# 2024 - 2025 Major Map

## Robotics and Autonomous Systems, BS

School/College: Ira A. Fulton Schools of Engineering
ESRASBS

| Term 1 0 - 16 Credit Hours Critical course signified by | Hours | Minimum Grade | Notes |
|---|---|---|---|
| ASU 101-MSN: The ASU Experience | 1 | | • ASU 101 is required of all first-year students.<br>• Prep for success using the First-Year Student Guide.<br>• Join a Fulton community.<br>• Explore engineering and technical professions. |
| RAS 101: Foundations of Robotic Engineering I | 3 | C | |
| CSE 101: Introduction to Computer Science and Programming for Non-Computer Science Majors (QTRS) OR RAS 110: Principles of Programming for Engineers | 3 | C | |
| ENG 101 or ENG 102: First-Year Composition OR ENG 105: Advanced First-Year Composition OR ENG 107 or ENG 108: First-Year Composition | 3 | C | |
| MAT 265: Calculus for Engineers I (MATH OR MA) | 3 | C | |
| Humanities, Arts and Design (HUAD) | 3 | | |
| Term hours subtotal: | 16 | | |

| Term 2 16 - 32 Credit Hours Critical course signified by | Hours | Minimum Grade | Notes |
|---|---|---|---|
| RAS 102: Foundations of Robotic Engineering II | 3 | C | • Create a Handshake profile.<br>• Get involved with EPICS, the Generator Labs, and the Fulton Start-Up Center. |
| ENG 101 or ENG 102: First-Year Composition OR ENG 105: Advanced First-Year Composition OR ENG 107 or ENG 108: First-Year Composition | 3 | C | |
| MAT 266: Calculus for Engineers II (MATH OR MA) | 3 | C | |
| PHY 121: University Physics I: Mechanics (SCIT OR SQ) | 3 | C | |
| PHY 122: University Physics Laboratory I (SCIT OR SQ) | 1 | C | |
| RAS 205: Design and Analysis of Data Structures and Algorithms | 3 | C | |
| Complete ENG 101 OR ENG 105 OR ENG 107 course(s). | | | |
| Complete MAT 265 course(s). | | | |
| Term hours subtotal: | 16 | | |

| Term 3 32 - 47 Credit Hours Critical course signified by | Hours | Minimum Grade | Notes |
|---|---|---|---|
| EGR 216: Engineering Electrical Fundamentals | 3 | C | • Prep for success using the Sophomore Guide. |
| MAT 267: Calculus for Engineers III (MATH OR MA) | 3 | C | |
| RAS 210: Computer-Aided Design and Manufacturing (CAD/CAM) | 3 | C | |
| RAS 215: Statics and Mechanics of Materials | 3 | C | |
| Sustainability (SUST) | 3 | | |
| Complete MAT 266 course(s). | | | |
| Complete Mathematics (MATH) requirement. | | | |
| Term hours subtotal: | 15 | | |

| Term 4 47 - 62 Credit Hours Critical course signified by | Hours | Minimum Grade | Notes |
|---|---|---|---|

| | | | |
|---|---|---|---|
| MAT 275: Modern Differential Equations (MATH OR MA) OR MAT 243: Discrete Mathematical Structures | 3 | C | • Pursue an undergraduate research experience.<br>• Apply for internships.<br>• Attend career fairs and events. |
| MAT 343: Applied Linear Algebra | 3 | | |
| RAS 220: Dynamics | 3 | C | |
| RAS 230: Introduction to Robotic Mechanism Design and Deployment | 3 | C | |
| Social and Behavioral Sciences (SOBE) | 3 | | |
| Complete RAS 215 AND EGR 216 course(s). | | | |
| Term hours subtotal: | 15 | | |

| **Term 5** 62 - 78 Credit Hours Necessary course signified by | Hours | Minimum Grade | Notes |
|---|---|---|---|
| RAS 304: Embedded Systems Design Project I | 3 | C | • Technical Electives can be selected from the approved list at the bottom of the major map.<br>• Plan for success using the Junior Guide.<br>• Network at student organization competitions or professional societies. |
| RAS 455: Robotic Systems I | 3 | C | |
| EGR 280: Engineering Statistics (QTRS OR CS) | 3 | | |
| Upper Division Technical Elective | 3 | | |
| Scientific Thinking in Natural Sciences (SCIT) | 4 | | |
| Term hours subtotal: | 16 | | |

| **Term 6** 78 - 93 Credit Hours Necessary course signified by | Hours | Minimum Grade | Notes |
|---|---|---|---|
| RAS 314: Embedded Systems Design Project II | 3 | C | • Research and prepare for graduate school.<br>• Apply for an engineering accelerated degree program.<br>• Develop a professional profile online. |
| RAS 456: Robotic Systems II | 3 | C | |
| PHY 321: Vector Mechanics and Vibration | 3 | | |
| RAS 433: Transforms and Systems Modeling | 3 | C | |
| Upper Division Technical Elective | 3 | | |
| Term hours subtotal: | 15 | | |

| **Term 7** 93 - 108 Credit Hours Necessary course signified by | Hours | Minimum Grade | Notes |
|---|---|---|---|
| RAS 401: Professional Design Project I (L) OR EGR 401: Professional Design Project I (L) | 3 | C | • Plan for success using the Senior Guide .<br>• Use Handshake to apply for full-time positions.<br>• Complete an in person or virtual practice interview. |
| HST 318: History of Engineering (HUAD OR (L or SB) & G) | 3 | | |
| RAS 446: Robotic and Manufacturing System Control and Optimization | 3 | | |
| RAS 475: Applied Machine Learning and AI for Robotics and Manufacturing | 3 | | |
| Global Communities, Societies and Individuals (GCSI) | 3 | | |
| Term hours subtotal: | 15 | | |

| **Term 8** 108 - 120 Credit Hours Necessary course signified by | Hours | Minimum Grade | Notes |
|---|---|---|---|
| RAS 402: Professional Design Project II | 3 | C | • Use Handshake to apply for full-time positions. |
| Upper Division Technical Elective | 3 | | |
| American Institutions (AMIT) | 3 | | |
| Governance and Civic Engagement (CIVI) | 3 | | |
| Term hours subtotal: | 12 | | |

Hide Course List(s)/Track Group(s)

Technical Elective

EGR 463: Vehicle Electrical Systems and Hybrid Systems

EGR 465: Ground Vehicle Dynamics

EGR 494: Power Electronic Converters and Systems

MFG 387: Industrial Automation

MFG 494: Integration of Automation Systems

RAS 484: Internship

- **Total Hours:** 120
- **Upper Division Hours:** 45 minimum
- University Undergraduate Graduation Requirements

**Notes:**
Mathematics Placement Assessment score determines placement in first mathematics course.

> General Studies designations listed next to courses on the major map were valid for the 2024 - 2025 academic year. Please refer to the course catalog for current General Studies designations at time of class registration. General Studies credit is applied according to the designation the course carries at the time the class is taken.