PROPOSED PROGRAM SUMMARY

Instituion: University of Kentucky
Program Name: Aerospace Engineering
Degree Designation: MASTER OF SCIENCE (MS)
Degree Level : Master's

Program Description

The proposed aerospace engineering master's degree program will provide a rigorous foundation in the fundamental principles of modern aerospace science and engineering. The program's main objective is to prepare its students for aerospace research and development in industry, government, and academia. The program will offer a comprehensive aerospace engineering curriculum, similar to those at the top aerospace programs in the US, with instructors that are active researchers in the aerospace community.

The program is motivated by an increasing aerospace industry within Kentucky, increasing demand from students for a structured Aerospace program at UK, and the existence of sufficient faculty expertise within the Mechanical Engineering Department at UK to offer such a program with minimal investment.

The proposed aerospace engineering master's program offers a thesis option and a

non-thesis option. The thesis option, which is intended for full-time graduate students, requires a minimum of 24 semester hours of coursework and 6 credit hours of thesis research, along with the thesis. The non-thesis option, which is intended for part-time students who are employed, requires a minimum of 30 semester hours of coursework.

The University of Kentucky's mission includes promoting economic development and improving people's lives through excellence in education and research. The proposed aerospace program supports UK's mission by increasing scientific discovery and innovation in aerospace, and by supporting the local aerospace industry with a highly-skilled workforce.

Will this program replace or enhance any existing programs(s) or tracks, concentrations, or specializations within an existing program? If yes, please specify
NA

CIP Code: 14.0201
Credit Hours: 30

Institutional Board Approval Date: 6/16/2021
Implementation Date: 8/16/2021

Student Demand

Year 1 - 5
Year 2 - 10
Year 3 - 15
Year 4 - 15
Year 5 - 15

Market Demand

Currently, undergraduate students in Mechanical Engineering that wish to pursue graduate degrees in Aerospace Engineering must look for those opportunities at other universities, and this regularly occurs with approximately 5-10 students each year pursuing AER advanced degrees elsewhere following completion of their BS in ME at UK. The current enrollment in the Mechanical Engineering MS program is approximately 35 students with approximately 15 graduates per year. At typical joint Mechanical and Aerospace Engineering departments in other states about 1/3 of the total department students are in the Aerospace Program, thus we expect a steady enrollment of approximately 15 students, with annual MS graduates of 6-7 students and annual new enrollments of 7-10 students. These are consistent with the demand we see just from our own BS graduates. While this is a modest number of students, we note that the existing expertise of Mechanical Engineering faculty in Aerospace fields permits this program to be launched with no required hires. The companion proposal to start a BS program in Aerospace Engineering will support hiring of several additional faculty. Thus, while the MS program can start without the BS program, the BS program will expand aerospace expertise and permit additional courses to be added to the curriculum over time.

The anticipated rates of MS graduates matches well with current regional and state demand not accounting for the projected 14% growth in this area over the coming decade.

Employment Demand

	Regional	State	National
Type Of Job	**Aerospace Engineering (Architectural, Engineering, and related services; Aerospace Product and Parts**		
Avg. Wage	$87	$98,650	$84,186
# Jobs (Postings)	15	7	1987
Expected Growth	14%	14%	6%

Indicate source of market demand information

Salary data is from Burning Glass that uses actual job postings over the last 12 months and was supplemented by BLS/OES 2018 data when burning glass was unavailable. Projections are BLS/OES, 2018 data from 2016-2026.

Academic Demand

NA

Unneccessary Duplication

Similar Program(s):

Program Id	Inst code	Inst Description	Degree Designation	Program Title	Report year
10090	00197600	Morehead State University	MS	Space Systems Engineering	2015

Comparison of Objectives/Focus/Curriculum to Similar Programs:
Morehead State University offers an MS in Space Systems Engineering. Their program is focused on systems-level engineering for spacecraft design, development and operation (1). The program emphasizes astronautics and satellite systems. The required curriculum includes classes in Spacecraft Design, Spacecraft Sensors, Space Communications, and Space Mission Design. The MSU program is very specialized in satellite systems.

The proposed MS in Aerospace Engineering at UK is a broad more traditional Aerospace Engineering program with courses available in applications of aeronautics, propulsion, and aerospace controls. The course requirements for students are built around the requirements for their specific research projects. The research focus in the department in aerospace applications does include some satellite control, but also include computational modeling for hypersonics, combustion for aerospace propulsion, and control for aeronautics and astronautic systems. The companion proposal to develop a BS in AER will also support the hiring of faculty with expertise in aerospace structures and materials. These areas are part of a more comprehensive aerospace engineering program.

https://www.moreheadstate.edu/study/MS-spacesystemsengineering

Comparison of Student Populations:
Both the MSU and UK MS programs are residential programs and both require students to have an undergraduate degree in mechanical or aerospace engineering or related area. The primary difference in student population surrounds the students interest within aerospace engineering. Students seeking study in other areas of aerospace engineering except for satellite systems do not have an option within any program in Kentucky. The proposed MS AER program at UK will provide broad opportunities for students interested in aeronautics, aerospace structures, hypersonics, and other areas. The MSU program will continue to appeal to students with a specific interest in satellite systems.

Access to Existing Programs:
The existing program does not cover the broader areas of Aerospace Engineering proposed here.

Feedback from Other Institutions:
Requested

Cost

Projected Revenue over Next Five Years ($) : 324912
Projected Expenses over Next Five Years ($) : 161800

Will Additional faculty be needed? Yes

No. Additional faculty will be hired as part of the companion proposal to develop a BS program in AER, and those faculty will bring new expertise that will be valuable to the MS program. However, existing expertise is sufficient and no faculty are required just for the MS program.

Provide a budgetary rationale for creating this new program

The Mechanical Engineering Department has developed a significant expertise in aerospace applications over the years. Present funding for research in the department is already about 1/3 in the Aerospace area with major funding coming from NASA as well as form the Department of Defense. Our elective courses in Mechanical Engineering have been developed to fit the needs of this aerospace oriented research and we find ourselves with sufficient expertise, capacity and course offerings to launch an Aerospace Engineering MS program with no additional resources. Initial courses for the AER MS program can take full advantage of courses already developed to meet research needs. As the program grows and new faculty are hired, particularly if the BS program is also approved, additional courses wi