Faculty Executive Committee Approved Regulations and Policies Outlining the Technical Breadth Requirement
Technical Breadth Areas (Effective Fall 2018 as of 9/20/2018)

·Students must satisfy a single Technical Breadth Area (TBA) outside their major's department. Example: students in the Bioengineering major cannot choose the TBA in Bioengineering; Exceptions are:

1) Students in the Computer Engineering major have the choice to select a technical breadth area in either the department of Electrical and Computer Engineering or Computer Science since this major is jointly administered by both departments.

2) Students do have the option to choose a course offered by their major's department IF the course is part of a schoolwide TBA (e.g. Engineering Mathematics) and not being used to satisfy other degree requirements. Example: the TBA in Engineering Mathematics lists COM SCI 112 which is not required for the Computer Science and Engineering major, therefore, a student in Computer Science and Engineering can choose COM SCI 112 to satisfy that TBA. This course cannot also be used simultaneously to fulfill a Major Field Elective.

3) A student who is taking a curriculum that requires a subset of courses from another department (different from the one from which the student's degree is granted) may select three additional upper division courses for a TBA from that department to broaden his/her education in that area of study, as long as item 1 is satisfied. Example: The Computer Science and Engineering majors are required to complete several curses from the Electrical and Computer Engineering department; students in that major can satisfy the technical breadth requirement by taking 3 additional EC ENGR courses.

4) The Aerospace Engineering major and the Mechanical Engineering major should refer to the HSSEAS Announcement or meet with an academic counselor at 6426BH for clarification on their options.

Courses chosen to satisfy the TBA cannot be used to satisfy other degree requirements.*

·Students are responsible for meeting requisites of courses selected.

·Students may petition, at 6426BH, to use one lower division course to satisfy a technical breadth elective IF that lower division course is a requisite for at least one of the two upper division technical breadth courses that the student takes from the same area (and that lower division course is not being applied toward another degree requirement).

·Effective W16, Theater C146A will NO longer be considered in satisfaction of any TBA; however, students may petition this course at 6426BH toward the General Education Foundation - Visual and Performance Arts Analysis and Practice.

*Degree requirements include required courses, major field electives, science & technology electives, etc - any course that satisfies a degree requirement.

The Technical breadth requirement is a 12 unit requirement. To complete the requirement with only three courses, those three courses must add up to at least 12 units. SEE PAGE 2 OF THIS DOCUMENT FOR A SUMMARY OF THE RESTRICTIONS.

The Technical Breadth area in Bioengineering is designed to provide students with the opportunity to gain working knowledge of a technical field other than his/her major. Required Upper Division Courses (12 units): select from BIOENGR 100 through 187. One of the three courses can be substituted by CHEM 20B or by LIFESCI 3 if not used to satisfy other degree requirements and additional two courses that are applied to technical breadth area are upper division.

The Technical Breadth area in Chemical and Biomolecular Engineering is designed to provide students with the opportunity to gain working knowledge of a technical field other than his/her major. Required Upper Division Courses (12 units): select from CH ENGR 100 through 187. One of the three courses can be substituted by CHEM 20B if not used to satisfy other degree requirements and additional two courses that are applied to technical breadth area are upper division. Restriction: CH ENGR 102A (not open to students with MECH&AE 105A credit). SEE PAGE 2 OF THIS DOCUMENT FOR A SUMMARY OF ALL THE RESTRICTIONS.

The Technical Breadth area in Civil and Environmental Engineering is designed to provide students with the opportunity to gain working knowledge of a technical field other than his/her major. Required Upper Division Courses (12 units): select from C&EE 100 through 187. One of the three courses can be substituted by CHEM 20B if not used to satisfy other degree requirements and additional two courses that are applied to technical breadth area are upper division. Restrictions: C&EE 101 (not open to students with MECH&AE 101 (formerly 96) credit), C&EE 108 (not open to students with MECH&AE 101 (formerly 96) credit), C&EE 103 (not open to students with EC ENGR 133A credit). SEE PAGE 2 OF THIS DOCUMENT FOR A SUMMARY OF ALL THE RESTRICTIONS.

The Technical Breadth area in Computer Science is designed to provide students with the opportunity to gain working knowledge of a technical field other than his/her major. Required (12 units): select from COM SCI 102 through 187. COM SCI 31, 32, 33, Math 61 can all be applied toward satisfaction of this TBA if not used to satisfy other degree requirements.

The Technical Breadth area in Electrical and Computer Engineering is designed to provide students with the opportunity to gain working knowledge of a technical field other than his/her major. Required Upper Division Courses (12 units): select from EC ENGR 10, EC ENGR 100 through 187 EXCEPT EC ENGR CM182. Restrictions: EC ENGR 102 (not open to students with MECH&AE 107 credit), EC ENGR 133A (not open to students with C&EE 103 credit). See restrictions among EC ENGR 10, 100, 110 ON PAGE 2 OF THIS DOCUMENT FOR A SUMMARY OF RESTRICTIONS.

The Technical Breadth area in Materials Science and Engineering is designed to provide students with the opportunity to gain working knowledge of a technical field other than his/her major. Required Upper Division Courses (12 units): select from MAT SCI 100 through 187. One of the three courses can be substituted by CHEM 20B if not used to satisfy other degree requirements and additional two courses that are applied to technical breadth area are upper division.

The Technical Breadth area in Mechanical and Aerospace Engineering is designed to provide students with the opportunity to gain working knowledge of a technical field other than his/her major. Required Upper Division Courses (12 units): select from MECH&AE 100 through 187. Restrictions: MECH&AE 101 (formerly 96) (not open to students with C&EE 101 or C&EE 108 credit), MECH&AE 102 (not open to students with C&EE 101 credit), MECH&AE 105A (not open to students with CH ENGR 102A credit), MECH&AE 105D (not open to students with CH ENGR 101B credit). SEE PAGE 2 OF THIS DOCUMENT FOR A SUMMARY OF ALL THE RESTRICTIONS. **Technical Breadth Areas pg. 1 of 2**

The Technical Breadth area in Computational Genomics is designed to provide students with a broad background in Genomics. Required courses (12 unit minimum). Select from: Any three courses from: CHEM 20A, EE BIOL 135,HUM GEN C144, LIFESCI 7A, LIFESCI 7B, LIFESCI 7C, LIFESCI 107, MCD BIO 144, 172, PHYSCI 125 for enrollment in any of the following 200 level courses undergraduates need to petition, at 6426BH, and approval is subject to student meeting course requisites and having at minimum a 3.0 GPA: BIOMATH M203, BIOMATH M211, BIOSTAT M272, BIOSTAT M278, EE BIOL M231, HUM GEN 236A HUM GEN 236B, STATS M254.

The Technical Breadth area in Energy and the Environment is designed to provide students with a broad-background in science and technology related to renewable energy. Required Courses (12 units): select from CH ENGR 102A (not open to students with MECH&AE 105A credit), CH ENGR CM127, C&EE 151, C&EE 153, C&EE C159, EC ENGR M185, ENVIRON M153, ENVIRON 157, ENVIRON 159, MECH&AE 105A (not open to students with CH ENGR 102A credit), MECH&AE 133A, MECH&AE 135, MECH&AE 136, MECH&AE C137, MECH&AE 150C and for enrollment in any of the following 200 level courses undergraduates need to petition, at 6426BH, and approval is subject to student meeting course requisites and having at minimum a 3.0 GPA:CH ENGR 223, EC ENGR 279AS (specifically Introduction to Clean Energy Science and Technology), MAT SCI 252, MAT SCI 298 (specifically Materials Science for Alternative Energy Technologies) **SEE BOTTOM OF THIS PAGE FOR A SUMMARY OF ALL THE RESTRICTIONS**.

The Technical Breadth area in Engineering Mathematics is designed to provide students with the opportunity to gain working knowledge of a technical field other than his/her major. Required Courses (12 units): select from C&EE 103 (see subset restriction), C&EE 110, COM SCI 112, COM SCI 170A, COM SCI 180, COM SCI 181, EC ENGR 102 (not open to students with MECH&AE 107 credit), EC ENGR 133A (not open for students with C&EE 103 credit), EC ENGR 131A, MECH&AE 181A, MECH&AE 182B, MECH&AE 182C, MATH 110A, MATH 115A, MATH 131A, MATH 132, MATH 151A, MATH 164, MATH 167, STATS 105. MECH&AE 181A, MECH&AE 182B and MECH&AE 182C are acceptable for the Mechanical and Aerospace Engineering majors. **SEE BOTTOM OF THIS PAGE FOR A SUMMARY OF ALL THE RESTRICTIONS**.

The Technical Breadth area in Engineering Science is designed to provide students with the opportunity to gain working knowledge of a technical field other than his/her major. Required Courses (12 units): select from BIOENGR C101, COM SCI 31 or COM SCI 32 or EC ENGR 10 (if additional two courses that are applied to technical breadth area are upper division), CH ENGR 102A (not open to students with MECH&AE 105A credit), C&EE 101 (not open to students with MECH&AE 101 (formerly 96) credit), C&EE 103(see subset restriction), C&EE 108 (not open to students with MECH&AE 101 (formerly 96) credit), EC ENGR 100 (not open to students with EC ENGR 10 or 110 credit), EC ENGR 101A (formerly 101), ENGR M101/MAT SCI M105, EC ENGR 102 (not open to students with MECH&AE 107 credit), EC ENGR 133A (not open for students with C&EE 103 credit), MAT SCI 104, MECH&AE 101 (formerly 96) (not open to students with C&EE 101 credit), MECH&AE 102 (not open to students with C&EE 101 credit), MECH&AE 103, MECH&AE 105A (not open to students with CH ENGR 102 credit), MECH&AE 105D (not open to students with CH ENGR 101B credit). MECH&AE 105D is acceptable for aerospace engineering majors. **SEE BOTTOM OF THIS PAGE FOR A SUMMARY OF ALL THE RESTRICTIONS**.

The Technical Breadth area in Nanotechnology is designed to train students with cutting-edge knowledge and skills for their future successes in nano-related fields. Required Upper Division Courses (12 units): ENGR M101/MAT SCI M105 (required), additional 8 units selected from BIOMED CM150/ EC ENGR CM150/MECH&AE CM180, ENGR M103/C&EEM165, EC ENGR 128, (EC ENGR major students may take this course as long as they are NOT using the course to satisfy other degree requirements) MECH&AE M183B, MECH&AE C187L. **SEE BOTTOM OF THIS PAGE FOR A SUMMARY OF ALL THE RESTRICTIONS.**

The Technical Breadth area in Pre-Med is designed for HSSEAS pre-med students. Required Courses (12 units): select from CHEM 30BL, CHEM 153A, LIFESCI 3, LIFESCI 4, LIFE SCI 7B, LIFESCI 7C , LIFE SCI 107, Physics 4BL, BIOSTATS 100A or STATS 100A.

The Technical Breadth area in Technology Management is designed to teach students how technology management works and what drives decision making in start-ups, in venture-backed IPOs and in giant multinationals. Required Courses (12 units): select from C&EE 170 , ENGR 110, ENGR 111, ENGR 112, ENGR 113, ENGR 180, MGMT 108, MGMT 160. MGMT 180 will be considered by petition filed at 6426BH. **SEE BOTTOM OF THIS PAGE FOR A SUMMARY OF ALL THE RESTRICTIONS.**

The Technical Breadth area in Urban Planning is designed to provide students with the opportunity to gain working knowledge of community development, environmental planning, housing, land development, regional and international development, transportation, and urban design. Required (12 units): select courses from URBN PL 120, URBN PL 121, URBN PL 130, URBN PL CM137, URBN PL 141, URBN PL M150, URBN PL 151 and for enrollment in any of the following 200 level courses undergraduates need to petition, at 6426BH, and approval is subject to student meeting course requisites and having at minimum a 3.0 GPA: URBN PL M206A, URBN PL M250, URBN PL 251, URBN PL M253, URBN PL 254, URBN PL M255, URBN PL M256, URBN PL M258.

SUMMARY OF RESTRICTIONS

Item 1: It is not permitted to use more than one course from the same subset in meeting the degree requirements of any HSSEAS major unless an additional course from that subset is explicitly specified as recommended or is listed as a prerequisite in the catalog description of the course in the same subset.

Subset 1: Probability and Statistics course subset (C&EE 110, STATS 110A, EC ENGR 131A, MATH 170A, STATS 100A)

Subset 2: Numerical Computing course subset (EC ENGR 133A, C&EE 103, CH ENGR 109, MATH 151A)

Subset 3a): Structural Mechanics Subset (C&EE 108, MECH&AE 101 (formerly 96))
Subset 3b): Statics Subset (C&EE 91, MECH&AE 101 (formerly 96))
Subset 3c): Dynamics Subset (C&EE 102, MECH&AE 102)
Subset 4a): Introductory Thermodynamics subset (CH ENGR 102A, MECH&AE 105A)
Subset 4b): Transport Phenomena (CH ENGR 101B, MECH&AE 105D)
Subset 5a): Systems (EC ENGR 102, MECH&AE 107)
Subset 5b): Controls (CH ENGR 107, EC ENGR 141, MECH&AE 171A)
Subset 6): Circuits (EC ENGR 10, EC ENGR 100), (EC ENGR 100, EC ENGR 110)
Subset 7): Differential Equations (MATH 33B, MECH&AE 82)