ECE Undergraduate Programs Update

Mel Gomez, Associate Chair for Undergraduate Education

DEPARTMENT OF
ELECTRICAL &
COMPUTER ENGINEERING

Topics

- Undergraduate Data – Enrollment Trends, Retention & Graduation
- Updates on Latest Programs
- BS ES and IOT at Universities at Shady Grove
- Ebikes! 125-mile Challenge Competition Results

University of Maryland--College Park

College Park, MD 20742 | (301) 405-1000

#64 in **National Universities** (tie)

Overview | **Rankings** | User Reviews | Questions & Answers | Applying | Cost & Aid | Academics | Student Life | Services | Saf

University of Maryland--College Park Rankings

- **#25** in **Best Undergraduate Engineering Programs** (tie)
  At schools whose highest degree is a doctorate
  - **#13** in **Aerospace /Aeronautical / Astronautical**
    At schools whose highest degree is a doctorate
  - **#22** in **Civil**
    At schools whose highest degree is a doctorate
  - **#20** in **Computer** (tie)
    At schools whose highest degree is a doctorate
  - **#22** in **Electrical / Electronic / Communications** (tie)
    At schools whose highest degree is a doctorate
  - **#26** in **Mechanical**
    At schools whose highest degree is a doctorate

MORE FROM T

Online Programs

COLLEGES AD

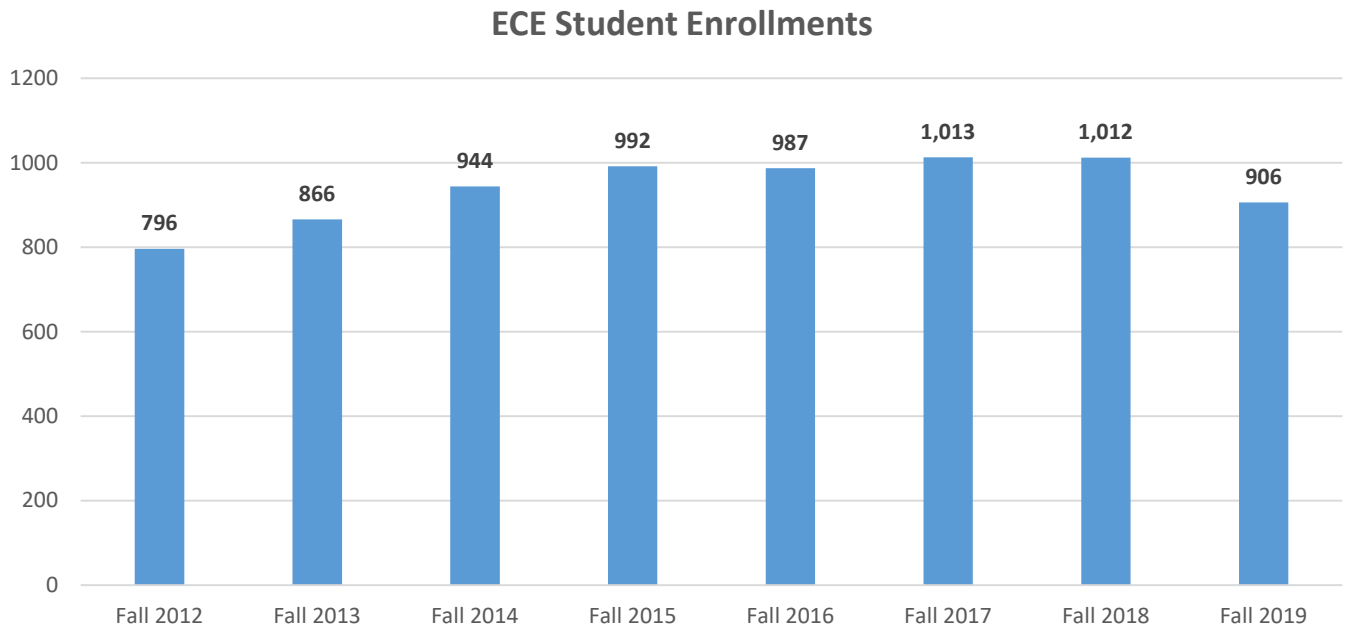
FINDING THE RIGHT

Learn how to explo

EE up by 1 from last year
CpE up by 2 from last year

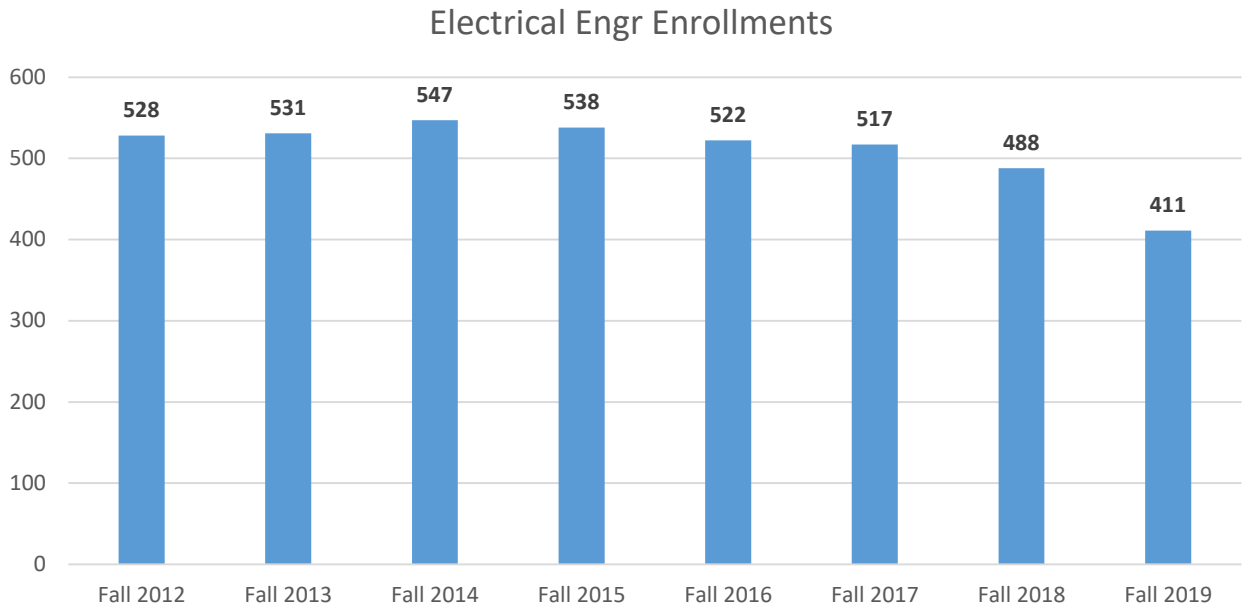
CpE Peer: OSU
EE Peers: JHU, ASU, Duke

ECE Undergraduate Enrollments



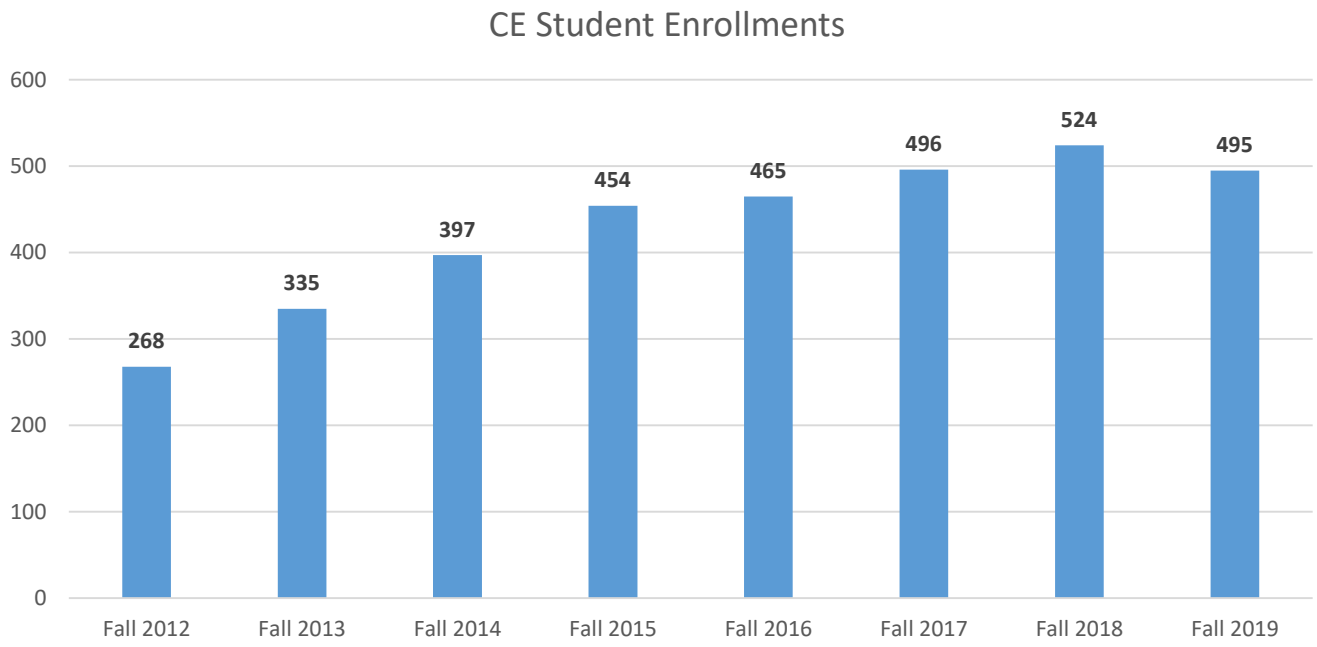
Electrical Engineering Enrollments

- EE enrollments down by 77 from Fall 2018.

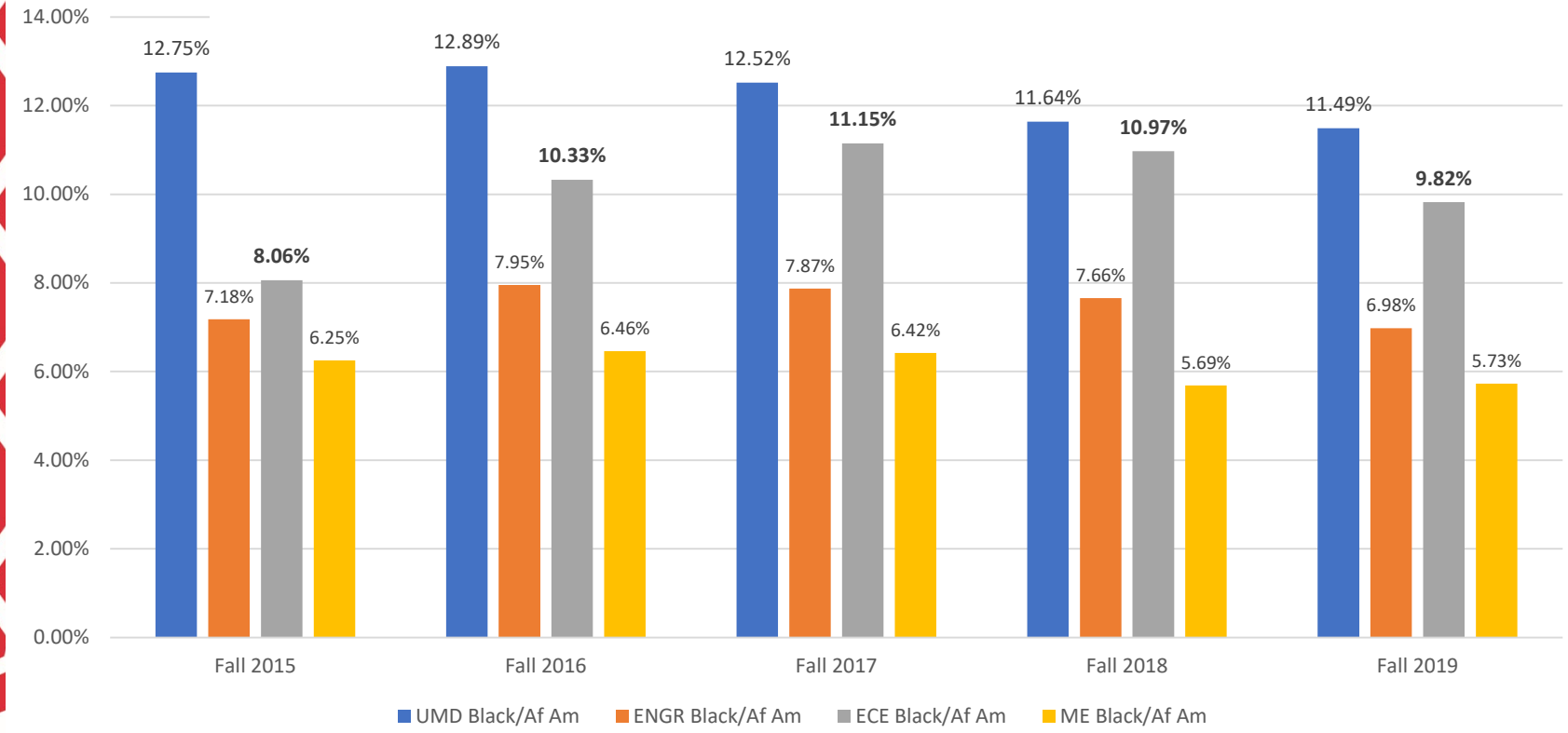


Computer Engineering Enrollments

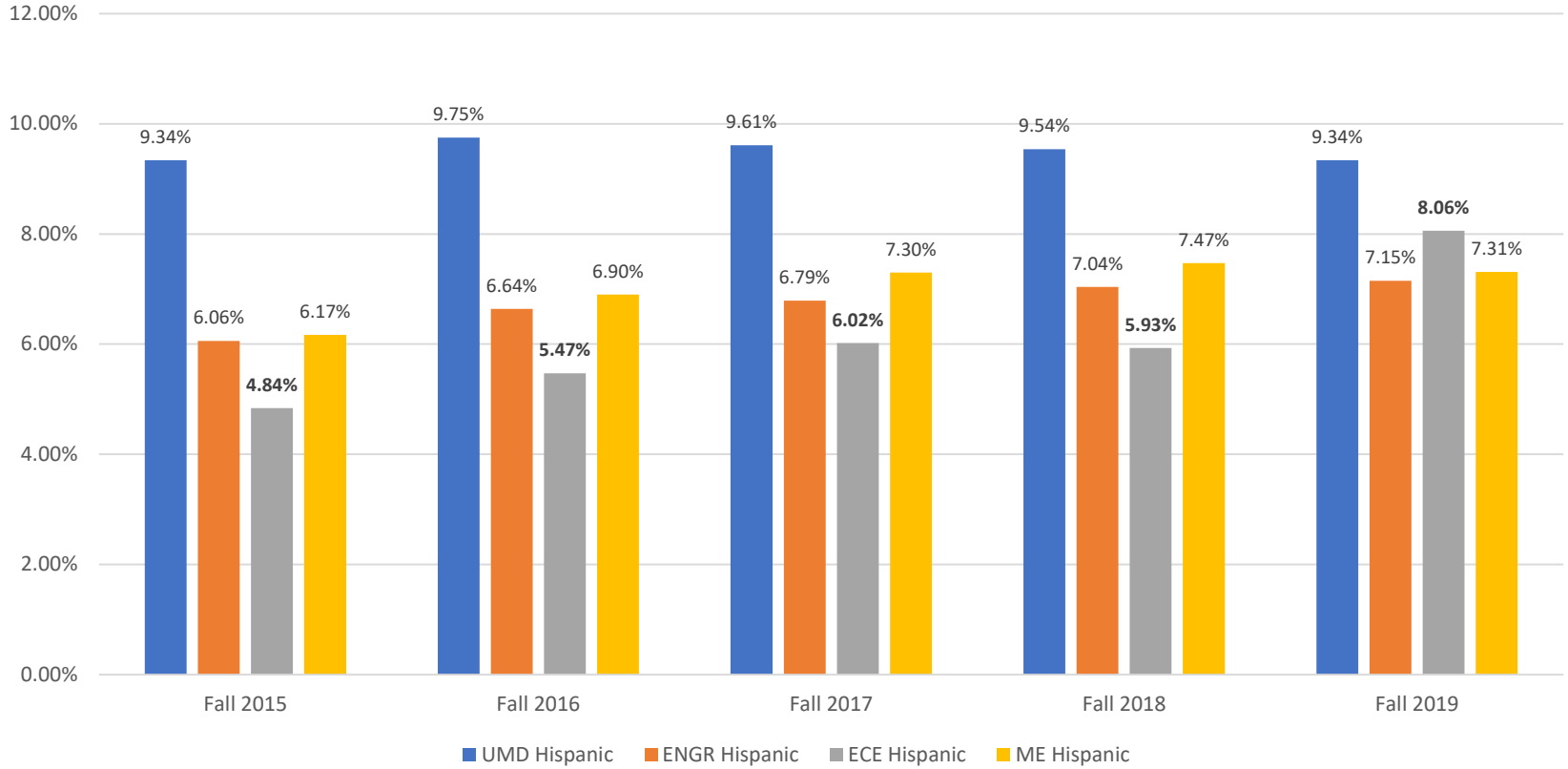
- CE enrollments down from 29 from Fall 2018



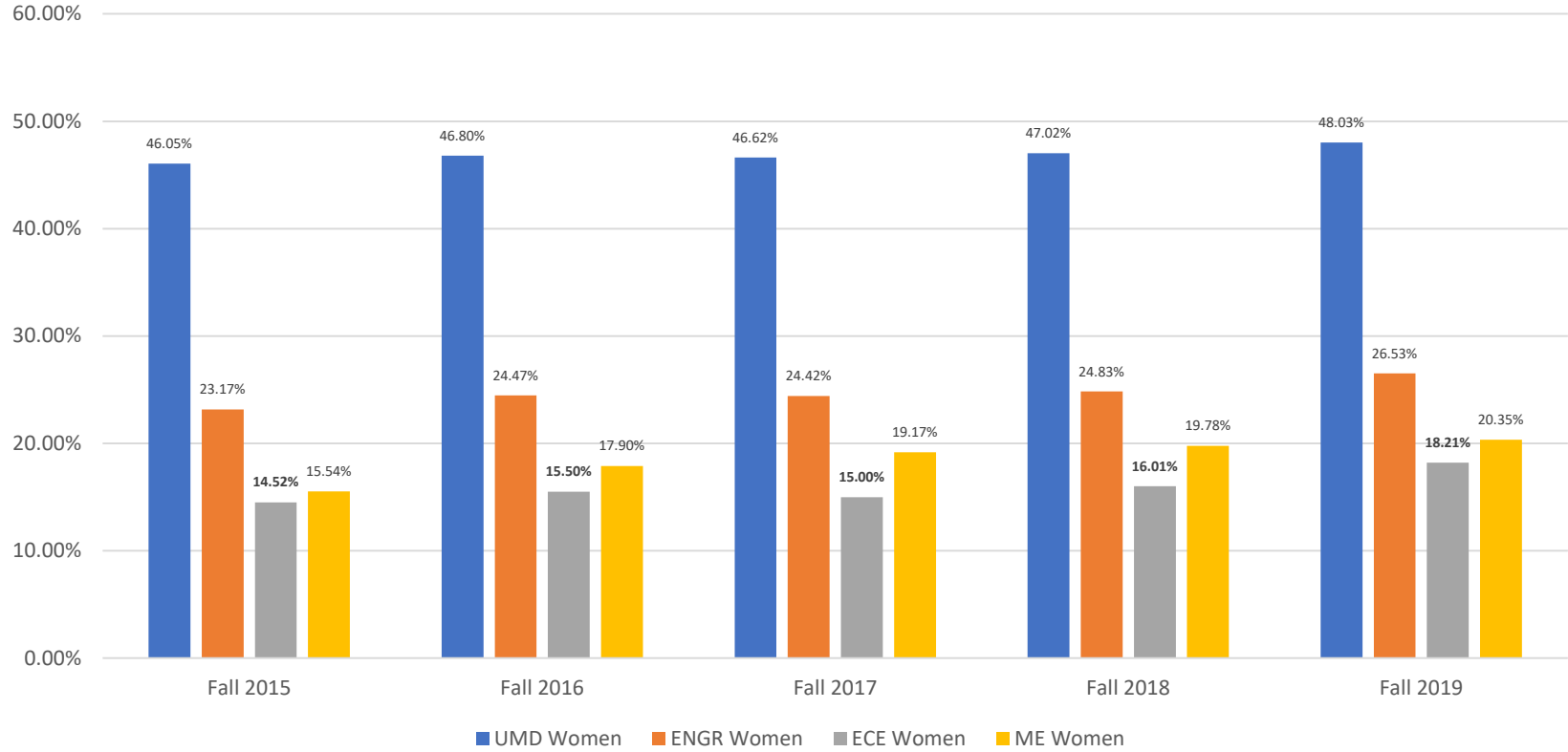
ECE Black/Af American Enrollments



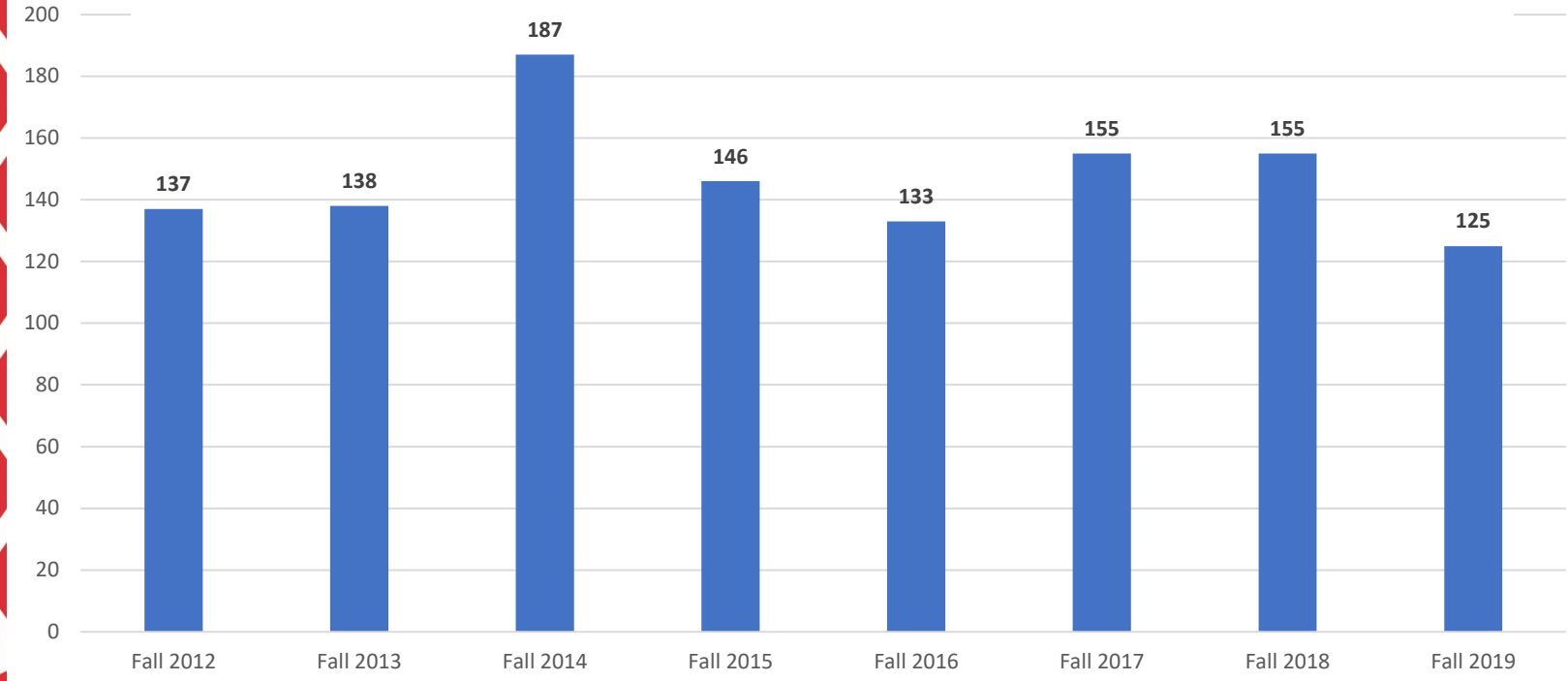
ECE Hispanic Enrollments



ECE Female Enrollment

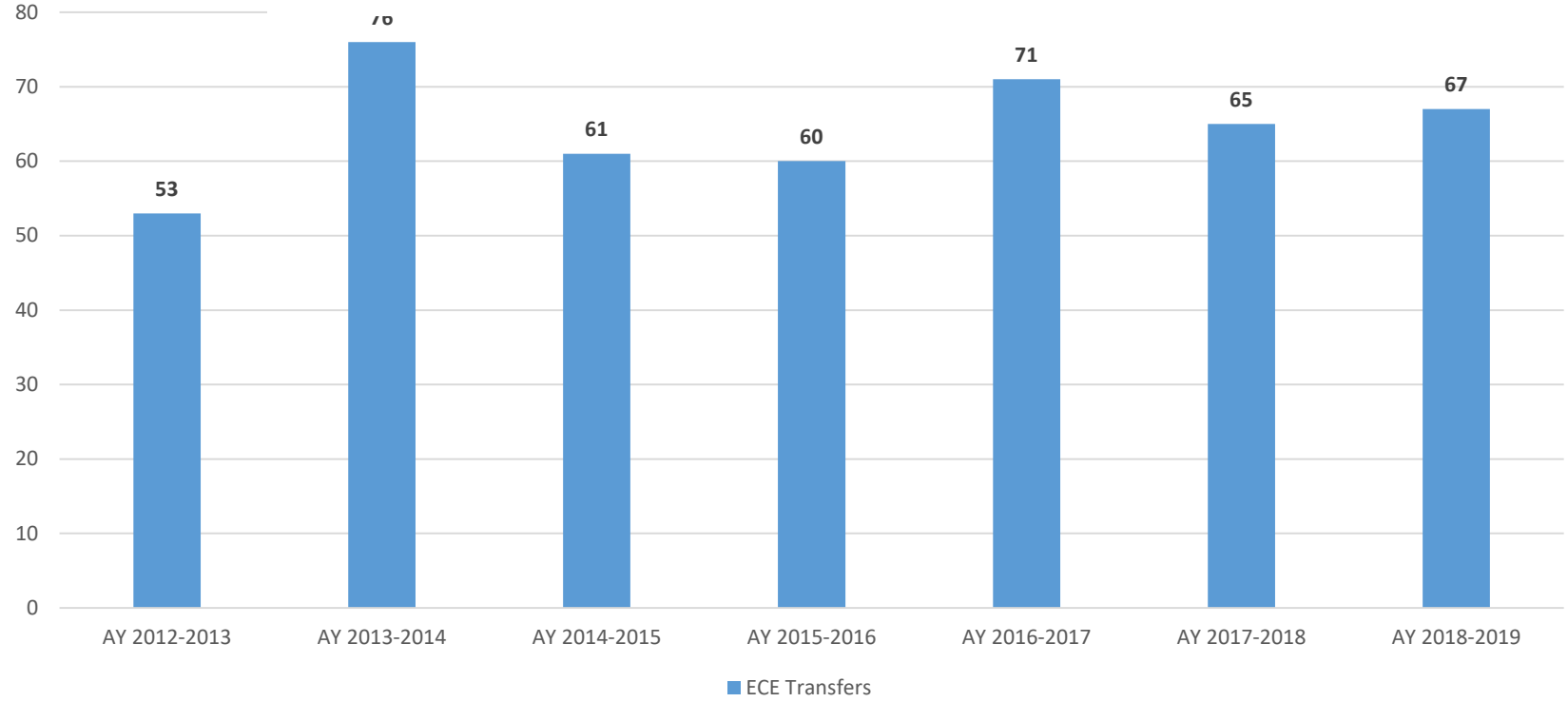


ECE New Freshmen Enrollment



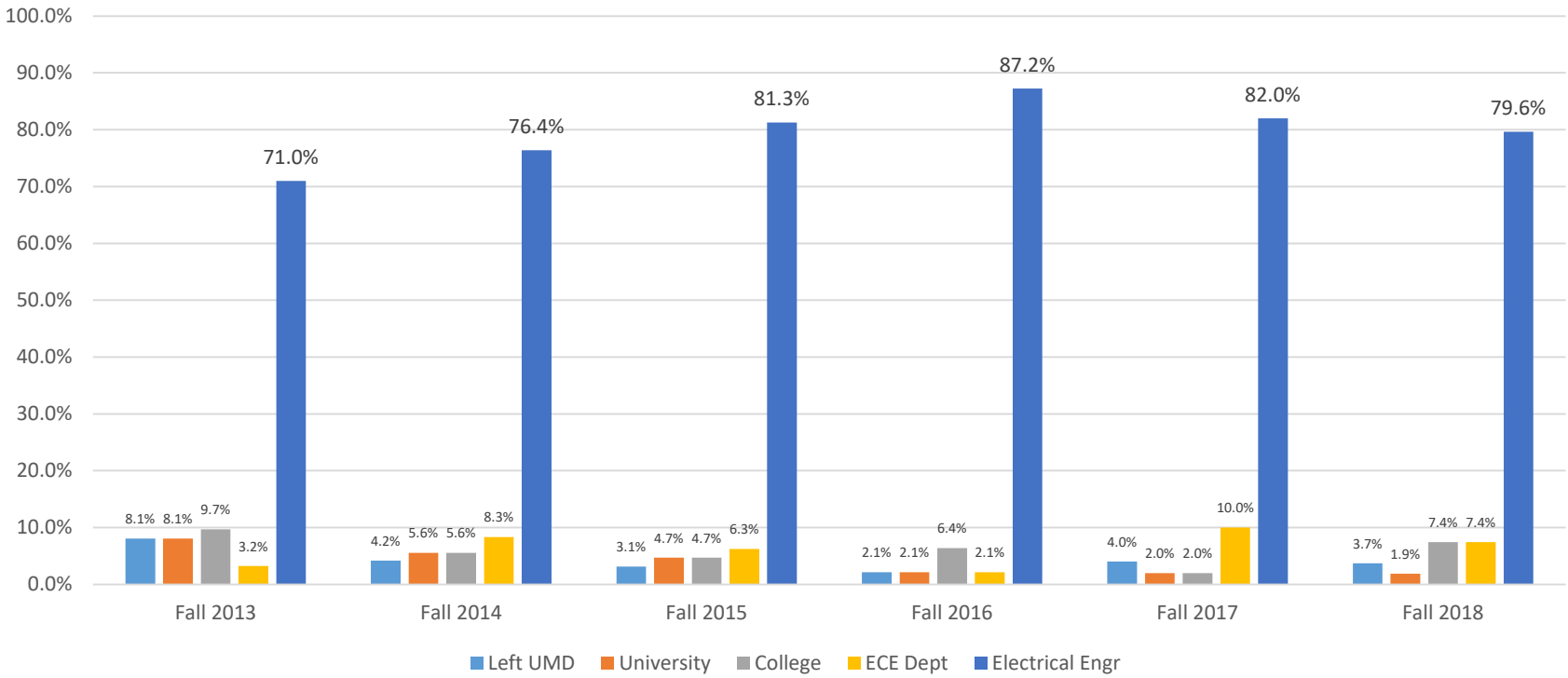
ENGR New Freshmen down by 195 from Fall 2018.

ECE New Transfer Students

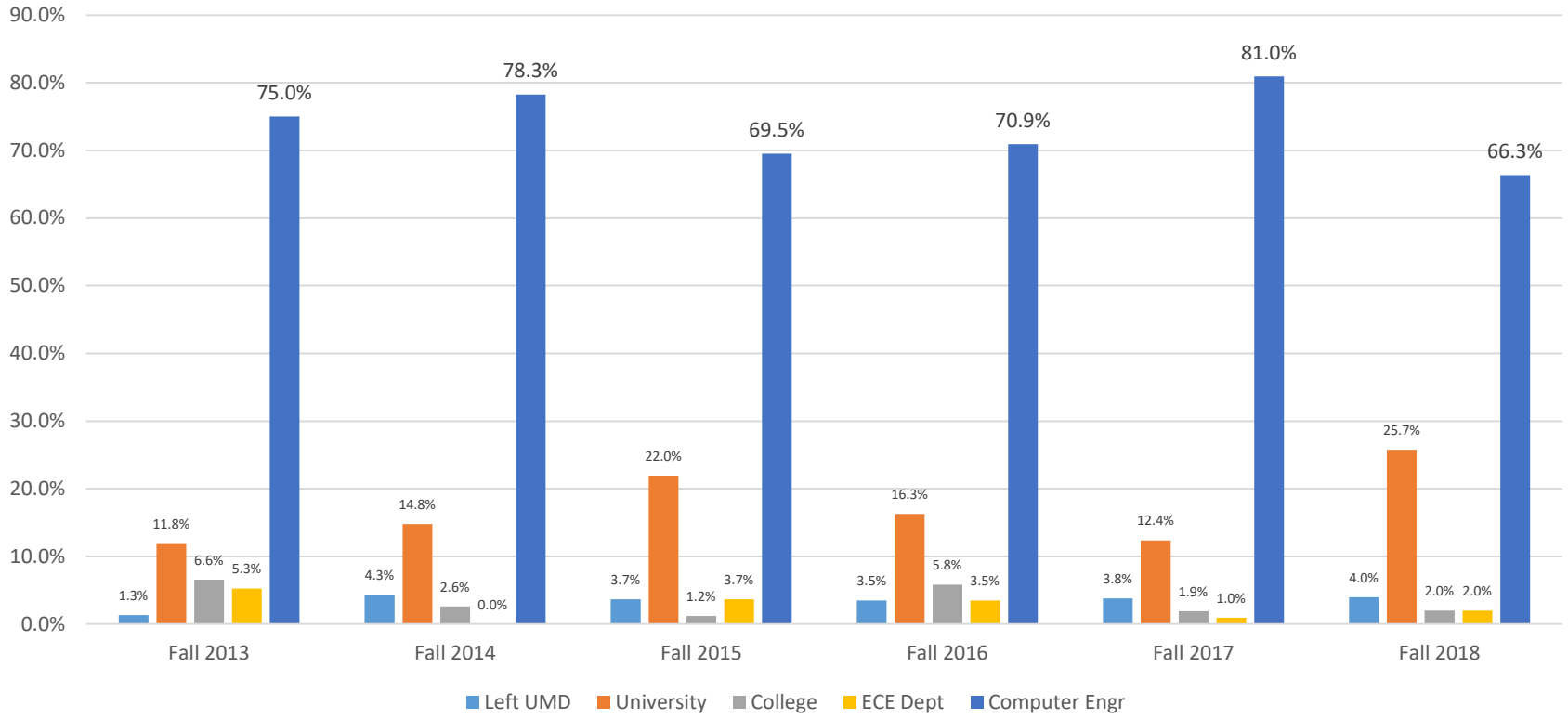


Data denotes Fall and Spring transfer admissions. Fall 2019 numbers: 46 new ECE transfer students.

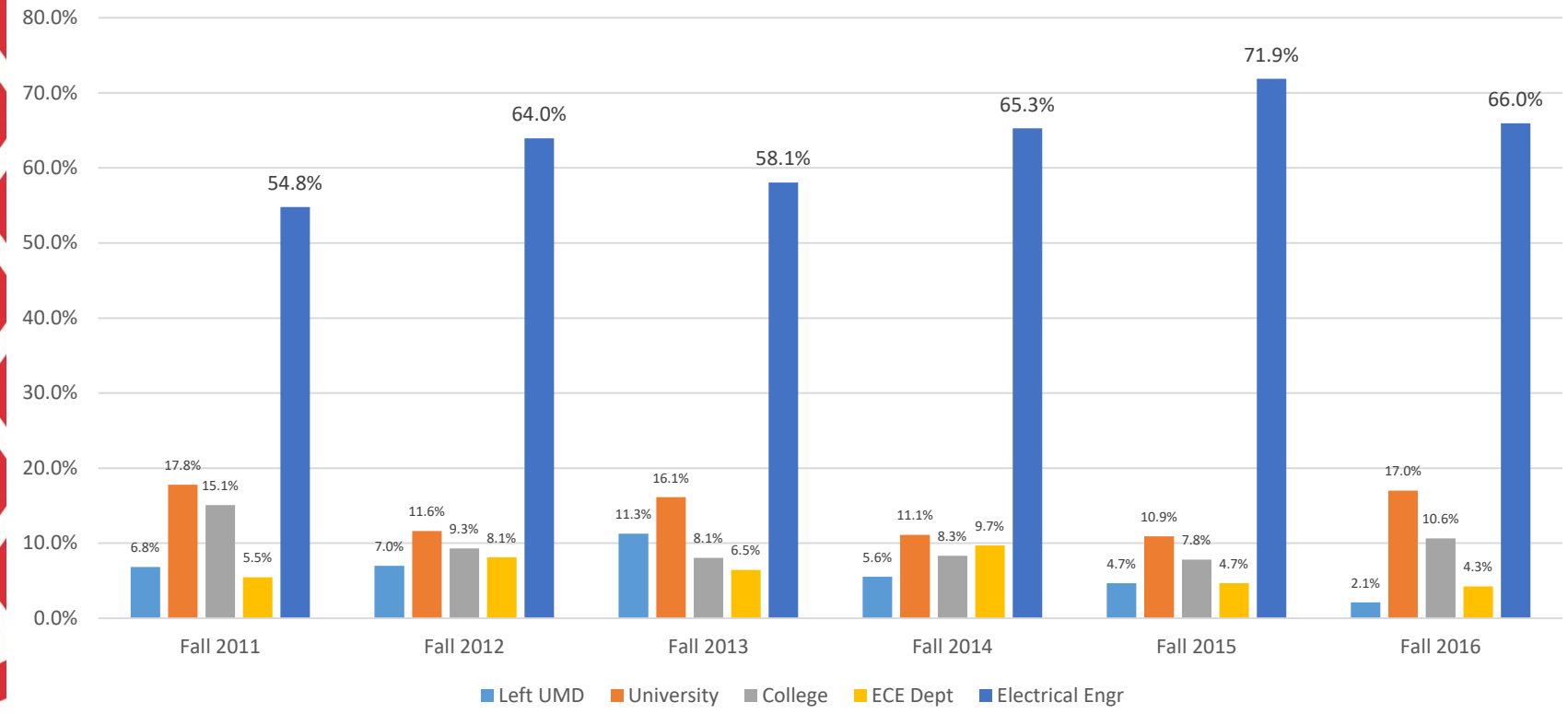
Electrical Engr 1st-Year Retention



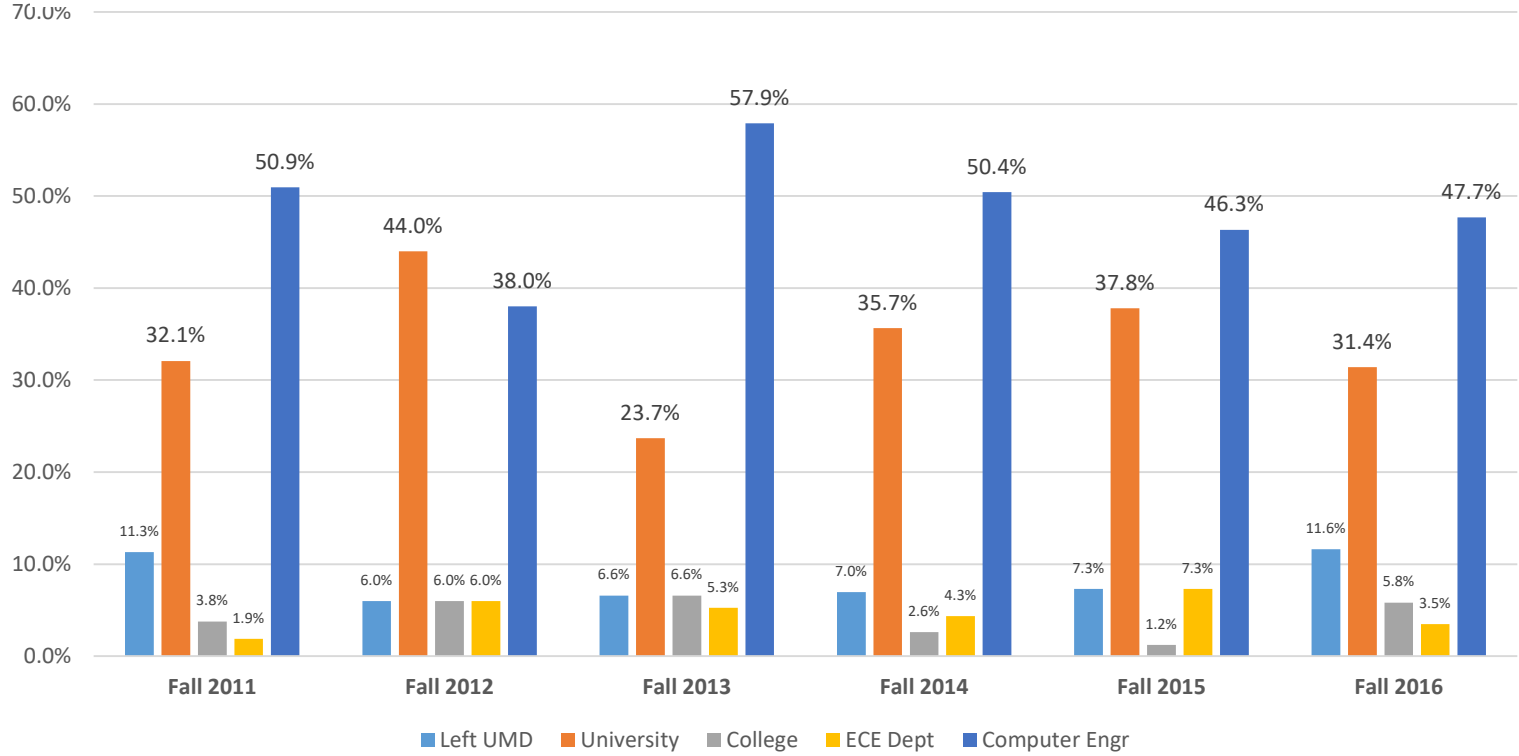
Computer Engr 1st-Year Retention



Electrical Engr 3rd-Year Retention



Computer Engr 3rd-Year Retention



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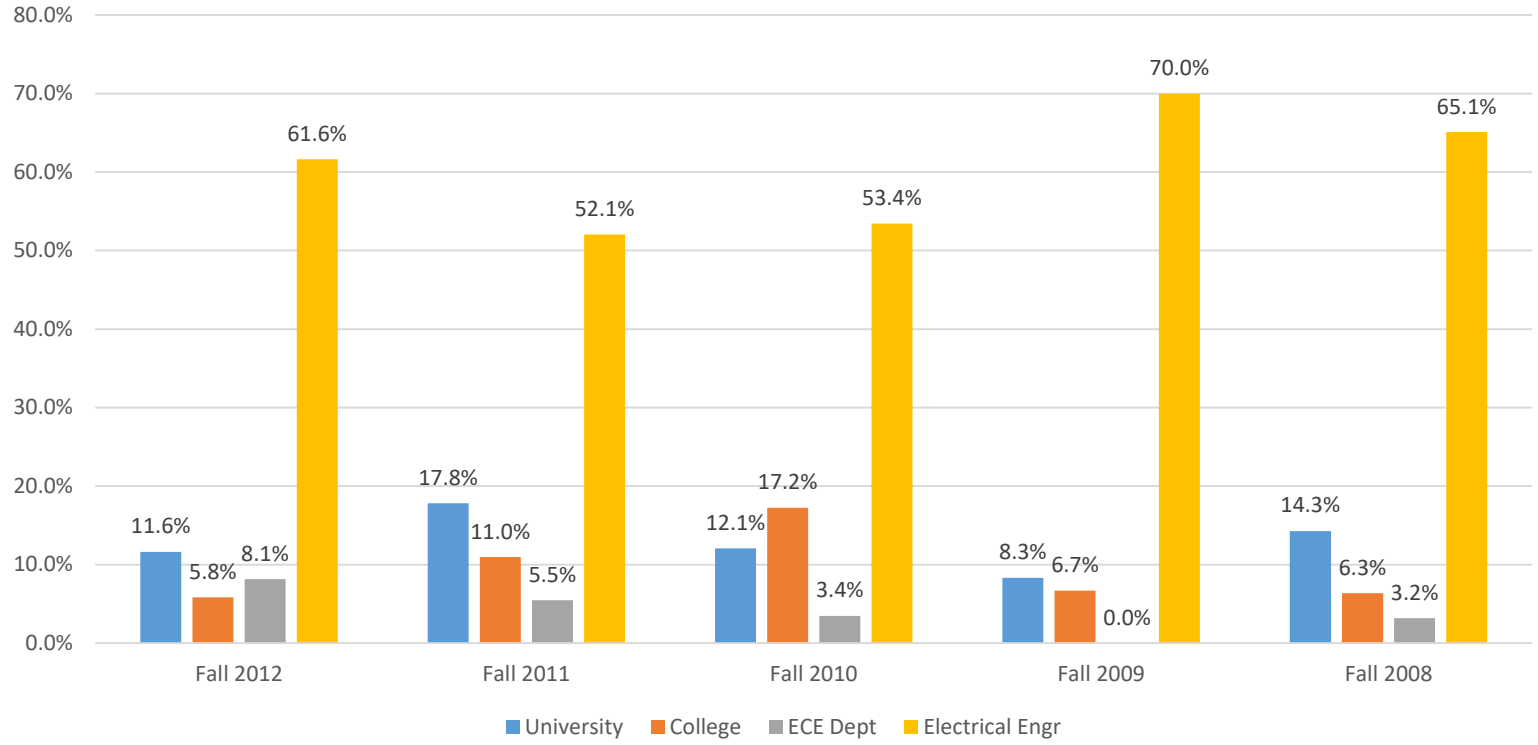
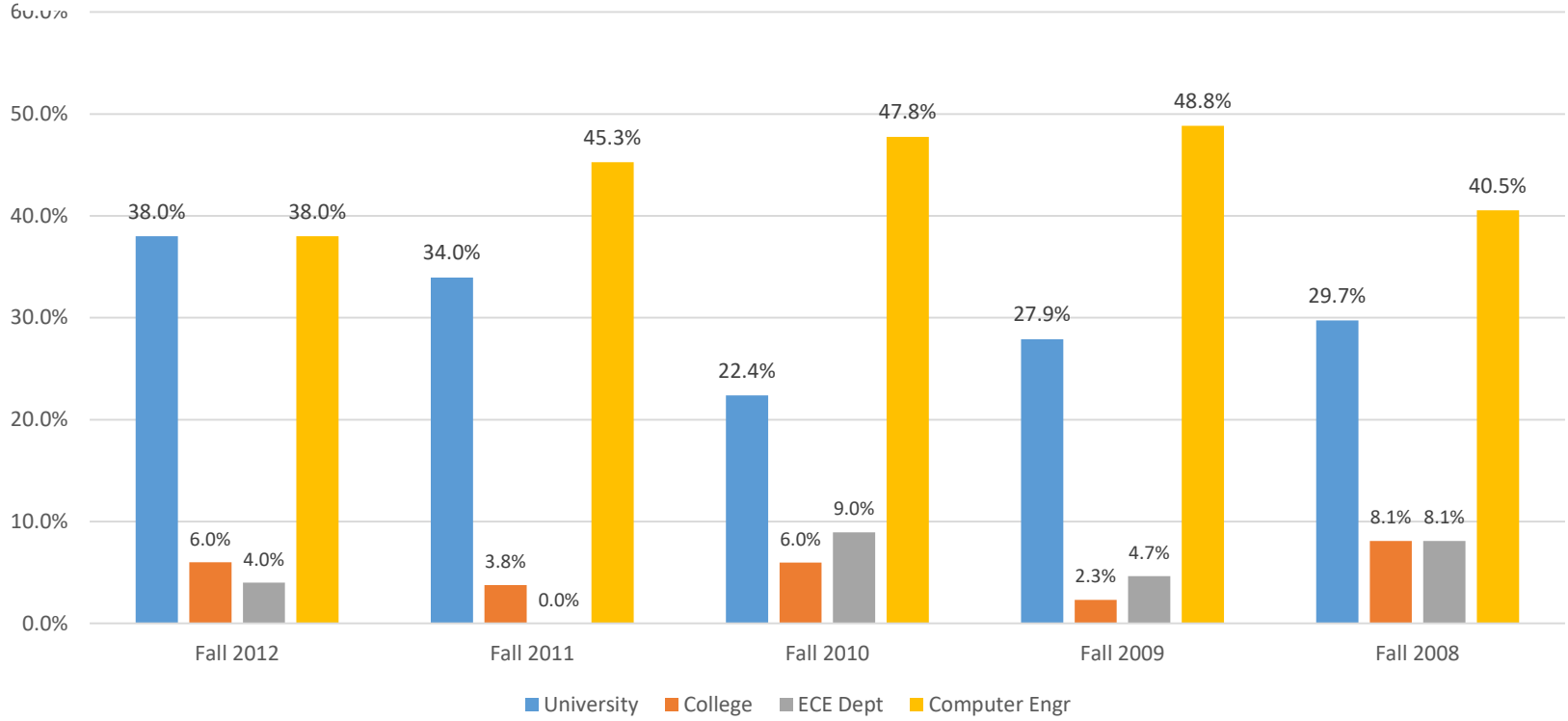
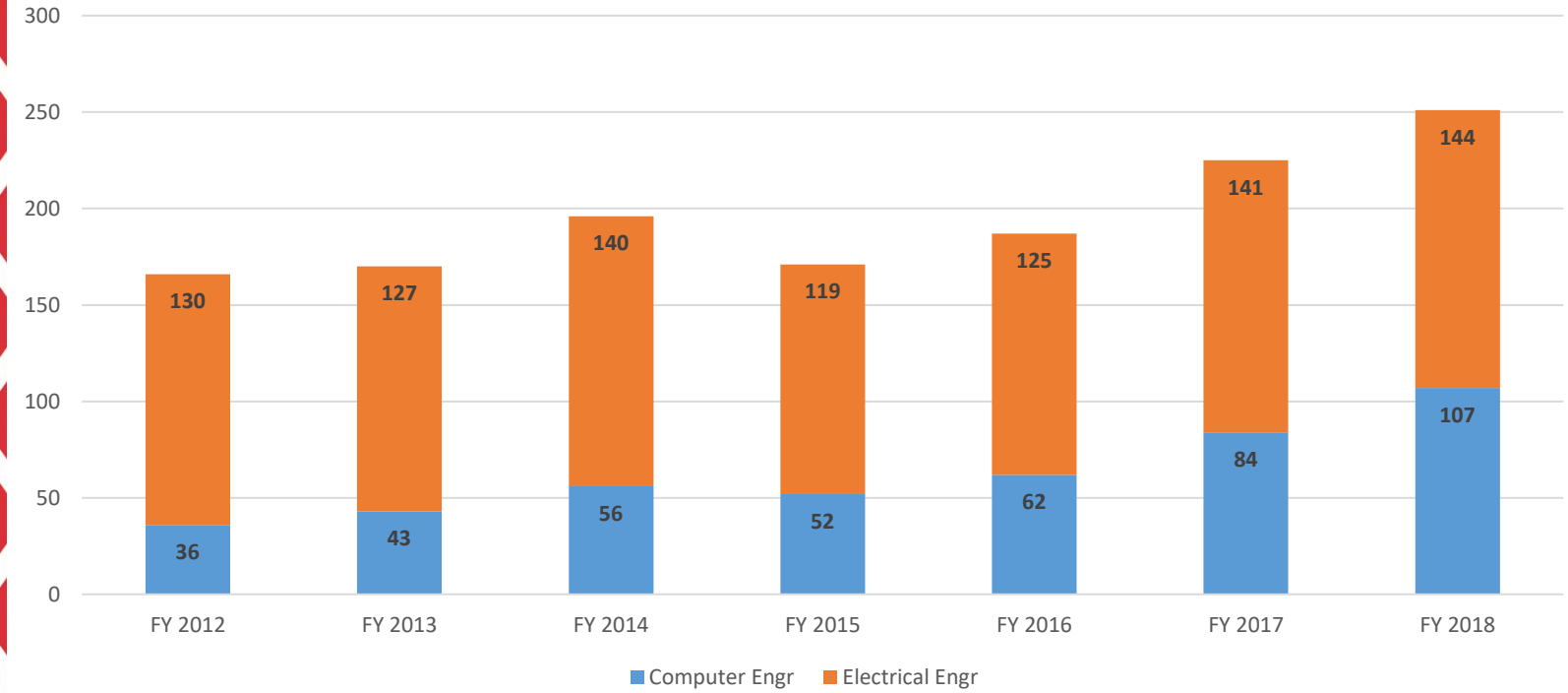
Electrical Engr 6-Year Graduation



Computer Engr 6-Year Graduation



ECE Graduates



FY19 Unofficial numbers: 240 grads (84 CE, 156 EE)

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Placement by Discipline (May 2019)

	Employed		Graduate School		Seeking		Not Started		No information			
Aerospace	64	**65%**	11	**11%**	12	**12%**	1	**1%**	11	**11%**	99	$71,800
Bioengineering	41	**51%**	31	**39%**	3	**4%**	0	**0%**	5	**6%**	80	$69,900
Chemical	37	**51%**	11	**15%**	11	**15%**	3	**4%**	11	**15%**	73	$73,000
Civil	73	**78%**	8	**9%**	4	**4%**	2	**2%**	7	**7%**	94	$67,500
Computer	51	**85%**	3	**5%**	1	**2%**	2	**3%**	3	**5%**	60	$89,600
Electrical	84	**76%**	12	**11%**	8	**7%**	1	**1%**	6	**5%**	111	$76,900
Fire Protection	29	**78%**	8	**22%**	0	**0%**	0	**0%**	0	**0%**	37	$72,800
Materials	12	**60%**	5	**25%**	2	**10%**	0	**0%**	1	**5%**	20	$73,400
Mechanical	157	**70%**	16	**7%**	29	**13%**	7	**3%**	16	**7%**	225	$71,500
Total	548	**69%**	105	**13%**	70	**9%**	16	**2%**	60	**7%**	799	**$74,000**

Courtesy of Dean Pines

UPDATE: Electrical Engineering @ Southern MD

- First cohort graduated in Spring 2019 – 8 students (out of 10 original students)
- Current enrollment of 12 students.
- Second cohort expected to graduate in Spring 2020 – 5 students (out of 5 original students)
- Southern Maryland Higher Education Center now under USM jurisdiction – new name USM-Southern Maryland campus
- Planning to offer Computer Engineering minor in Southern Maryland starting Fall 2020

UPDATE: Academy of Machine Learning

- Officially launched this semester (Fall 2019)
- ECE Undergraduate Office has already received 17 applications for the program
- Unique Courses
    - ENEE436 Foundations of Machine Learning
    - ENEE437 Machine Learning Design to be piloted in Sp20

UPDATE: Computer Engineering Minor

- Awarded 5 minor citations last year
- Current enrollment in the minor: 15 students
- Minor Student By Major
  - Aerospace Engineering: 3 students
  - Electrical Engineering: 7 students
  - Mechanical Engineering: 5 students

UPDATE: BSESIOT @ Universities at Shady Grove

- Recruitment for Bachelor of Science in Embedded Systems & Internet of Things (ESIOT) program underway
- 21 New courses under development
- ECE Undergrad Office in full recruitment mode
- Target schools: Montgomery College, Frederick CC, Howard CC, and Prince George's CC
- Biomedical Sciences & Engineering Building opened on November 7th
- First Cohort: Fall 2020, 25 students

Biosciences and Engineering Building at USG

Building commissioned in Nov.7, 2019

A. James Clark School of Engineering

Department of Electrical and Computer Engineering

EMBEDDED SYSTEMS & INTERNET OF THINGS

Four-Semester Plan

The Universities at Shady Grove

Semester 1

Course	Title	Credits
ENEB302 ★	Analog Circuits	3
ENEB340 ★	Intermediate Progamming Concepts and Applications for Embedded Systems (C/C++)	3
ENEB341 ★	Introduction to Internet of Things	3
ENEB344 ★	Introduction to Digital Circuits	4
ENEB354 ★	Discrete Mathematics for Information Technology	3
	Total	**17**

Semester 2

Course	Title	Credits
ENEB304 ★	Microelectronics and Sensors	3
ENEB352 ★	Introduction to Networks and Protocols	3
ENEB353 ★	Computer Organization for Embedded Systems	3
ENEB355 ★	Algorithms in Python	3
ENGL393	Technical Writing	3
	Total	**15**

★ : developed Fall 2019

★ : developed Spring 2020

Department of Electrical & Computer Engineering

BSESIOT Program Tracks

EMBEDDED SYSTEMS & INTERNET OF THINGS

Program Tracks

Students in the Embedded Systems major will be required to choose one of three program tracks available in the major. Each track will have its specific senior level course required course(s) and electives.

The Hardware Track is focused primarily on the physical layer and concentrating on operations performed at the device level.

The Computational Track is focused on the modeling and software level, and concentrating on data analytical methods and applications.

The Security Track is focused on security issues on cyber-physical systems and concentrating on hardware and software aspects of data integrity, corruption and threats.

ESIOT Program Sample Plan

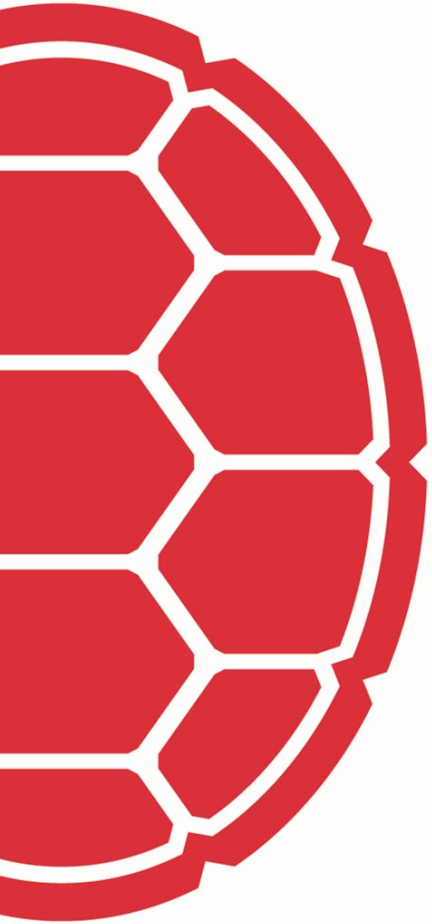
Semester 3			Semester 4		
Course	**Title**	**Credits**	**Course**	**Title**	**Credits**
ENEB408X	Capstone Design Lab I	3	ENEB408X	Capstone Design Lab II	3
ENEB454	Embedded Systems	3	ENEB443	Hardware/Software Security for Embedded Systems	2
ENEB4xx	Senior Level Elective 1	3	ENEB4xx	Senior Level Elective 4	3
ENEB4xx	Senior Level Elective 2	3	ENEB4xx	Senior Level Elective 5	4
ENEB4xx	Senior Level Elective 3	3	ENEB4xx	Senior Level Elective 6	3
	Total	**15**		**Total**	**15**

Senior Level Electives*

★ Operating Systems for Embedded Systems
Advanced FPGA System Design Using Verilog
Web Based Application Development
Network Security
Probability and Statistical Inference
Machine Learning Tools
Database
Advanced Software for Embedded Systems-Connected Systems
★ Linear Algebra for Embedded Systems

* Students in the Embedded Systems major must choose one of three program tracks. Each track requires specific senior level electives. To view tracks and related coursework, flip to the back page.

BSESIOT Faculty



Committed to teach at Shady Grove

1. Three(3) Regular Faculty (3 Full Professors)
2. Two (2) Adjunct Faculty
3. One (1) ENTS Faculty/Director

Full/Part Time Instructor Hiring

1. Application Deadline: Dec. 10 ejobs posting
2. Twelve (12) applicants
3. Hiring expected Spring 2020

Laboratories at USG

4 Laboratories for ESIOT Program

1. Analog Devices
2. Digital Devices
3. Networking and Communications
4. Capstone Design Projects

Equipment

$500k for State of the Art Instructional Labs,
Currently in the procurement process.

125 Ebikes! Design Challenge

Competition completed in Oct. 12, 2019

- 30 Teams registered
- 10 Teams received subsidy for components
- 7 teams competed, ALL teams completed 125 miles

https://umdeng.screenlight.tv/shares/2Bshx1OqaSWAKeyz3b2gBedHWvL15hUG

125-Mile Ebikes! Design Challenge

30 kg Max Weight, Bicycle Form Factor Fastest time: 100 mi in lab, 25 mi in real world

(Engineering discipline, creativity, technology choices, power management)

1st. Cause for Concern: Optimized design, off-shelf battery, innovative energy generation (5h26m)

2nd. THOR: Optimized for maximum battery capacity, ultra light weight materials and ease-of-use (5h29m)

rdgomez@umd.edu

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125-Mile Ebikes! Design Challenge

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