A. James Clark School of Engineering AT The Universities at Shady Grove

ABET Engineering Accreditation Commission

CYBER-PHYSICAL SYSTEMS ENGINEERING

Bachelor of Science (B.S.)

The Cyber-Physical Systems Engineering (CPSE) undergraduate engineering program based at the Universities at Shady Grove campus is a rigorous and innovative program offered by the Department of Electrical & Computer Engineering (ECE) at the University of Maryland, College Park.

HOW TO APPLY

VISIT
go.umd.edu/SGAdmissions

Be sure to check "Shady Grove" when you apply!

DEADLINES (Fall Admission Only)
Priority Deadline: March 1
Final Deadline: June 1

FAST FACTS

The CPSE program is part of the prestigious A. James Clark School of Engineering.

According to *U.S News & World Report 2024-2025*, the A. James Clark School of Engineering at UMD is **ranked #16** among U.S. colleges and universities in undergraduate engineering programs.

In 2024, CPSE became the first cyber-physical systems engineering program to be **ABET-accredited** at the undergraduate level.

Students in the CPSE program receive instruction from top-tier ECE Department faculty (full-time and adjunct professors) who have experience navigating the most in-demand industry sectors.

According to *Statistica*, the global market in Internet of things (IoT) is expected to grow to $690 billion by 2030.

The majority of students in the CPSE program have access to scholarships from UMD College Park and the Universities at Shady Grove. As of Fall 2024, over **88% of students in CPSE were awarded scholarships** while enrolled in the major.

The CPSE program at Shady Grove is the first of its kind in the DMV area and Northeastern US at a top-tier institution.

ABOUT US

With the rapid pace of growth in Internet of Things (IoT) products and applications, there is a pressing need for engineers with special skills in hardware and software design. These engineers must be well-versed with both analog and digital electronics and information systems. The new Bachelor of Science in Cyber-Physical Systems Engineering (CPSE) offered at the Universities at Shady Grove trains future engineers who are aware of the latest trends in circuits and hardware-oriented software, and who are capable of immediate contribution to the private and public sector institutions in which they will work.

ADMISSIONS REQUIREMENTS

All students applying to the CPSE program must meet the A. James Clark School of Engineering's Limited Enrollment Program requirements, as well as the additional courses & requirements listed below:

Engineering LEP Requirements:

- Minimum 3.0 cumulative GPA *(from all previous institutions)*
- Completion of the following courses with a minimum grade of B-:
  - MATH141 (Calculus II)
  - PHYS 161 (Physics I)
- Completion of the following course(s) with a minimum grade of C-:
  - CHEM135, CHEM271 or CHEM134 *(students who take CHEM134 must also have completed CHEM131 with a minimum grade of C-)*
- Students must follow all LEP Admissions policies outlined on the University's LEP website (**lep.umd.edu**)

Additional requirements:

- Completion of the following courses with a minimum grade of C-:
  - MATH140: Calculus I
  - ENES100: Intro to Engineering Design
  - PHYS260/261: Physics II
  - An introductory programming course in C, C++, Java, or Python
  - **One** of the following math courses:
    - MATH246: Differential Equations
    - MATH241: Calculus III
    - MATH240: Linear Algebra
  - Completion of all lower-level General Education requirements
  - At least 60 transferable credits to UMD

A. James Clark School of Engineering
University of Maryland, College Park

The Universities at Shady Grove
Building IV (Biomedical Sciences and Engineering Facility)
9630 Gudelsky Drive
Rockville, MD 20850

es-sg@umd.edu
shadygrove.ece.umd.edu

UNIVERSITY OF MARYLAND FEARLESSLY FORWARD

Prerequisite Equivalencies

Course Title	University of Maryland	Montgomery College	Frederick Community College	Howard Community College	Prince George's Community College	Anne Arundel Community College
Introduction to Engineering Design	ENES100	ENES100	ENGR100	ENES100	EGR1010	EGR120
Calculus I	MATH140	MATH181	MATH185	MATH181	MAT2410	MAT191
Calculus II	MATH141 *(Minimum of B-)*	MATH182	MATH195	MATH182	MAT2420	MAT192
MATH2XX *(select one)*:						
Linear Algebra	MATH240	MATH284	MATH265	MATH250	MAT2450	MAT202
Calculus III	MATH241	MATH280	MATH285	MATH240	MAT2430	MAT201
Differential Equations	MATH246	MATH282	MATH275	MATH260	MAT2460	MAT212
General Physics: Mechanic & Particle Dynamics	PHYS161 *(Minimum of B-)*	PHYS161	PHYS151	PHYS110	PHY1030	PHY211
General Physics: Vibration, Waves, Heat, Electricity and Magnetism	PHYS260/261	PHYS262	PHYS252	PHYS111	PHY2030	PHY212
General Chemistry for Engineers	CHEM271 or CHEM135 *(Minimum of C-)*	CHEM132 or CHEM135	CHEM102	CHEM135 or CHEM102	CHM2000 or CHM1020	CHE112
Programming**	N/A	CMSC140 or CMSC203	CMIS 105 or CMIS 140	CMSY141 OR CMSY166 OR CMSY156	INT2200	**CONTACT ADVISOR**

NOTE: All major requirements must be completed with a C- or better.
*Students who complete CHEM134 must also have completed CHEM131 with a C- or better.
**An introductory course in C, C++, Java, or Python is required. Other courses may be reviewed as needed.

CURRICULUM

DEGREE REQUIREMENTS

The CPSE program will provide students with a solid foundation in key emerging technologies of the Internet of Things. The program curriculum is designed to have a balance between theory and direct hands-on experience.

The major will require 122 credits for graduation, of which 60 are transferred into the program and 62 credits are completed at Shady Grove.

JUNIOR YEAR FOUNDATION COURSES

In the junior year of the program, students will be introduced to the following fundamental concepts:

- Analog Circuits
- Digital Logic Design for Embedded Systems
- Discrete Mathematics for IT
- Intermediate Programming (C/C++)
- Introduction to Internet of Things
- Microelectronics & Sensors
- Introduction to Networks and Protocols
- Computer Organization for Embedded Systems
- Algorithms in Python
- Probability & Statistical Inference

SENIOR YEAR ADVANCED CONCEPTS

The senior year of the program features a two-semester capstone design course, which is a culminating design experience with specific attention to real-world applications. Students will also take advanced courses in topics such as:

- Operating Systems for Embedded Systems
- Web-Based Application Development
- Network Security
- Machine Learning Tools
- Advanced FPGA System Design Using Verilog
- Advanced Software for Connected Embedded Systems
- Linear Algebra for Machine Learning Applications
- Professional Writing

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