



# BKCASE™

*Body of Knowledge and Curriculum  
to Advance Systems Engineering*

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[www.bkcase.org](http://www.bkcase.org)

*Conference on Navy Lessons Learned  
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# What is BKCASE?



- Project to create:
  - Systems Engineering Body of Knowledge
  - Graduate Reference Curriculum in Systems Engineering (GRCSE™ – pronounced “Gracie”)
- Started in September 2009 by Stevens Institute of Technology and Naval Postgraduate School with primary support from Department of Defense
- Project will run through 2012
- Intended for world-wide use



# What is the SEBoK?



Describes the boundaries, terminology, content, and structure of SE that are needed to systematically and consistently *support*:

Task Name	Task Description
<i>Inform Practice</i>	Inform systems engineers about the boundaries, terminology, and structure of their discipline and point them to useful information needed to practice SE in any application domain
<i>Inform Research</i>	Inform researchers about the limitations and gaps in current SE knowledge that should help guide their research agenda
<i>Define Curricula</i>	Define the content that should be common in undergraduate and graduate programs in SE
<i>Certify Professionals</i>	Certify individuals as qualified to practice systems engineering
<i>Decide Competencies</i>	Decide which competencies practicing systems engineers should possess in various roles ranging from apprentice to expert

Guide to the literature, not all the content of the literature

# What is in GRCSE?



- ***Guidance for Constructing and Maintaining the Reference Curriculum:*** the fundamental principles, assumptions, and context for the reference curriculum authors
- ***Entrance Expectations:*** what students should be capable of and have experienced before they enter a graduate program
- ***Outcomes:*** what students should achieve by graduation
- ***Architecture:*** the structure of a curriculum to accommodate core material, university-specific material, and elective material
- ***Core Body of Knowledge:*** material that all students should master in a graduate SE program

Not specific courses. Not specific packaging. Adaption and selective adoption expected and encouraged.

# BKCASE Vision and Objectives



## Vision

“Systems Engineering competency models, certification programs, textbooks, graduate programs, and related workforce development initiatives around the world align with BKCASE.”

## Objectives

1. Create the SEBoK and have it be globally recognized by the SE community as the authoritative guide to the body of knowledge for the SE discipline.
2. Create GRCSE and have it be globally recognized by the SE community as the authoritative guidance for graduate programs in SE.
3. Facilitate the global alignment of related workforce development initiatives with SEBoK and GRCSE.
4. Transfer stewardship of SEBoK and GRCSE to INCOSE and the IEEE after BKCASE publishes version 1.0 of those products, including possible integration into their certification, accreditation, and other workforce development and education initiatives.

# Our Partners



Under  
consideration



Under  
consideration





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# SEBoK Value Proposition



1. There is no authoritative source that defines and organizes the knowledge of the SE discipline. Knowledge gap creates unnecessary inconsistency and confusion in understanding the role of SE and in defining SE products and processes.
2. Creating the SEBoK will help build community consensus on the boundaries of SE, including its entanglements with project management and software engineering.
3. A common way to refer to SE knowledge will facilitate communication among systems engineers and provide a baseline for competency models, certification programs, educational programs, and other workforce development initiatives around the world.
4. Common ways to identify metadata about SE knowledge will facilitate search and other automated actions on SE knowledge.

# SEBoK Content



1. The definition of fundamental terms and concepts and primary relationships between those concepts
2. A statement of the principles of SE
3. A description of generally accepted activities, practices, technologies, processes, methods, and artifacts of SE and how they relate to one another
4. How the knowledge of SE varies within individual application domains such as medicine, transportation, and telecommunications
5. References to books, articles, websites, and other sources that elaborate on the information in the SEBoK

*Version 0.25 released for limited review on September 15, 2010. 656 pages, 700+ references.*

# SEBoK 0.25 Table of Contents



1. Introduction
2. System Concepts and Systems Thinking
3. SE Overview
4. SE Life Cycle Models
5. Service SE
6. Enterprise SE
7. Enabling SE in Organizations
8. SE Management
9. SE Definition
10. SE Realization
11. SE Deployment and Use
12. SE Life Management
13. SE Agreement
14. Cross-Cutting Knowledge
15. SE Competencies
16. SE Applications and Case Studies
17. References
18. Glossary

# GRCSE Value Proposition



1. There is no authoritative source to guide universities in establishing the outcomes graduating students should achieve with a master's degree in SE, nor guidance on reasonable entrance expectations, curriculum architecture, or curriculum content.
2. This gap in guidance creates unnecessary inconsistency in student proficiency at graduation, makes it harder for students to select where to attend, and makes it harder for employers to evaluate prospective new graduates.

GRCSE is being created analogously to GSwE2009 – in fact, using GSwE2009 as the starting text

*Version 0.25 expected in December 2010*

# GRCSE 0.25 Table of Contents



Title - Chapters
1. Introduction
2. Guidance for the construction of GRCSE
3. Expected objectives when a graduate has 3-5 years' experience
4. Expected outcomes when a student graduates
5. Expected student background when entering master's program
6. Curriculum architecture
7. Core body of knowledge (CorBOK)
8. Assessment
9. Anticipated GRCSE evolution

Title - Appendices
App A. Summary of Graduate SE-centric SE programs in 2010
App B. Bloom's taxonomy of educational objectives
App C. Systems engineering competency frameworks
App D. Untitled – probably Assessment and curriculum
App E. GRCSE outcomes CorBOK mapping
Glossary
Index

# If We Are Successful...



SEBoK will strongly influence the INCOSE SE Handbook Version 4, the INCOSE SE Professional Certification Program, DoD SE competency efforts, will highlight places where research is needed, become a standard reference for practitioners, and improve the quality and richness of communication among systems engineers worldwide.

GRCSE will clearly distinguish between graduate and undergraduate education in SE and influence the content of both undergraduate and graduate SE programs worldwide.

# Questions?

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