PREFACE

The process of creating the present strategic plan began during the College summer leadership retreat in 2013. The participants – senior university leadership, dean’s staff members, selected faculty members, and department chairs and associate chairs -- were provided with broad goals and a framework that defined the outlook for the College. The participants then took part in a series of discussions and breakout sessions to identify areas of concentration and promise that the College should pursue to achieve the goals.

Following the summer 2013 retreat, in the fall of 2013, the College of Engineering Board of Advisors was also engaged to add its input to the identified areas and to identify ways in which board members could help the College in reaching its goals. Committees were formed to address specific points of the plan, and board members participating in the committees met again in December to discuss means of achieving the goals. A set of initiatives with the framework of the College plan were developed by the board in its early 2014 meeting.

Meanwhile, each of the College departments was asked to create a department-level strategic plan within the framework that was laid out during the 2013 leadership summer retreat. These plans are intended to delineate how each department would contribute toward attaining the overall goals of the College. The descriptions of framework of the College plan and an overview of the departmental strategic plans were presented to the President and Provost, and to peers at a leadership meeting in early 2014.

Finally, the dean, associate and assistant deans, and chairs all were quite involved in the University’s planning process, and information and ideas from those meetings were also taken into account in developing the current College plan. They all have contributed into formation and refinement of the plan that is presented here. As result, the present plan has synergy and congruency with the Guiding Themes of the University: 1) Health and Human Conditions; 2) Sustainable Urban Communities; 3) Global Environmental Impact; 4) Data-driven Discovery and Enhancement of Knowledge.

The plan lays the groundwork for the College’s progression into the next decade. Goals and strategies outlined in this document are to contribute to attaining the national university excellence in teaching and research and to increase the number of highly qualified engineers to meet the needs of the state and nation. By no means, the process ends with this document. This will be a living plan and the results of its implementation will be closely monitored and periodic refinements will be made to make sure that the set goals are achieved.

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GOALS

This strategic plan aims to achieve two crucial and overarching goals:

Goal 1: Contribute to attain the national research university level of excellence in education and research

Goal 2: Increase the number of highly qualified engineering graduates to help meet the engineering needs of the state and the nation

The University of Texas at Arlington (UT Arlington) has been designated as one of the select universities in the state of Texas as an emerging research university that can become eligible for receiving proceeds from the National Research University Fund (NRUF), if it meets certain criteria, the details of which are given in Appendix A of this document. The College of Engineering (COE) is fortunate to be in a leading position to contribute significantly toward UT Arlington achieving the criteria. Naturally, achieving this goal will allow the COE to be recognized nationally as a leading college, excelling in engineering research and education. It will also pave the way toward greater global recognition and stature of the College.

The Texas Workforce Commission projects that during the next 10 years an additional 88,000 new engineers will be needed for the growth of the economy of the state. By setting Goal 2, the COE at UTA takes on this challenge to significantly contribute to this rising need.

1 GOAL 1: ATTAIN NATIONAL UNIVERSITY LEVEL OF EXCELLENCE IN TEACHING AND RESEARCH

Since there is no globally accepted set of criteria that defines the “national research university”, one may opt to carefully examine what has been proposed by the Texas Legislature (i.e., Texas House Bill 51) and determine a reasonable and optimized set of criteria that would guide the COE’s contribution to UT Arlington achieving National Research University status\(^1\). The NRUF criteria set by the Texas legislature are aimed at determining whether the university has attained: A) excellence in attracting top-level undergraduate students; B) excellence in graduate education; C) a high level of externally funded research activity; and D) excellence in garnering community support through endowments. Hence, to achieve Goal 1, four major objectives

\(^1\) A list of the criteria is presented in Appendix A of this document.
relating to these criteria are proposed. In the following, a number of strategies for meeting the objectives and assessing progress toward achieving them are described.

### 1.1 OBJECTIVE A: EXCEL IN ATTRACTING TOP-LEVEL UNDERGRADUATE STUDENTS

The COE undergraduate excellence initiative will focus on means and methods that will attract high achieving students.

#### 1.1.1 Strategy A1: RECRUIT HIGH ACHIEVING FRESHMEN

Based on NRUF criteria, assessment of the achievement level of the undergraduate students in an institution is measured by their standardized test scores. Specifically, it is required that at least 50% of the first-time entering freshman class students at the institution are in the top 25 percent of their high school class, or the average SAT score of first-time entering freshman class students at or above the 75th percentile of SAT scores was equal to or greater than 1210 (consisting of the Critical Reading and Mathematics Sections) or the average ACT score of first-time entering freshman class students at or above the 75th percentile of ACT scores was equal to or greater than 26. Consistent with these NRUF criteria, we set the objective that each year at least 50% of first-time freshman engineering students must meet either one of these two criteria. To achieve this, we will work to provide scholarships and financial incentives for high school students who meet the above qualification. Our recruitment and outreach activities will also emphasize our focus on attracting such students. We will target our development activities for securing scholarships toward this objective.

#### 1.1.2 Strategy A2: INTEGRATE INDUSTRIAL EXPERIENCE IN UNDERGRADUATE CURRICULUM

Most of the high achieving and talented students who choose engineering want to gain industrial experience, as it helps them understand the practice of engineering and enhances their chances of getting their desired job after graduation. The COE departments will work with industrial partners and UTARI to increase the opportunities for industrial internships and industry sponsored projects for senior-year capstone design courses. Participation in industrial internships will be formally recognized and given credit by integrating such courses toward the degree requirement. We will publicize and inform prospective students about this feature of our undergraduate curriculum to attract high achieving students.

#### 1.1.3 Strategy A3: TARGET RECRUITING FROM HIGH RANKED HIGH SCHOOLS
We will identify high schools that have an excellent track record of preparing their graduates for college. For this purpose, we will use standardized test scores and college acceptance rates as metrics for identification of high performing high schools. Visits by the College recruiter, faculty, and students to area high schools would give priority to those that are highly ranked. Further, we will engage science teachers and academic counselors from higher ranked high schools in campus visits and other activities that provide an opportunity for introducing the College’s strengths to them. Additionally, we will recruit high school interns for summers from the high ranked schools.

1.1.4 STRATEGY A4: ESTABLISH OVERSEAS STUDY OPPORTUNITY

Highly qualified students can gain a competitive advantage by having international experience and exposure to other cultures and learning environments. The college will seek collaborations with universities abroad which have high standards of instruction to place students for completing part of their degree requirement abroad. The prescribed courses completed by the students at the collaborating institutions abroad will be applied toward their degrees.

1.1.5 STRATEGY A5: SUPPORT STUDENT PARTICIPATION IN EXTRAMURAL COMPETITION AT STATE, NATIONAL AND INTERNATIONAL LEVELS

Recent success of our students in competitions at national and international levels has unequivocally proven their excellence. Informing prospective students of such successes will encourage highly qualified students to choose the UT Arlington COE for their undergraduate study. Additionally, we will establish a systemic approach to selecting and nominating outstanding undergraduate students for competitive and high visibility competitive awards (e.g., Goldwater Scholars, Whitaker International Scholars, etc.).

1.1.6 ASSESSMENT PROCESS FOR ACHIEVING OBJECTIVE A

Several metrics will be used to measure progress toward achieving Objective A (i.e., Excel in Attracting Top Level Undergraduate Students). On an annual basis, we will measure the following metrics:

a) Percentage of first-time in college (FTIC) freshman class engineering students who ranked in the 25% of their high school class.

b) The average SAT score of FTIC freshman class at or above the 75th percentile

c) The average ACT score of FTIC freshman class at or above the 75th percentile

The NRUF criteria regarding the undergraduate requires that the University, for two academic years preceding the state fiscal year for which the NRUF appropriation is made, attains 50%
for metric a) and 1210 for metric b) or 26 for metric c). Hence, the COE will aim to meet and exceed these minimum levels every year.

Three-year trends for the above metrics will be computed and used as part of the assessment process. The information will be analyzed and necessary adjustments to the recruiting strategies will be made.

1.2 OBJECTIVE B: EXCEL IN GRADUATE EDUCATION

Three measures of excellence in graduate education are required as part of qualifying for NRUF status. These measures have to be achieved for two consecutive academic years preceding the state fiscal biennium and they are: 1) the total number of Ph.D.’s awarded must be at least 200; 2) the 10-year research doctoral student graduation rate must be at least 58%; and 3) 5-year graduation rate for M.S. degree students must be at least 56%. While these metrics are applied as the university-level measure of performance, the COE is a major contributor toward meeting and exceeding these metrics for UT Arlington. Hence, corresponding levels have to be set for the COE.

The COE currently graduates about 30% of total number of annual Ph.D. graduates from the University. The average number of annual Ph.D. graduates from UT Arlington for the past three years is 146. Hence, a minimum of 37% increase in the number of doctoral degrees awarded by UT Arlington is needed to reach the required minimum of 200 Ph.D. graduates per year. Therefore, the COE also needs to increase its doctoral degree graduation at least by 37%. The following strategies are aimed at increasing the number of doctoral degrees awarded by the COE.

1.2.1 STRATEGY B1: ENHANCE AWARENESS ABOUT COE’S DOCTORAL PROGRAM THROUGH UP-TO-DATE AND EASY-TO-NAVIGATE WEBPAGES

A recent survey of newly admitted graduate students revealed that most students chose to come to UT Arlington based almost entirely on the information that they found on our webpages. Hence, it is paramount that these pages accurately reflect up-to-date accomplishments of our faculty and students. Further, the admission requirements and application process on the web needs to be presented in a clear and concise way. Departments will be encouraged to adopt a pre-application processing of doctoral applicants that is free of charge to the applicants. This will provide a rapid way of identifying applicants who are highly qualified and allow interested faculty to recruit them. Hence, it will increase the likelihood of identifying students whose background and interest are aligned with the faculty and that can lead to successful recruitment of additional qualified doctoral students.
1.2.2 **STRATEGY B2: MAKE EXPEDITIOUS PROCESSING OF DOCTORAL ADMISSION APPLICATIONS A HIGH PRIORITY**

The processing of doctoral applications will be given high priority to allow rapid response to the applicants. Prompt response to applicants who qualify for admission may encourage them to join us for their doctoral studies. For this purpose, the current review duration of each doctoral application will be examined and possible efficiencies to expedite the process and enhance the quality of reviews will be implemented.

1.2.3 **STRATEGY B3: LEVERAGE ENHANCED GRADUATE TEACHING ASSISTANT (EGTA) POSITIONS TOWARD INCREASING DOCTORAL DEGREE PRODUCTION**

Current policy for assignment of EGTA s allows that when an EGTA slot becomes available, either through new allocations to the College or when a holder of the position vacates it, the vacant position must be assigned to an incoming Ph.D. student or a student who has successfully entered into doctoral candidacy. Also, under current policy the duration of assignment of the EGTA to a doctoral student is left to the discretion of the departments. A review committee will be formed to examine the outcome of these policies – as they have been in place for a number of years – and efficiencies that may be gained from modifications of these policies. Also, the current practices of the departments in regard to the duration, expectation, and assignment of these positions will be discussed and best practices shared to help leverage the EGTA position toward increasing the recruitment of doctoral students. EGTA positions should be awarded to the highly qualified applicants, as they are most likely to complete their doctoral degrees.

1.2.4 **STRATEGY B4: SUPPORT GRANT ACTIVITIES AIMED AT SECURING FUNDS FOR DOCTORAL TRAINING FROM GOVERNMENT AGENCIES, CORPORATIONS, AND FOUNDATIONS**

Faculty members will be encouraged to submit grant applications aimed at providing support for doctoral students. Examples of such programs are Graduate Assistant for Areas of National Need (GAANN) by the Department of Education and NSF’s Research Traineeship Program (NRT). Additionally, eligible doctoral students will be encouraged to apply for individual predoctoral support from funding agencies such as the Ford Foundation Predoctoral Fellowship or the doctoral fellowship program of the National Institutes of Health.

1.2.5 **STRATEGY B5: CREATE NEW MULTIDISCIPLINARY DOCTORAL DEGREE PROGRAMS IN THE AREAS OF NATIONAL NEED.**
The COE has seven well-established departments covering broad areas of engineering. In addition, UT Arlington has six other colleges that cover a large array of disciplines, covering business to nursing to liberal arts. There is ample opportunity to create new doctoral degree programs that take advantage of this wealth of disciplines by integrating the available courses and research expertise to train doctoral students at the highest level to address national needs in multidisciplinary discoveries. Examples of such multidisciplinary doctoral programs are application of data mining and processing in optimizing health care delivery, use of robotics for enhanced teaching in special education, and computer modeling and simulation in molecular biology.

1.2.6 STRATEGY B6: CONTINUE IMPROVEMENTS OF M.S. DEGREE INSTRUCTION AND CURRICULUM DEVELOPMENT

The current 5-year degree graduation rate for M.S. in the COE is over 80%. This readily meets the set criterion for M.S. graduation rate. However, each department within COE will be asked to examine and – if needed – streamline the M.S. degree curriculum and other processes to ensure the continuation of timely graduation of our M.S. degree students.

1.2.7 STRATEGY B7: STREAMLINE DOCTORAL DEGREE REQUIREMENTS

The available data for 10-year graduation rates for the COE are from 2001, 2002, and 2003 and are 48.4%, 53.1%, and 51.5%, respectively, averaging to 51%. The UT Arlington 10-year doctoral graduation rate, as reported in April 2014 by the Texas Higher Education Coordinating Board stood at 40% and 51% for fiscal year 2012 and 2013 respectively. Hence, the COE rate has to increase by at least 7%. COE departments will be asked to review all aspects of their doctoral programs, including didactic course requirements, research credit hours, and doctoral examinations to determine if any modification can be made to enhance doctoral graduation rates.

1.2.8 ASSESSMENT FOR ACHIEVING OBJECTIVE B

Consistent with the metrics used for NRUF eligibility, we will use the following metrics to assess progress toward Objective B (i.e., Excel in Graduate Education):

a) Annual doctoral degrees conferred,

b) Five-year graduation rate for M.S. students, and

c) Ten-year graduation rate for doctoral students.

These metrics will be computed at the conclusion of each academic year and compared with the annual desired levels that are set for them. Specifically, metric a) needs to have an 8% of annual cumulative increase to help UT Arlington attain the 200 doctoral graduate level per year, after 5 years. For metrics b) and c), the graduation rates will be compared with the
NRUF-specified thresholds of 56% and 58%, respectively. Further, trends in all three metrics will be computed based on a 3-year moving average to predict trends.

1.3 OBJECTIVE C: ATTAINING AND MAINTAINING A HIGH LEVEL OF EXTERNALLY FUNDED RESEARCH ACTIVITY

One important criterion for becoming eligible for NRUF is the level of annual restricted research expenditure (RRE). This level is to equal or exceed $45M. The COE has, on the average over the past three years, contributed approximately 31% of the total UT Arlington’s RRE. As of April 2014, UT Arlington’s RRE needed to grow at least by 40% to meet this criterion. Assuming the same rate of contribution from the COE, the RRE of the COE also has to grow at a minimum cumulative rate of 8% per year. The following strategies are proposed to achieve this rate of growth.

1.3.1 STRATEGY C1: IDENTIFY RESEARCH AREAS WITH HIGH GROWTH POTENTIAL

The COE leadership has identified four broad areas of research as the high growth areas for the next five years. They are: 1) Energy, 2) Environment, 3) Health Care, and 4) Security. The selection of these areas was based on the current research strength of the COE faculty and the national need. Specifically, a report issued by the National Research Council in 2012 identified these four areas as areas of need for the prosperity of the U.S. This report was written in response to a request from the U.S. Congress to the National Academies to “assess the competitive position of America’s research universities, both public and private.” Hence, the COE will focus efforts toward the growth of research in these areas.

1.3.2 STRATEGY C2: FOSTER RESEARCH GROWTH IN 4 SELECTED AREAS BY TARGETED GROWTH OF FACULTY

The COE departments have developed strategic plans during the academic year 2013-2014. Through these plans, they have identified in which of the four areas they plan to grow. The recruitment of new faculty is a significant element of growing research activities. Hiring of new faculty will be focused on the four areas of research and aligned with the departmental strategic plan.

1.3.3 STRATEGY C3: WHEN ESTABLISHING FACILITIES AND ACQUIRING EQUIPMENT, TARGET GROWTH OF RESEARCH IN THE 4 SELECTED AREAS

As described later in this document (page 13) under the strategies for Goal 2, the COE will expand its enrollment at all levels significantly. To accommodate this planned expansion, new facilities must be added to the College which will include teaching and research laboratories.
The growth of such facilities will be primarily purposed toward the four selected areas of research growth.

1.3.4 STRATEGY C4: INCREASE RESEARCH ACTIVITIES BY FOSTERING COLLABORATION

Research clusters covering various sectors of the four selected areas of research growth will be encouraged and promoted. This will be achieved in multiple ways including conducting meetings where faculty members with similar and synergistic research interests present their research activities to stimulate collaboration both within and outside the University. Particular emphasis will be placed on collaborating with UTARI in both development of new technologies and transfer of developed technologies by COE faculty to industry. Such sessions will be held periodically throughout the year. In particular, faculty will be encourage to establish multi-disciplinary research centers that are supported by various funding agencies such as the National Science Foundation Industry and University Collaborative Research Center.

1.3.5 STRATEGY C5: PROVIDE TRAINING FOR PROPOSAL PREPARATION AND SUBMISSION TO FACULTY

Throughout the year special workshops and training sessions will be held for faculty – particularly junior faculty – to facilitate their proposal preparation and submission. These workshops will be conducted both by the faculty members who have a record of successfully winning grants as well as outside experts or representatives of the granting agencies. Further, periodically, junior faculty members will be sponsored for visits with program directors at various funding agencies in Washington, DC.

1.3.6 ASSESSMENT PROCESS FOR ACHIEVING OBJECTIVE C

While the key NRUF metric for Objective C (i.e., Attaining and Maintaining a High Level of Externally Funded Research Activity) is the level of annual RRE, several other metrics will be used as follows. All metrics will be computed annually and broken down by the four selected areas of research focus:

a) Total research funding received
b) Annual restricted research funding received
c) Number of proposals submitted to industry, State, and Federal agencies
d) Number of proposals funded by industry, State, and Federal agencies
e) Number of industrial research contracts funded
f) Total amount of industrial research contracts received
g) Number of intra-college multi-departmental collaborative proposals submitted
h) Number of intra-college multi-departmental collaborative proposals funded
i) Number of inter-college collaborative proposals submitted
j) Number of inter-college collaborative proposals funded.
k) Total research expenditure by the COE faculty (whether the proposal is submitted through COE or other entities)
l) Restricted research expenditure
m) Per faculty total research expenditure
n) Per faculty restricted research expenditure

A 3-year moving average will be used to evaluate the new annual values of the metrics against past performance.

1.4 **OBJECTIVE D: EXCEL IN GARNERING COMMUNITY SUPPORT THROUGH ENDOWMENTS.**

The NRUF eligibility criterion for this objective calls for a total endowment of $400M for the university. As of April 2014, the level of endowment for UT Arlington as reported by the Texas Higher Education Coordinating Board stands at $102M. Hence, substantially more endowment funds need to be secured to reach the NRUF eligibility level. During the five-year period of this plan, the COE will pursue the following strategies to contribute to UT Arlington reaching the $400M.

1.4.1 **STRATEGY D1: ENGAGE ALUMNI TO PARTICIPATE IN COLLEGE ACTIVITIES AND RECOGNIZE THEIR ACCOMPLISHMENTS**

This initiative started in academic year 2013-2014 in the College by a multi-pronged approach. First, the members of the College Board of Advisors (BOA) were engaged in participating in this initiative. A subcommittee consisting of BOA members and members of the faculty has started activities that include identifying and reaching out to COE alumni who are able to contribute to the College activities either financially or by volunteering their time to the College. The committee has also designed and prepared business cards and lapel pins to make connections with alumni in public places easier. Second, the College, in collaboration with the College of Business, has held two meetings for the alumni in the Houston area and plans are under way to continue these meetings in Houston and possibly other metropolitan areas where a significant number of alumni reside. Third, the COE has recognized its distinguished alumni annually through the University Distinguished Alumni Gala event and will continue to do so.
Another initiative that will be pursued is to hold events for recognizing the accomplishments of alumni by the departments. Following a successful model that the Department of Industrial and Manufacturing Systems (IMSE) already has in place, other departments within the College of Engineering will be encouraged to consider holding special events to recognize their alumni. At the College level, last year, a 50-year reunion luncheon for the COE graduates was held for the first time. This new tradition will continue annually.

1.4.2 STRATEGY D2: ENGAGE WITH LOCAL INDUSTRY TO DETERMINE AND MEET THEIR EDUCATIONAL NEEDS

Activities related to this strategy are already under way. Engagements with local industry have led to efforts for establishing an undergraduate program in Architectural Engineering in the Department of Civil Engineering and in collaboration with the School of Architecture. Also, similar engagement has led to establishment of undergraduate and graduate training program certificates in unmanned vehicle systems (UVS). We will continue this initiative and take advantage of being located in the DFW area by visiting with local industry to determine their educational needs and work toward meeting them.

1.4.3 STRATEGY D3: ACTIVELY PURSUE OPPORTUNITIES TO NAME COE FACILITIES

The COE already has a number of attractive naming opportunities. These include vistas in the Engineering Research Building, as well as conference rooms, laboratories, and classrooms in all COE buildings. Indeed, the naming of two major buildings, the Engineering Research Building and the Engineering Lab Building, are also two major opportunities that remain available. All of these opportunities will be provided to both potential corporate and individual donors. In addition, as described under the strategies for Goal 2 (starting on page 13), the College is expected to significantly grow in enrollment and that necessitates adding a new building to the COE building cluster. This will provide additional opportunities for naming the new spaces within the building and the building itself.

1.4.4 STRATEGY D4: ACTIVELY PURSUE NAMING THE COLLEGE AND DEPARTMENTS

All seven departments within the COE are available for naming. Further, the College itself is available for naming. These opportunities will be actively presented to corporate and individual donors. In particular, it is expected that each department will take a leading role in identifying and engaging donors for naming of the department.

1.4.5 ASSESSMENT PROCESS FOR ACHIEVING OBJECTIVE D
The level of philanthropic funds received by the COE will be monitored monthly, quarterly, and annually. The data will be used to assess the efficacy of the proposed strategies and identify any needed correction.

2 GOAL 2: INCREASE THE NUMBER OF HIGHLY QUALIFIED ENGINEERING GRADUATES TO HELP MEET THE ENGINEERING NEEDS OF THE STATE AND THE NATION

In late 2012, The University of Texas System formed a Task Force that included all the deans of the colleges of engineering of the System components. In addition to the engineering deans, Task Force members included individuals from industry, academic leaders, and members of the UT System Board of Regents. The charge for the Task Force was to examine the opportunities and challenges related to engineering education in the State Texas in the 21st Century. Since its formation, the Task Force held a number of meetings and submitted a draft of its final report in November 2013 to the UT System. Using the projections developed by the Texas Workforce Commission, the Task Force established that in the current decade the colleges of engineering in the UT System components need to double their number of graduates to meet the needs of the state. During the 5-year horizon of this plan, the COE will significantly contribute toward meeting this need. In this regard, the following objectives are set.

- **Objective E**: The COE will increase the number of conferred bachelor’s degrees by 41%
- **Objective F**: The COE will increase the number of conferred master’s degrees by 54%
- **Objective G**: The COE will increase the number of conferred doctoral degrees by 68%

These objectives reflect part of the growth proposed in the plan that the COE has developed and submitted to the Task Force. In the following the proposed strategies for meeting the above objectives are described. It is critical to note that attainment of Goal 2 is only possible if the needed resources (e.g., adequate operating funds, faculty members, staff members, and laboratory and classroom space) are provided in a timely fashion for the projected growth.

2.1 OBJECTIVE E: THE COE WILL INCREASE THE NUMBER OF CONFERRED BACHELOR’S DEGREES BY 41%

To achieve this objective, two sets of strategies are needed. The first set are those strategies aimed at increasing enrollment in the baccalaureate degree programs. The second set are those aimed at increasing the retention and rate of success of the students.

2 Please note labels for objectives in this section are continuation of the labels used in Section 1
The strategies aimed at increasing the enrollment are highly synergistic with those proposed for achieving Objective A (i.e. Excel in Attracting Top Level Undergraduate Students, pages 4-5). Hence, achieving those objectives will contribute to achieving Objective E. In addition, the following strategies will be implemented.

2.1.1 STRATEGY E1: ATTRACT TRANSFER STUDENTS WITH HIGH QUALIFICATIONS

Nearly half of the undergraduate students in the College are transfer students from two-year institutions. As part of this strategy, we will work closely with the two-year institutions in the Dallas-Fort Worth Metroplex to identify high achieving students with an interest in engineering. By organizing campus tours and direct personal communication regarding COE faculty and student accomplishments with such prospective students, we will make them aware of the opportunities in the COE. We also will make students and advisors at the colleges aware of various COE events such as the Distinguished Speaker Series and Engineering Week celebrations.

An important element in attracting transfer students is effective articulation of the community college curriculum and our curriculum. To ensure quality and improve the articulation process, we will regularly meet with the administrators and advisors of the community colleges. We will also work to make sure that the transfer process is well described in our literature and webpages as changes in our curriculum are implemented or new programs established.

2.1.2 STRATEGY E2: ENHANCE RETENTION BY INTRODUCING ENGINEERING MATH INTO UNDERGRADUATE CURRICULUM

Studies have shown that if working knowledge of math skills needed to solve introductory engineering problems is taught to entering freshmen, they can successfully complete many freshman and sophomore level engineering courses. Having the needed math skills to progress through these courses, the students can postpone taking calculus courses until their junior and senior years. This will give students better insight and motivate them to excel at completing the calculus courses needed for completion of their degrees.

To achieve this objective, a faculty task force comprised of those experienced in undergraduate teaching and advising will be formed to devise means of introducing this course into the undergraduate curriculum for the departments.

2.1.3 STRATEGY E3: INCORPORATE NEW LEARNING AND TEACHING METHODS

Ubiquitously, computer technology affords us many innovations toward improved teaching and learning. One example of such innovation is recording class lectures and making
them available to students for their review at all times during the semester. We will work toward recording and streaming online undergraduate engineering courses. In addition, engineering faculty members will be encouraged to use their recorded lectures to examine the effectiveness of the “flipped” classroom teaching method.\(^3\)

Other innovations in teaching, such as the use of affordable new electronic boards and electromechanical experiment kits which permit students to experiment and learn concepts without having to use laboratory facilities, will be explored.

### 2.1.4 STRATEGY E4: DEVELOP NEW UNDERGRADUATE DEGREE PROGRAMS THAT ARE NEEDED BY STATE INDUSTRY

Part of the projected need for new engineers by the Texas Work Force Commission relates to engineering degrees that the COE currently does not offer. To contribute toward meeting these needs, new undergraduate degree programs will be considered and developed. An example of activities related to this strategy which is already under way is the development of the Architectural Engineering B.S. degree that has been developed and is currently awaiting approval by the Texas Higher Education Coordinating Board. Another degree under consideration is the establishment of a Resource Engineering Department which will include chemical and petroleum specialties.

### 2.1.5 ASSESSMENT PROCESS FOR ACHIEVING OBJECTIVE E

The metrics that will be used to assess progress toward achieving Object E (i.e., The COE Will Increase Number of Conferred Bachelor Degrees by 41%) are as follows:

- a) Number of B.S. degrees conferred during December and May commencements
- b) Annual Fall enrollment of undergraduate students
- c) First-year student return rate
- d) Four-year graduation rate
- e) Six-year graduation rate

A 3-year moving average will be used to evaluate the new annual values of the metrics against past performance.

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\(^3\) This is a teaching paradigm where the students study the lecture content for each class via online streaming and the faculty member does not lecture during the class time, instead solving instructive problems to raise student learning to higher levels.
2.2 **OBJECTIVE F: THE COE WILL INCREASE THE NUMBER OF CONFERRED MASTER’S DEGREES BY 54%**

The strategies aimed at achieving this objective will be focused on increasing enrollment of highly qualified students.

2.2.1 **STRATEGY F1: RECRUIT FROM DOMESTIC AND INTERNATIONAL INSTITUTIONS WITH EXCELLENT REPUTATIONS**

Each year the College will organize a number of campus visits (i.e., Texas Swing) to other universities around the state to create awareness about the graduate degrees, and in particular master’s degrees, that we offer. Additionally, faculty who plan to visit abroad and are interested in recruiting graduate students as part of their travel will be asked and incentivized to do so.

2.2.2 **STRATEGY F2: DEVELOP M.S. DEGREE PROGRAMS WITH EMPHASIS IN THE AREAS OF NEED**

Two types of new and innovative M.S. degrees will be considered, based on the assessment of need by industry in Texas and nationally. First, given the breadth of curriculum and expertise that is available in the current seven departments in the COE, it is likely that new curriculum for M.S. degree can be formulated by bundling courses to offer new focus areas or tracks under the existing M.S. degrees. An example of such an approach is the recent development of the M.S. degree in Electrical Engineering with Emphasis on Controls. Another example that is currently under consideration in the Bioengineering Department is the creation of an M.S. Degree in Biomedical Engineering with Emphasis on Biostatistics. The second type of new M.S. degree is the creation of degrees that are offered through the existing COE departments, but with a new title. An example of such approach is the creation of the Master of Construction Management that was approved by the Texas Higher Education Coordinating Board in the spring of 2014 and is currently awaiting the last needed approval by the Southern Association of Colleges and Schools (SACS).

2.2.3 **ASSESSMENT PROCESS FOR ACHIEVING OBJECTIVE F**

2.3 The metrics that will be used to assess progress toward achieving Object F (i.e., The COE Will Increase the Number Of Conferred Master’s Degrees By 54%) are as follows:

a) Number of M.S. degrees conferred during December and May commencements
b) Annual Fall enrollment of M.S. students
c) Five-year graduation rate
A 3-year moving average will be used to evaluate the new annual values of the metrics against past performance.

### 2.4 OBJECTIVE G: THE COE WILL INCREASE THE NUMBER OF CONFERRED DOCTORAL DEGREES BY 68%

The strategies B1 through B4 described above aimed at increasing the doctoral degree production are entirely applicable toward achieving this objective.

#### 2.4.1 ASSESSMENT PROCESS FOR ACHIEVING OBJECTIVE G

The metrics that will be used to assess progress toward achieving Object G (i.e., The COE Will Increase Number of Conferred Doctoral Degrees by 68%) are as follows:

- a) Number of Ph.D. degrees conferred during December and May commencements
- b) Annual Fall enrollment of doctoral students
- c) Ten-year graduation rate for doctoral students
- d) Five-year graduation rate for doctoral students

In addition to annual tracking of these metrics, a 3-year moving average of them will be used to evaluate the new annual values of the metrics against prior year performances.
Appendix A

Coordinating Board Rules

Chapter 15. National Research Universities
Subchapter C. National Research University Fund

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15.40. Purpose

This subchapter establishes rules for eligible institutions to receive funds under the National Research University Fund, which is established to support emerging research universities to achieve national prominence as major research universities.

15.41. Authority

Authority for this subchapter is provided by Texas Education Code, Section 62.145 - 62.146, which directs the Coordinating Board to adopt standards for the purposes of determining an institution’s eligibility for funding from the National Research University Fund (NRUF) and authorizes the Board to adopt rules for the standard methods of accounting and standard methods of reporting information for the purpose of determining eligibility of institutions to receive funds under the NRUF.

15.42. Definitions

The following words and terms, when used in this subchapter, shall have the following meanings, unless the context clearly indicates otherwise.

(1) Coordinating Board or Board--The Texas Higher Education Coordinating Board.

(2) Doctoral degree--An academic degree beyond the level of a master's degree that typically represents the highest level of formal study or research in a given field, e.g., a Doctor of Philosophy, Doctor of Education, Doctor of Musical Arts, Doctor of Engineering, Doctor of Public Health, Doctor of Nursing Practice.

(3) Eligible institution--A general academic teaching institution that is eligible and meets the Coordinating Board's standards to receive distributions of money under
the NRUF.

(4) Emerging research university--A public institution of higher education designated as an emerging research university under the Board's accountability system. Endowment funds--Funds treated as total endowment funds under the Board's accountability system.

(5) Fund--The National Research University Fund (NRUF).

(6) General academic teaching institution--As defined in Texas Education Code, §61.003.

(7) Graduate-level program--Degree programs leading to master's, professional, and/or doctoral degree.

(8) Master's degree--An academic degree that requires the successful completion of a program of study of at least 30 semester credit hours or the equivalent at the post-baccalaureate, graduate, or professional level.

(9) Master's Graduation Rate--The Master's Graduation Rate is the percent of students in an entering fall and spring cohort for a specific degree program who graduate within five years.

(10) Doctoral Graduation Rate--The Doctoral Graduation Rate is the percent of students in an entering fall cohort for a specific degree program who graduate within 10 years. Doctoral graduation rates do not include students who received a master's degree.

(11) Restricted funds (restricted awards)--As defined in §13.122 of this title (relating to Definitions).


15.43. Eligibility

(a) The eligibility criteria for a general academic teaching institution to receive distributions from the Fund include: having an entering freshman class of high academic achievement; receiving recognition of research capabilities and scholarly attainment of the institution; having a high-quality faculty; and demonstrating commitment to high-quality graduate education.

(b) A general academic teaching institution is eligible to receive an initial distribution from the Fund appropriated for each state fiscal year if:

(1) the institution is designated as an emerging research university under the coordinating board's accountability system;
(2) in each of the two state fiscal years preceding the state fiscal year for which
the appropriation is made, the institution expended at least $45 million in
restricted research funds; and

(3) the institution satisfies at least four of the following six criteria:

(A) the value of the institution's endowment funds is at least $400 million in
each of the two state fiscal years preceding the state fiscal year for which
the appropriation is made;

(B) the institution awarded at least 200 doctor of philosophy degrees during each
of the two academic years preceding the state fiscal year for which the
appropriation is made;

(C) in each of the two academic years preceding the state fiscal year for which
the appropriation is made, the entering freshman class of the institution
demonstrated high academic achievement as reflected in the following
criteria;

(i) At least 50 percent of the first-time entering freshman class students at
the institution are in the top 25 percent of their high school class; or

(ii) The average SAT score of first-time entering freshman class students at or
above the 75th percentile of SAT scores was equal to or greater than 1210
(consisting of the Critical Reading and Mathematics Sections) or the
average ACT score of first-time entering freshman class students at or
above the 75th percentile of ACT scores was equal to or greater than 26;
and

(iii) The composition of the institution's first-time entering freshman class
demonstrates progress toward achieving the goals of the Board's Closing the
Gaps report by reflecting the population of the state or the institution's
region with respect to underrepresented students and shows a commitment
to improving the academic performance of underrepresented students. One
way in which this could be accomplished is by active participation in one of
the Federal TRIO Programs, such as having one or more McNair Scholars
in a particular cohort.

(D) the institution is designated as a member of the Association of Research
Libraries, has a Phi Beta Kappa chapter, or is a member of Phi Kappa Phi;
(E) in each of the two academic years preceding the state fiscal year for which the appropriation is made, the faculty of the institution was of high quality as reflected in the following:

(i) The cumulative number of tenured/tenure-track faculty who have achieved national or international distinction through recognition as a member of one of the National Academies (including National Academy of Science, National Academy of Engineering, Academy of Arts and Sciences, and Institute of Medicine) or are Nobel Prize recipients is equal to or greater than 5; or

(ii) The annual number of tenured/tenure-track faculty who have been awarded national or international distinction during a specific state fiscal year in any of the following categories is equal to or greater than 7.

   (I) American Academy of Nursing Member
   (II) American Council of Learned Societies (ACLS) Fellows
   (III) American Law Institute
   (IV) Beckman Young Investigators
   (V) Burroughs Wellcome Fund Career Awards
   (VI) Cottrell Scholars
   (VII) Getty Scholars in Residence
   (VIII) Guggenheim Fellows
   (IX) Howard Hughes Medical Institute Investigators
   (X) Lasker Medical Research Awards
   (XI) cArthur Foundation Fellows
   (XII) ndrew W. Mellon Foundation Distinguished Achievement Awards
   (XIII) National Endowment for the Humanities (NEH) Fellows
   (XIV) National Humanities Center Fellows
   (XV) National Institutes of Health (NIH) MERIT
   (XVI) National Medal of Science and National Medal of Technology winners
   (XVII) NSF CAREER Award winners (excluding those who are also PECASE winners)
   (XVIII) Newberry Library Long-term Fellows
   (XIV) Pew Scholars in Biomedicine
   (XX) Pulitzer Prize Winners
   (XXI) nners of the Presidential Early Career Awards for Scientists and Engineers (PECASE)
   (XXII) ort Wood Johnson Policy Fellows
   (XXIII) Searle Scholars
   (XXIV) Sloan Research Fellows
   (XXV) Woodrow Wilson Fellows

(iii) In lieu of meeting either clause (i) or (ii) of this subparagraph, an institution
may request that a comprehensive review of the faculty in five of the institution’s Doctoral degree programs be conducted by external consultants selected by Coordinating Board staff in consultation with the institution and said review must demonstrate that the faculty are comparable to and competitive with faculty in similar programs at public institutions in the Association of American Universities. Costs for the review shall be borne by the institution. This review is only available if the institution has already met or, as determined by Coordinating Board staff, is on track to meet three of the other eligibility criteria listed in subparagraphs (A) - (D) of this paragraph;

(F) In each of the two academic years preceding the state fiscal year for which the appropriation is made, the institution has demonstrated a commitment to high-quality graduate education as reflected in the following:

(i) The number of Graduate-level programs at the institution is equal to or greater than 50;

(ii) The Master’s Graduation Rate at the institution is 56 percent or higher and the Doctoral Graduation Rate is 58 percent or higher; and

(iii) The institution must demonstrate that the overall commitment to five Doctoral degree programs, including the financial support for Doctoral degree students, is competitive with that of comparable high-quality programs at public institutions in the Association of American Universities. The five Doctoral degree programs selected for this review must be those selected in subparagraph (E)(iii) of this paragraph or, if subparagraph (E)(iii) of this paragraph is not chosen by the institution, then any five Doctoral degree programs at the institution. Costs for the review shall be borne by the institution.

15.44. Accounting and Reporting

(a) Emerging research universities shall report data pertaining to this subchapter according to the procedures outlined in the Coordinating Board’s reporting manuals.

(b) As soon as practicable in each state fiscal year, the Coordinating Board shall certify to the comptroller and the legislature verified information relating to the criteria established by Texas Education Code §62.145, which are addressed in this subchapter, to be used to determine which institutions are eligible for distributions of money from the Fund.

(c) Information submitted by institutions for the purpose of establishing eligibility is subject to a mandatory audit by the state auditor in accordance with Government Code, Chapter 321. The Coordinating Board reserves the right to request additional audits by the
state auditor as deem necessary and appropriate at any time after an eligible institution begins receiving distributions.