The Undergraduate Curriculum Committee recommends approval of the following:

1. Special Consideration

Dwight Look College of Engineering
BS in Interdisciplinary Engineering
Request for a new degree program
SPECIAL CONSIDERATION
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Dwight Look College of Engineering
BS in Interdisciplinary Engineering
Request for a New Degree Program
January 29, 2015

Dr. Tim Scott, Chair
Undergraduate Curriculum Committee
College of Science
514 Blocker
3257 TAMU
College Station, TX 77843-3257

Dear Dr. Scott,

On behalf of the Dwight Look College of Engineering, I kindly submit the attached documents for your consideration and review. The documents pertain to a new Bachelor of Science in Interdisciplinary Engineering (BS ITDE) degree program.

The BS ITDE degree program consists of 128 semester credit hours (SCH) and is intended to prepare students for careers in emerging, interdisciplinary engineering fields. The degree program is designed to meet the General Criteria of the Engineering Accreditation Commission (ABET) and accreditation will be sought at the appropriate time.

The educational objectives of the BS ITDE degree program are to produce graduates who are prepared to create products, processes, or services that require application of knowledge from fields that are intersections of two or more accepted engineering and/or scientific fields, and advance engineering knowledge and/or practice in emerging Interdisciplinary fields.

The curriculum structure is somewhat novel. It involves a mentored degree plan of study tailored to a student’s personal interests and goals. Students will work closely with the Director of Interdisciplinary Engineering Programs and an Advising Committee to assemble their degree plan. Each degree plan will consist of 66 semester credit hours that satisfy the General Education Core Curriculum and a set of Required Courses, and 62 semester credit hours that will be composed from two or more sequences of engineering courses that span sophomore- to senior-level instruction. When combined, the set of engineering sequences shall define a coherent engineering subject that meets the student’s personal interests and goals.

The Dwight Look College of Engineering seeks the approval to establish this new Bachelor of Science in Interdisciplinary Engineering degree program from the Undergraduate Curriculum Committee. Thank you for your time and attention.

Sincerely,

[Signature]

Valerie Taylor
Senior Associate Dean for Academic Affairs, Regents Professor &
Royce E. Wisenbaker Professor of Computer Science & Engineering
Texas A&M University
New Certificate, Bachelors, Masters, or Doctoral Program
Undergraduate • Graduate • Professional
• Proposal Checklist •

Program request type:  ☒ Undergraduate  ☐ Graduate  ☐ First Professional (e.g., DVM, JD, MD, etc.)

Requested by the Department or Unit of:  Dwight Look College of Engineering

**Program Type, Level, Designation, Title, Description, Hours**

Program Type:  ☐ Certificate Program  ☒ Degree Program

Program Level:  ☐ UG Certificate  ☐ Grad Certificate  ☒ Bachelor  ☐ Master  ☐ Doctoral  ☐ Professional

Degree Designation (i.e., BS, BA, MA, MS, MAgr, MEd, PhD, EdD, etc.)  BS

Title of proposed program:  Bachelor of Science in Interdisciplinary Engineering

Proposed CIP Code (if known):  14.0101.00

Brief program description (provide a catalog description for undergraduate and graduate certificates):
The Bachelor of Science in Interdisciplinary Engineering (BS ITDE) degree program consists of 128 SCH and is intended to prepare students for careers in emerging, interdisciplinary engineering fields. Some examples may include Material Engineering, Robotic Vision, and Energy Engineering. The BS ITDE degree program intends to seek accreditation from ABET at the appropriate time. Guidance and academic advising will be provided through the office of the Director of Interdisciplinary Engineering Programs.

Minimum program semester credit hours (SCH)  Certificates - 12 hours*  Bachelors - 120 hours  Masters - 30 hours

Proposed program hours:  

*12 hours minimum to appear on transcript

Certificate Programs  ☐ Embedded

Students take coursework that will result in a degree and certificate being earned at the same time.

☐ Standalone

Non-degree seeking students take coursework to earn a certificate only (no degrees are awarded).

**Off-Campus or Distance Delivery**

% of Program a student can take off-campus or through Distance Education  Program Start Date  SACSCOC Approval**  When Provost needs to inform SACSCOC

☐ 25%  

☐ 50%  

☐ 80%  

☐ 100%  

Notification Only  6 months before first day of program

Approval Required  6 months before first day of program

Approval Required  6 months before first day of program

**Notification letter arranged through the Vice Provost for Academic Affairs and sent by TAMU President.**

**Program Delivery Mode**

☒ On-campus  

☐ Broadcast / TTVN

☐ Specific off-campus location***

☐ Distance Education / Internet  ☐ In-State  ☐ Out-of-State  Start Date  

☐ Out-of-Country

Will this program be offered with another institution?  ☐ Yes  ☐ No

If yes, contact the Vice Provost for Academic Affairs for additional reporting requirements.

***Is this an approved SACSCOC location?  ☐ Yes  ☐ No

If no, a program prospectus must be sent to SACSCOC. Approved locations as of March 2012: TAMU-Galveston, TAMU-Qatar, University Center-The Woodlands, CityCentre-Houston, Dubai and Saudi Arabia.

**Program Funding**

Has program funding been finalized at the department or college level?  ☒ Yes  ☐ No

If no, explain or attach budget:  

Will new costs for the first five years of the program be under $2 million?  ☒ Yes  ☐ No

Revised 04.11.2014
Texas A&M University
New Certificate, Bachelors, Masters, or Doctoral Program
Undergraduate • Graduate • Professional
• Proposal Checklist •

If new costs exceed $2 million, coordinating board approval is required.
Submitted by (Contact Person):

Dr. John E. Hurtado
Name
Director of Interdisciplinary engineering Programs
Title
jehurtado@tamu.edu
Email
979-845-7200
Phone

Certification Statement
By signing below, the Dean of the College certifies the proposed program complies with coordinating board standards. If the program is delivered through Distance Education, the Dean of the College certifies that they are following the Principles of Good Practice for Academic Degree and Certificate Programs and Credit Courses Offered Electronically.

Signature, Department Head or Interdisciplinary Program Chair
John E. Hurtado
Typed or Printed Name

Signature, Department Head or Interdisciplinary Program Chair (If joint program)
Typed or Printed Name

Chair, College Review Committee
Date
Dean of College
Date

Chair, University Curriculum Committee or Graduate Council
Date

Dean of College
Date

Additional Approvals Required: Faculty Senate and President.
Request Form for Bachelor's and Master's Degrees

Following Board action on July 30, 2009, new bachelor's and master's programs that meet the following criteria are automatically approved (Chapter 5, Subchapter C, Section 5.44):

- The program has institutional and governing board approval;
- the program complies with the Standards for Bachelor's and Master's Programs;
- adequate funds are available to cover the costs of the new program;
- new costs during the first five years of the program will not exceed $2 million;
- the program is a non-engineering program (i.e., not classified under CIP code 14); and
- the program will be offered by a university or health-related institution.

A new bachelor's or master's degree program that meets these criteria may be requested using the Certification Form for New Bachelor's and Master's Programs and is automatically approved if no objections are received during the 30-day public comment period. The institution's program inventory will be updated accordingly and a letter of approval will be sent to the institution/System. All other requests for new bachelor's or master's programs must be submitted using the Form for Requesting a New Bachelor's or Master's Degree Programs.

Section 5.45 of the Texas Higher Education Coordinating Board Rules set forth criteria that must be met in developing new bachelor's and master's degree programs. These criteria are show in red.

I. Need

NEEDS ASSESSMENT
Useful resources for developing a degree program proposal can be found at: http://www.thecb.state.tx.us/index.cfm?objectid=C62788D7-DBFD-5C19-BFA9642A88E40A48&flushcache=1&showdraft=1

Use the THECB website, to check program inventory for existing programs within the state http://www.thecb.state.tx.us/InteractiveTools/ProgramInventory/

A. Job Market Need – Provide short- and long-term evidence of the need for graduates in the job market.

The BS ITDE degree program will prepare undergraduate students for careers that cross disciplinary boundaries in emerging fields. Emerging fields are those specializations that combine elements of more than one traditional discipline into a new specialization. Using the national projections developed by the Bureau of Labor Statistics, U.S. Department of Labor, we find there is a demand for students with interdisciplinary engineering degrees. If we take, for example, the interdisciplinary area of architectural engineering (which can be considered a combination of the conventional civil, mechanical, and electrical engineering disciplines), the projections for 2015 indicate a need for 3680 new architectural engineers. The long-term job demand for architectural engineering in 2022 is 13,100 new architectural engineers.

AAR/Webmasters Updated 11/30/2010
Furthermore, an industry survey was conducted to gauge industry interest. The survey included a brief description of the proposed ITDE program along with two simple questions, each with yes or no answers. The TAMU Career Center distributed the survey to 1800 representatives from companies that usually hire engineering students; 263 representatives responded. The first question centered on hiring students with a BS ITDE, for which 67% of the respondents indicated that their company would consider hiring students with a BS ITDE if the student’s study concentration aligned with the available positions. A second question asked if students with a BS ITDE would add value to the company, for which 57% of the respondents indicated that such students would add value to their company workforce.

B. **Student Demand** – Provide short- and long-term evidence of demand for the program.

A recent survey of undergraduates in the Dwight Look College of Engineering (Look College) indicated that 44% of respondents would be interested in the proposed BS in Interdisciplinary Engineering degree. Moreover, 34% indicated they were unsure whereas only 22% indicated they would not be interested. Approximately 1/3 of the Look College undergraduate students responded to this question. Furthermore, there has been strong student interest and enrollment in certificate programs that supplement traditional curriculum in established engineering fields. Currently, certificates are offered in: Energy Engineering, International Engineering, Engineering Systems Management, Engineering Project Management, Engineering Therapeutics Manufacturing, Data Center Engineering Operations, Polymer Specialty, Safety Engineering, and Quality Engineering for Regulated Medical Technologies. While certificates are very popular, they provide only small steps to preparing students to productively practice in emerging, interdisciplinary engineering fields. For the past five years, the number of certificates awarded to engineering students has grown from 66 in 2008 to 167 in 2013, corresponding to a growth by a factor of 1.5 over a five-year period.

C. **Enrollment Projections** – Use this table to show the estimated cumulative headcount and full-time student equivalent (FTSE) enrollment for the first five years of the program. (Include majors only and consider attrition and graduation.)

<table>
<thead>
<tr>
<th>Year</th>
<th>Change of Major/Transfers</th>
<th>New Students</th>
<th>Attrition</th>
<th>Graduation</th>
<th>Cumulative Headcount</th>
<th>Cumulative* FTES (New only)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>25</td>
<td>0</td>
<td>0</td>
<td>25</td>
<td>750</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>25</td>
<td>1</td>
<td>0</td>
<td>49</td>
<td>750</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>25</td>
<td>1</td>
<td>0</td>
<td>73</td>
<td>750</td>
</tr>
<tr>
<td>4</td>
<td>0</td>
<td>25</td>
<td>1</td>
<td>20</td>
<td>77</td>
<td>750</td>
</tr>
</tbody>
</table>
The Look College currently admits entering freshmen into the general engineering program whereby most students follow a common first-year engineering curriculum. The same first-year curriculum will be required for the BS ITDE degree program. Students interested in the proposed BS ITDE degree program will apply using the same entry-to-a-major process for all existing engineering majors. Because the large majority of engineering majors are full-time students, it is assumed that most BS ITDE majors will be full-time students. Further, because BS ITDE majors must prepare custom degree programs under the mentorship of the Director of Interdisciplinary Engineering Programs and a committee composed of a tenured or tenure-track faculty representatives (the Advising Committee), it is assumed that attrition rates will be substantially lower than attrition in the other engineering majors. Given that students remain in general engineering for their first year, students will start the BS ITDE degree program as sophomores. Hence, the numbers reflect students graduating from the program after three years.

II. Quality

A. Degree Requirements – Use this table to show the degree requirements of the program. (Modify the table as needed; if necessary, replicate the table for more than one option.)

For bachelor's degree:

<table>
<thead>
<tr>
<th>Category</th>
<th>Semester Credit Hours</th>
<th>Clock Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education Core Curriculum</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>(bachelor's degree only)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Required Courses</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>Prescribed Electives</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Free Electives</td>
<td>62</td>
<td></td>
</tr>
<tr>
<td>Other (Specify, e.g., internships, clinical work)</td>
<td>(if not included above)</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>128</td>
<td></td>
</tr>
</tbody>
</table>
Note: A Bachelor degree should not exceed 120 Semester Credit Hours (SCH) per Board rule 5.44 (a) (3). Those that exceed 120 SCH must provide detailed documentation describing the compelling academic reason for the number of required hours, such as programmatic accreditation requirements, statutory requirements, or licensure/certification requirements that cannot be met without exceeding the 120-hour limit.

Existing engineering programs in the Look College require 127 or 128 SCH. The 127 or 128 SCH requirement is needed to satisfy ABET requirements for depth and breadth in the engineering discipline, math, and science and satisfy the core curriculum requirements. Over several years, seven current BS degree programs offered by the Look College have been ranked among the top 10 programs offered by publicly funded institutions in the nation. The proposed BS in ITDE degree will require 128 SCH so that the ITDE degree program will have similar depth and breadth to satisfy ABET accreditation and core curriculum requirements.

B. Curriculum – Use these tables to identify the required courses and prescribed electives of the program. Note with an asterisk (*) courses that would be added if the program is approved. (Add and delete rows as needed. If applicable, replicate the tables for different tracks/options.)

Students entering the proposed BS ITDE degree program will develop a mentored degree plan of study tailored to their personal interests and goals. Students will receive needed guidance and academic advice from the Director of Interdisciplinary Engineering Programs and Advising Committee. This process will help ensure the satisfaction of requirements for ABET accreditation. Concentrations and plans of study will be approved by the Director of Interdisciplinary Engineering Programs and Advising Committee. Below are the details for the required and prescribed elective courses.

<table>
<thead>
<tr>
<th>Prefix and Number</th>
<th>Required Courses</th>
<th>SCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 104</td>
<td>Composition</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 111</td>
<td>Foundations of Engineering I</td>
<td>2</td>
</tr>
<tr>
<td>ENGR 112</td>
<td>Foundations of Engineering II</td>
<td>2</td>
</tr>
<tr>
<td>MATH 151</td>
<td>Engineering Mathematics I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 152</td>
<td>Engineering Mathematics II</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 107</td>
<td>General Chemistry for Engineering Students</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 117</td>
<td>General Chemistry Laboratory for Engineering Students</td>
<td>1</td>
</tr>
</tbody>
</table>
New Program Request Form for Bachelor's and Master's Degrees

Page 5

| PHYS 218   | Mechanics  | 4 |
| PHYS 208   | Electricity and Optics | 4 |
| MATH 251   | Engineering Mathematics III | 3 |
| MATH 308   | Differential Equations | 3 |
| ENGR 401   | Interdisciplinary Design | 3 |
| ENGR 402   | Interdisciplinary Design II | 3 |
| ENGR 482   | Ethics and Engineering | 3 |
| Total Semester Credit Hours | 42 |

<table>
<thead>
<tr>
<th>Prefix and Number</th>
<th>Prescribed Electives</th>
<th>SCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 304 or 323 or 311 or 401</td>
<td>Linear Algebra or Advanced Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>COMM 205 or ENGL 210</td>
<td>Technical Writing or Comm for Technical Professionals</td>
<td>3</td>
</tr>
<tr>
<td>Total Semester Credit Hours</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

C. Faculty --

a. Use these tables to provide information about Core and Support faculty. Add an asterisk (*) before the name of the individual who will have direct administrative responsibilities for the program. (Add and delete rows as needed.)

<table>
<thead>
<tr>
<th>Name of Core Faculty and Faculty Rank</th>
<th>Highest Degree and Awarding Institution</th>
<th>Courses Assigned in Program</th>
<th>% Time Assigned To Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>e.g.: Robertson, David Asst. Professor</td>
<td>PhD. in Molecular Genetics Univ. of Texas at Dallas</td>
<td>MG200, MG285 MG824 (Lab Only)</td>
<td>50%</td>
</tr>
<tr>
<td>*Hurtado, John Professor</td>
<td>Ph.D. in Aerospace Engineering; Texas A&amp;M</td>
<td>AERO 310</td>
<td>50%</td>
</tr>
<tr>
<td>William Schneider</td>
<td>Ph.D. in Mechanical Engineering; Rice University</td>
<td>ENGR 401/402</td>
<td>100%</td>
</tr>
<tr>
<td>Valerie Taylor</td>
<td>Ph.D. in Electrical Engineering and Computer Science, University of California, Berkeley</td>
<td>ENGR 111</td>
<td>25%</td>
</tr>
<tr>
<td>Prasad Enjeti</td>
<td>Ph.D. in Electrical Engineering, Concordia University, Montreal, Canada</td>
<td>ENGR 111</td>
<td>25%</td>
</tr>
<tr>
<td>Name of Support Faculty and Faculty Rank</td>
<td>Highest Degree and Awarding Institution</td>
<td>Courses Assigned in Program</td>
<td>% Time Assigned to Program</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>----------------------------------------</td>
<td>----------------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>Kristi Shryock, Senior Director of Retention</td>
<td>Ph.D. in Interdisciplinary Engineering; Texas A&amp;M University</td>
<td>AERO 201</td>
<td>10%</td>
</tr>
<tr>
<td>Patricia Smith, Cintron University Professor for Undergraduate Teaching Excellence</td>
<td>Ph.D. Biological and Agricultural Engineering; North Carolina State University</td>
<td>BAEN 340</td>
<td>10%</td>
</tr>
<tr>
<td>Melissa Grunlan, Associate Professor</td>
<td>Ph.D., Chemistry; University of Southern California, Los Angeles</td>
<td>BMEN 345</td>
<td>10%</td>
</tr>
<tr>
<td>Victor Ugaz, Associate Professor</td>
<td>Ph.D. Chemical Engineering; Northwestern University</td>
<td>CHEN 304</td>
<td>10%</td>
</tr>
<tr>
<td>Kelly Brumbelow, Associate Professor</td>
<td>Ph.D. Civil Engineering; Georgia Institute of Technology</td>
<td>CVEN 207</td>
<td>10%</td>
</tr>
<tr>
<td>Richard Furuta, Professor</td>
<td>Ph.D., Computer Science; University of Washington,</td>
<td>ENGR 270</td>
<td>10%</td>
</tr>
<tr>
<td>Le Xie, Assistant Professor</td>
<td>Ph.D. Electrical and Computer Engineering; Carnegie Mellon University</td>
<td>ECEN 214</td>
<td>10%</td>
</tr>
<tr>
<td>Angie Price, Associate Professor</td>
<td>Ph.D. in Interdisciplinary Engineering; Texas A&amp;M University</td>
<td>ENTC 207</td>
<td>10%</td>
</tr>
<tr>
<td>Martin Wortman, Professor</td>
<td>Ph.D. Operations Research; Virginia Polytechnic Institute and State University</td>
<td>ISEN 316</td>
<td>10%</td>
</tr>
<tr>
<td>Terry Creasy, Associate Professor</td>
<td>Ph.D., Mechanical Engineering; University of Delaware</td>
<td>MEEN 360</td>
<td>10%</td>
</tr>
<tr>
<td>Debjyoti Banerjee, Associate Professor</td>
<td>Ph.D. Mechanical Engineering; University of California, Los Angeles</td>
<td>MEEN 315</td>
<td>10%</td>
</tr>
<tr>
<td>Lee Peddicord, Professor</td>
<td>Ph.D., Nuclear Engineering; University of Illinois</td>
<td>NUEN 101</td>
<td>10%</td>
</tr>
<tr>
<td>Teri Reed, Associate Professor</td>
<td>Ph.D. Industrial Engineering; Arizona State University</td>
<td>ENGR 111</td>
<td>10%</td>
</tr>
</tbody>
</table>

b. What impact will the new program have on current programs in regards to faculty resources?
The new program will have negligible impact on current programs for three reasons: (1) the new program is built on existing courses, (2) the enrollment will be limited, and (3) the enrollment will span many
departments. For these reasons, the current courses, number of course sections, and overall current programs should remain unchanged.

1. How will the teaching load of current faculty be impacted?
The teaching load of current faculty will not be greatly impacted because the program will have limited enrollment and the interests of students will span many different departments.

2. How will the teaching load of faculty assigned a portion of their time to the new program be covered?
Any additional teaching load of faculty assigned to the new program may be covered through the use of Professors of Practice.

C. Students – Describe general recruitment efforts and admission requirements.
In accordance with the institution’s Uniform Recruitment and Retention Strategy, describe plans to recruit, retain, and graduate students from underrepresented groups for the program.

Beginning in the fall of 2014, the Look College has admitted all entering freshmen into a general engineering pool for which most students follow a common freshmen year. Students interested in the BS ITDE degree will be able to apply for the ITDE program through the entry-to-a-major process, starting as early as their second semester of study. For students already in a major, the change of curriculum process will be required for entry to the BS ITDE degree program. The Director of Interdisciplinary Engineering Programs will oversee both processes.

a) Details for applying to the BS ITDE degree program will be made known to students consistent with the process for informing all ENGE students about the entry-to-a-major process.

b) Interested ENGE students are required to meet with the Director of Interdisciplinary Engineering Programs to discuss the program’s purpose and identify the student’s interdisciplinary interests.

c) Students then submit their tentative degree plans to the Director of Interdisciplinary Engineering Programs and Advising Committee for review.

d) Steps (b) and (c) above must be completed before students apply to the BS ITDE degree program through the entry-to-a-major process on the Howdy web portal. The Director of Interdisciplinary Engineering Programs will oversee the review process for the entry-to-a-major ITDE applications. Admission into the BS ITEDE degree program will be based on a comprehensive review of the entry-to-a-major application by the Advising Committee.

E. Library – Provide the library director’s assessment of library resources necessary for the program. Describe plans to build the library holdings to support the program.
All necessary library resources are already in place, both at the University level and via internet searches.

F. Facilities and Equipment – Describe the availability and adequacy of facilities and equipment to support the program. Describe plans for facility and equipment improvements/additions.

Each engineering department currently houses all the laboratory, computational and pedagogical resources to support the proposed program. Furthermore, the newly established 16,000 sq. ft. Engineering Innovation Center (EIC) in the College is well equipped to support interdisciplinary interactions among undergraduate students at various stages of the program. EIC resources include more than 7,000 sq. ft. of multiuser collaboration spaces available to students for extended hours including weekends, it includes 6,600 sq. ft. fabrication area with access to 3D printing, laser cutters, lathes and mills to support the development of multidisciplinary team project prototypes, and access to conference room for remote collaborations with industry. Furthermore, EIC offers students access to informal programs such as Aggies Invent and Pop-Up Classes which promote collaborations across majors, innovation, and entrepreneurship.

G. Accreditation – If the discipline has a national accrediting body, describe plans to obtain accreditation or provide a rationale for not pursuing accreditation.

ITDE program curriculum is designed to meet the General Criteria of the Engineering Accreditation Commission of ABET. The applicable criteria are the program criteria for Engineering, General Engineering, Engineering Physics, Engineering Science, and Similarly Named Engineering Programs. These program criteria apply to "engineering (without modifiers)," "general engineering," "engineering physics," "engineering science(s)," or similarly named engineering programs. There are no program-specific criteria beyond the General Criteria. See: [http://www.abet.org/eac-criteria-2014-2015/](http://www.abet.org/eac-criteria-2014-2015/). The lead society from which program evaluators are appointed is the Society: American Society of Engineering Education. ABET requires that an institution seeking accreditation for a new engineering degree program must apply for an accreditation visit in the first fall after students have graduated from the new degree program. Further, an institution cannot seek accreditation until students have graduated from the new degree program. All of the other engineering programs in the Look College are accredited by the Engineering Accreditation Commission of ABET, so the Look College is very familiar with expectations for accredited engineering programs. The Look College will use its experience and experience with the accreditation process in seeking accreditation for the ITDE degree program.
H. Evaluation – Describe the evaluation process that will be used to assess the quality and effectiveness of the new degree program.

The General Criteria of the Engineering Accreditation Commission of ABET have eight criteria: Students, Program Educational Objectives, Student Outcomes, Continuous Improvement, Curriculum, Faculty, Facilities, and Institutional Support. Within the Look College, institutional processes and resources that support applications for accreditation for existing engineering programs will be used virtually unchanged for the following criteria: Students, Facilities, and Institutional Support. The criterion for Faculty has been met by the outstanding engineering faculty across the Look College. Look College faculty members who want to invest some of their time in the BS ITDE degree program will be identified. Once the faculty members are identified, it is expected that their qualifications will satisfy the criterion for Faculty. Program Educational Objectives have already been developed and are included in this application. They will be refined using existing processes for review of the Program Educational Objectives by program stakeholders. In this way, the Program Educational Objectives criterion will be satisfied.

The Student Outcomes criterion requires that student outcomes be developed. Since these outcomes have been developed and are included in this application, it is thought that this criterion will be satisfied. The requirements for the Curriculum criterion were carefully considered in preparing the curriculum for the BS ITDE degree program. Therefore, it is expected that the Curriculum criterion will be satisfied.

The final criterion is Continuous Improvement, which requires that there is a process to evaluate achievement of student outcomes and a process to improve achievement of student outcomes. There are several approaches to satisfying the Continuous Improvement criterion that do not rely on a large number of required courses. Since the BS ITDE degree program does not have a large number of required courses, one of these approaches will be selected. One approach would be to satisfy the requirement to evaluate achievement of the student learning outcomes as a part of the required interdisciplinary capstone design sequence. Results from the evaluation could be used to alter the requirements on the courses used to satisfy the requirements for engineering topics and directed electives. Since the number of students enrolled in the interdisciplinary degree program is initially small, a second approach would be to require that BS ITDE majors maintain an ePortfolio in which they document individual achievement of the student outcomes. Auditing the ePortfolios would be done by the director and committee for the interdisciplinary engineering degree program in a way similar to which a department evaluates student learning outcomes as a part of preparing the self-study. In addition, an advisory committee consisting of people from industry and academia will be formed to help guide and review the program. Given the experience of the Look College with respect to the Continuous
Improvement criterion, it is expected that the Continuous Improvement criterion will be satisfied.

III. Costs and Funding

New Five-Year Costs and Funding Sources - Use this table to show new five-year costs and sources of funding for the program. (Please refer to reference and resources at end of document in developing information)

<table>
<thead>
<tr>
<th>Five-Year Costs</th>
<th>Five-Year Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personnel¹</td>
<td>Reallocated Funds</td>
</tr>
<tr>
<td>Faculty</td>
<td>$0</td>
</tr>
<tr>
<td>Administration</td>
<td>$400,000</td>
</tr>
<tr>
<td>Graduate Assistants</td>
<td>$150,000</td>
</tr>
<tr>
<td>Clerical/Staff</td>
<td>$360,000</td>
</tr>
<tr>
<td>Other Personnel</td>
<td>$0</td>
</tr>
<tr>
<td>Facilities, Equipment &amp; IT</td>
<td>Anticipated New Formula</td>
</tr>
<tr>
<td>Resources</td>
<td>Funding³</td>
</tr>
<tr>
<td>Supplies and Materials</td>
<td>Special Item Funding</td>
</tr>
<tr>
<td>Library</td>
<td>Designated Tuition</td>
</tr>
<tr>
<td>Other²</td>
<td>Other⁴</td>
</tr>
<tr>
<td>Total Costs</td>
<td>Total Funding</td>
</tr>
<tr>
<td>$910,000</td>
<td>$910,000</td>
</tr>
</tbody>
</table>

1. Report costs for reassigned faculty, new faculty hires, graduate assistants, and technical support personnel. Prorate individual salaries as a percentage of the time assigned to the program. If existing faculty will contribute to program include costs necessary to maintain existing programs (e.g., cost of adjunct to cover courses previously taught by faculty who would teach in new program).
2. Specify other costs here (e.g., accreditation, travel).
3. Indicate formula funding for students new to the institution because of the program; formula funding should be included only for years three through five of the program and should reflect enrollment projections for years three through five.
4. Report other sources of funding here. In-hand grants, "likely" future grants, and fees can be included.

There are fundamentally no new faculty costs associated with teaching this program as (1) all faculty resources are already in place, (2) all software and labs are already in place, and (3) student recruiting and enrollment will be done through existing mechanisms.

There are some new administrative costs associated with this program. A new interdisciplinary engineering program office will need to be established to coordinate recruiting, student inquiries and plan of study monitoring and control. These additional space requirements and program costs will be covered out of the existing budget for the Look College and the Dean’s office.
Reference and Resources for completion of proposal.

For certification on signature page.

TAC Section 5.50 (b).

(b) To be approved by the Commissioner, a proposal for a new degree program must include certification in writing from the Board of Regents of a proposing institution, in a form prescribed by the Commissioner, that the following criteria have been met:

(1) The proposed degree program is within the Table of Programs previously approved by the Board for the requesting institution.

(2) The curriculum, faculty, resources, support services, and other components of a proposed degree program are comparable to those of high quality programs in the same or similar disciplines offered by other institutions.

(3) Clinical or in-service placements, if applicable, have been identified in sufficient number and breadth to support the proposed program.

(4) The program is designed to be consistent with the standards of the Commission on Colleges of the Southern Association of Colleges and Schools, and with the standards of other applicable accrediting agencies; and is in compliance with appropriate licensing authority requirements.

(5) The institution has provided credible evidence of long-term student interest and job-market needs for graduates; or, if proposed by a university, the program is appropriate for the development of a well-rounded array of basic baccalaureate degree programs at the institution where the principal faculty and other resources are already in place to support other approved programs and/or the general core curriculum requirements for all undergraduate students.

(6) The program would not be unnecessarily duplicative of existing programs at other institutions.

(7) Implementation and operation of the program would not be dependent on future Special Item funding.

(8) New costs to the institution over the first five years after implementation of the program would not exceed $2,000,000.
Section II. C of the CB proposal asks campuses to provide information about Core and Support Faculty but does not ask for any other personnel information or any additional personnel who may be involved in the delivery of the new program. AND Section III of the proposal requests identification of personnel costs for first five-year period.

The following ‘FTE personnel’ table provides program proposal preparers an avenue to identify personnel requirements by category types, along with the types of funding sources [new costs vs. reallocated/reassigned funds from existing sources] for these personnel. The total costs from this table will provide ‘Personnel’ information costs to be included within Section III -- the ‘Five-Year Costs and Funding Sources’ table on p. 4 of the program proposal form.

**FTE Personnel Involved in Delivery of New Program**

<table>
<thead>
<tr>
<th>Personnel</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program Administration</td>
<td>New</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td>Reassignment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CORE Faculty</td>
<td>New</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reassignment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SUPPORT Faculty</td>
<td>New</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reassignment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Graduate Student Assts</td>
<td>New</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Reassignment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clerical/Other Support</td>
<td>New</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Reassignment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>New</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
<td>12.5</td>
</tr>
<tr>
<td></td>
<td>Reassignment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5-Year TOTAL/TOTAL</td>
<td>New</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>12.5</td>
</tr>
</tbody>
</table>

**NOTE:** Reassignment = reallocation(s)
NEW COSTS TO THE INSTITUTION OF THE PROGRAM/ADMINISTRATIVE CHANGE  (TAMUS modified)

*Complete this* chart to indicate the dollar costs to the institution that are anticipated from the change requested.

<table>
<thead>
<tr>
<th>Cost Category</th>
<th>Cost Sub-Category</th>
<th>1st Year</th>
<th>2nd Year</th>
<th>3rd Year</th>
<th>4th Year</th>
<th>5th Year</th>
<th>TOTALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faculty Salaries</td>
<td>(New)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Reassignments)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Program Administration</td>
<td>(New)</td>
<td>$80,000</td>
<td>$80,000</td>
<td>$80,000</td>
<td>$80,000</td>
<td>$80,000</td>
<td>$400,00</td>
</tr>
<tr>
<td></td>
<td>(Reassignments)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Graduate Assistants</td>
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<td>$30,000</td>
<td>$30,000</td>
<td>$30,000</td>
<td>$30,000</td>
<td>$30,000</td>
<td>$150,00</td>
</tr>
<tr>
<td></td>
<td>(Reassignments)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clerical/Staff</td>
<td>(New)</td>
<td>$72,000</td>
<td>$72,000</td>
<td>$72,000</td>
<td>$72,000</td>
<td>$72,000</td>
<td>$360,00</td>
</tr>
<tr>
<td></td>
<td>(Reassignments)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supplies &amp; Materials</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Library</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equipment &amp; IT Resources**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Facilities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other (Identify)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTALS</td>
<td></td>
<td>$182,000</td>
<td>$182,000</td>
<td>$182,000</td>
<td>$182,000</td>
<td>$182,000</td>
<td>$182,00</td>
</tr>
</tbody>
</table>

AAR/Webmasters Updated 11/30/2010
New Program Request Form for  
Bachelor's and Master's Degrees  
Page 14  
ANTICIPATED SOURCES OF FUNDING  

*Note: Use this chart to indicate the dollar amounts anticipated from various sources. Use the additional explanation section that follows this page to specify as completely as possible each non-formula funding source.

<table>
<thead>
<tr>
<th>Funding Category</th>
<th>1st Year</th>
<th>2nd Year</th>
<th>3rd Year</th>
<th>4th Year</th>
<th>5th Year</th>
<th>TOTALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Formula Income*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$546,000</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>$182,000</td>
<td>$182,000</td>
<td>$182,000</td>
<td></td>
</tr>
<tr>
<td>II. Other State Funding*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>III. Reallocation of Existing Resources*</td>
<td>$72,800</td>
<td>$72,800</td>
<td>$72,800</td>
<td>$72,800</td>
<td>$72,800</td>
<td>$364,000</td>
</tr>
<tr>
<td>IV. Federal Funding* (In-hand only)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V. Other Funding*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TOTALS

*For more information, please refer to the accompanying Anticipated Sources of Funding: Explanatory Notes and Examples

AAR/Webmasters Updated 11/30/2010
## NON-FORMULA SOURCES OF FUNDING

*Note: Use this form to specify as completely as possible each of the non-formula funding sources for the dollar amounts listed on the reverse side of this form.*

<table>
<thead>
<tr>
<th>Funding Category</th>
<th>Non-Formula Funding Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>II. Other State Funding*</td>
<td>#1</td>
</tr>
<tr>
<td></td>
<td>#2</td>
</tr>
<tr>
<td>III. Reallocation of Existing Resources*</td>
<td>#1 The funding source to support the Reallocation of Existing Resources will be within the Dwight Look College.</td>
</tr>
<tr>
<td></td>
<td>#2</td>
</tr>
<tr>
<td>IV. Federal Funding*</td>
<td>#1</td>
</tr>
<tr>
<td></td>
<td>#2</td>
</tr>
<tr>
<td>V. Other Funding*</td>
<td>#1</td>
</tr>
<tr>
<td></td>
<td>#2</td>
</tr>
</tbody>
</table>
Explanations: ANTICIPATED SOURCES OF FUNDING: EXPLANATORY NOTES AND EXAMPLES

I. Formula Income
   A. The first two years of any new program should not draw upon formula income to pay for the program.
   B. For each of Years 3 through 5, enter the smaller of:
      1. the new formula income you estimate the program would generate, based on projected enrollments and formula funding rates; or
      2. half of the estimated program cost for that year.
   C. Because enrollments are uncertain and programs need institutional support during their start-up phase, it is the Coordinating Board's policy to require institutions to demonstrate that they can provide:
      1. sufficient funds to support all the costs of the proposed program for the first two years (when no new formula funding will be generated); and
      2. half of the costs of the new program during years three through five.
   D. When estimating new formula income, institutions should take into account the fact that students switching programs do not generate additional formula funding to the institution. For example, if a new master's program has ten students, but five of them switched into the program from existing master's programs at the institution, only five of the students will generate new formula income to help defray the costs of the program.

II. Other State Funding
    This category could include special item funding appropriated by the legislature, or other sources of funding from the state that do not include formula-generated funds (e.g., HEAF, PUF, etc.).

III. Reallocation of Existing Resources:
    If faculty in existing, previously budgeted positions is to be partially or wholly reallocated to the new program, you should explain in the text of your proposal how the institution will fulfill the current teaching obligations of those faculty and include any faculty replacement costs as program costs in the budget.

IV. Federal Funding
    Only federal monies from grants or other sources currently in hand may be included. Do not include federal funding sought but not secured. If anticipated federal funding is obtained, at that time it can be substituted for funds designated in other funding categories. Make note within the text of the proposal of any anticipated federal funding.

V. Other Funding
    This category could include Auxiliary Enterprises, special endowment income, or other extramural funding.
# New Bachelor's and Master's Degree
## Cover Page/Signature Page

**Directions:** An institution shall use this form to propose a new bachelor's or master's degree program. In completing the form, the institution should refer to the document *Standards for Bachelor's and Master's Programs*, which prescribes specific requirements for new degree programs. Note: This form requires signatures of (1) the Chief Executive Officer, certifying adequacy of funding for the new program; (2) a member of the Board of Regents (or designee), certifying Board approval, and (3) if applicable, a member of the Board of Regents or (designee), certifying that criteria have been met for staff-level approval. NOTE: Preliminary authority is required for all engineering programs. An institution that does not have preliminary authority for a proposed engineering program shall submit a separate request for preliminary authority prior to submitting the degree program request form. That request shall address criteria set in Coordinating Board rules Section 5.24 (a).

**Information:** Contact the Division of Academic Affairs and Research at 512/427-6200 for more information.

## Administrative Information

1. **Institution:** Texas A&M University

2. **Program Name** — Show how the program would appear on the Coordinating Board’s program inventory (e.g., *Bachelor of Business Administration degree with a major in Accounting*): Bachelor of Science degree in Interdisciplinary Engineering

3. **Proposed CIP Code:** 14.0101.00

4. **Number of Required Semester Credit Hours (SCHs)** *(If the number of SCHs exceeds 120 for a Bachelor's program, the institution must request a waiver documenting the compelling academic reason for requiring more SCHs):* 128 SCH

5. **Brief Program Description** — Describe the program and the educational objectives:

   The Bachelor of Science in Interdisciplinary Engineering (BS ITDE) degree program consists of 128 SCH and is intended to prepare students for careers in emerging, interdisciplinary engineering fields. Some examples may include Material Engineering, Robotic Vision, and Energy Engineering. The BS ITDE degree program intends to seek accreditation from ABET at the appropriate time. Guidance and academic advising will be provided through the office of the Director of Interdisciplinary Engineering Programs.

6. **Administrative Unit** — Identify where the program would fit within the organizational structure of the university (e.g., *The Department of Electrical Engineering within the College of Engineering*): Dwight Look College of Engineering

7. **Proposed Implementation Date** — Report the date that students would enter the program *(MM/DD/YY):* 09/01/16

AAR/Webmasters Updated 11/30/2010
8. **Contact Person** – Provide contact information for the person who can answer specific questions about the program:

   Name: Dr. John E. Hurtado

   Title: Director of Interdisciplinary Engineering Programs

   E-mail: jehurtado@tamu.edu

   Phone: 979-845-7200
1. **Adequacy of Funding** – The chief executive officer shall sign the following statement:

   *I certify that the institution has adequate funds to cover the costs of the new program. Furthermore, the new program will not reduce the effectiveness or quality of existing programs at the institution.*

   _________________  ________________
   Chief Executive Officer          Date

2. **Board of Regents or Designee Approval** – A member of the Board of Regents or designee shall sign the following statement:

   *On behalf of the Board of Regents, I approve the program.*

   _________________  ________________
   Board of Regents (Designee)          Date of Approval

3. **Board of Regents Certification of Criteria for Commissioner of Assistant Commissioner Approval** – For a program to be approved by the Commissioner or the Assistant Commissioner for Academic Affairs and Research, the Board of Regents or designee must certify that the new program meets the eight criteria under TAC Section 5.50 (b): The criteria stipulate that the program shall:

   (1) be within the institution’s current Table of Programs;
   (2) have a curriculum, faculty, resources, support services, and other components of a degree program that are comparable to those of high quality programs in the same or similar disciplines at other institutions;
   (3) have sufficient clinical or in-service sites, if applicable, to support the program;
   (4) be consistent with the standards of the Commission of Colleges of the Southern Association of Colleges and Schools and, if applicable, with the standards or discipline-specific accrediting agencies and licensing agencies;
   (5) attract students on a long-term basis and produce graduates who would have opportunities for employment; or the program is appropriate for the development of a well-rounded array of basic baccalaureate degree programs at the institution;
   (6) not unnecessarily duplicate existing programs at other institutions;
   (7) not be dependent on future Special Item funding
   (8) have new five-year costs that would not exceed $2 million.

   *On behalf of the Board of Regents, I certify that the new program meets the criteria specified under TAC Section 5.50 (b).*

   _________________  ________________
   Board of Regents (Designee)          Date
AGENDA ITEM BRIEFING

Submitted by: Dr. Mark A. Hussey, President/CEO
Texas A&M University

Subject: Approval of a new Bachelor of Science in Interdisciplinary Engineering Degree Program and Authorization to Request Approval from the Texas Higher Education Coordinating Board

Proposed Board Action:

Approve the establishment of a new degree program at Texas A&M University leading to a Bachelor of Science in Interdisciplinary Engineering, authorize the submission of this degree program to the Texas Higher Education Coordinating Board (THECB) for approval and certify that all applicable THECB criteria have been met.

Background Information:

The Bachelor of Science in Interdisciplinary Engineering (BS ITDE) degree program consists of 128 semester credit hours (SCH) and is intended to prepare students for careers in emerging, interdisciplinary engineering fields. Some examples may include Material Engineering, Robotic Vision, and Energy Engineering. The BS ITDE degree program is designed to meet the General Criteria of the Engineering Accreditation Commission (ABET) and accreditation will be sought at the appropriate time.

The educational objectives of the BS ITDE degree program are to produce graduates who are prepared to create products, processes, or services that require application of knowledge from fields that are intersections of two or more accepted engineering and/or scientific fields, and advance engineering knowledge and/or practice in emerging Interdisciplinary fields.

The curriculum involves a mentored degree plan of study tailored to their personal interests and goals. Students will receive significant guidance and academic advice from the Director of Interdisciplinary Engineering Programs and Advising Committee. Concentrations and plans of study will be approved by the Director of Interdisciplinary Engineering Programs and Advising Committee. Each student will complete 66 semester credit hours that satisfy the General Education Core Curriculum and a set of Required Courses. The remaining 62 semester credit hours will be composed from two or more sequences of engineering courses that span sophomore- to senior-level instruction. When combined, the set of engineering sequences shall define a coherent engineering subject that meets the student’s personal interests and goals. Some example engineering sequences might be centered on robotics and computer-human interaction, and an example set could combine these sequences to prepare a student to work in the robotics field.

A&M System Funding or Other Financial Implications:

The proposed BS ITDE degree program is thoughtfully composed to be resource neutral. The costs associated with hiring instructional personnel (to maintain existing programs) and material and supply costs will be accounted for through reallocated funds and formula funding from students new to the institution because of the unique nature of this new degree program.
Members, Board of Regents  
The Texas A&M University System

Subject: Approval of a new Bachelor of Science in Interdisciplinary Engineering Degree Program and Authorization to Request Approval from the Texas Higher Education Coordinating Board

I recommend adoption of the following minute order:

"The Board of Regents of the Texas A&M University System approves the establishment of a new degree program at Texas A&M University leading to a Bachelor of Science in Interdisciplinary Engineering.

The Board also authorizes submission of Texas A&M University's new degree program request to the Texas Higher Education Coordinating Board for approval and hereby certifies that all applicable criteria of the Coordinating Board have been met."

Respectfully submitted,

Dr. Mark A. Hussey  
Interim President

Approval Recommended:  

John Sharp  
Chancellor

Approved for Legal Sufficiency:

Ray Bonilla  
General Counsel

Billy Hamilton  
Executive Vice Chancellor and  
Chief Financial Officer

James R. Hallmark, Ph.D.  
Vice Chancellor for Academic Affairs
Texas A&M University
Bachelor of Science
with a major in Interdisciplinary Engineering
(CIP 14.0101.00)

Program Review Outline

BACKGROUND & PROGRAM DESCRIPTION

Administrative Unit: Dwight Look College of Engineering

The Bachelor of Science in Interdisciplinary Engineering (BS ITDE) degree program consists of 128 semester credit hours (SCH) and is intended to prepare students for careers in emerging, interdisciplinary engineering fields. Some examples may include Material Engineering, Robotic Vision, and Energy Engineering. The BS ITDE degree program is designed to meet the General Criteria of the Engineering Accreditation Commission (ABET) and accreditation will be sought at the appropriate time. Guidance and academic advising will be provided through the office of the Director of Interdisciplinary Engineering Programs.

The educational objectives of the BS ITDE degree program are to produce graduates who are prepared to accomplish all of the objectives listed below and who will, within two to five years after graduation, indeed accomplish at least two of the following objectives:

- Create products, processes, or services that require application of knowledge from fields that are intersections of two or more accepted engineering and/or scientific fields;
- Advance engineering knowledge and/or practice in emerging Interdisciplinary fields;
- Pursue lifelong learning activities, which may include licensure or advanced degrees;
- Contribute time, talent, and ideas to improve communities and the profession.

Regarding the curriculum, students entering the proposed BS ITDE degree program will develop a mentored degree plan of study tailored to their personal interests and goals. Students will receive significant guidance and academic advice from the Director of Interdisciplinary Engineering Programs and Advising Committee. This process will help ensure the satisfaction of requirements for ABET accreditation. Concentrations and plans of study will be approved by the Director of Interdisciplinary Engineering Programs and Advising Committee. Each student will complete 66 semester credit hours that satisfy the General Education Core Curriculum and a set of Required Courses.

The above-mentioned 66 semester credit hours will only partially define a student degree plan. The remaining 62 semester credit hours will be composed from two or more sequences of engineering courses that span sophomore- to senior-level instruction. When combined, the set of engineering sequences shall define a coherent engineering subject that meets the student's personal interests and goals. Each engineering sequence and set must be approved by the Director of Interdisciplinary Engineering Programs and Advising Committee. Some example engineering sequences might be centered on robotics, computer-human interaction,
computational fluid dynamics and parallel computing. Some example sets could be robotics and computer-human interaction, which could prepare a student to work in the robotics field, or computational flow and parallel computing, which could prepare a student to work in the field of turbulent flow computation.

The proposed implementation date is Fall 2016.

Texas A&M University certifies that the proposed new degree program meets the criteria under the 19 Texas Administrative Code, Section 5.45 in regards to need, quality, financial and faculty resources, standards and costs. New costs during the first five years will not exceed $2 million.

I. NEED

A. Employment Opportunities
The BS ITDE degree program will prepare undergraduate students for careers that cross disciplinary boundaries in emerging fields. Emerging fields are those specializations that combine elements of more than one traditional discipline into a new specialization. Using the national projections developed by the Bureau of Labor Statistics, U.S. Department of Labor, we find there is a demand for students with interdisciplinary engineering degrees. For example, in the interdisciplinary area of architectural engineering (which can be considered a combination of the conventional civil, mechanical, and electrical engineering disciplines), the projections for 2015 indicate a need for 3680 new architectural engineers. The long-term job demand for architectural engineering in 2022 is 13,100 new architectural engineers.

Furthermore, an industry survey was recently conducted. The survey included a brief description of the proposed BS ITDE program along with two questions, each with yes or no answers. The TAMU Career Center distributed the survey to 1800 representatives from companies that usually hire engineering students. One question pertained to hiring, and for this question, 66% of the respondents indicated that their company would consider hiring students with a BS ITDE. A second question asked if students with a BS ITDE would add value to their company. Here, 57% of the respondents indicated that such students would add value to their company workforce.

B. Projected Enrollment
The Look College currently admits entering freshmen into the general engineering program whereby most students follow a common first-year engineering curriculum. The same first-year curriculum will be required for the BS ITDE degree program. Students interested in the proposed BS ITDE degree program will apply using the same entry-to-a-major process for all existing engineering majors. Because the large majority of engineering majors are full-time students, it is assumed that most BS ITDE majors will be full-time students. Further, because BS ITDE majors must prepare custom degree programs under the mentorship of the Director of Interdisciplinary Engineering Programs and a committee composed of a tenured or tenure-track faculty representatives (the Advising Committee), it is assumed that attrition rates will be substantially lower than attrition in the other engineering majors. Given that students remain in general engineering for their first year, students will start the BS ITDE degree program as sophomores. Hence, the numbers below reflect students graduating from the program after three years.
<table>
<thead>
<tr>
<th>YEAR</th>
<th>1</th>
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C. Existing State Programs
A review of existing programs in Texas produced no programs like the BS ITDE degree program that is proposed herein. The University of Texas at Austin offers a dual degree option through the Cockrell School of Engineering and the Plan II Honors Program of the College of Liberal Arts. That program, however, is significantly different than our proposed program in that our BS ITDE degree program provides students with an interdisciplinary experience and education within a single, 128 SCH bachelor degree.

II. QUALITY AND RESOURCES

A. Faculty
The Look College of Engineering will assign the equivalent of two full time equivalent (FTE) faculty to the BS ITDE degree program. Additionally, support faculty from across the college in the form of at least one tenured or tenure-track faculty from each department will serve in supporting roles. The core and support faculty will bring teaching experience that ranges from sophomore- to senior-level courses. Additionally, the core faculty will provide expertise in senior design.

B. Program Administration
The BS ITDE degree program will be managed by the Director of Interdisciplinary Engineering Programs and a committee composed of a tenured or tenure-track faculty representative from each engineering department. The department representatives will be selected by the associated department head. The Director and these faculty representatives will be commonly referred to as the Advising Committee.

C. Other Personnel
Clerical staffing support will be provided by the Look College of Engineering. Additionally, department and college graduate teaching assistants will provide support for laboratory instruction.

D. Supplies, Materials
Adequate supplies and materials are in place in contributing departments and the college.

E. Library
All necessary library resources are already in place, both at the University level and via internet searches.

F. Equipment, Facilities
Each engineering department currently houses all the laboratory, computational and pedagogical resources to support the proposed program. Furthermore, the newly established 16,000 sq. ft. Engineering Innovation Center (EIC) in the Look College is well equipped to support
interdisciplinary interactions among undergraduate students at various stages of the program. The EIC resources include more than 7,000 sq. ft. of multiuser collaboration spaces available to students for extended hours including weekends. It also includes 6,600 sq. ft. fabrication area with access to 3D printing, laser cutters, lathes and mills to support the development of multidisciplinary team project prototypes, and access to conference room for remote collaborations with industry. Furthermore, the EIC offers students access to informal programs such as Aggies Invent and Pop-Up Classes, which promote collaborations across majors, innovation, and entrepreneurship.

G. Accreditation
ITDE program: curriculum is designed to meet the General Criteria of the Engineering Accreditation Commission of ABET. The applicable criteria are the program criteria for Engineering, General Engineering, Engineering Physics, Engineering Science, and Similarly Named Engineering Programs. These program criteria apply to "engineering (without modifiers)," "general engineering," "engineering physics," "engineering science(s)," or similarly named engineering programs. There are no program-specific criteria beyond the General Criteria. See: http://www.abet.org/eac-criteria-2014-2015/. The lead society from which program evaluators are appointed is the Society: American Society of Engineering Education. ABET requires that an institution seeking accreditation for a new engineering degree program must apply for an accreditation visit in the first fall after students have graduated from the new degree program. Further, an institution cannot seek accreditation until students have graduated from the new degree program. All of the other engineering programs in the Look College are accredited by the Engineering Accreditation Commission of ABET, so the Look College is very familiar with expectations for accredited engineering programs. The Look College will use its experience and experience with the accreditation process in seeking accreditation for the BS ITDE degree program.

III. NEW 5 YEAR COSTS & FUNDING SOURCES

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<th>SOURCES OF FUNDING</th>
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<td>Program Administration</td>
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<td>(Administrator and Staff)</td>
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<tr>
<td>Estimated 5-Year Costs</td>
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Good evening Dr Tim Scott and Ms Sandra Williams,

Thank you for passing along the table of comments below. I wanted to offer my explanation in completing the “Degree Requirements” table that is referenced. Please pass these comments to members of the University Curriculum Committee as you see fit.

My understanding of the guidelines for this table, and my subsequent actions, were as follows:

1. General Education Core Curriculum: 18 hours: These are the semester credit hours of University Core Curriculum that assures all undergraduate students are afforded a breadth of understanding. The 18 semester credit hours cover subjects including Communication, Natural Science, etc.

2. Required Courses: 42 hours: These are courses that are taken by all students in the program. These courses shall meet all requirements for accreditation, licensure, or certification and shall be consistent with similar programs in the state and nation. These 42 semester credit hours include basic engineering, math, and physics courses. The sources of the 42 semester credit hours is shown in the table of Section II.B. title Required Courses.

3. Prescribed Electives: 6: Prescribed electives are a list of specific courses from which students must choose to meet curricular requirements of the program. Prescribed electives shall complement the required courses and are numerous enough to provide breadth and depth of study. The sources of the 6 semester credit hours is shown in the table of Section II.B. title Prescribed Electives.

4. Free Electives: 62: Free electives are consistent with similar programs and are selected by the student, subject to advisor approval. These 62 semester credit hours complete the degree plan and will be composed from two or more sequences of engineering courses that span sophomore- to senior-level instruction. When combined, the set of engineering sequences shall define a coherent engineering subject that meets the student’s personal interests and goals. Unfortunately, there did not appear to be a proper place in Section II of the New Bachelors Program Form to give explicit detail of these 62 semester credit hours. Nevertheless, the structure is mentioned in the proposal cover letter, and on page 1 of the Agenda Item Briefing, and on page 1 of Program Review Outline. Moreover, a file titled “Threads for UCC.pdf” was provided at the request of Dr Paulo Lima-Filha to illustrate how the 62 hours of free electives could be distributed for sample degree plans. That file is included here for further distribution and review.

Thank you again for the opportunity to provide some clarification.

Sincerely,
Johnny

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