

ROBOTICS ENGINEERING (BS) / ROBOTICS ENGINEERING (MS) (COMBINED OPTION)

Program of Study

Code	Title	Credit Hours
Core IMPACTS Area : Institutional Priorities ¹		4-5
COMM 1110	Public Speaking	3
ITDS 1779	Scholarship Across the Disciplines	2
LEAD 1705	Introduction to Servant Leadership	2
PERS 1506	Perspectives 1-hour	1
PERS 1507	Perspectives 2-hour	2
Foreign Language Course Options		
ARAB, CHIN, FREN, GERM, GREK, ITAL, JAPN, KREN, LATIN, PORT, SPAN - 1001, 1002, 2001, 2002		
SWAH 1001	Elementary Swahili I	
SWAH 1002	Elementary Swahili II	
Core IMPACTS Area : Mathematics & Quantitative Skills ¹		3-7
DATA 1501	Introduction to Data Science	3
MATH 1001	Quantitative Skills and Reasoning	3
MATH 1101	Introduction to Mathematical Modeling	3
MATH 1111	College Algebra	3
MATH 1113	Pre-Calculus	4
MATH 1125	Applied Calculus	3
MATH 1131	Calculus with Analytic Geometry I	4
MATH 1132	Calculus with Analytic Geometry II	4
MATH 1165	Computer-Assisted Problem Solving	3
MATH 1401	Introduction to Statistics	3
MATH 1501	Calculus I	4
MATH 2125	Introduction to Discrete Mathematics	3
STAT 1401	Elementary Statistics	3
Core IMPACTS Area : Political Science and U.S. History		6
HIST 2111	U. S. History to 1865	3
or HIST 2112	U. S. History since 1865	
POLS 1101	American Government	3
Core IMPACTS Area : Arts, Humanities, and Ethics		6
Select one Fine Arts course		3
ARTH 1100	Art Appreciation	
ARTH 2125	Introduction to the History of Art I– Prehistoric through Gothic	
ARTH 2126	Introduction to the History of Art II– Renaissance through Modern	
MUSC 1100	Music Appreciation	
THEA 1100	Theatre Appreciation	
ITDS 1145	Comparative Arts ²	
Select one Humanities course		3
ENGL 2111	World Literature I	
ENGL 2112	World Literature II	

ITDS 1774	Introduction to Digital Humanities	
PHIL 2010	Introduction to Philosophy	
ITDS 1145	Comparative Arts ²	
Core IMPACTS Area : Communicating in Writing		6
ENGL 1101	English Composition I	3
ENGL 1102	English Composition II	3
Core IMPACTS Area : Technology, Mathematics, and Sciences ¹		7-11
ANTH 1145	Human Origins	3
ASTR 1105	Descriptive Astronomy: The Solar System	3
ASTR 1106	Descriptive Astronomy: Stars and Galaxies	3
ASTR 1305	Descriptive Astronomy Lab	1
ATSC 1112	Understanding the Weather	3
ATSC 1112L	Understanding the Weather Lab	1
BIOL 1125	Contemporary Issues in Biology Non-Lab	3
BIOL 1215K	Introductory Biology	4
BIOL 1225K	Contemporary Issues in Biology with Lab	4
CHEM 1151 & 1151L	Survey of Chemistry I and Survey of Chemistry I Lab	4
CHEM 1152 & 1152L	Survey of Chemistry II and Survey of Chemistry II Lab	4
CHEM 1211 & 1211L	Principles of Chemistry I and Principles of Chemistry I Lab	4
CHEM 1212 & 1212L	Principles of Chemistry II and Principles of Chemistry II Lab	4
CPSC 1105	Introduction to Computing Principles and Technology	3
CPSC 1301K	Computer Science I	4
ENVS 1105	Environmental Studies	3
ENVS 1105L	Environmental Studies Laboratory	1
ENVS 1205K	Sustainability and the Environment	4
GEOG 2215	Introduction to the Geographic Information Systems	3
GEOL 1110	Natural Disasters: Our Hazardous Environment	3
GEOL 1121	Introductory Geoscience I: Physical Geology	3
GEOL 1121L	Introductory Geoscience I: Physical Geology Lab	1
GEOL 1122	Introductory Geo-sciences II: Historical Geology	3
GEOL 1322	Introductory Geo-sciences II: Historical Geology Lab	1
GEOL 2225	The Fossil Record	4
PHYS 1111 & PHYS 1311	Introductory Physics I and Introductory Physics I Lab	4
PHYS 1112 & PHYS 1312	Introductory Physics II and Introductory Physics II Lab	4
PHYS 1125	Physics of Color and Sound	3
PHYS 1325	Physics of Color and Sound Lab	1
PHYS 2211 & PHYS 2311	Principles of Physics I and Principles of Physics I Lab	4
PHYS 2212 & PHYS 2312	Principles of Physics II and Principles of Physics II Lab	4
Core IMPACTS Area : Social Sciences		6
Select one Behavioral Science course		
ECON 2105	Principles of Macroeconomics	
ECON 2106	Principles of Microeconomics	
PHIL 2030	Moral Philosophy	

PSYC 1101	Introduction to General Psychology	
SOCI 1101	Introduction to Sociology	
Select one World Cultures course		3
ANTH 1107	Discovering Archaeology	
ANTH 1105	Cultural Anthropology	
ANTH 2105	Ancient World Civilizations	
ANTH 2136	Language and Culture	
ENGL 2136	Language and Culture	
GEOG 1101	World Regional Geography	
HIST 1111	World History to 1500	
HIST 1112	World History since 1500	
ITDS 1155	The Western Intellectual Tradition	
ITDS 1156	Understanding Non-Western Cultures	

Core IMPACTS Total Hours 42

Health and Wellness 3

KINS 1106	Lifetime Wellness	2
	or PHED 1205 Concepts of Fitness	

Select one PEDS course (<https://catalog.columbusstate.edu/course-descriptions/peds/#peds>)

¹ The hours applied in the Institutional Priorities; Mathematics & Quantitative Skills; and Technology, Mathematics, and Sciences areas must add to 18 credit hours.

² ITDS 1145 Comparative Arts, though listed under both Fine Arts and Humanities, may be taken only once.

Major Requirements

Code	Title	Credit Hours
Core Requirements		
Complete the core requirements for this program		45
Core Total		45
Field of Study Requirements		
Minimum grade of C is required		
ENGR 2221	Computing for Engineers 1	3
ENGR 2255	Engineering Graphics and Computer Aided Design	3
MATH 2115	Introduction to Linear Algebra	3
MATH 2135	Calculus with Analytic Geometry 3	4
PHYS 2212	Principles of Physics II	3
PHYS 2312	Principles of Physics II Lab	1
Include 1 hour from MATH 1131 in Area A		1
Field of Study Requirements Total		18
Required for the Major		
Minimum grade of C is required		
ENGR 1701	Introduction to Robotics	1
ENGR 2115	Statics	3
ENGR 2125	Dynamics of Rigid Bodies	3
ENGR 2206	Digital Logic	4
ENGR 3235	Circuit Analysis	3
ENGR 3236	Introduction to Signal Processing	3
ENGR 3245	Robotics Engineering Design Lab	2
ENGR 3255	Sensors and Actuators	3
ENGR 3275	Feedback Control Systems	3

ENGR 4391	Robotics Senior Design 1	2
ENGR 4392	Robotics Senior Design 2	2
ENGR 5151G	Computer Vision 1 (Also applies toward the master's degree requirements)	3
ENGR 5161U	Elements of Machine Intelligence	3
ENGR 5176U	Kinematics and Dynamics	3
ENGR 5236G	Microelectronic Circuits (Also applies toward the master's degree requirements)	3
ENGR 5238G	Introduction to Embedded Systems (Also applies toward the master's degree requirements)	3
MATH 3107	Differential Equations	3
MATH 3175	Introduction to Probability	3
Required for the Major Total		50

Major Electives

Include 1 hour from MATH 1132 in Area D	1
Choose 9 hours from the following options:	9
Any 1000+ science course	
Any 1000+ ENGR course	
Any 2000+ MATH/STAT class with advisor approval	
Any 3000+ CPSC class with advisor approval	
Area H Total	10

Master's Degree Requirements

Area 1

The following 3 courses are taken with the bachelor's degree but also count toward the master's degree requirements.

ENGR 5151G	Computer Vision 1	
ENGR 5236G	Microelectronic Circuits	
ENGR 5238G	Introduction to Embedded Systems	
Take four additional courses from the following list to accumulate an additional 12 credit hours in Area 1:		12
ENGR 6137	Dynamic Optimization	
ENGR 6145	Human-Robot Interactions	
ENGR 6148	Military Applications in Robotics	
ENGR 6152	Computer Vision 2	
ENGR 6162	Machine Intelligence and Synthesis	
ENGR 6167	Multi-Robot Systems	
ENGR 6172	Multivariable Linear Controls	
ENGR 6173	Nonlinear Controls	
ENGR 6178	Biomechanics	
ENGR 6239	Embedded Systems Design	
ENGR 6555	Selected Topics in Robotics	
Any 5000+ CPSC/MATH class with advisor approval		
Area 1 Total		12

Area 2

Choose one of the following 2 options for 9 additional credit hours

ENGR 6000	Thesis Defense	
ENGR 6999	Thesis Research (Repeat to complete a total of 9 hours)	

Nonthesis Option

Take one of the following two courses twice for a total of 6 hours

ENGR 6399	Graduate Research Project	
ENGR 6689	Supervised Graduate Internship	

Choose one of the following courses that is not applied in Area 1:

ENGR 6137	Dynamic Optimization	
ENGR 6145	Human-Robot Interactions	
ENGR 6148	Military Applications in Robotics	
ENGR 6152	Computer Vision 2	
ENGR 6162	Machine Intelligence and Synthesis	
ENGR 6167	Multi-Robot Systems	
ENGR 6172	Multivariable Linear Controls	
ENGR 6173	Nonlinear Controls	
ENGR 6178	Biomechanics	
ENGR 6239	Embedded Systems Design	
ENGR 6555	Selected Topics in Robotics	
	Any 5000+ CPSC/MATH class with advisor approval	
Area 2 Total		9
Total Credit Hours		144