

# A. JAMES CLARK SCHOOL OF ENGINEERING AT SHADY GROVE

## The Universities at Shady Grove

9636 Gudelsky Drive | Rockville, MD 20850

Biocomputational Engineering: Biomedical Sciences and Engineering Facility 4119, [biocomp@umd.edu](mailto:biocomp@umd.edu)

**Interim Dean:** Robert Briber, Ph.D. (through September 30, 2021)

**Dean:** Samuel Graham, Jr., Ph.D. (effective October 1, 2021)

**Associate Deans:** Hugh Bruk, Ph.D., Ken Kiger, Ph.D., Min Wu, Ph.D., Jelena Sebric, Ph.D.

The University of Maryland's A. James Clark School of Engineering is a premier program, ranked among the top 20 in the world. Located just a few miles from Washington, D.C., the Clark School is at the center of a constellation of high-tech companies and federal laboratories, offering students access to unique opportunities to prepare for and launch rewarding careers.

We combine rigorous classroom learning with opportunities for hands-on educational experiences, including the autonomous vehicle project in freshman year and capstone courses in junior and senior years; participation in numerous national and international engineering competitions in which the school is consistently successful; a vibrant entrepreneurial ecosystem; and extensive internship opportunities.

We offer students the chance to engage in cutting-edge research, whether in the many labs run by prominent faculty members in state-of-the-art facilities, or with potential employers in nearby federal research labs and corporations. Research enables students to dig deeper into their majors or explore new areas of possible interest.

With one of the nation's most active chapters of Engineers Without Borders, Clark School students can apply their skills and energies in the service of others all around the world. Service options closer to home are available through the many student societies, alternative spring breaks and targeted initiatives started by fellow students.

It is this range of opportunities that makes the Clark School so valuable to talented, ambitious students who want a deeper university experience. We encourage you to explore further by visiting [www.eng.umd.edu](http://www.eng.umd.edu) (<http://www.eng.umd.edu/>).

## Admission Requirements

### Transfer Admission

#### Direct Admissions Requirements

Internal and external transfer students will be directly admitted to the Clark School if they meet the following Gateway requirements: MATH141 with a "B-" or higher, PHYS161 with a "B-" or higher, either CHEM135 or CHEM271 or CHEM134 with a minimum grade of "C-" or higher (Students who take CHEM134 must also have completed CHEM131 with a minimum grade of "C-"). Students must also have a minimum cumulative GPA of 3.0 in all college-level coursework, and have not previously been admitted to the Clark School of Engineering. Only one repeat of a single Gateway course, either at

the University of Maryland or at any other university or college, will be considered to meet the review requirements. A course in which a grade of "W" (withdrawn) is earned is counted as an attempt. Students should wait until all gateway requirements are complete before applying for admission to the School.

### Transfer Admission Appeal Process

All students denied admission to the Clark School may appeal the decision in writing directly to the Associate Dean of Undergraduate Student Affairs in the Clark School.

### Maryland Community College transfer students

Students who complete an associate's at a Maryland community college may be prepared to enter into the sophomore or junior year in engineering at the University of Maryland if they have completed the required engineering coursework. To ensure that you are enrolling in the correct courses to transfer, please consult the Engineering four-year plans and the Transfer Credit Services website. There may be some courses which are not offered at Maryland community colleges. Students should investigate the feasibility of completing these courses during the summer session at the University of Maryland before starting their junior course work in the fall semester. A maximum of one-half of the degree credits (approximately 60 semester hours) may be transferred from a two-year community college program.

## Programs

### Majors

- Biocomputational Engineering at Shady Grove (<https://academiccatalog.umd.edu/undergraduate/colleges-schools/universities-shady-grove/engineering/biocomputational-engineering/>)
- Embedded Systems and Internet of Things at Shady Grove (<https://academiccatalog.umd.edu/undergraduate/colleges-schools/universities-shady-grove/engineering/embedded-systems-internet-of-things/>)

## College Requirements

### Undergraduate Degree Requirements

Structure of Engineering Curricula: The section below describes the requirements and the prescribed credit hours leading to the Bachelor of Science degrees awarded in the Clark School of Engineering. The courses in each curriculum may be classified in the following categories:

1. Courses in the General Education Program;
2. Courses in Basic Sciences (mathematics, chemistry, and physics);
3. Related technical courses, engineering sciences and other courses approved for one curriculum but offered by another department;
4. Courses in the major department. The courses in each engineering curriculum, as classified below, form a sequential and developmental pattern in subject matter. In this respect, curricula in engineering may differ from curricula in other colleges. Some regulations which are generally applicable to all students may need clarification for purposes of orderly administration among engineering students (see Academic Regulations (<https://academiccatalog.umd.edu/undergraduate/registration-academic-requirements-regulations/academic-records-regulations/>)). Moreover, the Clark School of Engineering establishes policies that supplement university regulations.

## School Regulations

1. The responsibility for proper registration and for satisfying stated prerequisites for any course must rest with the student as does the responsibility for proper achievement in courses in which the student is enrolled. Each student should be familiar with the provisions of this catalog, including the Academic Regulations.
2. Required courses in mathematics, physics, and chemistry have highest priority. It is strongly recommended that every engineering student register for mathematics and chemistry or mathematics and physics each semester until the student has fully satisfied requirements of the Clark School of Engineering in these subjects.
3. To be eligible for a bachelor's degree in the Clark School of Engineering, a student must have an overall cumulative grade point average of at least a 2.0 and a "C-" or better in all engineering degree requirements (including all technical coursework but not limited to courses taken in MATH, PHYS, CHEM). Students matriculating to UMD in the fall of 2012 or after must also have a 2.0 cumulative GPA in their major courses, minor courses and classes used to satisfy certificate programs.
4. A course taken at UMD in which a grade has been earned may not be repeated via transfer from another institution.
5. Students in the Clark School of Engineering must have a minimum 2.0 University of Maryland GPA to enroll in courses at another institution.
6. All students are required to complete a number of general education courses and must follow the university's requirements regarding completion of the General Education Program. Consult the Academic Regulations section of this catalog for additional information. Engineering students are required to complete Technical Writing, (ENGL393) for the Professional Writing requirement.
7. All degree programs in the Clark School of Engineering require a minimum of 120 credits plus satisfaction of all department, School, and University general education program requirements (Aerospace Engineering majors are required to complete a minimum of 124 credits). Students should be aware that, for all currently existing engineering programs, the total number of credits necessary for the degree exceeds 120 by some number that depends on the specific major.

Curricula for the various engineering departments are given in this catalog to illustrate how the programs may be completed in four years. These curricula are rigorous and relatively difficult. It is not uncommon for a student to extend their curriculum; this may be necessary or desirable for a variety of reasons. However, students should seek academic advising in order to ensure that courses are taken in the proper sequence.

Another factor impacting the academic plan is the math placement exam. For entering freshmen, the math placement is determined solely by performance on the University math placement exam and not on the Math SAT score. Placement in MATH115 or lower will delay eligibility to take certain engineering courses by a semester.

All students are encouraged to utilize the university's degree auditing system, uAchieve, and to review the audit with their departmental advisor throughout the course of their academic career. The purpose of the audit is to discuss academic progress and to confirm that graduation requirements are met.

## Departments and Degrees

The Clark School of Engineering consists of eight academic departments and offers the degree of Bachelor of Science in the following fields of study: Aerospace Engineering, Bioengineering, Chemical Engineering, Civil Engineering, Computer Engineering, Electrical Engineering, Embedded Systems and Internet of Things, Fire Protection Engineering, Materials Science and Engineering, and Mechanical Engineering. All of the above programs are accredited by the Engineering Accreditation Commission of ABET, [www.abet.org](http://www.abet.org) (<http://www.abet.org>) (with the exception of Embedded Systems and Internet of Things).

Entering freshmen may enroll in the Clark School as Undecided Engineering. Students declared as Undecided Engineering are advised by the Undergraduate Advising & Academic Support Office. No later than their third semester a student should select an academic degree program. The student's newly declared major department assumes the responsibility for the student's academic guidance, counseling, and program planning from that point until the completion of the degree requirements. For the specific requirements, see the curriculum listing in each engineering department.

## Freshmen-Sophomore Years

The freshmen and sophomore years in engineering are designed to lay a strong foundation in mathematics, physical sciences, and the engineering sciences upon which the student will later develop a professional program during the upper division (junior and senior) years. During the first two years, students are introduced to the concepts of engineering design and work in multidisciplinary teams. The Clark School course requirements for the freshmen and sophomore years are similar for all students, regardless of their intended academic program, thus affording the student maximum flexibility in choosing a specific engineering specialization.

## Engineering Sciences

Engineering Science courses represent a common core of basic material offered to students of several different departments. All freshmen and sophomore students of engineering are required to take ENES100. Other ENES courses, ENES102, ENES220, ENES221, and ENES232 are specified by the different departments. The responsibility for teaching the engineering science courses is shared among faculty from different departments by means of the Keystone Program. In addition to the core courses noted above, several courses of general interest to engineering or non-engineering students have been given ENES designations.

## Advising

Advising is mandatory prior to registration each semester for all students in the Clark School. Each engineering department has a representative who advises students in their respective discipline. Undecided Engineering students are advised by the Undergraduate Advising & Academic Support Office until they have declared a major, typically in their first year. Refer to the individual program for additional advising information.

During orientation to the university, all students will receive advising from the Undergraduate Advising & Academic Support Office in collaboration with departmental advising representatives.