BACHELOR OF SCIENCE IN EMBEDDED SYSTEMS & INTERNET OF THINGS
UNIVERSITY OF MARYLAND
UNIVERSITIES AT SHADY GROVE

The Embedded Systems and Internet of Things (ESIOT) program based at the Universities at Shady Grove 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 ESIOT program is part of the prestigious A. James Clark School of Engineering.

Students in the ESIOT program will receive instruction from both regular faculty members in the ECE Department as well as adjunct professors who are active in the industry.

Students in the ESIOT program have access to scholarships from UMD College Park as well as private scholarships from the Universities at Shady Grove.

According to Business Insider (2018), the IoT industry is on pace to grow over $3 trillion annually by 2025.

The ESIOT program at Shady Grove is the first of its kind in the 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. It is critical that these engineers are well-versed with both analog and digital electronics and information systems. The new Bachelor of Science in Embedded Systems and Internet of Things (ESIOT) 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 ESIOT 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 a B-:
  • MATH141 (Calculus II)
  • PHYS 161 (Physics I)
• Completion of the following course(s) with a minimum grade of a C-:
  • CHEM135, CHEM271 or CHEM134 (students who take CHEM134 must also have completed CHEM131 with a minimum grade of C-)
• Students must adhere to all LEP Admissions policies outlined on the University’s LEP website (lep.umd.edu)

Additional requirements:
• Completion of the following major courses with a minimum grade of C-:
  • 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
**CURRICULUM**

**DEGREE REQUIREMENTS**
The ESIOT 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
- Introduction to Internet of Things
- Microelectronics & Sensors
- Introduction to Networks and Protocols
- Computer Organization for Embedded Systems
- Algorithms in Python
- Technical Writing

**SENIOR YEAR ADVANCED CONCEPTS**
The senior year of the program features a two-semester capstone design course, which will be 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
- Linear Algebra for Machine Learning Applications
- Web Based Application Development
- Network Security
- Machine Learning Tools
- Probability and Statistical Inference
- Advanced Software for Connected Embedded Systems
- Advanced FPGA System Design Using Verilog
- Foundations of Databases-Web Applications

**Program Tracks**
Seniors will be required to select one of the three program tracks; each track will have its specific set of senior level courses and required electives:

- Hardware Track
- Computational Track
- Security Track

**Prerequisite Equivalencies**

<table>
<thead>
<tr>
<th>Course Title</th>
<th>University of Maryland</th>
<th>Montgomery College</th>
<th>Frederick Community College</th>
<th>Howard Community College</th>
<th>Prince George's Community College</th>
<th>Anne Arundel Community College</th>
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<tbody>
<tr>
<td>Introduction to Engineering Design</td>
<td>ENES100</td>
<td>ENES100</td>
<td>ENGR100</td>
<td>ENES100</td>
<td>EGR1010</td>
<td>EGR120</td>
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<tr>
<td>Calculus I</td>
<td>MATH140</td>
<td>MATH181</td>
<td>MATH185</td>
<td>MATH181</td>
<td>MAT2410</td>
<td>MAT191</td>
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<tr>
<td>Calculus II</td>
<td>MATH141 (Minimum of B-)</td>
<td>MATH182</td>
<td>MATH195</td>
<td>MATH182</td>
<td>MAT2420</td>
<td>MAT192</td>
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<td>MATH2xx (select one):</td>
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<tr>
<td>Linear Algebra</td>
<td>MATH240</td>
<td>MATH284</td>
<td>MATH265</td>
<td>MATH250</td>
<td>MAT2450</td>
<td>MAT202</td>
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<tr>
<td>Calculus III</td>
<td>MATH241</td>
<td>MATH280</td>
<td>MATH285</td>
<td>MATH240</td>
<td>MAT2430</td>
<td>MAT201</td>
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<tr>
<td>Differential Equations</td>
<td>MATH246</td>
<td>MATH282</td>
<td>MATH275</td>
<td>MATH260</td>
<td>MAT2460</td>
<td>MAT212</td>
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<tr>
<td>General Physics: Mechanics &amp; Particles Dynamics</td>
<td>PHYS161 (Minimum of B-)</td>
<td>PHYS161</td>
<td>PHYS151 or PY203</td>
<td>PHYS110</td>
<td>PHY1030</td>
<td>PHY211</td>
</tr>
<tr>
<td>General Physics: Vibration, Waves, Heat, Electricity and Magnetism</td>
<td>PHYS260/261</td>
<td>PHYS262</td>
<td>PHYS252 or PY204</td>
<td>PHYS111</td>
<td>PHY2030</td>
<td>PHY212</td>
</tr>
<tr>
<td>General Chemistry for Engineers</td>
<td>CHEM135 (Minimum of C-)</td>
<td>CHEM135 or CHEM132</td>
<td>CHEM102</td>
<td>CHEM135 or CHEM102</td>
<td>CHM2000 or CHEM102</td>
<td>CHE112 or CHE134*</td>
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<tr>
<td>Programming**</td>
<td>N/A</td>
<td>CMSC140 or CMS203</td>
<td>CMIS 105 or CMIS 140</td>
<td>CMSY155, 166, 180, or 181</td>
<td>INT2200</td>
<td>CIS110</td>
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</table>

*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.**