Applied Physics (MS)

541-346-2120

The Knight Campus Graduate Internship Program (KCGIP) is an accelerated master's program with five focus areas that combines lab and lecture content with a 9-month paid internship. We train students to be successful in the fast-paced, team-driven environment typical of the industrial or government lab setting.

The applied physics master of science (MS) degree requires the completion of 54 total credits—24 graded credits at the 500 level or higher and 30 internship research credits. The internship requirement must be fulfilled through the industrial internship program. Internship credits are taken pass/no pass. A student who is working full-time as an intern typically earns 10 credits each term.Graded credits must be selected from an approved departmental list. The table below highlights courses commonly taken by students in the program. Other 600-level physics courses qualify, but may require additional prerequisites. Some graduate-level courses in chemistry may qualify. Other courses may be added or substituted with the approval of the applied physics program advisor.

Photovoltaic & Semiconductor Device Processing

Situated at the intersection of chemistry, physics and chemical engineering, the semiconductor (microelectronics) industry enables greener, smarter, and more connected economy. The field has significant implications in society's ability to support technology innovation and address the global energy crisis through applications in microprocessors, photovoltaics, LEDs and power transistors. For students who love to stay connected, semiconductor technology has driven advancements in the internet, 5G and IoT. And for anyone who loves smart technology – iPhone, Fitbit, self-driving cars- this field is ripe with opportunities. The continued success of this vast, interdisciplinary, and sophisticated yet innovative industry is deemed critical to long-term U.S. national competitiveness, which translates into impactful and well-paid job opportunities for those who choose to join this sector. Alumni from this track work in a wide variety of engineering and management roles in manufacturing, hardware development, materials research, battery development, supply chain, research & development, and analytics. Skills developed in this track transfer to a myriad of roles peripheral to these roles, including systems engineering, software engineering, applications engineering and others.

Optical Materials & Devices

Optics is the branch of physics that utilizes both simple and sophisticated instruments to study, measure and influence how photons propagate through and interact with matter. The field of optics is critical to the technology found in our modern lives - computers, smartphones, medical equipment and many other 21st century amenities we take for granted. Optical engineers and scientists use their technical knowledge to develop and operate metrology tools (instruments designed to take high-precision, non contact measurements). These tools are used in applications ranging from the life sciences to the semiconductor industry; to build laser writing and cutting tools that revolutionize our ability to mass manufacture advanced technology; and contribute to cutting edge research and development activities impacting the fields of medicine, defense, microelectronics, and astronomical observation. Alumni from this track work in a wide variety of engineering roles within the life sciences, semiconductor, and defense sectors, as well as peripheral sectors such as next-gen computing and autonomous vehicles. Skills developed in this track have been successfully transferred to a wide variety of engineering and management roles in manufacturing, hardware development, materials research, analytics, software development and research and development.

Master of Science: Applied Physics

Code	Title	Credits
500- or 600-level courses [1]		24
Industrial internship		10
Additional graduate-level physics courses		11-19
Total Credits		**45-53**

[1] At least 9 credits of 600-level courses are required.

Additional Requirements

For a student to be in good academic standing, the cumulative GPA of the graded-credit total must be 3.00 or better.

Graduate School requirements, including time limits, must be satisfied.

The applied physics master of science (MS) degree requires the completion of 54 total credits—24 graded credits at the 500 level or higher and 30 internship research credits. The internship requirement must be fulfilled through the industrial internship program. Internship credits are taken pass/no pass. A student who is working full-time as an intern typically earns 10 credits each term.

Graded credits must be selected from an approved departmental list. The table below highlights courses commonly taken by students in the Master's Industrial Internship Program. Other 600-level physics courses qualify, but may require additional prerequisites. Some graduate-level courses in chemistry may qualify. Other courses may be added or substituted with the approval of the applied physics program advisor.

Code	Title	Credits
PHYS 581	Design of Experiments	4
PHYS 626	Physical Optics with Labs	4
PHYS 627	Optical Materials and Devices	4
PHYS 628		4
PHYS 677M	Semiconductor Device Physics	4
PHYS 678M	Semiconductor Processing and Characterization Technology	4
PHYS 679M	Device Processing and Characterization Laboratory	4
CH 680	Electronics and Vacuum Systems	4
CH 681	Introduction to Electron Microscopy	4
CH 682	Electron Microprobe Analysis	4
CH 683	Surface Analysis	4
CH 685	Advanced Transmission Electron Microscopy	4