A GUIDE TO GRADUATE PROGRAMS IN KENT STATE UNIVERSITY’S COLLEGE OF AERONAUTICS AND ENGINEERING
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Kent State University’s College of Aeronautics and Engineering

Kent State University’s College of Aeronautics and Engineering (CAE) strives to be a global leader embracing a unique synergy of aeronautics, engineering and technologies that inspires individuals to innovate, impact and improve life.

CAE makes the universe more accessible and the opportunities for students immeasurable. CAE is one of 11 colleges at Kent State with more than 1,000 students and double-digit growth in recent years.

Through the fields of aeronautics and engineering, CAE seeks to positively change the trajectory of the regional, national and global community by providing a dynamic educational experience that fosters experiential learning and cultivates innovative research that transforms ideas into reality.
The Impacts of Aeronautics and Engineering

The challenges facing **aeronautics and engineering** represent a tremendous opportunity:

- The **aviation industry** is experiencing an urgent need for pilots, mechanics, technicians and support personnel to effectively move people and goods across the country and the world.
- The **space industry** is undergoing a transformation resulting in growth in the private and commercial sectors, increasing the necessity for qualified engineers.
- The area of **autonomous transportation systems**, including autonomous water, ground, aerial and space vehicles, is leading to new industries and expanding the workforce.
- The call for **sustainable and alternative energy systems** across the globe is resulting in a demand for individuals trained to understand complex environmental, societal, ethical and engineering interactions.
- **Engineering design and manufacturing** companies around the world are competing for engineers who are out-of-the-box thinkers with hands-on training and understanding.

Through the graduate programs offered within the CAE, students will have the opportunity to positively impact and influence regional, national and global communities by:

- Providing a dynamic educational experience that fosters experiential learning.
- Cultivating innovative research that transforms ideas into reality.
- Producing forward-thinking professionals dedicated to overcoming limits and improving lives.
Kent State offers the following graduate programs in the College of Aeronautics and Engineering:

- Master of Engineering Technology
- Master of Science in Mechatronics Engineering (available for Fall 2022 enrollment)
- Master of Science in Aerospace Engineering
- Master of Science in Aviation Management and Logistics — 100% online
- Doctor of Philosophy in Aerospace Engineering
- Doctor of Philosophy in Mechatronics Engineering (available for Fall 2022 enrollment)

Unique Features of Kent State’s College of Aeronautics and Engineering Graduate Programs

College of Aeronautics and Engineering’s (CAE) state-of-the-art facilities, academic programs and faculty’s cutting-edge research are designed to address the critical needs of the changing world. CAE’s Master of Engineering Technology (M.E.T.) includes a set of specialized concentrations in quality, mechanical and computer engineering technology as well as engineering management technology that equip students to be leaders in a variety of career paths.

Within the CAE at Kent State, the M.E.T. and M.S. in Aviation Management and Logistics (AvML) are cutting-edge degrees with no thesis requirement. The M.S. in AvML is 100 percent online and is completed as a series of seven five week courses. The M.E.T. degree offers several online courses as well, providing much-needed flexibility for students.

The M.S. and Ph.D. in Aerospace Engineering incorporate high-tech research in artificial intelligence, cybersecurity engineering and unmanned aerial vehicles.

The M.S. and Ph.D. in Mechatronics is a multidisciplinary field that encompasses the principles of mechanical, electrical, computer and controls engineering to provide a unified solution that connects various stages of design and production processes into a single, streamlined system.
These are just a few of the factors that make CAE so distinctive. Whether your passion is to design new space systems to improve communication or safely manage air traffic and logistics, to help fuel the future through improved design of alternative energy systems or operate and manage swarms of unmanned aerial vehicles (UAVs), to create and operate new robotic manufacturing systems or to design, build and operate the engineered systems that will help individuals in their homes and businesses, CAE will help get you there.

Interested in what else makes CAE so unique? Here are just a few of the department's remarkable features:

**Faculty Credentials** — Meet the many expert faculty members who contribute to the success of the CAE.

**Kent State University Airport** — The Kent State University Airport is a public use airport serving the CAE’s Professional Pilot program, which provides professional aeronautical training to Kent State University students enrolled in the Aeronautics program.

**CAE Career Services** — CAE has a career services office to provide CAE students the resources and support to jumpstart their career. From resume review and interview tips to career fairs and internships, we’re here to connect you to employers.

**Advisory Council** — The CAE’s Industrial Advisory Council is composed of decision-makers from a diverse cross-section of the aeronautics and engineering industries. The council is active in guiding the college’s curricular activities with an emphasis on joint effort — resulting in the brightest and best-prepared graduates.

**Student Body Diversity** — The Division of Diversity, Equity and Inclusion (DEI) leads Kent State University’s community effort to increase diverse representation, create and sustain equality of opportunity and foster an inclusive and equitable environment.

** Entirely Online Degree Offerings** — CAE offers the Master of Science in Aviation Management and Logistics graduate program as a 100 percent online degree, as well as a variety of master’s level courses online.

**Corporate Relationships** — Corporate relationships provide internship and mentoring opportunities to CAE students along with a clear pathway to post-graduation employment.

**Fellowships** — Graduate teaching and research assistantships are available for some research graduate students.
Research in Kent State’s College of Aeronautics and Engineering

The College of Aeronautics and Engineering is proud of its research. CAE research leverages the distinct combination of aeronautics and engineering, enabling innovative engineered systems for a smarter, more secure and sustainable future that improves lives and makes the universe more accessible to all.

Research in the College of Aeronautics and Engineering:

**Smart**
CAE research pushes the boundaries of smart engineered systems in the air, on the ground, in space and on the manufacturing floor, focusing on AI for autonomous systems, biomedical informatics, robotics, unmanned aerial vehicles, cognitive swarms and mechatronic systems.

**Safe and Secure**
From air traffic control to aviation and cyberspace systems, CAE researchers are focused on ensuring that skies are safe and cyber-engineered systems are secure and trustworthy. CAE faculty solve real-world problems to enhance human-machine interaction and engineer systems that are less vulnerable to persistent threats.

**Sustainable**
As responsible stewards of the planet, CAE researchers are pioneering sustainable innovations in energy, materials, manufacturing and design. From fuel cells and fuel-flexible power solutions to additive manufacturing of engineered systems, the research at CAE is helping to ensure that future generations inherit a healthy environment.

**Improved Accessibility**
From drones for military reconnaissance and domestic surveillance to space exploration, CAE researchers are working to expand the boundaries of accessibility on Earth and beyond. The faculty’s expertise in design, guidance, navigation, control and human factors uniquely positions us to diminish the barriers of distance and time.
CAE is growing! Our building expansion features a two-story atrium that will enable year-round drone training and research, as well as plenty of collaboration space, workstations, and open project space. Groundbreaking for the expansion occurs in March 2022. A decision to join our college is a decision to be part of the inaugural class to occupy our brand-new expansion which will be filled with endless opportunities to be innovative change makers and to DARE MIGHTY THINGS!
The **Bot Bunker** is CAE’s foundation of automation featuring four expanded labs, including the Autonomous Vehicles and Systems Lab, the Industrial Robotics Lab, a new Mechatronics Teaching Lab, and the Robotics and Mechatronics Research Lab. The labs are designed to facilitate dynamic learning environments with adaptable teaching to support our researchers in mechatronics, robotics, cognitive robotics, and robot applications.

The **cyber.domain** is a collection of three teaching and research laboratories all with an emphasis on the critically important area of cybersecurity engineering and computer engineering technology: the Cyber Range/ Esports Lab, the Networking Lab, and the adjacent Sim/Cybersecurity/AI Research Lab. The cyber.domain is critical to the academic progression of students pursuing these majors as they learn to fend off security issues before they occur and become experts in solving the unsolvable by mastering the art of computer systems and critical thinking.

Three new teaching labs will be available in the **Maker Alley**: The Design & Innovation Lab, the Makerspace Lab, and the Pattern & Fabrication Lab. Together, these labs create a dynamic learning environment with flexible and adaptable teaching and research lab spaces and will provide a truly unique and impactful set of facilities enabling students to understand the entire engineering design and manufacturing enterprise.
Research Initiatives in CAE

**Advanced Medical Robot Lab (AMRLab)** — Researchers with the AMRLab are dedicated to advancing robots for medical applications. Their research focuses on system control, human-robot physical interaction, advanced mechanism design and robotic sensing.

**Cognitive Robotics and AI (CRAI)** — Within the CRAI Lab, the CAE aims to conduct world-class cognitive robotics research, designing the “Mind” for robotic and AI systems for seamless cooperation with a human. The robot mind is a cognitive model based on AI algorithms and theory in cognitive science, psychology and neuroscience. We envision that with cognitive models, robots have self-awareness and self-behavior diagnosis, understand human attention and environmental risk and build a trustworthy relation with humans and other robotic systems. The applications include daily assistive robots, UAV teaming and deployment, medical AI systems and intelligent manufacturing. Research directions in CRAI include i) Theoretical Models of Robot Cognition, ii) Multi-UAV System Design and Deployment, and iii) Trust-Worthy Human-Robot Interaction.

**Control, Automation, and Mechatronics** — The Control, Automation, and Mechatronics (CAM) lab aims to contribute to the design, modeling and control of mechatronics systems with an emphasis on cyber-physical systems, biomedical applications and unmanned vehicles. The CAM lab is capable of cyber-physical testing platform for biomedical applications, design and evaluation of advanced closed-loop controllers, human driver models and driving interfaces and trajectory optimization tools for unmanned systems.
Extended Reality Lab — One of CAE’s newest labs, researchers with the Extended Reality (XR) Lab explore how learning and training in dynamic environments and on complex systems can be enhanced by using immersive technology. Training innovations in augmented reality (AR), mixed reality (MR), and virtual reality (VR) technologies are being researched for many fields and in conjunction with researchers from across the campus. The research goals of the lab include the use of XR development and simulation to discover novel frameworks to direct complex systems, design representation, and decision-making as pertains to system stakeholders. This is essential for the realization of elegant design in all phases of system lifecycles.

Fuel Cells, Clean Energy, And Sustainability Lab — The Clean Energy and Sustainability Research Team is focused on renewable energies, primarily Solid Oxide Fuel Cell (SOFC) technology, but also incorporates projects in solar and other renewable technologies. Current capabilities include materials processing, fuel cell fabrication and electrochemical characterization equipment.

“I make robots clever by designing the robot mind based on AI and cognitive science ... Robots should have their own reasoning capabilities — not only the ability to follow human orders but also the capacity to be flexible and adapt to the real world.”

— Dr. Rui Liu, Assistant Professor, Kent State University
“Extended reality technologies will greatly enhance how students learn and apply knowledge and skills in aerospace, aviation and engineering. These areas provide the focus for research in complex decision making representation within XR environments. Research in the lab will guide instructors and content developers as they integrate these technologies and push the boundaries of education and training.”

— Dr. Benjamin Kwasa, Assistant Professor at Kent State University

**Green and Advanced Mobility Engineering** — The Green and Advanced Mobility Engineering (GAME) lab is fueled by an interest in operations planning for traditional and advanced air mobility. This lab focuses on developing data-driven optimal decision-making systems for aviation based on artificial intelligence/machine learning, optimization and operations research techniques. The research conducted in this lab can be applied to areas that include air traffic management for manned and unmanned aircraft systems, pricing and revenue management, scheduling/dispatching and route/network planning.

**Rockwell Automation Advanced Mechatronics Lab** — There are multiple classes that take place in this lab, including the electricity/electronics courses, the programmable logic controller courses and the mechatronics capstone courses.
SEAL: SEcure AI Lab — The SEcure AI Laboratory (SEAL) aims to develop efficient methods for data analysis, especially in machine learning and cloud computing, while protecting data security and privacy when facing untrusted parties or collaborators. The proposed fundamental research is implemented in different areas including bioinformatics, Blockchain technology, UAVs and wireless communications. We also aim to design efficient and implementable artificial intelligent frameworks and systems for cyber-physical systems (healthcare systems, power systems, etc.), the Internet of Things and more emerging systems.

Space Systems — The Space Systems Laboratory (SSL) develops next-generation spacecraft and space exploration concepts. Major capabilities in SSL include preliminary mission design and analysis, spacecraft dynamics simulation and testing and small satellite system development and testing. The research at SSL encompasses mission design using aeroassist maneuvers (i.e., aerobraking, aerocapture, aerogravity-assist), innovative small satellite concepts for Earth, interplanetary missions and advanced concepts for planetary in-situ exploration.

“Emerging artificial intelligence techniques and blockchain technology are changing the world. In the near future, AI-enabled facilities will become part of our everyday existence, which will improve our lives. The blockchain technique naturally ensures security and privacy when we interact with others. It’s a public ledger to which everyone has access, but no single person can control or modify the historical data.”

— Dr. Xuhui (Tracy) Chen, Assistant Professor at Kent State University
Degree Programs to Explore

Master of Science and Doctoral Degrees in Aerospace Engineering

The Master of Science and Doctoral degrees in Aerospace Engineering provide an advanced theoretical and/or research-oriented curriculum with significant depth in aerospace-specific disciplines. Students may choose engineering-focused electives related to astronautics, dynamics and control, structures and materials and systems and design. The master’s program offers both thesis and non-thesis degree options and students may choose to continue their academic journey in the aerospace engineering doctoral program.

Doctoral students will conduct cutting-edge research with faculty in areas including, but not limited to, advanced air mobility, cognitive robotics and automation, astronautics, artificial intelligence, multi-system unmanned aerial vehicles and space systems.

Have an idea? We want to hear it! Share your idea in the goal statement of your application.

Master of Science and Doctoral Degrees in Mechatronics Engineering

The Master of Science and Doctoral degrees in Mechatronics Engineering provide students with advanced theoretical training and practical research experience, beyond the general fundamentals of the engineering bachelor’s degree. These programs offer significant depth in mechatronics-related disciplines. The master’s program offers both thesis and non-thesis degree options and students may choose to continue their academic journey in the mechatronics engineering doctoral program.

Doctoral students will conduct research in advanced topics alongside faculty members focusing on disciplines such as control systems, robotics and automation, machine intelligence and the interaction between humans and machines.

Is there more to explore? Share your research idea in the goal statement of your application.
Master of Science in Aviation Management and Logistics

Offered 100 percent online with no GRE or thesis requirement, the Master of Science in Aviation Management and Logistics prepares graduates to perform at an advanced level in organizations that move people or goods via air transport. All classes are 7.5 weeks in duration and the entire degree can be completed in as little as three semesters.

The key focus areas are management information systems and marketing course work. Students take an in-depth study of the concepts, principals, design, implementation and administration of aviation safety management systems.

Students in the program examine the business of aviation logistics and its role in the global supply chain. Students are given practical experience in negotiating, vetting and managing vendor and labor contracts. They also discuss the economic, regulatory, political, geographical and human-centric challenges facing the industry today including profit strategies, human-error interventions tactics and post-9/11 security legislation concerning air cargo operations.

Note: Kent State will offer a dual degree option — M.S. in Aviation Management and Logistics and MBA — available for enrollment in 2023.

APPLY NOW
Master of Engineering Technology

Offered on Kent State’s campus, the Master of Engineering Technology (M.E.T) program prepares graduates for careers in planning and management of organizations that focus on the application of engineering principles to manufacturing, engineering and industrial operations. The program provides students flexibility in course selection to meet the diverse demands of careers in a diverse number of rapidly changing fields.

The M.E.T. program includes an investigative core of coursework that teaches students to analyze and evaluate processes, manage projects and perform industry research, with a focus on ethics and gaining familiarity with various technology-based environments. With their applied knowledge of engineering concepts, graduates of this program will be able to begin work in a variety of management and technical roles in a wide range of sectors.

Within their degree, students have the opportunity to focus their coursework in concentration options including:

- Computer Engineering Technology
- Mechanical Engineering Technology
- Quality Systems and Engineering Management Technology
Mechanical Engineering Technology concentration

A comprehensive graduate degree program designed to prepare the 21st-century workforce with engineering skills and knowledge, technology-based tools and scientific management techniques for the competitive global economy.

M.E.T. Computer Engineering Technology concentration

Computer Engineering Technology Concentration provides students with the opportunity to study computer systems and learn technical skills so that they are capable of analyzing the problems in the computer and networking industry and designing computer hardware and software solutions.

Quality Systems and Engineering Management Technology concentration

As the socio-economic dependence on technology increases, the industrial, commercial, research and service sectors have made quality systems, reliability engineering and productivity measurement and analysis three essential elements that are imperative to the success of an enterprise, corporations and industries.

In an environment of accelerated rate of technological change and the competitive global economy, engineering management professionals are widely recognized as an essential workforce with embedded knowledge and skills for strategic planning, scientific problem-solving and critical decision-making to make a technological enterprise relevant to the 21st-century economy.

APPLY NOW
The career opportunities for professionals working in fields related to aerospace and engineering are vast, and the job outlook is bright.

Below are just seven of the many of the careers available to professionals who graduate with a respected graduate degree from Kent State’s College of Aeronautics and Engineering.

1. **Aerospace Engineers** — “Aerospace engineers are employed in industries whose workers design or build aircraft, missiles, systems for national defense or spacecraft. Aerospace engineers are employed primarily in manufacturing, analysis and design, research and development and within the federal government.”

   **Median Annual Salary:** $91,000

2. **Aviation Manager** — “Aviation managers work at airlines, airports, or other businesses within the aviation or aerospace industry, such as aircraft manufacturers. In this job, you might oversee the day-to-day operations of an airport or aviation organization or supervise a department.”

   **Median Annual Salary:** $92,000

3. **Computer Hardware Engineer** — “Computer hardware engineers research, design, develop and test computer systems and components. Computer hardware engineers usually work in research laboratories that build and test various types of computer models. Most work in computer systems design services or manufacturing.”

   **Median Annual Salary:** $102,000
4. **Controls Engineer** — “Controls engineers develop, test and implement automation, control and processing systems, such as those used for electrical or water control. They may review blueprints, meet with contractors and resolve issues to ensure that a client’s project is correct.”

**Median Annual Salary:** $100,000

5. **Mechatronics Engineer** — “Mechatronics engineers use a combination of mechanical, electrical, computer and software skills to work with smart technologies, such as robots, automated guided systems and computer-integrated manufacturing equipment.”

**Median Annual Salary:** $86,000

6. **Architectural and Engineering Manager** — “Architectural and engineering managers plan, direct, and coordinate activities in architectural and engineering companies.”

**Median Annual Salary:** $144,000

7. **Engineering Teacher, Postsecondary** — “Engineering teachers are responsible for teaching “courses pertaining to the application of physical laws and principles of engineering for the development of machines, materials, instruments, processes, and services.”

**Median Annual Salary:** $103,000
Join a Community of Exceptional Scholars at Kent State

As a future leader in the field of aeronautics or engineering, you owe it to yourself to obtain a respected degree from a world-class university. You have the valuable opportunity to do exactly that at Kent State University’s College of Aeronautics and Engineering. We hope this resource is helpful as you consider earning a graduate degree at Kent State, and if you have any questions about our programs, we invite you to request more information.

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