

MECHATRONICS ENGINEERING - PH.D.

College of Aeronautics and Engineering
www.kent.edu/cae

About This Program

Join the forefront of robotics and automation research with a Ph.D. degree in Mechatronics Engineering. Collaborate with world-renowned experts, access state-of-the-art facilities and unlock a world of advanced career opportunities. Enroll now and be part of the next generation of innovators. Read more...

Contact Information

- Program Coordinator: **Ali Abdul-Aziz, Ph.D., P.E.** | CAEgraduatestudies@kent.edu | 330-672-1032
- Connect with an Admissions Counselor: U.S. Student | International Student

Program Delivery

- **Delivery:**
 - In person
- **Location:**
 - Kent Campus

Examples of Possible Careers and Salaries*

Engineering teachers, postsecondary

- 8.6% much faster than the average
- 44,600 number of jobs
- \$103,600 potential earnings

Engineers, all other

- 1.3% slower than the average
- 170,100 number of jobs
- \$103,380 potential earnings

Electronics engineers, except computer

- 1.4% slower than the average
- 134,900 number of jobs
- \$107,540 potential earnings

Aerospace engineers

- 2.8% slower than the average
- 66,400 number of jobs
- \$118,610 potential earnings

Operations research analysts

- 24.8% much faster than the average
- 105,100 number of jobs
- \$86,200 potential earnings

* Source of occupation titles and labor data comes from the U.S. Bureau of Labor Statistics' Occupational Outlook Handbook. Data comprises projected percent change in employment over the next 10 years; nation-wide employment numbers; and the yearly median wage at which half of the workers in the occupation earned more than that amount and half earned less.

For more information about graduate admissions, visit the graduate admission website. For more information on international admissions, visit the international admission website.

Admission Requirements

- Bachelor's or master's degree in mechatronics engineering or closely related area (e.g., electrical engineering or mechanical engineering) from an accredited college or university
- Minimum 2.750 GPA on a 4.000 point scale
- Official transcript(s) from each institution in which eight or more semester credit hours were attempted
- Goal statement
- Three letters of recommendation
- English language proficiency - all international students must provide proof of English language proficiency (unless they meet specific exceptions) by earning one of the following:
 - Minimum 550 TOEFL PBT score (paper-based version)
 - Minimum 79 TOEFL IBT score (internet-based version)
 - Minimum 77 MELAB score
 - Minimum 6.5 IELTS score
 - Minimum 58 PTE score
 - Minimum 110 Duolingo English test score

For more information about graduate admissions, please visit the Graduate Studies website. For more information on international admission, visit the Office of Global Education website.

Application Deadlines

- **Fall Semester**
 - Application deadline: November 1

Applications submitted after this deadline will be considered on a space-available basis.

Program Requirements

Major Requirements

| Code | Title | Credit Hours |
|---|--|--------------|
| Major Requirements | | |
| ENGR 81091 | GRADUATE SEMINAR (repeated for 3 credit hours total) | 3 |
| Major Electives, choose from the following: | | 18 |
| Engineering | | |
| ENGR 72410 | ENGINEERING OPTIMIZATION | |
| ENGR 73030 | MECHATRONICS | |
| ENGR 78005 | LINEAR SYSTEM ANALYSIS AND CONTROL | |

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|--|---|
| Control Systems | |
| ENGR 78004 | OPTIMAL CONTROL THEORY |
| ENGR 78006 | NONLINEAR SYSTEMS AND CONTROL |
| ENGR 78007 | DIGITAL CONTROL SYSTEMS |
| ENGR 78008 | INTRODUCTION TO ROBUST CONTROL |
| Robotics and Automation | |
| CS 73334 | HUMAN-ROBOT INTERACTION |
| ENGR 72620 | INDUSTRIAL AUTOMATION AND CONTROL |
| ENGR 77300 | MEDICAL ROBOTICS |
| ENGR 77400 | ROBOTICS: KINEMATICS AND DESIGN |
| ENGR 78101 | AUTONOMOUS UNMANNED AERIAL SYSTEMS |
| Machine Intelligence | |
| CS 74201 | ADVANCED ARTIFICIAL INTELLIGENCE |
| ENGR 78010 | MACHINE VISION |
| ENGR 78102 | INTELLIGENT SENSING AND PLANNING OF UNMANNED AERIAL SYSTEMS |
| Other courses with approval from advisor and/or college | |
| Advisor-approved courses in or outside the College of Aeronautics and Engineering ¹ | 0-30 |
| <i>Culminating Requirements</i> | |
| ENGR 85098 | RESEARCH (repeated for 9 credit hours total) 9 |
| ENGR 85199 | DISSERTATION I ² 30 |
| Minimum Total Credit Hours for Post-Baccalaureate Students: | 90 |
| Minimum Total Credit Hours for Post-Master's Students: | 60 |

¹ Post-baccalaureate students may apply toward the 30 credit hours a maximum 15 credit hours of coursework outside the College of Aeronautics and Engineering and 9 credit hours of research (maximum 18 credit hours total of research toward the degree).

² Each doctoral candidate, upon admission to candidacy, must register for ENGR 85199 for a total of 30 credit hours. It is expected that a doctoral candidate will continuously register for ENGR 85199, and thereafter ENGR 85299, each semester, until all requirements for the degree have been met. The dissertation is specialized research, leading to a definitive contribution to the candidate's research focus-area. This contribution should be of sufficient importance to warrant publication in a recognized journal. The candidate must successfully propose and defend their research dissertation in a public setting.

Program Learning Outcomes

Graduates of this program will be able to:

1. Conduct literature searches, comprehend advanced research materials and uncover connections between related work.
2. Perform research, discovery and integration by applying advanced knowledge of mechatronics engineering.
3. Communicate problems and solutions in mechatronics engineering clearly, both verbally and in writing.

Full Description

The Ph.D. degree in Mechatronics Engineering provides an advanced theoretical and/or research-oriented curriculum with significant depth in mechatronics related discipline, beyond the general fundamentals of the engineering bachelor's degree.