K-State 2025 Strategic Action and Alignment Plan

College or Major Unit: Engineering

Department: Chemical 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?**

   The department's mission is to provide students with a rigorous and relevant education in the fundamentals of chemical engineering and to advance the scientific and technological basis for chemical engineering practice

   The vision of the chemical engineering department is to be recognized for:

   1. Producing graduates well-grounded in the fundamentals and adaptable to a changing profession and world
   2. Generating research that is internationally recognized for its significance, innovation, and originality.

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.)***

Key Activities	Short Term (2013 - 2015) *Key Outcomes*	Intermediate (2016 - 2020) *Key Outcomes*	Long Term (2021 - 2025) *Key Outcomes*
What we plan to do…	*What we expect to happen…*	*What we expect to happen…*	*What we expect to happen…*
Theme 1. Education a) Graduate Program: Recruit and retain high caliber graduate students from top-tier chemical engineering programs, providing challenging and relevant research programs, and a quality graduate level education Strategies: 1. Offer attractive research programs, competitive compensation, and quality graduate level education 2. Foster a creative, respectful, and supportive environment for graduate students to develop into well-rounded independent researchers and leaders 3. Increase enrollment from a diverse group of high quality US citizen and international graduate students 4. Promote applications for national competitive fellowships, awards,	A. Number of completed Ph.D. graduate applications received annually increases to 50 B. Number of new Ph.D. students enrolled annually increases to 0.5*state-funded FTE [ENT1I]	A. Number of completed Ph.D. graduate applications received annually increases to 60 B. Number of new Ph.D. students enrolled annually increases to 0.6*state-funded FTE [ENT1I]	A. Number of completed Ph.D. graduate applications received annually increases to 70 B. Number of new Ph.D. students enrolled annually increases to 0.7*state-funded FTE [ENT1I]
	C. The average GRE verbal scores for new PhD students increases from 151 (49 percentile) to 153 (57 percentile). [None]	C. The average GRE verbal scores for new PhD students increases to 155 (65 percentile). [None]	C. The average GRE verbal scores for new PhD students increases to 157 (73 percentile).
	D. Percentage of female PhD students increases from 19% to 25% [None]	D. Percentage of female PhD students increases to 32% [None]	D. Percent of female PhD students is maintained at 32%. [None]
	E. Increase the average number of B.S. graduates from 30 to 37 [ENT1E]	E. Increase the number of B.S. graduates in Chemical Engineering at 44 annually. [ENT1E]	E. Maintain the number of B.S. degrees awarded annually at 44. [ENT1E]
	F. Increase the diversity of B.S. graduates from 26% women to 28% women and ethnic diversity from 8%	F. Increase the diversity of B.S. graduates to 32% women and ethnic diversity to 12%	

and travel grants 5. Increase the number of PhD graduates who pursue academic careers	to 9% [ENT1C, ENT1D]	[ENT1C, ENT1D]	
b) Undergraduate Program: Recruit and retain the most capable, motivated and diverse class of undergraduates, and help them to obtain a solid and relevant education throughout their K-State experience Strategies: 1. Continually review the curriculum to maintain its relevance to societal needs 2. Provide multiple, challenging opportunities for team and group activities in courses and laboratories 3. Expand opportunities for internships and co-operative education experiences by providing flexibility in course scheduling and availability 4. Ensure all required lecture courses are taught by faculty members 5. Provide opportunities for undergraduate research experiences as a component of the curriculum		G. Increase the number of distance courses offered annually to 8. [None]	
Theme 2. Faculty and Staff Attract, develop, and retain the best and brightest faculty and staff. Encourage all faculty and staff to participate in activities that will enhance their career, develop their skills, and help them become more productive. Actively promote recognition by internal and external award nominations. Strategies: 1. Expand the number of tenured/tenure-track faculty members in the department 2. Establish and maintain a diverse	A. Increase the number of hard-funded faculty members to 12 from current 8.5 [None]	A. Increase the number of hard-funded faculty members to 14 [None]	A. Increase the number of hard-funded faculty members to 16 [None]
	B. Increase the diversity of faculty to 25% female, 5% underrepresented minorities [ENT2F]	B. Increase the diversity of faculty to 28% female, 14% underrepresented minorities [ENT2F]	
	C. Increase the number of K-State and national teaching and research awards received by the faculty and staff to 4 annually. [ENT2B]	C. Increase the number of K-State and national teaching and research awards received by faculty and staff to 7 annually. [ENT2B]	

faculty and staff 3. Provide funds and other inducements to retain top-quality faculty 4. Pursue recruitment of NAE members as faculty in the department 5. Encourage and support faculty and staff participation in professional development activities 6. Increase K-State and national award nominations		D. Recruit National Academy member to join the faculty in the department. [ENT2G]	
Theme 3. Research Conduct research that expands the knowledge base of chemical engineering, educates our students, has a beneficial effect on society, and acts as a catalyst for economic development 1. Strengthen our position in areas where the department is viewed as preeminent, including: catalysis and reaction engineering, materials science, and separation processes. Continue to build upon our strong foundation in areas including renewable energy and nanotechnology, with the aim of becoming recognized as a leading program for research in these areas. 2. Recruit and retain exceptional faculty whose interests align with our strategic and emerging research areas 3. Focus our efforts and resources on securing large, interdisciplinary, multi-year research projects that have potential for significant impact 4. Allocate resources to invest in core research areas.	A. Increase the average number of peer-reviewed journal publications from 25 to 30 annually. [ENT3A]	A. Increase the average number of peer-reviewed journal publications to 35 annually. [ENT3A]	A. Increase the average number of peer-reviewed journal publications to 45 annually. [ENT3A]
	B. Increase the number of citations to papers authored by ChE faculty from an average of 110 per year to 130 per year None	B. Increase the number of citations to papers authored by ChE faculty to 150 per year None	B. Increase the number of citations to papers authored by ChE faculty to 170 per year None
	C. Increase the average number of proposals submitted by ChE faculty annually from 18 to 27. None	C. Increase the average number of proposals submitted by ChE faculty annually to 35. None	C. Increase the average number of proposals submitted by ChE faculty annually to 40. None
	D. Increase department's extramural research expenditures from $4.0 M to $4.6 M [ENT3E]	D. Increase department's extramural research expenditures to $6.0 M [ENTE3]	D. Increase department's extramural research expenditures to $7.9 M [ENTE3]
	E. Increase industrial supported research projects or industrial collaborations from 2 to 3 per year. [None]	E. Increase major industrial research supported projects or industrial collaborations to 5 [None]	E. Maintain industrial research supported projects or industrial collaborations at 5 [None]

Theme 4. Development **Secure and improve the department's financial foundation as a means to continually improve its programs and physical facilities, while balancing short and long term goals.** **Strategies:** **1. Maintain state-of-the-art research, classroom, and office facilities** **2. Increase the endowment for unrestricted uses (e.g. special initiatives, program and facilities enhancements)** **3. Increase the endowment for restricted uses (professorships, undergraduate scholarships, graduate fellowships, start-up expenses)** **4. Increase the fraction of alumni who donate annually**	**A. Department Newsletter: Issued once a year, news about student and faculty successes** **[None]**	**A. Add content that will better engage alumni** **[None]**	
	B. Department website will be kept up to date; videos will be added for student recruiting and industrial engagement. **[None]**	**B. Website will be regularly updated and will be a source for the department's latest news** **[None]**	**B. Website will publicize alumni success and recognition.** **[None]**
	C. The average number of alumni donating to the department annually will be increased from 160 to 170. **[ENT4A]**	**C. The average number of alumni donating to the department annually will be increased to 180.** **[ENT4A]**	**C. The average number of alumni donating to the department annually will be increased to 190.** **[ENT4A]**
		D. Complete the fund-raising goals for 2014-2020: **1. Renovation - $1.25 M** **2. Student Access and Success - $1.25 M** **3. Faculty Recruitment, Retention, Creativity and Discovery - $2.50 M**	
Theme 5. Global Impact **Educate our students on the importance of the global/international nature of engineering practice and business activities. Cultivate and expand research relationships with prominent international research organizations.** **1. Increase undergraduate student participation in Study Abroad Programs** **2. Increase the number of formal partnerships with overseas ChE programs targeting Asia and Latin America** **3. Expand existing relationships with global universities to include overseas research opportunities for faculty and students** **4. Increase the number of international students who come to our department**	**A. Increase the number of formal reciprocal exchange agreements with international ChE programs from 0 to 1.** **[None]**	**A. Increase the number of formal reciprocal exchange agreements with international ChE programs from 1 to 2.** **[None]**	

Theme 6. Culture and Environment **Create a chemical engineering community at Kansas State University that affords students, staff, and faculty of diverse backgrounds every opportunity for achieving success. Enhance and expand safety activities and safety education.** **1. Encourage ChE community to participate in College and University diversity training that includes respect and tolerance** **2. Develop and offer safety training and education at the undergraduate and graduate level** **3. Ensure all individuals working in ChE laboratories have received safety training** **4. Promote community building through annual awards banquet, new student picnic(s), and other events.** 5. **Conduct departmental safety audits semi-annually.**	**A. Increase percentage of employees (faculty, staff and laboratory-active students) who have completed safety training to 85% [None]**	**A. Increase percentage of employees (faculty, staff and laboratory-active students) who have completed safety training to 90% [None]**	**A. Increase percentage of employees (faculty, staff and laboratory-active students) who have completed safety training to 93% [None]**
	B. Increase the percentage of students and employees participating in departmental community-building events to 40% [None]	**B. Increase the percentage of students and employees participating in departmental community-building events to 50% [None]**	**B. Increase the percentage of students and employees participating in departmental community-building events to 60% [None]**

4a. What resources and/or opportunities <u>exist</u> for your Department to achieve its vision and outcomes?

[Resources: Faculty, staff, students, and alumni, laboratories and offices, equipment and instruments

Opportunities Federal funding, corporate and private donations; funding from UEIA]

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

[Additional faculty and staff; more student and faculty offices; laboratories; renovation of existing laboratories; scholarships and fellowships; faculty teaching and research awards; endowed chairs and professorships]

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

[A coordinated effort that includes support from the university, the state, federal grants, and K-State Foundation.]

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-3 - Number of national academy members B-4 - Number of faculty awards B-5 - Number of doctorates granted annually B-8 - Percent of undergraduate students involved in research

Links to Common Elements
CE-1 - Communications and Marketing CE-2 - Culture CE-3 - Diversity CE-4 - External Constituents CE-5 - Funding CE-6 - International

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)**
T1 - Research, Scholarly and Creative Activities, and Discovery (RSCAD) **Theme 1 Metrics:** T1-1 - # of interdisciplinary research projects, institutes, and centers T1-2 - Total sponsored extramural funding expenditures T1-4 - # of refereed scholarly publications per academic year and allocated faculty member T1-5 - Total international research and development expenditures	T1-A - Increased intellectual and financial capital to support RSCAD T1-C - Increased funding for investigator-based research, research centers, and graduate training grants T1-E - Competitive compensation and support available to GRAs, GTAs, and GAs T1-F - Enhanced and systematic approach for UG research T1-G - Successful recruitment, retention, evaluation, compensation, and rewards strategies in place to support RSCAD needs T1-H - Enhanced visibility and appreciation for research, discovery, and scholarly and creative activities	T1-I - Intellectual and financial capital in place for expanded RSCAD efforts T1-J - Greater proportion of nationally and internationally recognized award-winning faculty in RSCAD programs T1-M - Increased participation by undergraduates in expanded opportunities in research	T1-N - Fifty nationally recognized K-State researchers, a high proportion of which are members of their national academies T1-O - Extramural funding competitive with our benchmark institutions T1-P - Research and development expenditures competitive with benchmark institutions T1-Q - Competitive amongst our peers in the percentage of undergraduates involved in research
T2 - Undergraduate Educational Experience (UEE) **Theme 2 Metrics:** T2-1 - # and % of undergraduate	T2-B - Engaged students benefitting from high impact educational practices used by excellent faculty and staff across the university T2-C - Increased participation by	T2-J - Excellent reputation for high quality teaching and advising that prepares students for their professional, community, social, and personal lives	T2-O - An undergraduate educational experience recognized as one of the best among the nation's Top 50 Public Research Universities

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)**
students participating in a meaningful international experience T2-3 - Total funding awarded for undergraduate scholarship support T2-6 - % of undergraduate enrollment by demographic group	undergraduates in expanded opportunities for meaningful research T2-D - Successful integration of undergraduate education and meaningful research is standard practice T2-E - Effective evaluation practices that recognize and reward teaching, advising, and life-long learning/professional development	T2-K - Superior and diverse faculty recognized for teaching excellence T2-M - Increased undergraduate contributions in the creation of scholarship through research	T2-P - Faculty teaching and advising awards comparable to our benchmark institutions
T3 - Graduate Scholarly Experience **Theme 3 Metrics:** T3-1 - # and % of graduate students with assistantships, endowed scholarships, and fellowships T3-2 - Total funds awarded for graduate assistantships, endowed scholarships, and fellowships T3-3 - # and % of graduate programs offering competitive compensation and support packages T3-4 - # of private/public sector partnerships supporting graduate experiential training opportunities T3-6 - # of graduate terminal degrees awarded T3-7 - Total graduate students enrolled by demographic group and degree type	T3-A - Competitive compensation and support available for GRAs, GTAs, and GAs T3-C - Engaged graduate students integrated in university life with enhanced visibility and appreciation T3-D - Outstanding mentoring for our graduate students T3-E - Expectation of excellence for the graduate scholarly experience T3-F - Increased capacity to secure funding for graduate research and teaching T3-H - Expanded partnerships with industry and government to provide high level learning and experiential training opportunities for graduate students	T3-K - Increased funding for graduate research and teaching T3-L - Increased number of nationally and internationally recognized award-winning graduate faculty T3-M - Increased number of Doctorates Awarded	T3-N - National and international reputation for outstanding graduates with demonstrable career success T3-P - Stable funding for graduate research and teaching competitive with benchmark institutions T3-Q - Doctorates Awarded comparable with benchmark institutions
T4 - Engagement, Extension, Outreach and Service	T4-E - Increased extramural funding for Engagement initiatives at the local, state, national, and international level		

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)**
T5 - Faculty and Staff **Theme 5 Metrics:** T5-1 - # of national and international faculty awards T5-4 - # and % of faculty and staff participating in international experiences T5-5 - % of tenure/tenure-track faculty by demographic group T5-6 - % of fulltime staff by demographic group	T5-C - Career-long learning recognized by the university and its employees as a shared value and responsibility T5-D - Effective evaluation processes that result in accountable faculty and staff with a clear understanding of their job expectations and how they contribute to the University's mission	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-I - Stable funding available for recruitment and retention of top level faculty and staff
T6 - Facilities and Infrastructure		T6-F - Efficient, reliable, and cost-effective central and building utilities with the capacity for expansion as needed to support campus needs and guarantee the safety, comfort, and integrity of our research, animal, and human environments	T6-H - High-quality research laboratories and specialty spaces that enhance research and scholarly activities