



K-State 2025 Strategic Action and Alignment Plan

College or Major Unit: Engineering

Department: Biological and Agricultural Engineering

1. What are your Department’s mission and vision and how does your organization contribute to achieving the University’s and your College’s/Major Unit’s vision for K-State 2025?

Vision: By 2025, the Biological and Agricultural Engineering Department will be recognized as a top 10 BAE department in the nation.

Mission: The Biological and Agricultural Engineering Department serves the citizens of Kansas, the nation, and the world by providing excellent teaching, research, and service for biological, agricultural, and food systems.

2. What are your Department’s key strategic activities and outcomes?

3. Identify [in brackets] which of your Department’s strategic outcomes are directly linked to your College’s/Major Unit’s outcomes. (If your Department or similar unit is not in a College or Major Unit, skip this question.) COE outcomes are indicated in the tables below, e.g., ENT4A represents Key Outcome A for Theme 4 on the COE plan.

Theme 1: Recruit and retain diverse academic achievers from both inside and outside Kansas to produce graduates who will take the lead in generating technological solutions for and new knowledge about tomorrow’s challenges.

Key Activities	Short Term (2013 - 2015) Key Outcomes	Intermediate (2016 - 2020) Key Outcomes	Long Term (2021 - 2025) Key Outcomes
<i>What we plan to do...</i>	<i>What we expect to happen...</i>	<i>What we expect to happen...</i>	<i>What we expect to happen...</i>
a) Undergraduate Students			
1. Develop programs (e.g., mentoring) to retain students with emphasis on students who are high-performing and/or from underrepresented groups.			
2. Develop comprehensive advising programs and provide support to the COE and COA advising programs.	A. Increase undergraduate enrollment from 107 to 120 in BSE and from 69 to 80 in ATM. [ENT1B]	A. Increase undergraduate enrollment to 130 in BSE and 90 in ATM. [ENT1B]	A. Increase undergraduate enrollment to 150 in BSE and 100 in ATM. [ENT1B]
3. Increase undergraduate enrollment and the number of graduates in the ATM & BSE degree programs.	B. Increase number of graduates from 15 to 18 in BSE and from 18 to 20 in ATM. [ENT1E]	B. Increase number of graduates to 22 in BSE and 22 in ATM. [ENT1E]	B. Increase number of graduates to 25 in BSE and 24 in ATM. [ENT1E]
4. Support COE and COE recruitment programs.	C. Improve freshmen-to-sophomore retention rate in BSE from 55% to 57%. [ENT1G]	C. Improve freshmen-to-sophomore retention rate in BSE to 60%. [ENT1G]	C. Improve freshmen-to-sophomore retention rate in BSE to 65%. [ENT1G]
5. Provide opportunities for undergraduate research.	D. Increase graduate enrollment from 30 to 34 and maintain an average of Ph.D. graduates at 2 per year. [ENT1I, ENT1J]	D. Increase graduate enrollment to 40 and increase number of Ph.D. graduates to 3 per year. [ENT1I, ENT1J]	D. Increase graduate enrollment to 45 and increase number of Ph.D. graduates to 4 per year. [ENT1I, ENT1J]
b) Graduate Students			
1. Supplement GRA stipends to make BAE			

<p>more attractive to top-notch graduate students.</p> <p>2. Strengthen integrated B.S. – M.S. program.</p>	<p>E. Increase enrollment of women and underrepresented minority students in BSE from 30% to 32%. [ENT1D]</p>	<p>E. Increase enrollment of women and underrepresented minority students in BSE to 34%. [ENT1D]</p>	<p>E. Increase enrollment of women and underrepresented minority students in BSE to 36%. [ENT1D]</p>
	<p>F. Increase number of undergraduate students supported in research to 5. [ENT1H]</p>	<p>F. Increase number of undergraduate students involved in research to 10. [ENT1H]</p>	<p>F. Increase number of undergraduate students involved in research to 15. [ENT1H]</p>

Theme 2. Provide outstanding and diverse faculty and technological facilities so students receive quality teaching and advising, enabling them to become problem solvers, leaders, and critical thinkers highly sought after by universities, industry, and the government.

Key Activities	Short Term (2013 - 2015) Key Outcomes	Intermediate (2016 - 2020) Key Outcomes	Long Term (2021 - 2025) Key Outcomes
<i>What we plan to do...</i>	<i>What we expect to happen...</i>	<i>What we expect to happen...</i>	<i>What we expect to happen...</i>
1. Recruit and retain outstanding and diverse faculty with teaching and scholastic excellence.	A. Increase freshmen-to-sophomore retention rate in BSE from 55% to 57%. [ENT2A]	A. Increase freshmen-to-sophomore retention rate in BSE to 60%. [ENT2A]	A. Increase freshmen-to-sophomore retention rate in BSE to 65%. [ENT2A]
2. Invest in upgrading classroom technology, classroom expansions, and teaching and research laboratories.	B. Nominate at least 2 faculty for teaching, research, and/or extension awards. [ENT2B]	B. Nominate at least 3 faculty for teaching, research, and/or extension awards. [ENT2B]	B. Continue to nominate at least 3 faculty for teaching, research, and/or extension awards. [ENT2B]
3. Hire additional faculty members in strategic areas.	C. Remodel research laboratory facilities. [ENT2E]	C. Improvements in classroom infrastructure and facilities with addition of teaching lab. [ENT2E]	C. Excellent and well-maintained learning environments. [ENT2E]
4. Provide incentives and opportunities for continuous development of faculty.	D. Add faculty (1) in strategic areas. [None]	D. Add faculty (1) in strategic areas. [None]	D. Maintain a student-to-teaching faculty ratio of less than 25. [ENT2D]
5. Develop comprehensive advising programs with adequate support.	E. Maintain a student-to-teaching faculty ratio of less than 25. [ENT2D]	E. Maintain a student-to-teaching faculty ratio of less than 25. [ENT2D]	

Theme 3: Establish focused, high-impact, nationally recognized research programs and build a prominent faculty that will enhance the BAE Department's national and international reputation.

Key Activities	Short Term (2013 - 2015) Key Outcomes	Intermediate (2016 - 2020) Key Outcomes	Long Term (2021 - 2025) Key Outcomes
<i>What we plan to do...</i>	<i>What we expect to happen...</i>	<i>What we expect to happen...</i>	<i>What we expect to happen...</i>
1. Establish and promote high-impact research programs in three focused areas – environmental engineering, bio-processing, and mechatronics.	A. Increase number of scholarly publications (refereed journals and conferences) from 28 to 32 per year. [ENT3A]	A. Increase number of scholarly publications (refereed journals and conferences) to 36 per year. [ENT3A]	A. Increase number of scholarly publications (refereed journals and conferences) to 40 per year. [ENT3A]
2. Allocate resources to invest in the three focused research areas.	B. Increase number of fellows, editors, honors, and significant national/ international activities. [ENT3B]	B. Increase number of fellows, editors, honors and significant national/ international activities. [ENT3B]	B. Increase number of fellows, editors, honors and significant national/ international activities. [ENT3B]
3. Secure substantial number of tenure-track faculty positions to embark upon			

<p>proactive searches for nationally prominent faculty; attract them with high salaries (e.g., through endowed chairs), competitive start-up packages, and other inducements.</p> <p>4. Provide funds and other inducements to retain top-quality faculty.</p> <p>5. Establish and maintain a diverse faculty.</p> <p>6. Establish efforts for faculty to gain national honors and to contribute national service to government agencies and professional societies.</p> <p>7. Fund faculty visits/collaborations with other campuses.</p> <p>8. Provide opportunities for undergraduate research.</p>	C. Achieve partial sponsorship for 1 faculty chair. [ENT3C]	C. Achieve 1 fully endowed chair/professorship. [ENT3C]	C. Achieve 2 fully endowed chairs/professorships. [ENT3C]
	D. Increase graduate enrollment from 30 to 34 and maintain an average number of Ph.D. graduates each year at 2. [ENT3D]	D. Increase graduate enrollment to 40 and increase the average number of Ph.D. graduates to 3. [ENT3D]	D. Increase graduate enrollment to 45 and increase the average number of Ph.D. graduates to 4. [ENT3D]
	E. Increase research expenditures from \$2.0M to \$2.25M. [ENT3E]	E. Increase research expenditures to \$2.5M. [ENT3E]	E. Increase research expenditures to \$3.0M. [ENT3E]
	F. Increase number of collaborative projects within and outside of COE and COA to 5. [ENT3G]	F. Increase number of collaborative projects within and outside of COE and COA to 10. [ENT3G]	F. Increase number of collaborative projects within and outside of COE and COA to 15. [ENT3G]
	G. Increase number of undergraduate students involved and supported in research to 5. [ENT3I]	G. Increase number of undergraduate students involved in research to 10. [ENT3I]	G. Increase number of undergraduate students involved in research to 15. [ENT3I]

Theme 4: Establish lifelong connections with alumni and capitalize on this network, corporate partnerships, and related research/scholarship within the department to strengthen the education experience, research/scholarship quality, and financial support of the department.

Key Activities	Short Term (2013 - 2015) Key Outcomes	Intermediate (2016 - 2020) Key Outcomes	Long Term (2021 - 2025) Key Outcomes
<i>What we plan to do...</i>	<i>What we expect to happen...</i>	<i>What we expect to happen...</i>	<i>What we expect to happen...</i>
<p>1. Establish faculty ties and involvement with industry, state agencies and alumni for the purpose of developing research, scholarship, and educational experiences for students and faculty.</p> <p>2. Work with the College Development staff to strengthen ties with alumni and industries to garner funding.</p> <p>3. Schedule events such as reunions, invitations to student events, etc., and use Open House to establish strong bonds with alumni & departmental friends.</p> <p>4. Department will send newsletters and reports to its alumni, friends of the department and allied companies.</p> <p>5. Promote student connections with the department that foster long-term relationships after graduation via student clubs, events, and competitions.</p> <p>6. Implement and maintain a comprehensive marketing and communication plan.</p>	<p>A. Increase philanthropic gift from \$50k to \$60k per year. [ENT4A]</p> <p>B. Achieve partial sponsorship for 1 faculty chair. [ENT4B]</p> <p>C. Increase number of students participating in national student organizations to 40% of the departmental enrollment. [ENT4D]</p> <p>D. Increase departmental endowment by \$1M. [ENT4E]</p> <p>E. Increase number of students with industry experience from 15 to 18 in BSE and from 15 to 17 in ATM.[ENT5D]</p>	<p>A. Increase philanthropic gift to \$100k per year. [ENT4A]</p> <p>B. Achieve 1 fully endowed chair/professorship. [ENT4B]</p> <p>C. Increase number of students participating in national student organizations and competitions to 60% of departmental enrollment. [ENT4D]</p> <p>D. Increase departmental endowment an additional \$3M. [ENT4E]</p> <p>E. Increase number of students with industry experience to 25 in BSE and 20 in ATM. [ENT5D]</p>	<p>A. Increase philanthropic gift to \$150k per year. [ENT4A]</p> <p>B. Achieve 2 fully endowed chairs/professorships. [ENT4B]</p> <p>C. Increase participation of students in national organizations to 80% of the departmental enrollment. [ENT4D]</p> <p>D. Increase departmental endowment an additional \$5M. [ENT4E]</p> <p>E. Increase number of students with industry experience to 36 in BSE and 22 in ATM. [ENT5D]</p>

Theme 5: Prepare students and faculty for the changing global environment to create a culture of diversity, creativity, and innovation.

Key Activities	Short Term (2013 - 2015) Key Outcomes	Intermediate (2016 - 2020) Key Outcomes	Long Term (2021 - 2025) Key Outcomes
<i>What we plan to do...</i>	<i>What we expect to happen...</i>	<i>What we expect to happen...</i>	<i>What we expect to happen...</i>
<ol style="list-style-type: none"> 1. Promote international experience for undergraduates through the Study Abroad Scholarship Program. 2. Develop international experience course and facilitate summer study abroad opportunities. 3. Facilitate a path for high-quality international students to come to K-State. 4. Promote international research and scholarly collaborations, and attendance at international meetings. 5. Integrate multicultural competency training into several BAE courses including BAE 101, 131, 231, 331, and 536. 6. Promote internships that allow students to work in industry settings, gaining real-world experience. 	<ol style="list-style-type: none"> A. Increase number of students with international experience (exchange programs, Study Abroad, cultural trips during semester breaks, etc.). [ENT5A] B. Maintain the high participation rate (~60%) of faculty in international scholarly activities and travel. [ENT5B] C. Increase number of students with industry experience from 15 to 18 in BSE and from 15 to 17 in ATM. [ENT5D] 	<ol style="list-style-type: none"> A. Increase number of students with international experience (exchange programs, Study Abroad, cultural trips during semester breaks, etc.). [ENT5A] B. Maintain the high participation rate (~60%) of faculty in international scholarly activities and travel. [ENT5B] C. Increase number of students with industry experience to 25 in BSE and 20 in ATM. [ENT5D] 	<ol style="list-style-type: none"> A. Increase number of students with international experience (exchange programs, Study Abroad, cultural trips during semester breaks, etc.). [ENT5A] B. Maintain the high participation rate (~60%) of faculty in international scholarly activities and travel. [ENT5B] C. Increase in number of students with industry experience to 36 in BSE and 22 in ATM. [ENT5D]

Theme 6. Disseminate new knowledge to a global society and the citizens of Kansas to meet the land-grant mission.

Key Activities	Short Term (2013 - 2015) Key Outcomes	Intermediate (2016 - 2020) Key Outcomes	Long Term (2021 - 2025) Key Outcomes
<i>What we plan to do...</i>	<i>What we expect to happen...</i>	<i>What we expect to happen...</i>	<i>What we expect to happen...</i>
<ol style="list-style-type: none"> 1. Identify and respond to critical needs for technical assistance and educational outreach that complement research and scholarly activities within the college and have a direct impact on government organizations/agencies and the private sector in Kansas and network with public and private entities to determine their short- and medium-term needs for data and information. 2. Identify and tap into state and national funding sources, both public and private, 	<ol style="list-style-type: none"> A. Identify and develop programs for technical assistance and educational outreach for Kansas, U.S., and outside the U.S. [None] B. Enhance program areas on irrigation, precision agriculture, livestock and grain facilities, urban and rural water and air quality issues, agricultural safety, biobased energy, application technology, and other critical areas. [None] 	<ol style="list-style-type: none"> A. Technical assistance programs will address targeted local and state needs. [None] B. Increase number of Extension programs that are recognized in Kansas and worldwide. Indicators include ASABE and ESP recognition. [None] 	<ol style="list-style-type: none"> A. Educational programs recognized for local and state technical assistance. [None] B. Well established programs with significant economic and environmental impacts of rural and urban communities in the state. [None]

which will complement existing university funding.	C. Improve educational outreach programs offered by the department measured by outcomes such as number of outreach presentations, workshops/training sessions conducted, and economic and environmental program impact. [ENT6B]	C. Increase capacity to conduct training sessions and educational outreach. [None]	
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4a. What resources and/or opportunities exist for your Department to achieve its vision and outcomes?

The major resource that the Department has is its dedicated faculty and staff.

The following offices in the College of Engineering will help achieve our objectives:

- Recruitment and Leadership Development
- Retention, Diversity and Inclusion
- Student Services
- Engineering Experiment Station

The following in the College of Agriculture and K-State Research and Extension will help achieve our objectives:

- Academic Support Services
- Research/Extension Centers

4b What resources and/or opportunities are needed for your Department to achieve its vision and outcomes?

To achieve the goals, the BAE Department will need the following resources:

- Additional faculty lines
- Incentives to recruit and retain high-performing faculty including compensation packages, endowed chairs/professorships and startup packages
- Funds to expand scholarship programs
- Improvements in facilities and research infrastructure
- New funds for scholarships, graduate student tuition waivers and stipends
- New funds for professional development
- Funds to enable Extension faculty to conduct targeted outreach activities

5. How do you propose to acquire the resources needed for your Department to accomplish its vision and outcomes?

We plan to acquire the resources as follows:

- Request central administration and Colleges of Engineering and Agriculture for additional faculty lines
- Request central administration and Colleges of Engineering and Agriculture for improvements in facilities and research infrastructure
- Pursue development opportunities to raise funds for scholarships and endowed positions
- Pursue grant opportunities to create a stable funding base

6. How does your plan link to the K-State 2025 University Benchmark Metrics, Common Elements, and Thematic Goals, Outcomes, and Metrics? (See below)

6. Departmental Links to K-State 2025 University Benchmark Metrics, Common Elements, and Thematic Goals, Outcomes, and Metrics

Links to Benchmark Metrics
B-1 - Total research and development expenditures B-2 - Endowment pool B-4 - Number of faculty awards B-5 - Number of doctorates granted annually B-6 - Freshman-to-sophomore retention rate B-8 - Percent of undergraduate students involved in research

Links to Common Elements
CE-1 - Communications and Marketing CE-3 - Diversity CE-4 - External Constituents CE-5 - Funding CE-6 - International CE-8 - Technology

Links to University Thematic Goals, Outcomes, and Metrics			
Links to 2025 Thematic Goals and Metrics	Links to Short Term Outcomes (2011 – 2015)	Links to Intermediate Outcomes (2016 – 2020)	Links to Long Term Outcomes (2021 – 2025)
<p>T1 - Research, Scholarly and Creative Activities, and Discovery (RSCAD)</p> <p>Theme 1 Metrics:</p> <p>T1-2 - Total sponsored extramural funding expenditures</p> <p>T1-4 - # of refereed scholarly publications per academic year and allocated faculty member</p>	<p>T1-A - Increased intellectual and financial capital to support RSCAD</p> <p>T1-B - More clusters/centers of collaborative RSCAD focus</p> <p>T1-C - Increased funding for investigator-based research, research centers, and graduate training grants</p> <p>T1-D - Tuition waivers for all GRAs</p> <p>T1-E - Competitive compensation and support available to GRAs, GTAs, and GAs</p> <p>T1-F - Enhanced and systematic approach for UG research</p> <p>T1-G - Successful recruitment, retention, evaluation, compensation, and rewards strategies in place to support RSCAD needs</p> <p>T1-H - Enhanced visibility and appreciation for research, discovery, and scholarly and creative activities</p>	<p>T1-I - Intellectual and financial capital in place for expanded RSCAD efforts</p> <p>T1-J - Greater proportion of nationally and internationally recognized award-winning faculty in RSCAD programs</p> <p>T1-K - Nationally and internationally recognized research centers</p> <p>T1-L - Recognized for prominent and productive placement of our graduates</p> <p>T1-M - Increased participation by undergraduates in expanded opportunities in research</p>	<p>T1-O - Extramural funding competitive with our benchmark institutions</p> <p>T1-P - Research and development expenditures competitive with benchmark institutions</p> <p>T1-Q - Competitive amongst our peers in the percentage of undergraduates involved in research</p>

Links to University Thematic Goals, Outcomes, and Metrics			
Links to 2025 Thematic Goals and Metrics	Links to Short Term Outcomes (2011 – 2015)	Links to Intermediate Outcomes (2016 – 2020)	Links to Long Term Outcomes (2021 – 2025)
<p>T2 - Undergraduate Educational Experience (UEE)</p> <p>Theme 2 Metrics:</p> <p>T2-1 - # and % of undergraduate students participating in a meaningful international experience</p> <p>T2-2 - # and % of undergraduate students completing an experiential learning experience</p>	<p>T2-A - Excellent, customized academic advising and services available to all students to support their success and degree completion</p> <p>T2-B - Engaged students benefitting from high impact educational practices used by excellent faculty and staff across the university</p> <p>T2-C - Increased participation by undergraduates in expanded opportunities for meaningful research</p> <p>T2-D - Successful integration of undergraduate education and meaningful research is standard practice</p> <p>T2-G - Successful recruitment and retention strategies that address our entire student population</p> <p>T2-H - Improved six-year graduation rates and retention ratios</p>	<p>T2-J - Excellent reputation for high quality teaching and advising that prepares students for their professional, community, social, and personal lives</p> <p>T2-K - Superior and diverse faculty recognized for teaching excellence</p> <p>T2-L - All UG students engaged in a diversity of experiences that expand their viewpoint</p> <p>T2-M - Increased undergraduate contributions in the creation of scholarship through research</p> <p>T2-N - Ongoing improvement of six-year graduation rates and retention ratios</p>	<p>T2-O - An undergraduate educational experience recognized as one of the best among the nation's Top 50 Public Research Universities</p> <p>T2-P - Faculty teaching and advising awards comparable to our benchmark institutions</p> <p>T2-Q - Freshman to Sophomore retention ratios comparable to benchmark institutions</p>
<p>T3 - Graduate Scholarly Experience</p> <p>Theme 3 Metrics:</p> <p>T3-1 - # and % of graduate students with assistantships, endowed scholarships, and fellowships</p> <p>T3-3 - # and % of graduate programs offering competitive compensation and support packages</p> <p>T3-6 - # of graduate terminal degrees awarded</p>	<p>T3-A - Competitive compensation and support available for GRAs, GTAs, and GAs</p> <p>T3-B - Tuition waivers for all GRAs</p> <p>T3-C - Engaged graduate students integrated in university life with enhanced visibility and appreciation</p> <p>T3-D - Outstanding mentoring for our graduate students</p> <p>T3-E - Expectation of excellence for the graduate scholarly experience</p>	<p>T3-K - Increased funding for graduate research and teaching</p> <p>T3-L - Increased number of nationally and internationally recognized award-winning graduate faculty</p> <p>T3-M - Increased number of Doctorates Awarded</p>	<p>T3-Q - Doctorates Awarded comparable with benchmark institutions</p>

Links to University Thematic Goals, Outcomes, and Metrics			
Links to 2025 Thematic Goals and Metrics	Links to Short Term Outcomes (2011 – 2015)	Links to Intermediate Outcomes (2016 – 2020)	Links to Long Term Outcomes (2021 – 2025)
	T3-F - Increased capacity to secure funding for graduate research and teaching		
T4 - Engagement, Extension, Outreach and Service Theme 4 Metrics: T4-4 - # of engagement activities and programs disaggregated by geographic boundaries	T4-B - Increased participation by undergraduates in expanded opportunities for meaningful Engagement experiences T4-D - Increased numbers and diversity of faculty and staff participating in Engagement T4-E - Increased extramural funding for Engagement initiatives at the local, state, national, and international level T4-F - Recognition as leaders in Engagement within our state and nation		
T5 - Faculty and Staff Theme 5 Metrics: T5-1 - # of national and international faculty awards T5-2 - # and % of faculty with endowed chairs, professorships, and fellowships T5-4 - # and % of faculty and staff participating in international experiences		T5-F - Faculty and staff current with developments in their fields and the skills needed to achieve excellence in performing their jobs T5-G - Successful recruitment and retention of a talented and high performing, diverse workforce	T5-H - Talented and high performing, diverse workforce recognized for excellence and award-winning faculty and researchers T5-J - Optimal number of faculty and staff comparable with our benchmark institutions
T6 - Facilities and Infrastructure			T6-H - High-quality research laboratories and specialty spaces that enhance research and scholarly activities