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Masters engineering online

As one of the oldest and broadest fields of engineering, the mechanical engineering master's programs offer you incredible flexibility to pursue your interests while the part-time nature of the program allows you to do so at your own pace. Instructors are executive-level mechanical engineers who deepen your understanding of the fundamentals and introduce you to modern technologies and theories. Learn to use advanced analysis techniques, translate mechanical engineering problems into a quantitative form, and analyze experiments. You also have the option to take elective courses from other Engineering for Professionals programs—giving you the control to gain the precise knowledge you seek. Upon graduation, you will: Master advanced techniques of analysis and modern tools. Translate practical mechanical engineering problems into a quantitative form amenable to an analytical or numerical solution, or to experimental investigation. Analyze, interpret, and apply the information obtained by experiment, computation, or analysis, or available in the literature. Choose a specialization that best fits your area of interest. Apply knowledge, facts, and theories immediately in your work outside the classroom. Master's Degree Focus Areas A focus area must be selected. While required to narrow your study, your focus area will not appear on your degree. **Advanced Manufacturing:** In this focus area students study the automation of design and manufacturing systems including computer-aided design (CAD), computer-aided engineering (CAE), computer-aided manufacturing (CAM), and robotics. They will gain understanding of the relationships between process machinery, process conditions, and material properties, as well as learn to design precision machines, instruments, and mechanisms through an understanding of gears, bearings, actuators, and sensors. They will develop a clear understanding of positional repeatability and accuracy as well as sources of machine and instrumentation errors. Students will also gain broad knowledge in smart automation, intelligent sensing, computer-integrated manufacturing, quality control, supply chain coordination, and explore the latest manufacturing processes in high-tech industries. This focus area prepares students for careers driving digital transformation in manufacturing. With exposure to both technical and analytical methods for advanced manufacturing, graduates will be ready to excel in cross-disciplinary engineering roles driving manufacturing innovation, efficiency, and competitiveness through digitalization and smart automation. **Aerospace Engineering:** In this focus area students will study the analysis, design, and development of aircraft, spacecraft, satellites, and rockets. They will gain broad foundations in aerodynamics, aerospace materials, structures, propulsion, flight dynamics, orbital mechanics, systems integration, and aerospace manufacturing. Students will explore topics such as aerodynamic analysis, computational fluid dynamics, aircraft structures, attitude determination and control, trajectory optimization, and propulsion. With exposure to core aeronautics and astronautics principles, graduates are prepared for rewarding careers advancing aerospace science and technologies through analysis, modeling, simulation, and development roles across the aerospace and defense industries. **Biomechanics:** In this focus area the students apply mechanical engineering principles to understand the mechanics of biological systems and the human body. They will study topics related to the musculoskeletal system, cardiovascular system, human motion, and flow within the body through a mechanics perspective. They will gain core knowledge in solid and fluid mechanics relating to tissues, organs, and overall body function. Students will learn about constitutive models for structures like bone, cartilage, ligaments, skin, and vessels, as well as analyze dynamics and motor control for movement and examine design requirements for medical implants and prosthetics. With a blend of mechanics fundamentals and bioengineering applications, graduates are prepared for biomedical and healthcare careers advancing patient treatment, diagnostics, and human recovery via technology innovations. **Fluid and Thermal Mechanics:** In this focus area the students will develop advanced knowledge in fluid mechanics, thermodynamics, and heat transfer. They will study the fundamentals of fluid flow, multiphase flows, thermodynamics, and heat exchange processes. Additionally, they will explore topics such as computational fluid dynamics, heat exchanger design, combustion, mass transfer, and renewable power systems. They will examine a variety of single and multiphase fluid flow problems - including non-Newtonian flows, compressible flow, turbulence, boundary layers, and microfluidics. They will also understand solution methods for the transport of heat by conduction, convection, radiation, and phase change. Students will gain experience with analyzing and designing thermal-fluid systems and components such as turbines, pumps, valves, reactors, heat exchangers, and piping systems. They will also leverage computational methods and simulations tools for modeling complex thermofluids phenomena. Graduates are equipped for engineering careers related to processing plants, energy systems, propulsion, microfluidics, HVAC, and emerging fields in renewable energies. **Hypersonic Technologies:** In this focus area the students will study the complex multidisciplinary challenges associated with sustained hypersonic flight, spanning speeds from Mach 5 to orbital velocities. Students will learn the fundamentals of high-speed aerodynamics, propulsion, materials, controls, and thermal management unique to the hypersonic flight regime. They will explore topics such as scramjet/ramjet engines, high-temperature materials, plasma flow interactions, boundary layer transition, heat transfer, and guidance/navigation of hypervelocity vehicles. Students will examine the capabilities of existing and proposed hypersonic aircraft, re-entry vehicles, rocket systems, and space launchers. They will also understand the technology barriers and physical constraints that influence cruise and acceleration performance, range, maneuverability and survivability. With a balanced exposure to theoretical and practical problems, this focus area prepares students for developing cutting-edge aerospace crafts, defense systems, or fundamental research focused on expanding the horizons of high-speed flight. Graduates will be equipped to take on lingering challenges in aerodynamic design, propulsion integration, materials development and flight control for practical hypersonic vehicles. **Ocean Engineering:** In this focus area students study the design, construction, and operation of equipment and systems for marine environments. Learn about naval architecture, ocean structures, underwater vehicles, ocean observing systems, coastal engineering, and marine renewable energy. Student will also explore topics such as ship hydrodynamics, offshore platforms, subsea pipelines, ocean instrumentation, wave/tidal energy, and environmental monitoring. This focus area prepares students for careers in shipbuilding, offshore oil/gas, ocean research, marine industries, and alternative ocean energy. **Robotics, Dynamics, and Controls:** In this focus area students study different aspects of robot motion planning including rigid and compliant body kinematics, trajectory optimization, robust and adaptive control, machine vision, and mapping. Students will also learn how to analyze dynamics and control for robotic manipulators and mobile systems. Additionally, students will gain hands-on experience programming autonomous ground vehicles, aerial robots, robotic arms and/or self-driving miniature cars. Students Learn classical feedback control techniques as well as modern optimal, adaptive, intelligent and learning control methodologies. Students will ultimately gain cross-disciplinary knowledge to tackle advanced automation and robotics problems across domains such as manufacturing, surgery, transportation, defense and more. The focus area provides strong foundations for robotics specialized research or industry careers. **Mechanics of Materials and Structures:** In this focus area the students develop an in-depth understanding of solid mechanics and its application to analyzing structural systems across scale (from microelectromechanical systems to infrastructures). The curriculum provides core knowledge on stress and strain analysis of structural components, elasticity, plasticity, and failure/fracture mechanics, fatigue, creep, and advanced material models, vibration analysis with analytical and computational methods. Additionally, the focus area covers multi-scale modeling of material systems, characterization of material properties, design and analysis of mechanical components, dynamic simulation and testing of structures, and utilizing tools such as finite element analysis in the design and prediction process. This focus area will prepare you to apply advanced mechanics principles to tackle real-world structural analysis and design problems across applications in aerospace, automotive, civil, marine, biomechanical, and other engineering systems. Our cross-cutting mechanics education prepares students for engineering careers or research related to modeling, testing, design, and development of advanced materials and structural systems by providing both theoretical grounding and practical experience applying concepts to analyze complex structural systems across length scales. **FOCUS AREA REQUIREMENTS** Did you know that 78 percent of our enrolled students' tuition is covered by employer contribution programs? Find out more about the cost of tuition for prerequisite and program courses and the Dean's Fellowship. **The EP program gave me the opportunity to access one of the best schools in the nation with some of the most brilliant minds in the nation from the other side of the country. It had many challenging courses with valuable information that helped me individually and professionally.** " Jamal Abdul-Hafiz '19 Mechanical Engineering Learn on Your Terms - Develop the in-demand knowledge to achieve your personal career goals in your field of choice—on your schedule. Choose modern, relevant courses to design the learning experience that best fits your objectives. Engineers See the World Differently - Watch our video to revisit the inspiration that sparked your curiosity in science and engineering. Industry-Specific Knowledge - Unique to Engineering for Professionals, faculty are senior-level, notable professionals who are the decision-makers and changemakers in the industry. For you, this means you learn the latest techniques, technologies, and solutions-based strategies to start enhancing your career, immediately. Learn More You can still apply for the Mechanical Engineering program even if you don't have a background in engineering. You must at least meet the program's course prerequisites. You can take these courses through Johns Hopkins. Yes, however, if you are transferring a course it must be a graduate-level course, the course cannot have been used to complete another degree, and your 5-year clock of completing your degree begins on the day you enroll in your first graduate class (including any transfer graduate courses). You may be able to waive a foundational course which would allow you the opportunity to take more advanced courses in your 10-course program sequence. The Engineering for Professionals program was designed to be part-time and online with working professionals in mind. Therefore, we offer both synchronous and asynchronous courses to accommodate your busy schedule. Most of our courses are offered fully online, letting you work and study when and where is best for you. Duke MEM Online offers you maximum flexibility. Typically, the degree takes two years to complete. With approval, students may extend the program beyond two years. **Go to Content 100% online MSc - complete within 2 years part-time 5 star rating for teaching, inclusiveness, employability and facilities*** Member of AACSB, CABS, EFMD and PRIME Top 40 UK University** Training engineers and technicians for over 100 years Engage in real-world projects inspired by our extensive research portfolio Prepares graduates for application for IEng and CEng registration £7,920 total fees, option to pay £660 per module *QS Stars World University Rankings 2023 **Guardian University Guide 2025 The MSc Engineering with Management course is designed for aspiring engineering professionals or those seeking to enhance their leadership and management skills within the engineering sector. It equips you with the expertise needed to navigate complex engineering environments, manage projects effectively, and apply advanced technological solutions to real-world challenges. You will explore key topics including engineering principles, engineering impact, and human-centred engineering, with practical applications in project management, engineering management techniques, and strategic business integration. Both technical skills and management practices are strongly emphasised, and you will develop a comprehensive understanding of commercial business setups, quality management, and professional engineering leadership. Overall, you'll receive a transformative learning experience, preparing you for leadership roles in engineering management, while fostering critical thinking and a deep understanding of engineering practices and their impact on society. Our MSc Engineering with Management course prepares you for a career in engineering management from anywhere in the world. Delivered entirely online, you'll develop the skills and expertise necessary to advance your career without the need to attend campus. This course is designed to provide flexibility, allowing you to balance your studies with other commitments such as work, family, and friends. You can access course materials on various digital devices at times that are convenient for you. Studying part-time will enable you to tailor your learning to fit your lifestyle and career goals. With six start dates per year, you can kickstart your career progression in a matter of weeks. Our 100% online MSc Engineering with Management course will deepen your understanding of core engineering and management principles, equipping you with the skills to manage complex engineering projects and lead teams in a rapidly evolving industry. You will explore the impact of engineering on society, integrate human-centred approaches, and apply management techniques that enhance efficiency and innovation across engineering functions. Additionally, you will develop proficiency in digital technologies, research methodologies, and strategic business integration, allowing you to tackle modern engineering challenges with confidence. Engineering principles and impact Human-centred engineering Human, quality and project management Engineering management techniques Strategic business integration and set ups Artificial intelligence and digital skills Internet of Things (IoT) in engineering Professional engineering management Organisations and systems practices The University of Sunderland has a proud tradition of providing global education to students. With campuses in Hong Kong, Sunderland, and London and partnerships worldwide, we are dedicated to fostering diversity among our learners. Our international student population benefits from collaborating and learning together while building their professional networks on a global scale. We have been recognised for our inclusive approach and are 8th in the UK for social inclusion (The Times and Sunday Times Good University Guide 2025). Our expertise, use of cutting-edge technology, and extensive experience in delivering high-quality online education distinguish the University of Sunderland and our MSc Engineering with Management course. Engineering Principles Gain an understanding of the fundamental engineering principles, including mechanics, engineering materials, manufacturing processes, electrical power, and ethical and professional standards in engineering practice. Engineering Impact Explore the impact engineering has had on society and the role it plays today. You'll identify the responsibilities of engineers and the skills required to create an impact. Additionally, you'll discuss case studies of projects which have had a significant impact on citizens and the environment. Human-Centred Engineering Examine a range of topics relating to human-in-the-loop, within contexts such as the management of digital transformation and integration, the utilisation of technology to simplify processes, manage knowledge and simplify product development for usability. You will develop the theoretical foundations and practical skills necessary to create systems, environments and products that enhance human performance, safety, usability and sustainability. Human & Quality Management Explore key quality concepts such as the meaning of zero defects, statistical control and management of quality, optimisation through robust design, and processes and procedures to manage the contribution of personnel within a quality context. Project Management Gain an understanding of two distinct strands. One strand looks at various processes and methodologies that can be used and applied to manage projects of various types, while the other strand explores project management tools for planning and control of project costs, schedules and risks. This module creates the opportunity for you to deal with a real-life scenario to manage all aspects of planning, controlling and closing a project. Engineering Management Techniques Gain an understanding of engineering maintenance management practices in modern engineering management. You'll discuss modern manufacturing equipment, condition monitoring techniques, and gain the skills required to use these tools. Maintenance practices involve various management and technological techniques to support investigation and planning of activities. Strategic Business Integration Explore the foundational roles of business strategy, finance, marketing, HR, and operations, analysing how these functions interrelate to form a cohesive organisational strategy. By integrating insights from leading strategy theorists, the module offers a robust theoretical framework. Commercial Business Setups Gain the knowledge and skills necessary to successfully start and manage a business. You'll cover a wide range of topics, from developing an idea and market research to legal considerations, financial management, and growth strategies with environmental sustainability approach. Artificial Intelligence & Digital Skills Learn to use artificial intelligence (AI) tools and techniques for real-world problems. You will explore and learn how to use AI tools and techniques to develop and enhance your skills in data handling, data analysis, digital literacy, and programming. You'll examine AI applications, including but not limited to machine learning, language processing, and computer vision, as well as their role in developing innovative solutions and advanced digital competencies. On completion, you'll be able to use these applications to solve real-world problems. Internet of Things in Engineering Gain the knowledge and skills to design and engineer the next generation of connected devices and systems based on Internet of Things (IoT), particularly in the context of engineering. You'll cover a combination of theoretical and practical topics in the domain of Internet of Things (IoT) in engineering, that is, the use of Internet technologies to access and interact with objects in the physical world, including IoT-enabled smart manufacturing and industrial automation. Professional Engineering Manager This module focuses on the professional responsibilities of an engineering manager, including project planning, coordination, team supervision, research, product implementation, and personal attributes in the workplace. You'll reflect on your own professional practice and knowledge in project execution and budget management. Operations & Systems Practices Learn the historical development of Operations Management, identify future trends in sustainability and inclusivity, and further develop your systems thinking in terms of theory and application, leading to process and analysis improvement. You'll explore operations strategies that will allow you to formulate and implement operations management theories, thus aligning them with the overall business strategy. QTop 40 university (Guardian University Guide 2025) Best in North East (The Times Good University Guide 2024) More than 70% of Nursing research rated 'world leading' or of 'international importance'*** University of the Year for Social Inclusion (The Times and Sunday Times Good University Guide, 2024) We're sorry but you will need to enable Javascript to access all of the features of this site. Stanford School of Engineering The profession of electrical engineering demands a strong foundation in physical science and mathematics, a broad knowledge of engineering techniques, and an understanding of the relation between technology and society. Curricula at Stanford are planned to offer the breadth of education and depth of training necessary for leadership in the profession. To engage in this profession with competence, four years of undergraduate study and at least one year of postgraduate study are recommended. For those who plan to work in highly technical development or fundamental research, additional graduate study is desirable. The master's degree program provides advanced preparation for professional practice or for teaching at the junior college level. If you want more flexibility than the part-time master's degree, you can apply to take individual courses or pursue an electrical engineering graduate certificate without being formally admitted to Stanford master's degree program. Upon successful completion of each course, you will receive academic credit and a Stanford University transcript. If you later choose to apply and are admitted into a master's degree program at Stanford, you may transfer up to 18 units towards the master's degree (pending department approval). Not sure which of these credentials is right for you? Compare our graduate certificate vs. master's degree. See more about tuition and fees. To earn the Master of Science in Electrical Engineering degree, you must complete 45 units. As a part-time student, you can expect to finish the degree in 3 to 5 years As a full-time student, you can expect to finish the degree in 1 to 2 years For admissions information, please visit the department's site or contact admissions@ee.stanford.edu. For degree requirements, please review either the department's graduate handbook or Stanford Bulletin. For more about the policies, procedures, and logistics, please review our website. While this degree can be completed online, it depends on your program plan and area of focus. Most courses in the Electrical Engineering department are offered only on campus. Specific online course offerings depend heavily on your program plan, area of focus, and the course offerings for any given academic quarter. Spotlight Hear Trevor's Story "If I wanted to grow and manage and have more input on the larger roadmap... and eventually lead other engineers and other projects I knew I needed to get a technical degree." Watch Video