

Annual Assessment Report

Bachelor of Science in Industrial Engineering (BSIE)

1. BSIE Program Educational Objectives

The BSIE program educational objectives, as published on the INEG departmental website, are as follows:

Within 3-5 years of graduation, graduates of the University of Arkansas undergraduate program in industrial engineering will have:

1. successfully applied core industrial engineering knowledge and skills for industrial or public sector organizations,
2. successfully pursued advanced professional degrees, graduate studies in industrial engineering, professional development, or engineering certification, and
3. demonstrated ongoing professional and intellectual growth as managers and leaders in industrial engineering, society, and their communities.

2. BSIE Student Outcomes

ABET defines student outcomes to be “what students are expected to know and be able to do by the time of graduation.” The INEG faculty have elected to use (1) through (7) as the BSIE student outcomes. The following student outcomes will be referred to in assessment results in the following sections of this document.

- (1) an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
- (2) an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
- (3) an ability to communicate effectively with a range of audiences
- (4) an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
- (5) an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
- (6) an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
- (7) an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

3. Assessment of Key Course Outcomes

For every INEG course required for the BSIE other than INEG 2001 and INEG 4913/4924, the INEG faculty define at least one but no more than four key course outcomes, the technical skills and abilities that students develop during completion of a course. Key course outcomes and their mapping to the BSIE student outcomes in the set { (1), (2), (6) } are documented in the course's syllabus of record. For each key course outcome, the continuous improvement team maintains a list of assessment questions with a corresponding answer key. During each offering of INEG 4924 Industrial Engineering Capstone Experience II, the capstone faculty coordinator administers to the students the assessment questions for all courses having key course outcomes. The goal for each BSIE student outcome in the set { (1), (2), (6) } is that at least 70% responses are correct. The results of responses only from capstone students for 2022-2023 are shown in Tables 1, 2 and 3. The results of students answering the questions while taking the courses during 2022-2023 are shown in Tables 4 and 5.

Table 1. 2022-2023 Student Outcome Outcomes Assessment Results for Capstone Students

BSIE Student Outcome	% Correct Responses from Capstone Students	Goal Met
(1)	60%	No
(2)	60%	No
(6)	59%	No

Table 2. 2022-2023 Key Course Outcomes Assessment Results for Capstone Students by Class

Course	% Correct			
	KCO1	KCO2	KCO3	KCO4
2103	81%	56%	69%	-
2214	64%	63%	-	-
2223	64%	81%	59%	-
2314	67%	63%	49%	39%
2323	74%	75%	50%	48%
2413	66%	56%	66%	-
2613	56%	40%	33%	-
3443	76%	57%	67%	-
3533	79%	76%	74%	-
3543	78%	72%	47%	-
3553	32%	62%	27%	-
3624	38%	25%	57%	48%
3714	77%	54%	82%	78%
3833	52%	59%	57%	-
4433	80%	54%	78%	-

Table 3. 2022-2023 Student Learning Outcomes Assessment Results for Capstone Students by Class

Course	% Correct		
	(1)	(2)	(6)
2103	69%	-	75%
2214	64%	-	-
2223	68%	-	-
2314	54%	-	54%
2323	62%	62%	-
2413	63%	-	-
2613	43%	44%	37%
3443	76%	62%	62%
3533	76%	75%	75%
3543	78%	59%	-
3553	40%	44%	44%
3624	41%	38%	53%
3714	78%	73%	71%
3833	57%	54%	-
4433	54%	79%	-

Table 4. 2022-2023 Key Course Outcomes Assessment Results for Students Enrolled in a Class During Reporting Period

Course	% Correct			
	KC01	KC02	KC03	KC04
2103	84%	79%	68%	-
2214	93%	86%	-	-
2223	82%	99%	94%	-
2314	58%	70%	41%	59%
2323	82%	78%	62%	68%
2413	81%	81%	80%	-
2613	74%	67%	50%	-
3443	78%	62%	77%	-
3533	95%	80%	92%	-
3543	93%	90%	70%	-
3553	34%	81%	62%	-
3624	45%	41%	53%	50%
3714	91%	81%	86%	95%
3833	64%	65%	71%	-
4433	77%	57%	83%	-

Table 5. 2022-2023 Student Learning Outcomes Assessment Results for Students Enrolled in a Class During Reporting Period

Course	% Correct		
	(1)	(2)	(6)
2103	77%	-	76%
2214	89%	-	-
2223	92%	-	-
2314	57%	-	57%
2323	72%	72%	-
2413	81%	-	-
2613	63%	62%	58%
3443	78%	69%	69%
3533	89%	86%	86%
3543	93%	80%	-
3553	59%	71%	71%
3624	48%	43%	51%
3714	95%	88%	87%
3833	71%	64%	-
4433	57%	80%	-

4. Assessment of Supplemental Course Outcomes

For every INEG course required for the BSIE other than INEG 4913/4924 Industrial Engineering Capstone Experience I/II, the INEG faculty may define one or more supplemental course outcomes, the non-technical skills and abilities that students develop during completion of a course. Supplemental course outcomes and their mapping to one of the BSIE student outcomes in the set { (3), (4), (5) (7) } are documented in the course's syllabus of record. Across all courses, at least two supplemental course outcomes must map to each BSIE student outcome in the set { (3), (4), (5) (7) }.

During each fall or spring offering of a course having supplemental course outcomes, the instructor administers the assessment mechanisms. For each mechanism, the instructor reports to the INEG ABET coordinator the number of students assessed and the number of students successfully demonstrating the outcome.

At the end of each academic year, the INEG ABET coordinator aggregates the results of supplemental course outcomes assessments. The goal for each BSIE student outcome in the set { (3), (4), (5), (7) } is that at least 70% of the corresponding assessment responses are successful. The results are shown in Table 6.

Table 6. 2022-2023 Supplemental Course Outcomes Assessment Results

Course	Relevant BSIE Student Outcome	% of Students Demonstrating the Outcome	Goal Met
2001 Fall	(7)	95%	Yes
2103 Fall	(3)	56%	No
2103 Fall	(4)	98%	Yes
2103 Fall	(5)	98%	Yes
2103 Spring	(3)	100%	Yes
2103 Spring	(4)	100%	Yes
2103 Spring	(5)	100%	Yes
2223 Fall	(3)	100%	Yes
2223 Spring	(3)	87%	Yes
2314 Fall	(7)	81%	Yes
2314 Spring	(7)	84%	Yes
2323 Fall	(3)	92%	Yes
2323 Spring	(3)	95%	Yes
2613 Fall	(4)	81%	Yes
2613 Spring	(4)	100%	Yes
3443 Fall	(3)	94%	Yes
3443 Fall	(5)	93%	Yes
3443 Spring	(3)	89%	Yes
3533 Spring	(4)	100%	Yes
3624 Fall	(3)	67%	No
3624 Fall	(3)	67%	No
3624 Spring	(3)	100%	Yes
3624 Spring	(3)	100%	Yes
3714 Fall	(3)	100%	Yes
3714 Fall	(5)	100%	Yes
3714 Spring	(3)	100%	Yes
3714 Spring	(5)	100%	Yes
4433 Fall	(3)	100%	Yes
4433 Fall	(5)	100%	Yes

5. Assessment of Capstone Student Performance

As early as possible during each fall semester, the INEG faculty review and finalize a plan for the current academic year for assessing and evaluating all seven BSIE student outcomes as part of the INEG capstone experience (INEG 4913/4924 Industrial Engineering Capstone Experience I/II).

The activities in the capstone experience related to the assessment and evaluation of BSIE student outcomes are managed by the capstone faculty coordinator. The capstone coordinator provides to the INEG ABET coordinator a report that includes the results of the quantitative assessment and evaluation associated with that year's capstone experience. The results are shown in Table 7 and 8.

Table 7. 2022-2023 Team Achievement of BSIE Student Outcomes

BSIE Student Outcome	Average Rating	Goal	Goal Met
1	1.68	≥ 1.5	Yes
2	1.55	≥ 1.5	Yes
3	1.95	≥ 1.5	Yes
4	1.95	≥ 1.5	Yes
5	1.82	≥ 1.5	Yes
6	1.55	≥ 1.5	Yes
7	1.82	≥ 1.5	Yes

Table 8. 2022-2023 Individual Student Achievement of BSIE Student Outcomes

BSIE Student Outcome	Students with Average Rating ≥ 1.5	Goal	Goal Met
1	98.1%	$\geq 70\%$	Yes
2	98.1%	$\geq 70\%$	Yes
3	98.1%	$\geq 70\%$	Yes
4	100%	$\geq 70\%$	Yes
5	100%	$\geq 70\%$	Yes
6	98.1%	$\geq 70\%$	Yes
7	100%	$\geq 70\%$	Yes

6. Planned Changes

The faculty met to review the preceding results. There are no degree/certificate changes planned from this review. The process itself will remain unchanged with the exception that the results for supplemental course outcomes will be reported at the program level.