Dept. of Electrical & Computer Engineering

Strategic Plan
Draft - Jan. 4, 2014

MISSION

The Missouri University of Science and Technology (Missouri S&T) Department of Electrical & Computer Engineering Department (ECE) strives to contribute to the state, nation, and world through the education of outstanding professionals and leaders in engineering. Our educational focus is on a broad, rigorous education in all areas of electrical and computer engineering with significant hands-on experiences. The program will provide students with an understanding of engineering problem solving at all levels and an appreciation for engineering as a profession.

VISION

We will cultivate curiosity, creativity and confidence in our graduates. We will be the ECE department of choice for partners around the world seeking a highly qualified, talented and entrepreneurial workforce; innovative research; relevant educational programs, products and services; and technology and ideas to solve the great challenges of our time.

VALUES

Lifelong Success
We add exceptional value. The rewards of the Missouri S&T ECE experience extend far beyond a college education, valued degree or gratifying career. The S&T experience prepares you for a fulfilling life defined by the confidence to succeed, a desire to excel and a love of learning that never stops.

Creativity
We are innovators. Building a better world demands a creative spark, innovative and entrepreneurial approaches, and curiosity to discover and explore new solutions to the world’s great challenges.

Integrity
We hold ourselves accountable for our actions. We strive to uphold the highest ethical standards, to conduct ourselves with trustworthiness and respect for all of humanity, and to instill in our campus community these same principles.

Sustainability
We live by example. As stewards of the public goodwill, the financial resources entrusted to us, and the environment, we emphasize resilient and sustainable practices in all our endeavors.

Partnerships
We are great partners. We focus on adding value and creating mutually beneficial partnerships. The solutions to today’s great challenges require agile collaboration, teamwork and engagement with our stakeholders, both on campus and in the greater business, civic, national and international communities.

Inclusion
We are an inclusive, welcoming community. We seek to build a creative learning environment marked by openness, understanding and valuing all people and perspectives.

**STRATEGY STATEMENT**

The Department of Electrical and Computer Engineering at Missouri S&T will provide by 2020 a top return on investment among public research universities to students, employers, research partners and donors through extraordinary access to renowned expertise, services and experiential learning opportunities.

**GOVERNANCE AND LEADERSHIP**

Following a similar structure as the campus strategic plan, every action has an owner or owners who ensure the completion of the plan while paying attention to predetermined shared metrics for success. Actions are the building blocks of levers, which indicate options or decisions made by the department that are aligned with our overall strategy for success. Lever leaders will be identified. Lever leaders have the authority to accomplish the predetermined lever metrics by fostering actions and encouraging their owners. The lever leaders work with the ECE Strategic Planning Committee that reports to the department chair.
Theme 1: Develop and inspire creative thinkers and leaders for life-long success

Levers/Categories of Actions

Lever 1 Require all undergraduate students to participate in some significant experiential activity before graduation.

Action 1.1.1 Incorporate experiential/service learning into the core curriculum of the BS CpE and BS EE degree programs. [Campus action 1.1.2]

Action 1.1.2 Support at least 3 student design teams that are not part of the student design center. [Currently support 2 – Robotics and IEEE Robotics]

Action 1.1.3 Continue to support the student design center.

Action 1.1.4 Ensure at least 10% of undergraduate students have a research experience by graduation by 2020.

Action 1.1.5 Ensure at least 50% of undergraduate students are involved in a department-related student organization, such as IEEE or Eta Kappa Nu by 2020.

Action 1.1.6 Encourage our students to have an overseas experience (for example, Missouri London program, a semester at a foreign university) by graduation.

Lever 1.2 Foster innovation and creativity for faculty, staff, and students.

Action 1.2.1 Identify a series of co-curricular activities (e.g., intersession or alternative spring break events) for interdisciplinary groups of students, faculty and/or staff focuses on providing solutions for problem-solving, innovation or leadership. [Campus action 1.2.5]
Theme 2: Enhance Reputation and Raise Visibility

Levers/Categories of Actions

Lever 2.1  Employ transformative and focused faculty hiring and retention, including cluster hires in select areas of expertise to support best in class (BIC) achievements.

Action 2.1.1  Support the identification of two BIC areas for initial investment and two other BIC areas for subsequent investment. [Campus action 2.1.1]

Action 2.1.2  Support identification and help pursue companies, foundations and individual donors for charitable gifts to hire two national academy stature faculty in endowed chair positions in strategic areas #1 and #2. [Campus action 2.1.4]

Action 2.1.3  Identify and pursue companies, foundations and individual donors to fund startup packages. [Campus action 2.1.6]

Lever 2.2  Leverage S&T as Missouri’s technological research university.

Action 2.2.1  Increase ECE’s undergraduate enrollment by 10% (+45) by 2020. [Note: campus goal is a 10% increase (+500) by 2020]. [Campus action 2.2.1]

Action 2.2.2  Increase ECE’s graduate Ph. D. enrollment by 50% (+37) by 2020. [Note: campus goal is a 100% increase (+500) by 2020]. [Campus action 2.2.2]

Action 2.2.3  Increase the number of T/TT (NTT) faculty members by 10 (2) by 2020 to achieve an overall student-to-faculty ratio of 18-1. [Note: Current student-to-faculty ratio is 21. Campus goal is student-to-faculty ratio of 16-1.] [Campus action 2.2.3]

Action 2.2.4  All open positions will be filled so they impact the campus and department strategic plan and progress on department performance measures. [An implementation of campus Action 2.1.2 - Develop and implement a process to transparently allocate all faculty positions to impact the strategic plan and progress on unit performance measures]. [Campus action 2.2.4]

Action 2.2.5  Increase the number of technical/specialized staff members by 2 to support faculty and strategic program activities. [Note: campus goal is an increase of 30]. [Campus action 2.2.5]

Action 2.2.6  ECE will support campus development of specific agreements with UM campuses and possibly other academic institutions to collaborate in delivering courses and degrees that enhance the current portfolios on each campus. [Campus action 2.2.6]

Action 2.2.7  Actively support the Missouri S&T Center for Pre-College Programs’ efforts to continue on-campus K-12 focused camps and programs aimed at stopping the shrinking pipeline of students interested in pursuing science, technology, engineering, and mathematics degrees.

Action 2.2.8  Host and promote the Digital Electronics module in Project Lead the Way (PLTW) teacher training effort.

Action 2.2.9  Establish a classified research facility.
Action 2.2.10 Increase physical space for research activities by 10000 sq. ft. (in proposed building addition)

Action 2.2.11 Support the establishment of at least one new interdisciplinary research center by 2020.

Lever 2.3 Develop a culture of excellence in research, scholarship and creative activity among faculty, staff and students.

Action 2.3.1 Identify and take actions to improve the metrics that contribute to increasing the national ranking of the ECE graduate programs \(\text{(refer to 3.1.2).} \) [Campus action 2.3.2]

Action 2.3.2 Support the expansion of research and entrepreneurial opportunities for undergraduate students, including the Opportunities for Undergraduate Research Experiences program. [Campus action 2.3.8]

Action 2.3.3 Balance teaching and research relative to comparator institutions by enforcing workload policy. [Campus action 2.3.9]

Action 2.3.4 Support the development and implementation a new program to instill a culture of excellence in research, scholarship and creative works in early career faculty. [Campus action 2.3.10]

Action 2.3.5 Support the development and implementation a new program to instill a culture of excellence in research, scholarship and creative works in doctoral students. [Campus action 2.3.11]

Action 2.3.6 Increase the number of IEEE Fellows from 6 to 8 by 2020.

Action 2.3.7 Have a faculty member on the National Engineering Academy by 2020.

Lever 2.5 Modify our conventional methods of teaching to accommodate current, new and advanced technology that will enhance student learning and increase faculty productivity.

Action 2.5.1 Offer 10 on-line BS courses by 2015. [Currently 121, 153, 215, 235, 253, 271, 332, 335]

Action 2.5.2 Participate in the Chancellors eLearning Transformation (CeLT).

Action 2.5.3 Continue to support LEAD assisted learning in EE 121, 151, 153, and CpE 111, at a minimum.

Action 2.5.4 Establish an endowed teaching chair in electronics. [One of the positions in action 2.2.3]

Action 2.5.5 Establish an endowed teaching chair in computer engineering. [One of the positions in action 2.2.3]
Theme 3: Achieve sustainable growth to ensure best return on investment

Levers/Categories of Actions

Lever 3.1 Evaluate current academic programs and create, modify, eliminate or combine in order to ensure a relevant portfolio that supports a Carnegie ranking as a national, research university.

Action 3.1.1 Perform a comparison of academic department productivity to peer institutions. [Campus action 3.1.1]

Action 3.1.2 Identify and take actions to improve the metrics that contribute to increasing the national ranking of ECE graduate programs (Refer to 2.3.2). [Campus action 3.1.2]

Action 3.1.3 Offer new graduate certificate programs: electromagnetic compatibility, controls, and computational intelligence.

Lever 3.3 Improve facilities to enhance research and student learning, and expand experiential learning.

Action 3.3.1 Leverage strategic funds for instructional laboratories with matching funding from nonappropriated sources. [Campus action 3.3.1]

Action 3.3.2 Support a campus plan and process for acquiring matching funding for research equipment in areas that have high return on investment to be matched with non-appropriated funds. [Campus action 3.3.2]

Action 3.3.3 Continue efforts to raise more endowment funds to support the acquisition of teaching and research equipment. [related to campus action 3.3.8 - Investigate the feasibility of establishing a $100 million endowment for the acquisition of (teaching, research, and cocurricular) equipment.]

Lever 3.4 Promote inclusion and increase diversity of faculty, staff and students to remain relevant and competitive in a global environment.

Action 3.4.1 Increase number of T/TT/NTT female faculty members and traditionally underrepresented T/TT/NTT minority faculty members to 10 or more by 2020. [Currently, ECE has 6 female faculty]
Theme 4: Increase and facilitate meaningful access to and interaction with renowned faculty, staff and services.

Levers/Categories of Actions

Lever 4.1 Create a comprehensive distance and online education strategy.

Action 4.1.1 Support a focused market study analysis to serve as the foundation for a comprehensive distance and online education strategy. [Campus action 4.1.1]

Action 4.1.2 Increase our focus on the professional non-credit distance education portfolio. [Campus action 4.1.4]

Action 4.1.3 Leverage existing success and resources from Distance Ed program to expand into more online or asynchronous course offering. [Campus action 4.1.7]

Lever 4.2 Enhance instructional labs and methods of delivering lab experiences.

Action 4.2.1 Explore how to partner with other universities, community colleges, high schools or extension to deliver lab experiences. [Campus action 4.2.1]

Action 4.2.2 Develop model frameworks and strategies for evaluating and redesigning instructional lab courses for blended/online delivery. [Campus action 4.2.2]

Lever 4.5 Engage in transformative doctoral student recruiting/retention and placement.

Action 4.5.1 Support campus development of a plan to provide fully covered tuition for doctoral students on appointments and explore implementation. [Campus action 4.5.1]

Action 4.5.2 Support campus development of memorandum of understandings and articulation agreements with reputed national and international schools to recruit high quality doctoral students. [Campus action 4.5.3]

Action 4.5.3 Offer a 25% assistantship to outstanding accepted graduate students. This support can be used to supplement GRA support they may obtain from faculty.