To: Faculty Senate
From: Faculty Senate Curriculum Committee: Turgay Korkmaz (Chair), Pepe Chang, Brian Davies, Liang Tang, Langston Clark, Bill Ramos,
Re: Review of proposal for the Bachelor in Science Degree in Multidisciplinary Studies
Date: Jan 24th, 2019

Faculty senate curriculum committee reviewed the proposal for the *Bachelor in Science Degree in Multidisciplinary Studies* from the University College. **Based on our evaluation, we recommend the proposal to be approved by the faculty senate**.
Yes: **3**, No: **1**, Abstain: **0** No response: **1**
Please see below for the summary of our evaluation.

The **objectives** of the program are to develop students that have a solid foundation in the content material of three different disciplines and are skilled in communication, critical thinking and analysis, investigating and solving problems, managing tasks, and relating to others. The degree program will provide a vehicle for students whose interests lie in multiple areas.

The requirements for the *Bachelor in Science Degree in Multidisciplinary Studies* include:

The Core Curriculum	42
A. Multidisciplinary Studies Foundation Courses Technology Requirement. Select one of the following: CS 1173 Data Analysis And Visualization CS 1063 Introduction to Computer Programming CS 1083 Programming I for Computer Scientist IS 1403 Business Information Systems Fluency Communications Requirement. Select one of the following: COM 1043 Introduction to Communication COM 1053 Business and Professional Speech COM 2113 Public Speaking ENG 2413 Technical Writing	6
B. Multidisciplinary Studies Fields of Study All candidates for the degree must select courses to satisfy the requirements of the following **three** focus areas based on **three** distinct disciplines: 1. Focus Area One: 24 semester credit hours of courses within a single discipline with at least 15 hours at the upper-division level. 2. Focus Area Two: 21 semester credit hours of courses within a single discipline with at least 12 hours at the upper-division level. 3. Focus Area Three: 21 semester credit hours of courses within a single discipline with at least 12 hours at the upper-division level. - Courses selected to satisfy a focus area must be approved by the Multidisciplinary Studies Program Director. Furthermore, the courses used to satisfy each focus area must be completed with at least a 2.00 grade point average. - At least one focus area must be selected from a discipline offered by the College of Sciences or the College of Engineering.	66
C. Multidisciplinary Studies Courses MDS 2013 Introduction to Multidisciplinary Studies MDS 4983 Senior Seminar for Multidisciplinary Studies	6
Total Credit Hours	**120**

Reason for Request

- The B.S. in Multidisciplinary Studies is similar to the B.A. in Multidisciplinary Studies, but would benefit students who choose focus areas within STEM fields as they pursue graduate education and career opportunities.
- The B.S. in Multidisciplinary Studies would provide students a high level of marketability and flexibility.
- Peer and aspirant institutions offer comparable degrees.

Relationship to Existing Programs

- The B.S. in Multidisciplinary Studies would be a complementary program to the B.A. in Multidisciplinary Studies.
- B. The B.S. in Multidisciplinary Studies may decrease enrollment in the B.A. in Multidisciplinary Studies as students choose an option more consistent with their academic and professional goals. However, the option to obtain a B.S. may bring more students to Multidisciplinary Studies, as they may see a clearer link between their academic and career goals which are STEM focused.

Expected Enrollment

YEAR	1	2	3	4	5
Headcount	25	50	100	125	150
FTSE	15	30	60	75	90

Resources

- The B.S. in Multidisciplinary Studies would use courses that already exist within the Multidisciplinary Studies program and other departments at UTSA. No new courses are necessary.
- No new faculty or faculty resources are required.

Other Information

A Sample Degree Plan for BS in Multidisciplinary Studies is provided.

To: Faculty Senate
From: Faculty Senate Curriculum Committee: Turgay Korkmaz (Chair), Pepe Chang, Brian Davies, Liang Tang, Langston Clark, Bill Ramos,
Re: Review of proposal for the Cyber Operations Track for BS in Computer Science
Date: Jan 24th, 2019

Faculty senate curriculum committee reviewed the proposal for the *Cyber Operations Track for BS in Computer Science* from the University College. **Based on our evaluation, we recommend the proposal to be approved by the faculty senate**. Yes: **4**, No: **0**, Abstain: **0** No response: **1**
Please see below for the summary of our evaluation.

The **objective** of the proposed Cyber Operations (CO) Track is to provide a technically rigorous curriculum in cybersecurity with a focus on offensive cyber operations while balancing theoretical foundations and experiential learning. It will prepare students to pursue productive cyber security careers in the private or public sectors. The CS Department at UTSA has been designated by the National Security Agency (NSA) as a National Center of Academic Excellence in Cyber Operations Fundamental (CAE-Cyber Operations) for 2018 through 2023. This track will be the first step towards offering a BS in Cybersecurity.

The requirements for the Cyber Operations (CO) Track for BS in Computer Science are based on the current BSCS degree with the changes summarized in the following table.

Category	Semester Credit Hours	
	B.S. Computer Science	**B.S. Computer Science, Cyber Operations Track (Proposed)**
A. General Education Core	42	**42**
B. Required CS Courses	48	**45***
C. Upper division support work	24 (CS electives)	**27 (required Cybersecurity courses)**
D. Additional Electives	6 (free electives)	**6 (CS electives)**
TOTAL	120	**120**

*Under Category B in the above table, CS 3853 Computer Architecture is not required for CO track students, but it is available as an elective under Category D.

The CO track support work (Category C and D in the above table) comprises of nine required cybersecurity courses and two electives (total credit hours of 33):

Required nine courses: CS3113 Principles of Cyber Security; CS 3433 Computer and Information Security; CS 3873 Computer Networks; CS 4353 Unix and Network Security; CS 4363 Cryptography; CS 4643 Cellular and Mobile Technologies; CS 4653 Software and Malware Reverse Engineering; CS 4663 Distributed and Cloud Systems Security; CS 4683 Secure Software Development and Analysis.

Two electives can be select from CS 3853 Computer Architecture, CS 4673 Cyber Operations, CS 4853 Advanced Systems Programming, any other CS upper division electives, or related electives such as IS 4523 Digital Forensics II (from Information Systems and Cybersecurity program in College of Business).

Reason for Request

- Owing to the explosion of cybersecurity threats, there is a very large and unmet demand for graduates with cybersecurity specialization. To meet this demand and to provide a rigorous learning experience in cybersecurity and cyber operations, the Department of Computer Science designed the Cyber Operations track.
- The proposed CO track will increase the attractiveness of B.S. in Computer Science degree program and help UTSA recruit additional students who otherwise may choose to go to the other CO programs in the state.
- The National Security Agency (NSA) reviewed the proposed CO curriculum and designated it as a Center of Academic Excellence in Cyber Operations (CAE-CO) for the period 2018-2023. The proposed CO Track will fulfil the requirements of CAE-CO designation.

Relationship to Existing Programs

- The current BSCS degree options include concentrations in cyber security, software engineering, data science, and cloud computing. The proposed CO track expands on the cyber security concentration by requiring additional courses on cybersecurity and cyber operations to be completed. These additional courses have already been developed and offered as electives in the last couple of years.
- Students who want to study cybersecurity beyond the requirements of a concentration will be interested in the CO track.
- In Texas, three universities---University of Texas at El Paso, University of Texas at Dallas, and Texas A&M University at College Station---received the NSA CAE-CO designation. The students for this program will be from the pool of current and future computer science students interested in cybersecurity and additional students specifically interested in cyber operations and would choose other universities in Texas if CO track is not offered by UTSA.

Expected Enrollment

Over the last several years, the enrollment in Computer Science has been constantly increasing with a particular interest in security area. In AY 2017-18, 169 UTSA students graduated with a BS in Computer Science, of which 14% had a concentration in Cyber Security. The following table summarizes the enrollment projections for the next five years.

Year	1	2	3	4	5
Headcount (CS-Cyber OP)	125	138	151	166	183
FTE	100	110	121	133	146

Resources

- The courses required for Cyber Operations Track have been developed and offered as elective courses in the last couple of years.
- No additional courses are needed to offer the CO track and meet NSA's CAE-CO requirements.
- There are enough faculty members to support the current demand for CO track and the Cyber Security concentration. However, as the enrollments increase, additional cybersecurity faculty will need to be recruited.

Other Information

Course descriptions and a Sample Degree Plan with Cyber Operations track were provided.

To: Faculty Senate
From: Faculty Senate Curriculum Committee: Turgay Korkmaz (Chair), Pepe Chang, Brian Davies, Liang Tang, Langston Clark, Bill Ramos,
Re: Review of proposal for the Aerospace Engineering Certificate in Mechanical Engineering
Date: Jan 24th, 2019

Faculty senate curriculum committee reviewed the proposal for the *Aerospace Engineering Certificate* from the University College. **Based on our evaluation, we recommend the proposal to be approved by the faculty senate**. Yes: **3**, No: **0**, Abstain: **1** No response: **1**
Please see below for the summary of our evaluation.

The **objective** of the program is to prepare degree seeking students or degree holders in Mechanical Engineering (ME) or related fields with the fundamental engineering knowledge necessary for successful careers in the aerospace industry. It certifies to employers that students awarded the certificate have completed coursework essential to success in entry-level positions in aerospace. Three new elective courses should be added to the ME curriculum. These classes will close current gaps in the UTSA ME curriculum while providing students on the aerospace engineering certificate track an experience comparable to what is offered by universities with accredited aerospace engineering undergraduate programs. These courses will the first steps in moving towards offering B.S. and M.S. degrees in aerospace engineering. This certificate will also fulfill the need of a San Antonio K-12 initiative that cultivates student interests in aviation related careers supported by the Dee Howard Foundation.

The requirements for the *Aerospace Engineering Certificate* include:

Students pursuing an Aerospace Engineering Certificate must complete 15 semester credit hours as follows*: Required courses: (3 SCH) ME 3663 Fluid Mechanics Electives (12 SCH): A. A minimum of 9 SCH must be completed from the courses selected in the following list; or all four courses in the following list can be used to complete the requirement ME 4183 Compressible Flow **ME 4953 SP: Aerodynamics** **ME 4953 SP: Propulsion** **ME 4953 SP: Astrodynamics** B. If only nine (9) SCH are completed in the courses listed in part A, then three (3) SCH must be completed from a course selected from the following list ME 3323 Mechanical Vibration ME 4603 Finite Element Analysis ME 4723 Reliability and Quality Control *Note that the certificate is 1 course (3 SCH) beyond the 128 required SCH for the current BS ME degree for ME UG students.	15

Reason for Request

- Given the rapid growth of The College of Engineering at UTSA and in particular the Department of Mechanical Engineering, there is a high demand for new course offerings and expanded degree/certificate options from the diverse population of students.
- Given the historical strength of the aerospace sector in San Antonio, the relationship between the College of Engineering and the Dee Howard Foundation, the college's recent investment in aerodynamics with the hire of Dr. Combs, and the strong push for aerospace-related courses and degree options from the student body, the establishment of an aerospace engineering certificate program is the next logical step in the development of an aerospace program at UTSA.
- The San Antonio aerospace industry has a $3.4B annual impact, with an estimated market growth of $8.8T over the next 20 years. There are currently over 10,000 aerospace jobs in San Antonio (with an average wage above $78k/year) and more than 1,000 new aerospace jobs were announced at Port San Antonio to be filled within the next two years.

Relationship to Existing Programs

- This new certificate program will build onto the existing course content at UTSA and leverage the existing expertise in the Department of Mechanical Engineering.
- Based on surveys of other top 50 aerospace engineering departments around the U.S., the primary difference between the standard mechanical engineering B.S. degree track and a typical aerospace engineering B.S. degree was found to be 3-4 core classes. Therefore, this degree option will focus on the addition of four elective courses while requiring students to take three ME-program required courses.

Expected Enrollment

	Year 1	Year 2	Year 3	Year 4	Year 5
Certificate awarded	5	8	10	12	15
enrollment of Elective courses	30-60	30-60	30-60	30-60	30-60

Resources

- Over the last 5 years, the ME program at UTSA has offered ad hoc a variety of aerospace related electives under special topics.
- The College of Engineering has reached a preliminary agreement with the Dee Howard Foundation for funds to cover instructor costs for three new aerospace engineering courses to be taught per academic year. The cost to employ instruction is $5,000/course, for a total of $15,000 for the three courses from DHF. The fourth course will be taught once per academic year by existing faculty member Dr. Combs as part of his planned teaching assignment.
- The aerospace electives will be added as additional electives open to all ME students in addition to the electives currently being offered.
- Additional administrative support is required to manage the certificate program including reports to SACSCOC.

Other Information

- New Course Descriptions were given