

College/School/Department: Science and Engineering
Academic Plan 2012-2017
Updated 10 March 2015

I. Introduction



State your department/school/college mission statement.

The College of Science and Engineering has a triple mission:

Preparing students for careers in science, engineering, mathematics and technology, providing future K-12 teachers with the scientific and mathematical knowledge that they will need in the classroom, and giving all students core knowledge in science and mathematics.

Providing an environment in which faculty can perform research consistent with Texas State's emerging-research-university status.

Serving our community, region, and state with research that is linked to commercialization and economic development.

Outline briefly your “vision” for the 2012-2017 planning cycle.

The College of Science and Engineering is playing a central role in Texas State’s emergence as a research university. All of our academic units have established solid research programs that are attracting significant external funding. Our programs in engineering, engineering technology, and computer science are seeing rapid enrollment growth. The College’s doctoral programs are doing well, and the new [MSEC-MS in Engineering](#) program has been approved.

As the 2012-2017 planning cycle [begins/progresses](#), we are poised to build on our [continuing](#) achievements. For 2017, we envision a college with additional programs in engineering and computer science. A new building housing our engineering programs will [likely](#) be in place. New faculty will have been hired for new programs, program maintenance, and enrollment growth. Our research productivity and external funding will [be significantly larger than it is now/continue to grow](#).

Using University goals and initiatives as a guide, list and briefly describe your top five priorities for the 2012-2017 planning cycle and indicate the university initiative/goal to which the unit’s initiative is linked.

1. [BS-MS in Engineering](#) [University Initiatives 2.1, 2.2; also 1.6, 1.9, 3.9]: This program is of critical importance to the Ingram School of Engineering and to local and regional industry. It will emphasize engineering practice and include [a long-term, targeted technical projects](#) related to real-world engineering applications. [The request for preliminary authority has already been completed. We hope to submit it to the Board of Regents and the Coordinating Board later this year \(2012\). Implementation of this program will be a high priority during the remainder of this planning cycle. \(Ongoing\)](#)

2. [BS in Civil and Environmental Engineering/Civil Engineering Technology](#) [University Initiatives 2.1, 2.2; also 1.6, 1.9, 3.9]: There is substantial synergy between these two programs, so they appear as a single priority. The success of the Concrete Industry Management and Construction Science and Management programs has identified a strong need for additional civil engineering programs in Central Texas. Environmental engineering is commonly associated with civil engineering programs; this aspect of civil engineering fits well with Texas State’s water-related activities (River Systems Institute, Edwards Aquifer Research Center). We would like to prepare requests for preliminary authority to offer these

programs for submission to the Coordinating Board in 2016. [\(Ongoing\)](#)

3. PhD in Computer Science [University Initiatives 1.5,1.6,1.9,2.1,2.2]: This program will be structured to serve the region's working professionals who currently have no access to a PhD program in computer science. The PhD programs in the region (UT Austin, UTSA) are structured to serve traditional full-time students. The regional demand for computer software and hardware focuses on Internet, E-commerce, smart devices, social media ~~and~~, gaming. The Department of Computer Science has research expertise in networking and cyber-security, data mining and service computing, high performance computing, and human computer interaction. The quality of faculty research is high, as demonstrated by external research support (NSF CAREER award, IBM Faculty Award), proposal development, and publications. A PhD program is critically needed to meet local needs. At the same time, it will fulfill the department's vision and help attract and retain outstanding faculty and students. ~~We would like to prepare a request for this~~[A request to offer this](#) program ~~to will be submitted~~[to the Coordinating Board in 2016.](#) [\(Ongoing\)](#)

4. Development of COSE programmatic and research areas [University Initiatives 1.2, 1.5, 1.9, 2.1, 2.2, 3.9]: Additional tenure-track faculty members are needed to grow and strengthen areas critical to College programs and research specialties. These include (a) software engineering (existing M.S. program; critical to local industry, as expressed in recent *Austin-Statesman* article), (b) biomaterials/biosensors (one Biology faculty member already hired into [MCSE](#) [MSEC](#) program; more needed to create research focus; critical to local industry, especially in San Antonio), (c) computer engineering (to strengthen existing concentrations in CS and Engineering; critical to Austin industry), (d) hire "professional faculty" in Concrete Industry Management, Construction Science and Management, and Manufacturing/Mechanical ET. This will require creating a "professional faculty" track analogous to clinical faculty; such faculty will greatly strengthen these programs' linked to industry, and will make their graduates far more employable ~~in~~[by](#) local industry. [\(Ongoing\)](#)

5.STEM Education [University Initiatives 1.2, 2.2, 3.5, 3.9, 4.3]: The College has significant expertise (and a Ph.D. program) in mathematics education. It has begun to acquire similar expertise in science and engineering education. We would like to [continue to](#) build on this foundation during the planning period in the following ways: (a) hire additional faculty with discipline-specific expertise in STEM education, (b) support Mathworks in its endowment and curriculum development efforts, (c) improve learning in core-curriculum STEM courses at Texas State, (d) work with the College of Education to develop better paths to certification for K-12 science teachers, and (e) consider the establishment of a Department of

Science and Mathematics Education. [\(Ongoing\)](#)

Based on unit goals, list the number of new (not replacement) faculty lines you plan to request in the 2012-2013 academic year and in the remaining 2-5 years.

2012-2013 planned requests: 18 tenure-track lines, 21 teaching related positions non-TT lines

College Priority 1: MS in Engineering

3 New Tenure Track lines in Engineering

7 GIA positions in Engineering

College Priority 4c: BS in Computer Engineering

1 Tenure Track line in CS

1 Tenure Track line in Engineering

College Priority 4b: Biomaterials/Biosensors

3 Tenure Track lines in Chemistry or Biology

College Priority 5: STEM Education

~~1 Tenure Track line in Chemistry or Physics~~ [1 Tenure Track line in Chemistry or Physics \(Completed\)](#)

College Priority 4a: Software Engineering

1 Tenure Track line in CS

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Unit/Department Goals-Growth/Maintenance

Biology: 1 Senior Lecturer/Lecturer position

Chemistry: 1 Senior Lecturer/Lecturer; 2 GIA positions

Engineering: 3 tenure-track lines; 1 Senior Lecturer/Lecturer position

Engineering-Technology: 1 Tenure Track line

Mathematics: 3 tenure-track lines; 5 Senior Lecturer/Lecture positions

Physics: 1 Tenure Track line; 3 GIA positions

MSEC: 1 Doctoral Teaching Assistantship

**-Summary: ~~18~~18 -TT lines = \$1,~~194~~194,000. ~~21~~21-teaching/research related support positions = \$
~~45~~451,000.**

2013-2017 Planned Requests: ~~17~~20 tenure-track lines, ~~20~~25 non-TT ~~but~~ lecturer, professional faculty, graduate student & technical staff positions

College Priority 2: BS in Civil and Environmental Engineering/Civil Engineering Technology

3 Tenure Track lines and 1 Senior Lecturer/Lecturer position in Engineering, [2 technical staff positions @ \\$75K & \\$50K](#)

2 Tenure Track lines in Engineering Technology

[College Priority 5: STEM Education](#)

[1 Tenure Track line in Chemistry or Physics](#)

College Priority 3: PhD in Computer Science

2 Tenure Track lines and 3 Senior Lecturer/Lecturer positions in CS

College Priority 4d: Professional Positions in Engineering Technology

4 Professional Faculty positions in Engineering Technology

[College Priority 5: STEM Education](#)

[Pursue additional funding for Mathworks. \(Ongoing\).](#)

Unit/Department Goals-Growth/Maintenance

Biology: 5 Senior Lecturer/Lecturer positions

[Chemistry: 2 Tenure Track lines for Biochemistry, 2 Tenure Track lines for Analytical Chemistry \(new\).](#)

Engineering: 4 Tenure Track lines; 3 Senior Lecturer/Lecturer position

Mathematics: 2 Tenure Track lines; 2 Senior Lecturer/Lecture positions

Physics: 3 Tenure Track lines

MSEC: 2 Doctoral Teaching Assistantships, 2 staff positions @ \$96K - years 4/5, 1 Entrepreneur in Residence @ \$20K (new).

Summary: 17-20 TT lines = \$1,313,553,000. 20-25 teaching/research related support positions = \$
885,000-1,126,000.

Based on unit initiatives outlined in your plan, estimate the total amount of new funding that your unit will realistically need in the ~~2012~~2014-2013-2015 academic year and in the remaining ~~2-5~~2-3 years.

For ~~2012~~2014-2013-2015 by Goal

Goal 1	MS in Engineering	\$ 183,443,000	616	
Goal 2	PhD Computer Science BS in Civil/Environmental Eng. & Eng. Technology			0
Goal 3 <u>2</u>	BS in Civil/Environmental Eng. & Eng. Technology PhD Computer Science			0
Goal 4 <u>2</u>	Programmatic/Research MSEC		440,640,000	
Goal 5 <u>2</u>	STEM Education	80,000		0

For ~~2013-2017~~ by Goal

Goal 1	MS in Engineering	\$ 500,000/yr.
Goal 2	BS in Civil/Environmental Eng. & Eng. Technology	1,300,000/yr.
Goal 3	PhD Computer Science	606,520/yr.
Goal 4	Programmatic/Research	1,761,200/yr.
Goal 5	STEM Education	202,000/yr.

For 2015-2017 by Goal

Goal 1	MS in Engineering	\$ 500,000/yr.
Goal 2	PhD Computer Science	606,520/yr.
Goal 2	BS in Civil/Environmental Eng. & Eng. Technology	1,300,000/yr.
Goal 2	Programmatic/Research MSEC	1,761,200/yr.
Goal 2	STEM Education	202,000/yr.

State the facilities (e.g. offices, research and lab space, classrooms) that will be required for anticipated growth and new initiatives.

- New Science and Engineering building to house engineering programs and biology research laboratories.
- Remodeled space in RF Mitte Building to house civil engineering/technology programs.
- Remodeled space in Psychology Building to house most of the Department of Computer Science (Completed)
- Additional space in MCS/Derrick to house the Mathematics faculty needed to accommodate student growth.
- Additional space in Centennial Hall to accommodate increased staffing and demands on the Advising Center.
\$200K (New)
- Renovate Dean's Offices in Centennial Hall in lieu of using valuable space in the new Engineering and Science

building for administrative purposes. \$200K (New)

II. Process



Describe, in a brief paragraph, the process used to develop your plan, including the nature and extent of faculty involvement.

Each department/school prepared its own update to the 2012-2017 strategic plan. The unit plans were ~~presented and discussed at a College Council all-day meetings~~ submitted to the Dean's Office so that they could be reviewed and merged into the College plan. The ~~College plan was derived from the unit plans. It was~~ updated plan will be presented and discussed at a meeting of the College Advisory Board and at a meeting of the College Council.

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III. Program Maintenance

Maintenance Need	Reason for Need	Cost	Result of Funding
The following Program maintenance needs are listed alphabetically by Department. They are not in priority order.			
3-2 New Advisor I positions	Anticipated enrollment growth	\$ 102,68 0,000 plus fringe	Maintain a student/Advisor ration of no greater than 450:1
Add a ½ time Admin II position	Accommodate anticipated workload growth	\$20,000.00 plus fringe	Help keep an NCADA Student/Advisor ration of 450:1
Reclassification of staff member	Accommodate growth of HLSAMP program	\$15,000	Meet the growing need to facilitate STEM students eligible to participate in this program
BIOLOGY Increase instructional assistantship salaries by the cost of registering for nine SCH each long semester	Current compensation is not adequate to attract top students	\$600,000	Higher quality graduate students resulting in higher graduation rate, better quality research, and increased extramural funding
Increase faculty salaries to mean of life scientists at other Texas ERUs	Needed to attract and retain scientists capable of building nationally recognized research and teaching programs	\$546,000	Ability to attract and retain strong researchers
Six additional senior lecturers and one additional staff position	Needed to address growth of both enrollment and extramurally funded research	\$320,000	Increased enrollment in departmental courses, including service courses, and increased extramural funding.

New instructional assistant lines (20)	Needed to address growth of University enrollment	220,000	40 additional lab sections can be offered each semester serving approximately 750 students each semester
CHEMISTRY & BIOCHEMISTRY Increased M & O	Enrollment and faculty increase	\$60,000 in 2012, <u>(completed)</u> \$3560,000 increase for 2013 2015-2017	Increased student graduation and retention, increased scholarly/creative activity
Increased Graduate Instructional Assistant (GIA) budget	Enrollment growth	\$25,000 increase each year	Need to offer more freshman chemistry sections
Senior Lecturer <u>(2)</u>	Increased enrollment	\$4590,000 per year	More sections of freshman chemistry to serve other disciplines on campus
COMPUTER SCIENCE New line <u>(42)</u> (lecturers)	Enrollment growth in CS and Engineering (taking CS introductory course)	\$11055,000 + fringe	Successful staffing of additional sections of the introductory CS courses
New graduate assistants (2)	Enrollment growth in CS and Engineering	\$11,000 + fringe per line	Successful staffing of additional lab sections of the introductory CS courses
New staff line (1)	Growth in research funding activities and student enrollment	\$45,000 + fringe	Sustaining the current level of growth in funding activities and student enrollment
Faculty salary adjustments (to the mean of CS faculty at other Texas ERUs)	Attracting and retaining faculty capable of building nationally recognized research and teaching programs	\$200,000 per year	Retention and attraction of strong faculty members
Ingram School of Engineering Four (4) new tenure track faculty lines (Asst. Prof. level) and two (2) new lecturer/senior lecturer lines in Electrical Engineering	Anticipated enrollment in EE program at end of planning period is 475 students. Without new faculty lines, the program will have 10 faculty and a student-to-faculty ratio of 47:1.	Salary of \$76,616 + fringe per tenure track line, \$200,000 start-up per tenure track line, salary of \$54000 + fringe per lecturer line	Student-to-faculty ratio at end of planning period will be 30:1. All student-to-faculty ratios in Section III include any lecturers in the department

<u>Machinist position (New)</u>	<u>Accommodate machining needs for Ingram School of Engineering and College of Science and Engineering</u>	<u>Salary of \$75,000 plus fringe</u>	<u>As research activity continues to grow, specialized, in-house machining capabilities are essential for saving both time and money.</u>
<u>IT Position (New)</u>	<u>Accommodate growing IT needs of the Ingram School of Engineering</u>	<u>Salary of \$50,000 plus fringe</u>	<u>As enrollment grows computer maintenance and upgrades grow exponentially. This position will help cope with rapid enrollment growth.</u>
Three (3) new tenure track faculty lines (Asst. Prof. level) and two (2) new lecturer/senior lecturer lines in Industrial Engineering	Anticipated enrollment in IE program at end of planning period is 258 students. Without new faculty lines, the program will have 4 faculty and a student-to-faculty ratio of 64:1.	Salary of \$73,017 + fringe per tenure track line, \$80,000 start-up per tenure track line, salary of \$54000 + fringe per lecturer line	Student-to-faculty ratio at end of planning period will be 29:1.
One (1) new lecturer line in Manufacturing Engineering	Anticipated enrollment in IE program at end of planning period is 125 students. Without new faculty lines, the program will have 3 faculty and a student-to-faculty ratio of 42:1	salary of \$54,000 + fringe per lecturer line	Student-to-faculty ratio at end of planning period will be 31:1
One (1) Admin II line	Anticipated enrollment in IE program at end of planning period is 125 students. Without new faculty lines, the program will have 3 faculty and a student-to-faculty ratio of 42:1	Salary of \$30,000 + fringe	High quality service to over 900 students and 33 faculty.
ENGINEERING TECH. Four (4) new "professional" faculty lines; two (2) in CSM, one (1) in Mfg./Mech. ET, and one (1) in CIM	Two (2) in fall 2013 to permit reassignment of TT faculty to graduate courses. One (1) each in fall 2015 and 2016 to meet demands in enrollment growth in CIM and CSM.	\$60,000 + fringe annually per line (\$120,000 in fall 2013; \$60,000 in fall 2015; \$60,000 in fall 2016.)	Release of TT faculty from undergraduate teaching to free them to cover new graduate courses in support of graduate curriculum revisions and research mission. Provide for enhanced cross coverage potential in CSM and CIM in anticipation of program growth.
Two (2) new tenure-track lines; One (1) in Environmental ET, one (1) in Electrical ET, and one (1) in Civil ET.	One (1) Env. ET line in fall 2014 to meet enrollment growth. One (1) Elect. ET in fall 2015 to strengthen faculty base and meet enrollment growth. One (1) Civil ET in fall 2016 to support new program.	\$65,000 + fringe annually per line (\$65,000 in fall 2014, 2015.)	Provide faculty expertise in Environmental ET that is lacking. To meet anticipated enrollment growth in Env. ET. Strengthen faculty credentials in Electrical ET and provide teaching and research support for revised Elec. ET curriculum. Acquire a faculty member in Civil ET to support proposed new program in that field

Four (4) new GIA lines, contingent on enrollment growth in master's program	Two (2) if enrollment can be increased and sustained at 55. Two (2) additional if enrollment can be increased to 70.	\$10,152 annually per line (\$40,608 total – timing to be determined.)	To provide enhanced teaching and research support for tenured and tenure-track faculty
Augment department M & O budget when overall departmental undergraduate enrollment reaches 630 majors. (Estimated fall 2014)	To provide for lab maintenance, faculty and student travel, material and equipment purchases, equipment repairs, etc. associated with growth in programs and faculty size	\$50,000 annually	Lab maintenance, modernization of tools and equipment, enhanced faculty research productivity, enhanced laboratory education outcomes, increased involvement of students in research, expanded student development activities, etc.
MSE&C Three additional Doctoral teaching assistantships	Increase MSEC PhD Program	\$32,000- year 2, \$64,000 year 3, \$96,000- each year 4,5	Increase PhD student production along with increased Research expenditures as they enhance research efforts.
Renovation for graduate student offices	Planned number of PhD students	\$100,000 2012-2013 2	Ability to accommodate current and near term PhD student population
M&O for recruiting	Need to increase recruiting efforts	\$10,000 each year	Ensure highest quality pool of assistants to ensure program success and research growth
MATHEMATICS Hire five new lecturers and 2 tenure track faculty immediately	Enrollment growth has increased the number of sections we offer and we need people to teach those courses	\$441,955	Be able to cover all of our courses for Fall 2012 and maintain credibility as a research institution
Hire 4 lecturers and 3 new tenure-track faculty	Needed to handle the projected student population growth. Moreover, upper division courses have seen a marked increase in enrollment. We are offering additional sections and the sections we offer are too large to provide an optimal teaching environment according to best practices.	\$1,081,210 = \$39,007x(4+3+2+1 years) + \$53,460x(4+3+2 years) + \$70,000x3	Improved educational experiences for undergraduates, improved quality of instruction, and greatly enhanced performance on departmental research initiatives
Hire a senior faculty member in Mathematics Education	Address the needs of the growing doctoral program in mathematics education, particularly chairing doctoral dissertation committees	\$162,014 = \$82,338x3 + \$85,000	Increased throughput and the ability to schedule additional graduate courses to meet the student's needs,

PHYSICS 4 new faculty lines	Meet needs imposed by enrollment growth in existing and proposed engineering programs as well as enrollment growth in other service courses.	\$80,000 per line + fringe, \$300,000 start-up per line	Add sections of PHYS1310/1320 (1 every two years), PHYS1315/1325 (1 every two years), PHYS1430/2425 (one per year)
3 new GIA positions	Increased enrollment in lab sections requires addition of lab sections	\$10200 per year per line.	Increase number of lab sections offered to meet enrollment needs.
1 new Admin II position	Increases administrative load due to increased enrollment and grant activity	\$35000 per year	More effective departmental administration
1 new technical staff position	Increased need for technical assistance with research equipment	\$45000 per year r	More effective use and maintenance of departmental and shared research equipment (Completed)
Increased funding of undergraduate instructional assistants	Increased need for technical assistance with research equipment	\$15000 per yea	Increase number of lab sections offered to meet enrollment needs

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IV. Planning Categories

Dept.	Initiative	1 yr	2-5 years	New Resources Required	Cost	Source of Resources	Assessment Criteria	University Initiative
University Goal 1: Promote academic quality by building and supporting a distinguished faculty.								
COSE	MS in Engineering	X		Faculty, GIAs, facilities, operating	2400,000	Provost	Program approval	1.6, 1.9 (Ongoing)
COSE	BS in Civil Engineering and Civil Engineering Technology		X	Faculty, GIAs, facilities	1,300,000	Provost, Development	Program approval	1.6, 1.9 (Ongoing)
COSE	PhD in Computer Science		X	Faculty, GIAs	606,520	Provost	Program approval	1.5, 1.6, 1.9 (Ongoing)
COSE	Strengthen software engineering	X		Faculty	80,000	Provost	Successful hires	1.2, 1.5, 1.9 (Ongoing)
COSE	Strengthen biomaterials/biosensors		X	Faculty	240,000	Provost	Successful hires	1.2, 1.5, 1.9 (Ongoing)
COSE	Strengthen computer engineering		X	Faculty	160,000	Provost	Successful hires	1.2, 1.5, 1.9 (Ongoing)
COSE	Hire professional faculty in Engineering Technology		X	Faculty	200,000	Provost	Successful hires	1.2, 1.5, 1.9 (Ongoing)
COSE	Strengthen STEM education		X	Faculty	202,000	Provost	Successful hires	1.2 (Completed)
Goal 2: Provide opportunities for a public university education and contribute to economic and cultural development.								
COSE	Strengthen Mathworks	X	X		100,000	Development	Reaching desired endowment level	2.2 (Ongoing)
COSE	Work with College of Education to develop better paths to certification for K-12 science teachers	X	X			Provost	Adoption of new career paths	2.2 (Ongoing)

COSE	PhD in Computer Science		X	Faculty, GIAs	606,520	Provost	Program approval	2.1, 2.2 (Ongoing)
COSE	MS in Engineering	X		Faculty, GIAs	200,000	Provost	Program approval	2.1, 2.2 (Ongoing)
COSE	BS in Civil Engineering and Civil Engineering Technology		X	Faculty, GIAs, facilities	1,300,000	Provost	Program approval	2.1, 2.2 (Ongoing)
Goal 3: Provide a premier student-centered, educational experience that fosters retention and success.								
COSE	Improve learning in core-curriculum STEM courses	X	X	Support for learning assistants	160,000	Provost	Improving student success in these courses	3.5, 3.9 (Ongoing)
COSE	MS in Engineering	X		Faculty, GIAs	200,000	Provost	Program approval	3.9 (Ongoing)
COSE	BS in Civil Engineering and Civil Engineering Technology		X	Faculty, GIAs, facilities	1,300,000	Provost	Program approval	3.9 (Ongoing)
COSE	Strengthen software engineering	X		Faculty	80,000	Provost	Successful hires	3.9 (Ongoing)
COSE	Strengthen biomaterials/biosensors		X	Faculty	240,000	Provost	Successful hires	3.9 (Ongoing)
COSE	Strengthen computer engineering		X	Faculty	160,000	Provost	Successful hires	3.9 (Ongoing)
COSE	Hire professional faculty in Engineering Technology		X	Faculty	200,000	Provost	Successful hires	3.9 (Ongoing)
Goal 4: Enrich our learning and working environment by attracting and supporting a more diverse faculty, staff, and student body.								
COSE	Strengthen STEM education		X	Faculty	160,000	Provost	Successful hires	4.3 (Ongoing)
Goal 5: Develop and manage human, financial, physical and technological resources effectively, efficiently, and ethically to support the university's mission.								
COSE	BS Civil/Env.Eng.		X	Facilities/renovations	400,000	Provost	Completion of renovations	5.4 (Ongoing)
COSE	C.S. relocation (Completed)	X		Modifications In Derrick	225,000	Provost	Completion of renovations	5.4 (Completed)
COSE	Renovate space in Centennial Hall for		X	Modifications In Centennial	\$200,000	Provost	Completion of renovations	5.4 (New)

	Advising Center (New)			Hall				
COSE	Renovate Dean's Offices in Centennial Hall (New).		X	Modify existing space in Centennial Hall	\$200,000	Provost	Completion of renovations	5.4 (New)