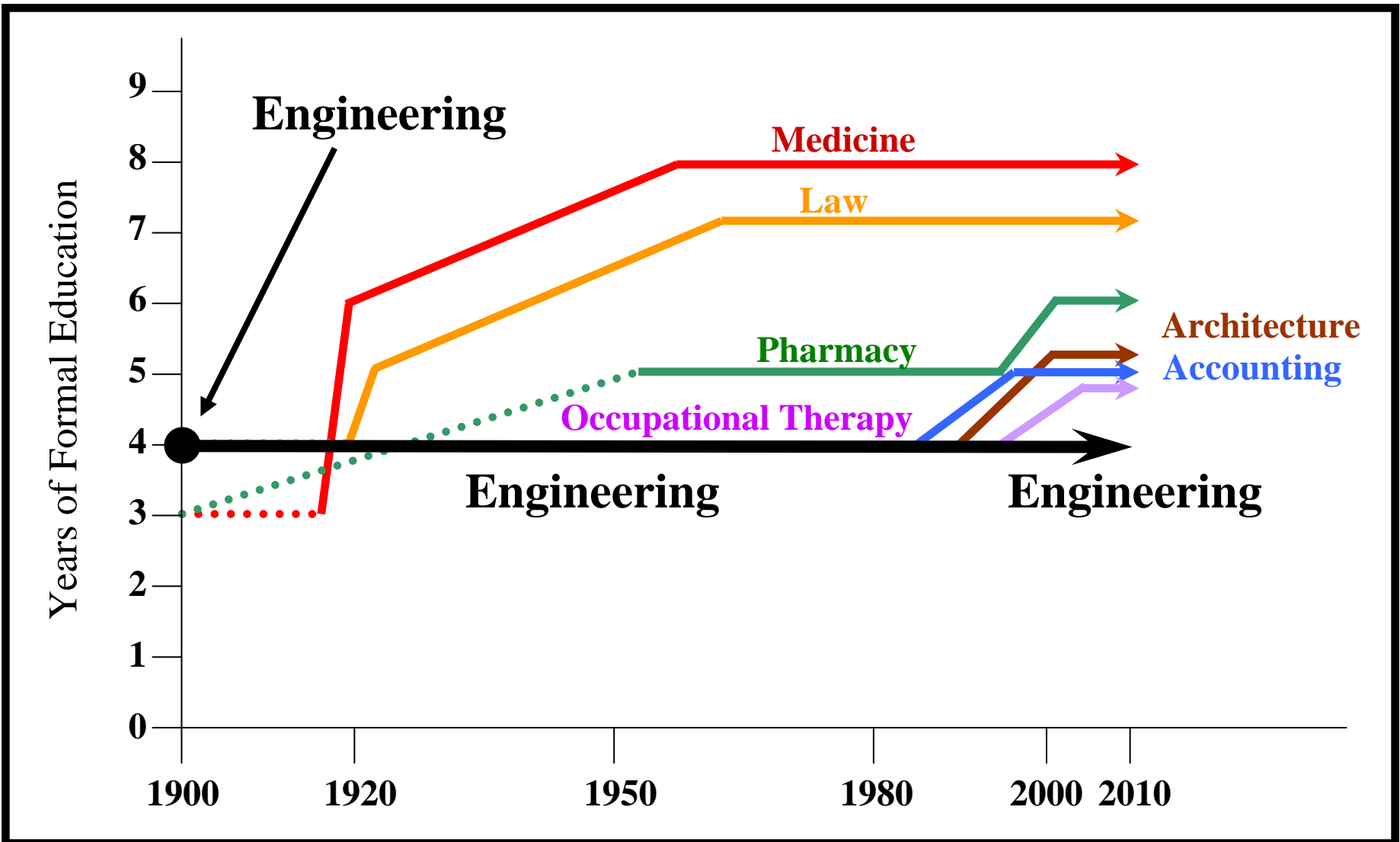
Partners

**“Redesign
today’s
BS”**

California State - L.A.

**“Specialization
beyond BS”**

A Leader No Longer



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Our Profession Needs -

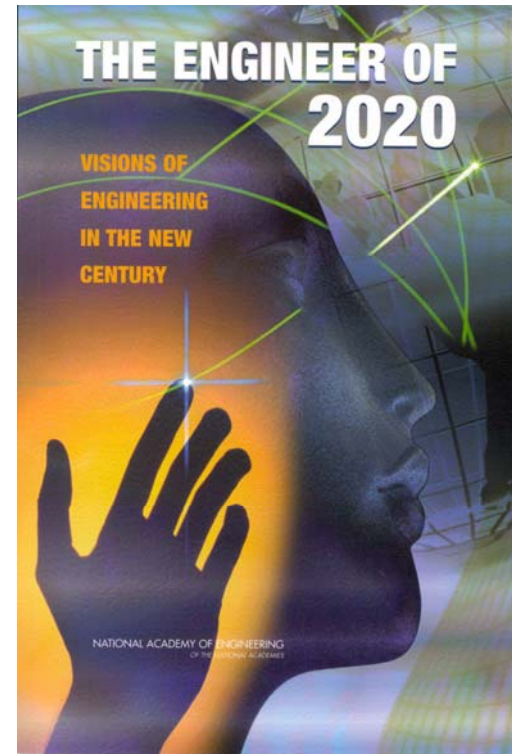
- Leadership by its Stewards
- Dynamic/Visionary BOK(s)
- Flexible Attainment Models
- **Implementation of Change!!**

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“It is evident that the exploding body of science and engineering knowledge can not be accommodated within the context of the traditional four year baccalaureate degree.”



Educating the Engineer of 2020
National Academy of Engineering,
2005



**National Society of
Professional Engineers®**

NSPE Professional Policy No. 168

With the continuing rapid expansion of knowledge required to practice . . . , NSPE believes that **additional engineering education, beyond the four year ABET/EAC degree, will be required** in order to meet the formal academic preparation necessary for the practice of engineering at the professional level (licensure) in the 21st century.

. . . Possible additional requirements could include a master's degree or equivalent.



Incorporate the following language requiring additional engineering education into the *Model Law* and *Model Rules* no sooner than 2010:

Graduate with a Bachelor of Science degree from an engineering program of four years or more accredited by EAC/ABET, or equivalent, plus 30 additional credits from an approved course provider(s) in upper-level undergraduate or graduate-level coursework in professional practice and/or technical topic areas.

Approved at NCEES Annual Meeting, August 2005



Incorporate the following language requiring additional engineering education into *Model Law* (Section 130.10):

Effective January 1, 2015, to be admitted to the principles & practice examination –

*(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, . . .***

*(2) An engineer intern **with a master's degree in engineering . . .***

**Approved at NCEES Annual Meeting
September 2006**



“The continuing rapid knowledge expansion required to practice basic engineering and be specialized in only one of the many available areas is beyond the four-year ABET/EAC degree required to be academically prepared in the 21st century. For these reasons, the concept of a master's degree or equivalent as a prerequisite for the practice of engineering at the professional level is a step in the right direction and one the U.S. Army Corps of Engineers fully supports.”

ASCE Policy 465

(Adopted by the BOD on October 19, 2004)

The American Society of Civil Engineers

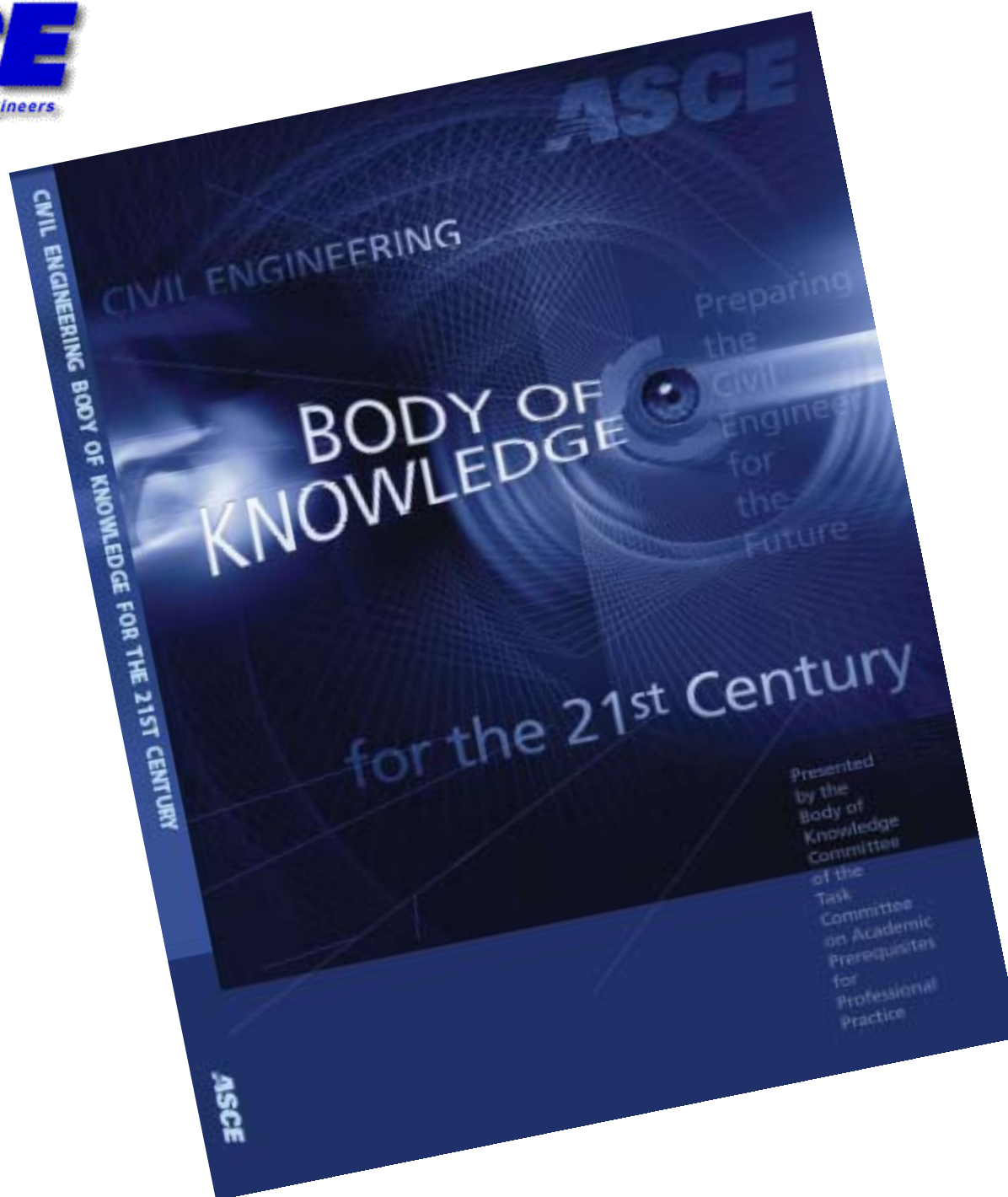
supports *the attainment of a Body of*

1. a baccalaureate degree

Knowledge for entry into the practice of

2. a master's degree, or approximately 30
civil engineering at a professional level.
coordinated graduate or upper level . . .

3. appropriate experience . . .



Example Paths to BOK Attainment

ABET

Path #1

Updated

& E

ABET Basic-Level Criteria

BOK

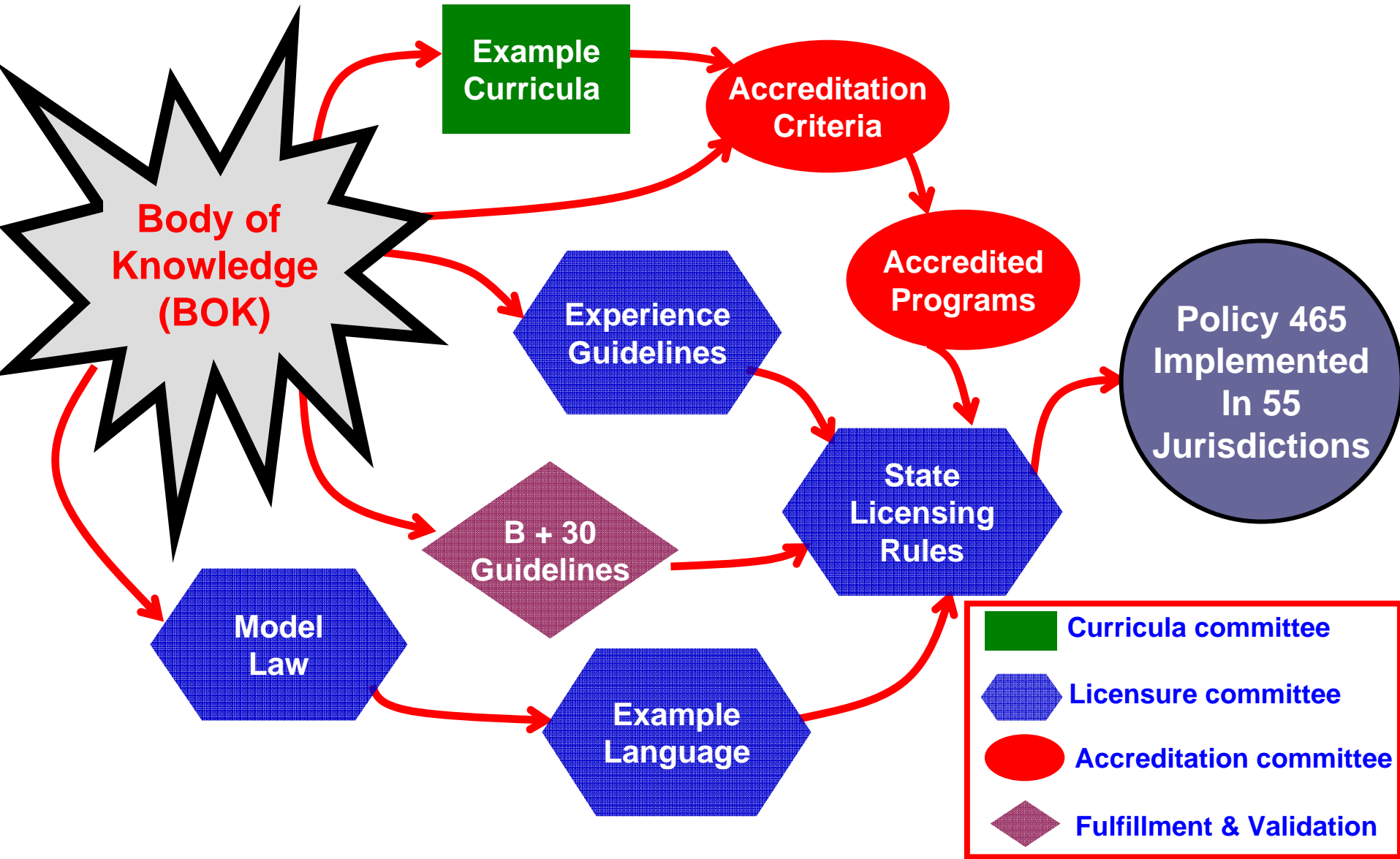
ABET

Path #2

& E

ABET Advanced-Level Criteria

Master Plan



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Information and Knowledgeable Points of Contact

www.asce.org/raisethebar

If you have questions or comments, please contact

Jeff Russell 608-262-7244 russell@engr.wisc.edu

Ernest Smerdon 520-577-7464 ejsmerdon@yahoo.com

Tom Lenox 800-548-2723 tlenox@asce.org

