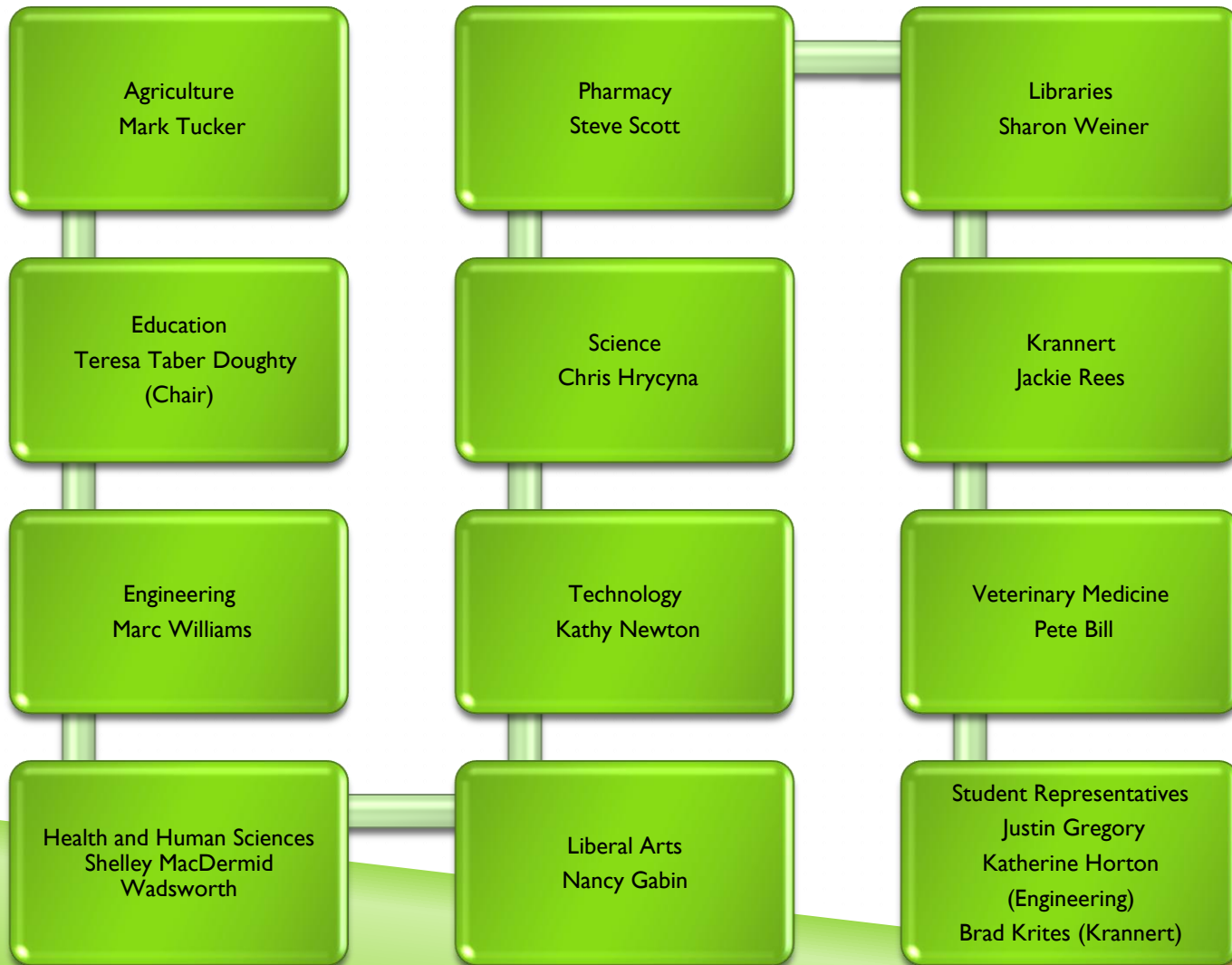


PURDUE'S CORE CURRICULUM

Presentation to the
College of Engineering
January 27, 2012




COMMITTEE MEMBERS



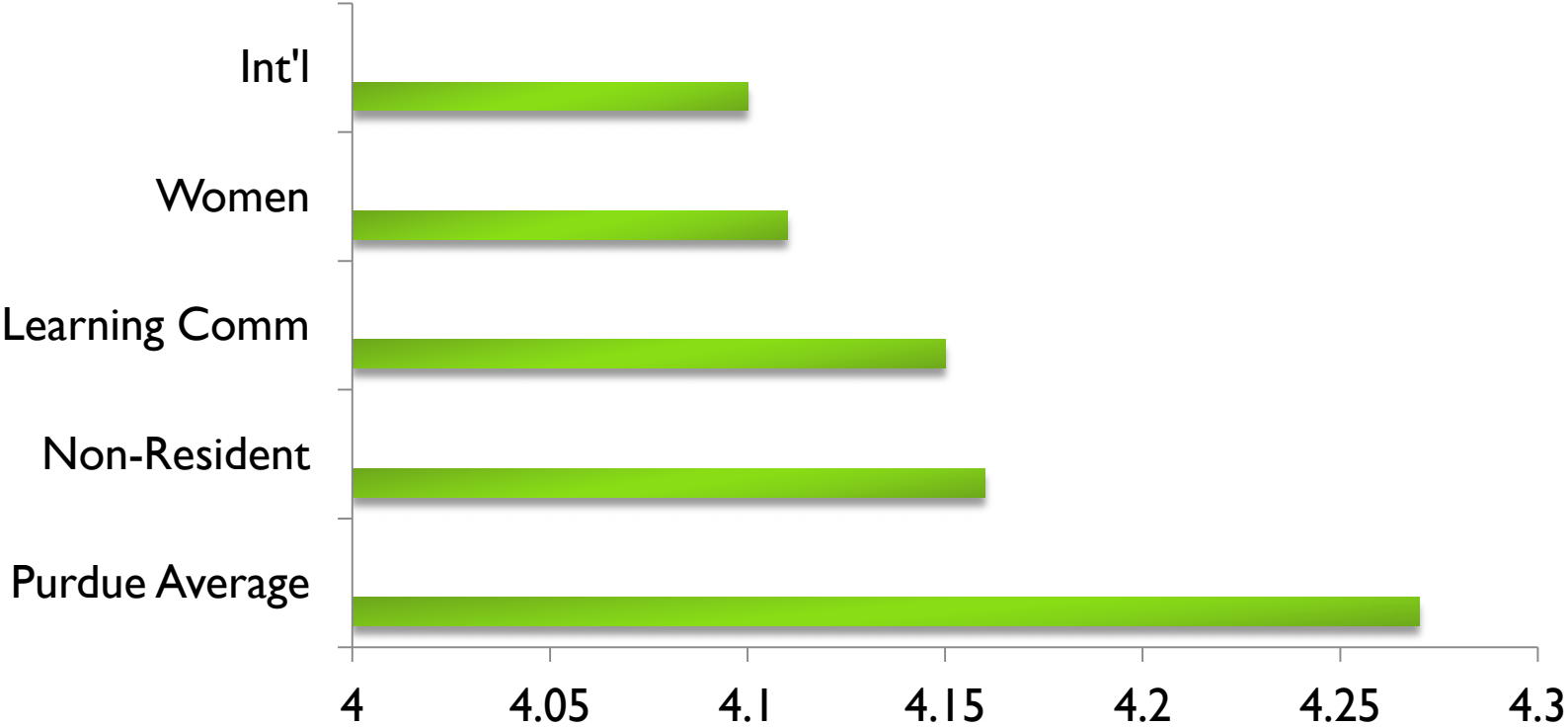
WHY A CORE CURRICULUM?



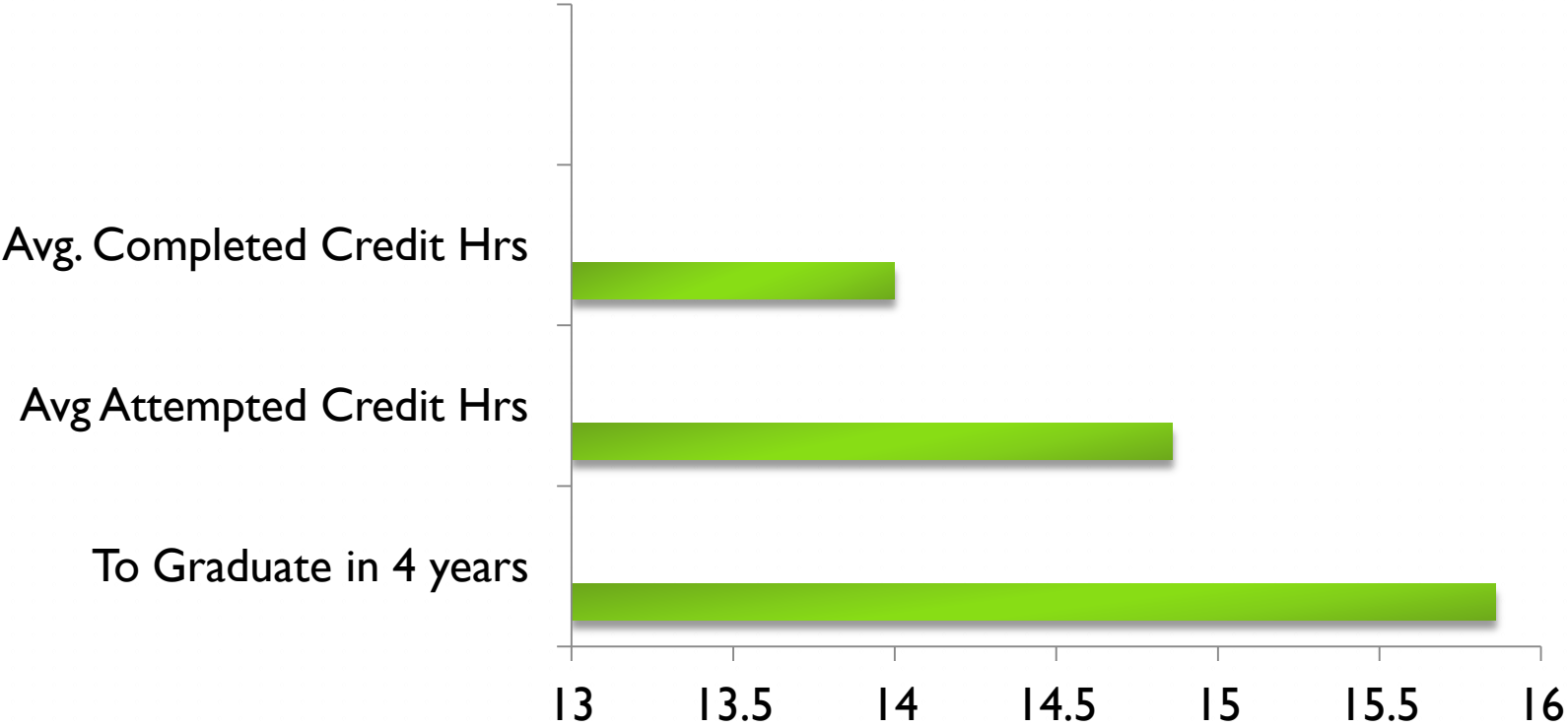
PURDUE STATISTICS

- ▶ Approximately 30,000 undergraduates
 - ▶ Retention:
 - ▶ First year students 90.2%
 - ▶ Second year students 82.5%
 - ▶ 97% graduate
 - ▶ Current graduation rate within 4 years: 42.4%
 - ▶ Greater than 70% of undergraduates who CODO experience delays
- 


AVERAGE TIME TO DEGREE



AVERAGE CREDIT HOURS PER SEMESTER



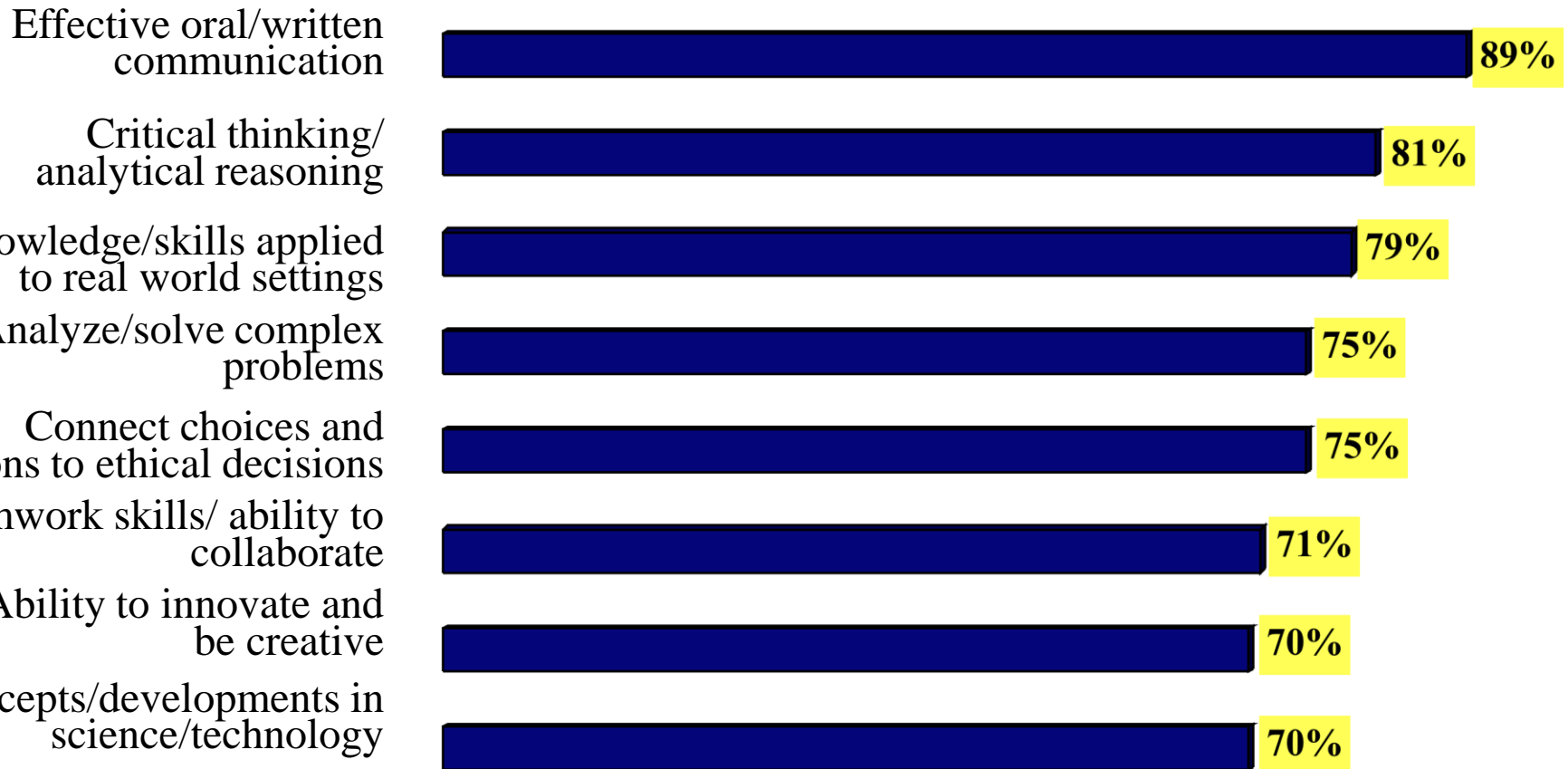
CHALLENGES

- ▶ Changing degree objective (CODO) behavior
 - ▶ 11.3% of new students change college after 1st year
 - ▶ Take an additional half-year to complete degree
 - ▶ Earn an average 7.5 more credit hours over career
 - ▶ Retaking courses
 - ▶ Delayed completion retake twice as many courses as on time completers (3.75 retakes vs. 1.87 retakes)
 - ▶ Larger percentage of delayed completers retake courses than on-time completers (83.4% of delayed vs. 54% of on-time)
- 


EMPLOYERS' TOP PRIORITIES FOR STUDENT LEARNING OUTCOMES IN COLLEGE



% saying two- and four-year colleges should place MORE emphasis on helping students develop these skills, qualities, capabilities, knowledge



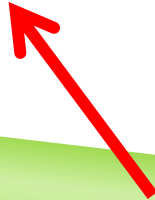
UNIVERSITY CORE CURRICULUM CHARGE TO COMMITTEE

- ▶ To propose and develop a foundation for an undergraduate core curriculum that:
 - ▶ *Facilitates student learning and mobility across all colleges and schools*
 - ▶ *Results in Purdue graduates who are highly skills in their specific disciplines*
 - ▶ *Results in students who are highly competent in the 21st Century skills considered critical for success in our global world.*
- 


CORE CURRICULUM TIMELINE



- Communicate purpose and value of a Purdue Core
 - Identify Core learning outcomes
 - Establish consensus on transportability of Core courses or activities
 - Determine process for course or activity inclusion
 - Develop/adopt rubrics for meeting Core outcomes
 - Make recommendations for auditing outcomes (working with Registrar)
- Obtain University Senate Approval
- Provide feedback and guidance to Colleges/Schools as they begin adjusting for the Core
 - Provide suggestions to Colleges/Schools for assessing student achievement in meeting Core outcomes
 - Work with UGC in determining issues related to 1) ongoing course approval for inclusion within the Core, 2) 3-5 year course audits offered within a School or College
- College curricula adjusted
 - Initial bank of Core courses identified
- Publish the Core by Spring 2013
 - Continue course evaluation process as courses are presented for inclusion within the Core
- First cohort begins undergraduate program of study within the Core
 - Assessment plan is operating at each level
 - UGC governance process is in place
 - Courses are available
 - Degree audit system in place




VISION OF PURDUE'S CORE CURRICULUM

- ▶ Learning outcomes within the core curriculum are designed to prepare students for continuous learning and expertise within disciplines
 - ▶ Purdue's core curriculum will be one that is outcomes-based
 - ▶ The core curriculum maintains high academic standards within disciplines
 - ▶ The goal is to design mechanisms to permit flexibility for both academic programs and students in meeting learning outcomes within the core curriculum
- 

OUR GOAL

To provide a means by which undergraduate students share a similar educational experience and in so doing achieve a set of common goals or outcomes required of all graduates. The core curriculum is such a mechanism that is grounded in a framework for building common knowledge and intellectual concepts in students and facilitating the development of skills and knowledge considered important for all Purdue graduates. It is intended to impart a common set of educational outcomes that will better equip students for success in tomorrow's global marketplace.



PROPOSED FRAMEWORK



FRAMEWORK

▶ Foundational

- ▶ (mostly) portable from one major to another
- ▶ Courses will be from those nominated by faculty and approved by “new” Senate committee

▶ Embedded

- ▶ Responsibility of each College and program area
- ▶ Need not be portable
- ▶ Faculty will be responsible for ensuring outcomes are addressed within discipline-specific curriculum

Foundational Learning Outcomes

Written Communication

Information Literacy

Oral Communication

CONTENT:

Science, Technology and Mathematics

- Science (Physical and Life Science)
- Technology or Computer Science
- Mathematics, Statistics

CONTENT:

Human Cultures

- Humanities
- Behavioral/Social Sciences
- Technology and Society

Embedded Learning Outcomes

Creative Thinking

Critical Thinking

Ethical Reasoning

Global Citizenship/Social Responsibility

Intercultural Knowledge

Integrative Learning

Leadership and Teamwork

Quantitative Reasoning

Written Communication

Foundational Outcomes

Rubric Level 1*

1. **Written communication***

Select ONE: (Courses TBD)

2. **Information Literacy***

Select ONE: (Courses TBD)

3. **Oral communication***

Select ONE: (Courses TBD)

4. **Science, Technology and Mathematics**

Select ONE of **EACH** (Specific courses TBD)

- Science (Physical and Life Sciences)
- Technology and Computer Science
- Mathematics, Statistics

5. **Human Cultures**

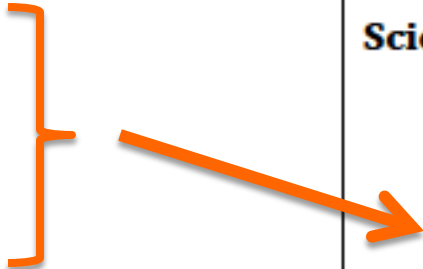
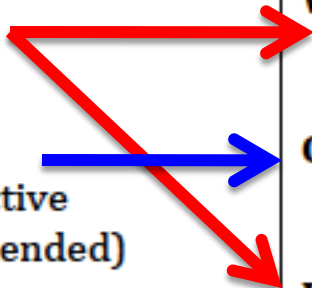
Select ONE of **EACH** (Specific courses TBD)

- Humanities
- Behavioral/Social Sciences
- Technology and Society

- More than one learning outcome may be satisfied in an individual course if that course is approved by Administration and Oversight Committee as fulfilling the requirements of each learning outcome rubric.
- Students receiving credit by exam for a course listed within the core will also fulfill the requirements of the specific learning outcome(s) tied to the course.
- Students will be able to satisfy the requirements of the core in multiple ways (e.g., co-curricular activities such as learning communities and a common reading program, service learning, course content requirements).


*Foundational outcomes also should be embedded within disciplinary areas and students are expected to demonstrate higher levels of learning in each area as indicated within rubrics.

College of Engineering	Proposed Core Curriculum Foundational Learning Outcomes
<p>Written Communication</p> <ul style="list-style-type: none"> English Composition <p>Oral Communication</p> <ul style="list-style-type: none"> General Education Elective (COM 114 recommended) <p>Science, Technology, and Mathematics</p> <ul style="list-style-type: none"> Calculus I Calculus II General Chemistry Physics I Science Selective <p>ENGR 131, 132 195 (pt 1 and 2)</p>	<p>Written Communication</p> <p>Select ONE (Courses TBD)</p> <p>Oral Communication</p> <p>Select ONE (Courses TBD)</p> <p>Information Literacy</p> <p>Select ONE (Courses TBD)</p> <p>Science, Technology, and Mathematics</p> <p>Select ONE of EACH (Specific courses TBD)</p> <ul style="list-style-type: none"> Science (Physical and Life Sciences) Technology and Computer Science Mathematics, Statistics <p>Human Cultures</p> <p>Select ONE of EACH (Specific courses TBD)</p> <ul style="list-style-type: none"> Humanities Behavior/Social Sciences Technology and Society




WHAT IS COMMON ACROSS ENGINEERING?

- ▶ General Education Requirements – 18 cr minimum
 - ▶ Liberal Arts exclusively
 - ▶ 9cr of Social Sci/Foreign Language
 - ▶ 6cr of something
 - ▶ 6cr of upper level

 - ▶ Enforcement: Internal to each School
- 

FOUNDATIONAL OUTCOMES

MATHEMATICS AND SCIENCE EXCEPTION

- ▶ Requirements will differ
 - ▶ Portability not feasible
 - ▶ Maintain list of requirements for different programs
- 

How to the Learning Outcomes fit with accreditation requirements?

ABET



ABET CRITERION 3: STUDENT OUTCOMES

- ▶ (a) an ability to apply knowledge of mathematics, science, and engineering
 - ▶ (b) an ability to design and conduct experiments, as well as to analyze and interpret data
 - ▶ (c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
 - ▶ (d) an ability to function on multidisciplinary teams
 - ▶ (e) an ability to identify, formulate, and solve engineering problems
- ▶ Learning Outcomes
 - ▶ Content: Math, Science, Technology
 - ▶ Quantitative Reasoning
 - ▶ Creative Thinking
 - ▶ Critical Thinking
 - ▶ Written Communication
 - ▶ Information Literacy
 - ▶ Content: Human Cultures
 - ▶ Leadership and Teamwork
 - ▶ Integrative Learning


ABET CRITERION 3: STUDENT OUTCOMES

- ▶ (f) an understanding of professional and ethical responsibility
 - ▶ (g) an ability to communicate effectively
 - ▶ (h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
 - ▶ (i) a recognition of the need for, and an ability to engage in life-long learning
 - ▶ (j) a knowledge of contemporary issues
 - ▶ (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- ▶ Ethical Reasoning
 - ▶ Written and Oral Communication
 - ▶ Global citizenship and social responsibility
 - ▶ Intercultural Knowledge
 - ▶ Content: Human Cultures
 - ▶ Integrative Learning


Written Communication Rubric

	Proficient 3	Emerging 2	Developing 1
Context of and Purpose for Writing <i>Includes considerations of audience, purpose, and the circumstances surrounding the writing task(s).</i>	Demonstrates a thorough understanding of context, audience, and purpose that is responsive to the assigned task(s) and focuses all elements of the work.	Demonstrates adequate consideration of context, audience, and purpose and a clear focus on the assigned task(s) (e.g., the task aligns with audience, purpose, and context).	Demonstrates awareness of context, audience, purpose, and to the assigned tasks(s) (e.g., begins to show awareness of audience's perceptions and assumptions).
Content Development	Uses appropriate, relevant, and compelling content to illustrate mastery of the subject, conveying the writer's understanding, and shaping the whole work.	Uses appropriate, relevant, and compelling content to explore ideas within the context of the discipline and shape the whole work.	Uses appropriate and relevant content to develop and explore ideas through most of the work.
Genre and Disciplinary Conventions <i>Formal and informal rules inherent in the expectations for writing in particular forms and/or academic fields (please see glossary).</i>	Demonstrates detailed attention to and successful execution of a wide range of conventions particular to a specific discipline and/or writing task (s) including organization, content, presentation, formatting, and stylistic choices	Demonstrates consistent use of important conventions particular to a specific discipline and/or writing task(s), including organization, content, presentation, and stylistic choices	Follows expectations appropriate to a specific discipline and/or writing task(s) for basic organization, content, and presentation
Sources and Evidence	Demonstrates skillful use of high-quality, credible, relevant sources to develop ideas that are appropriate for the discipline and genre of the writing	Demonstrates consistent use of credible, relevant sources to support ideas that are situated within the discipline and genre of the writing.	Demonstrates an attempt to use credible and/or relevant sources to support ideas that are appropriate for the discipline and genre of the writing.
Control of Syntax and Mechanics	Uses graceful language that skillfully communicates meaning to readers with clarity and fluency, and is virtually error-free.	Uses straightforward language that generally conveys meaning to readers. The language in the portfolio has few errors.	Uses language that generally conveys meaning to readers with clarity, although writing may include some errors.

WHAT'S HAPPENING THAT COULD EFFECT ALL PURDUE PROGRAMS?

- ▶ Core Curriculum
 - ▶ Indiana Senate Bill 182
 - ▶ Common course numbering
 - ▶ Statewide general education core
 - ▶ Requirement to admit AA and AS graduates from Indiana institutions (Ivy Tech/Vincennes Univ) at a preference over out-of-state students
 - ▶ Indiana House Bill 1220
 - ▶ 120 max credit hours
 - ▶ Trimesters
- 

NEXT STEPS

1. Work with faculty to nominate courses tied to the foundational outcomes
 2. Work with faculty to align current programs (courses within programs) with embedded learning outcomes to illustrate how students will meet these outcomes at increasing proficiency levels within their disciplines
 3. Development of assessment system
 - ▶ work with Registrar and Director of Assessment to design system for monitoring student progress through the core
 4. Outline recommendations for ongoing administration and oversight of the core curriculum (“new” Senate committee)
- 

WHY A CORE CURRICULUM? WHY DO LEARNING OUTCOMES MATTER?

Adapted from presentation by
P. Gaston, 4/15/11, Weldon Conf.

FOR FACULTY

- ▶ Frame learning priorities to reflect programmatic and institutional expectations
- ▶ Align methods to reflect the learning capacities of students
- ▶ Organize a class or course to ensure learning outcomes are accomplished

FOR COLLEGES

- ▶ Define for prospective and enrolled students both essential and distinctive outcomes
- ▶ Clarify priorities that bear on decisions concerning budget, staffing, facilities
- ▶ Justify the effective use of resources

FOR FUNDING SOURCES (DONORS, LEGISLATORS, PARENTS, ETC.)

- ▶ Can seek accountability relative to a balance between what is invested and what is accomplished
- ▶ Can undertake discussions concerning alignment of expressed outcomes with current or emerging priorities
- ▶ Can assess the adequacy of investment

FOR STUDENTS

- ▶ Middle and high school advisors can use a statement of learning outcomes in working with students and parents to ensure that high school curricular choices offer adequate preparation for college.
- ▶ High school teachers can organize their courses with reference to a statement of learning outcomes to ensure adequate preparation of students for college – thereby reducing the remedial burden for institutions.
- ▶ A statement of learning can give high school students a way to evaluate the competitive claims of colleges and universities with respect to a widely shared commitment to essential competencies.

- ▶ At college, students can use learning outcomes as a means for understanding and navigating their path to a degree.
- ▶ Students who understand what they are expected to learn are more efficient, more effective, more enthusiastic students.
- ▶ When learning outcomes are clearly stated and the curriculum is coherent and cumulative, students will be empowered to question curricular requirements. Colleges and universities will embrace the challenge of articulating their requirements, structures, and standards more clearly and persuasively.

- ▶ Students at each level of study (associate, baccalaureate, masters) will understand more clearly the incremental learning represented by the next level and can make a more informed decision about further study.
 - ▶ Achievement of clearly stated learning objectives assumes collaboration among faculty members (not “**my** work but **our** work”) and students will benefit from assignments that steadily build the competence to apply knowledge to unscripted problems.
 - ▶ After taking a degree, students will be better able to interpret their credentials to potential employers and graduate programs—and to offer assurance of their readiness.
- 