

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

Program Map

BS/MS Robotics Engineering Non-Thesis Option 1

Course	Title	Credit Hours
First Year		
Fall		
ENGL 1101	English Composition I (minimum grade of C)	3
MATH 1131	Calculus with Analytic Geometry I (minimum grade of C)	4
CHEM 1211	Principles of Chemistry I (minimum grade of C)	3
CHEM 1211L	Principles of Chemistry I Lab (minimum grade of C)	1
ENGR 1701	Introduction to Robotics (minimum grade of C)	1
ENGR 2255	Engineering Graphics and Computer Aided Design (minimum grade of C)	3
Area B2	Institutional Options Elective ¹	1
Credit Hours		16
Spring		
ENGL 1102	English Composition II (minimum grade of C)	3
MATH 1132	Calculus with Analytic Geometry II (minimum grade of C)	4
PHYS 2211	Principles of Physics I (minimum grade of C)	3
PHYS 2311	Principles of Physics I Lab (minimum grade of C)	1
Area H	Elective (minimum grade of C) ²	3
KINS 1106 or PHED 1205	Lifetime Wellness or Concepts of Fitness	2
Credit Hours		16
Second Year		
Fall		
MATH 2115	Introduction to Linear Algebra (minimum grade of C)	3
PHYS 2212	Principles of Physics II (minimum grade of C)	3
PHYS 2312	Principles of Physics II Lab (minimum grade of C)	1
ENGR 2115	Statics (minimum grade of C)	3
ENGR 2221	Computing for Engineers 1 (minimum grade of C)	3
Area E	Behavioral Science Elective ³	3
Credit Hours		16

Spring		
MATH 3107	Differential Equations (minimum grade of C)	3
ENGR 2206	Digital Logic (minimum grade of C)	4
ENGR 2125	Dynamics of Rigid Bodies (minimum grade of C)	3
Area H	Elective (minimum grade of C) ²	3
Area B1	Institutional Options Elective ⁴	3
Credit Hours		16

Third Year		
Fall		
MATH 2135	Calculus with Analytic Geometry 3 (minimum grade of C)	4
ENGR 3235	Circuit Analysis (minimum grade of C)	3
ENGR 3236	Introduction to Signal Processing (minimum grade of C)	3
Area C1	Humanities Elective ⁵	3
Credit Hours		13

Spring		
MATH 3175	Introduction to Probability (minimum grade of C)	3
ENGR 3255	Sensors and Actuators (minimum grade of C)	3
ENGR 3275	Feedback Control Systems (minimum grade of C)	3
Area H	Elective (minimum grade of C) ²	3
PEDS	Physical Education course 1***	1
Area C2	Fine Arts Elective ⁶	3
Credit Hours		16

Fourth Year		
Fall		
ENGR 4391	Robotics Senior Design 1 (minimum grade of C)	2
ENGR 5161U	Elements of Machine Intelligence (minimum grade of C)	3
ENGR 5176U	Kinematics and Dynamics (minimum grade of C)	3
ENGR 5236G	Microelectronic Circuits	3
Area E	American History ⁷	3
Credit Hours		14

Spring		
ENGR 4392	Robotics Senior Design 2 (minimum grade of C)	2
ENGR 5238G	Introduction to Embedded Systems	3
POLS 1101	American Government	3
Area E	World Cultures Elective ⁸	3
Credit Hours		11

Fifth Year		
Fall		
Area 1	Graduate Elective ⁹	3
Area 1	Graduate Elective ⁹	3
Area 1	Graduate Elective ⁹	3
ENGR 6399	Graduate Research Project	3
Credit Hours		12

Spring		
Area 1	Graduate Elective ⁹	3
Area 1	Graduate Elective ⁹	3
Area 2	Graduate elective from Area 1 list ⁹	3
ENGR 6399	Graduate Research Project	3
Credit Hours		12
Total Credit Hours		142

Footnotes

- ¹ Area B2: ITDS 1779 (2) or LEAD 1705 (2) or PERS 1506 (1; may be repeated with different topic) or PERS 1507 (2).
- ² Area H: ENGR 1000+, MATH/STAT 3000+, CPSC 3000+, MATH 2125, Science 1000+
- ³ ECON 2105 or ECON 2106 (recommended)
- ⁴ Area B1: COMM 1110 or FL 1001, 1002, 2001, 2002
- ⁵ Area C1: ENGL 2111, 2112; ITDS 1145, 1155, 2125; PHIL 2010
- ⁶ Area C2: ARTH 1100, 2125, 2126; ITDS 1145, MUSC 1100, THEA 1100
- ⁷ HIST 2111 or HIST 2112
- ⁸ World Culture: ANTH 1105, 1107, 2105, 2136; HIST 1111, 1112; ENGL 2136, GEOG 1101, ITDS 1156
- ⁹ Area 1 Graduate electives:
- 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

BS/MS Robotics Engineering Non-Thesis Option 2

Course	Title	Credit Hours
First Year		
Fall		
ENGL 1101	English Composition I (minimum grade of C)	3
MATH 1131	Calculus with Analytic Geometry I (minimum grade of C)	4
CHEM 1211	Principles of Chemistry I (minimum grade of C)	3
CHEM 1211L	Principles of Chemistry I Lab (minimum grade of C)	1
ENGR 1701	Introduction to Robotics (minimum grade of C)	1
ENGR 2255	Engineering Graphics and Computer Aided Design (minimum grade of C)	3
Area B2	Institutional Options Elective ¹	1
Credit Hours		16

Spring		
ENGL 1102	English Composition II (minimum grade of C)	3
MATH 1132	Calculus with Analytic Geometry II (minimum grade of C)	4
PHYS 2211	Principles of Physics I (minimum grade of C)	3
PHYS 2311	Principles of Physics I Lab (minimum grade of C)	1
Area H	Elective (minimum grade of C) ²	3
KINS 1106 or PHED 1205	Lifetime Wellness or Concepts of Fitness	2
Credit Hours		16

Second Year**Fall**

MATH 2115	Introduction to Linear Algebra (minimum grade of C)	3
PHYS 2212	Principles of Physics II (minimum grade of C)	3
PHYS 2312	Principles of Physics II Lab (minimum grade of C)	1
ENGR 2115	Statics (minimum grade of C)	3
ENGR 2221	Computing for Engineers 1 (minimum grade of C)	3
Area E	Behavioral Science Elective ³	3
Credit Hours		16

Spring

MATH 3107	Differential Equations (minimum grade of C)	3
ENGR 2206	Digital Logic (minimum grade of C)	4
ENGR 2125	Dynamics of Rigid Bodies (minimum grade of C)	3
Area H	Elective (minimum grade of C) ²	3
Area B1	Institutional Options Elective ⁴	3
Credit Hours		16

Third Year**Fall**

MATH 2135	Calculus with Analytic Geometry 3 (minimum grade of C)	4
ENGR 3235	Circuit Analysis (minimum grade of C)	3
ENGR 3236	Introduction to Signal Processing (minimum grade of C)	3
ENGR 5245U	minimum grade of C	2
Area C1	Humanities Elective ⁵	3
Credit Hours		15

Spring

MATH 3175	Introduction to Probability (minimum grade of C)	3
ENGR 3255	Sensors and Actuators (minimum grade of C)	3
ENGR 3275	Feedback Control Systems (minimum grade of C)	3
Area H	Elective (minimum grade of C) ²	3
PEDS	Physical Education course 1***	1

Area C2	Fine Arts Elective ⁶	3
Credit Hours		16
Fourth Year		
Fall		
ENGR 4391	Robotics Senior Design 1 (minimum grade of C)	2
ENGR 5161U	Elements of Machine Intelligence (minimum grade of C)	3
ENGR 5176U	Kinematics and Dynamics (minimum grade of C)	3
ENGR 5236G	Microelectronic Circuits	3
Area E	American History ⁷	3
Credit Hours		14
Spring		
ENGR 4392	Robotics Senior Design 2 (minimum grade of C)	2
ENGR 5238G	Introduction to Embedded Systems	3
ENGR 5151U	Computer Vision 1 (minimum grade of C)	3
POLS 1101	American Government	3
Area E	World Cultures Elective ⁸	3
Credit Hours		14
Fifth Year		
Fall		
Area 1	Graduate Elective ⁹	3
Area 1	Graduate Elective ⁹	3
Area 1	Graduate Elective ⁹	3
ENGR 6689	Supervised Graduate Internship	3
Credit Hours		12
Spring		
Area 1	Graduate Elective ⁹	3
Area 1	Graduate Elective ⁹	3
Area 2	Graduate elective from Area 1 list ⁹	3
ENGR 6689	Supervised Graduate Internship	3
Credit Hours		12
Total Credit Hours		147

Footnotes

¹ Area B2: ITDS 1779 (2) or LEAD 1705 (2) or PERS 1506 (1; may be repeated with different topic) or PERS 1507 (2)

² Area H: ENGR 1000+, MATH/STAT 3000+, CPSC 3000+, MATH 2125, Science 1000+

³ ECON 2105 or ECON 2106 (recommended)

⁴ Area B1: COMM 1110 or FL 1001, 1002, 2001, 2002

⁵ Area C1: ENGL 2111, 2112; ITDS 1145, 1155, 2125; PHIL 2010

⁶ Area C2: ARTH 1100, 2125, 2126; ITDS 1145, MUSC 1100, THEA 1100

⁷ HIST 2111 or HIST 2112

⁸ World Culture: ANTH 1105, 1107, 2105, 2136; HIST 1111, 1112; ENGL 2136, GEOL 1101, ITDS 1156

⁹ Area 1 Graduate electives:

- 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

BS/MS Robotics Engineering Thesis Option

Course	Title	Credit Hours
First Year		
Fall		
ENGL 1101	English Composition I (minimum grade of C)	3
MATH 1131	Calculus with Analytic Geometry I (minimum grade of C)	4
CHEM 1211	Principles of Chemistry I (minimum grade of C)	3
CHEM 1211L	Principles of Chemistry I Lab (minimum grade of C)	1
ENGR 1701	Introduction to Robotics (minimum grade of C)	1
ENGR 2255	Engineering Graphics and Computer Aided Design (minimum grade of C)	3
Area B2	Institutional Options Elective ¹	1
Credit Hours		16
Spring		
ENGL 1102	English Composition II (minimum grade of C)	3
MATH 1132	Calculus with Analytic Geometry II (minimum grade of C)	4
PHYS 2211	Principles of Physics I (minimum grade of C)	3
PHYS 2311	Principles of Physics I Lab (minimum grade of C)	1
Area H	Elective (minimum grade of C) ²	3
KINS 1106 or PHED 1205	Lifetime Wellness or Concepts of Fitness	2
Credit Hours		16
Second Year		
Fall		
MATH 2115	Introduction to Linear Algebra (minimum grade of C)	3
PHYS 2212	Principles of Physics II (minimum grade of C)	3
PHYS 2312	Principles of Physics II Lab (minimum grade of C)	1
ENGR 2115	Statics (minimum grade of C)	3
ENGR 2221	Computing for Engineers 1 (minimum grade of C)	3
Area E	Behavioral Science Elective ³	3
Credit Hours		16

Spring		
MATH 3107	Differential Equations (minimum grade of C)	3
ENGR 2206	Digital Logic (minimum grade of C)	4
ENGR 2125	Dynamics of Rigid Bodies (minimum grade of C)	3
Area H	Elective (minimum grade of C) ²	3
Area B1	Institutional Options Elective ⁴	3
Credit Hours		16

Third Year**Fall**

MATH 2135	Calculus with Analytic Geometry 3 (minimum grade of C)	4
ENGR 3235	Circuit Analysis (minimum grade of C)	3
ENGR 3236	Introduction to Signal Processing (minimum grade of C)	3
ENGR 5245U	minimum grade of C	2
Area C1	Humanities Elective ⁵	3
Credit Hours		15

Spring

MATH 3175	Introduction to Probability (minimum grade of C)	3
ENGR 3255	Sensors and Actuators (minimum grade of C)	3
ENGR 3275	Feedback Control Systems (minimum grade of C)	3
Area H	Elective (minimum grade of C) ²	3
PEDS	Physical Education course 1***	1
Area C2	Fine Arts Elective ⁶	3
Credit Hours		16

Fourth Year**Fall**

ENGR 4391	Robotics Senior Design 1 (minimum grade of C)	2
ENGR 5161U	Elements of Machine Intelligence (minimum grade of C)	3
ENGR 5176U	Kinematics and Dynamics (minimum grade of C)	3
ENGR 5236G	Microelectronic Circuits	3
Area E	American History ⁷	3
Credit Hours		14

Spring

ENGR 4392	Robotics Senior Design 2 (minimum grade of C)	2
ENGR 5238G	Introduction to Embedded Systems	3
ENGR 5151U	Computer Vision 1 (minimum grade of C)	3
POLS 1101	American Government	3
Area E	World Cultures Elective ⁸	3
Credit Hours		14

Fifth Year**Fall**

Area 1	Graduate Elective ⁹	3
Area 1	Graduate Elective ⁹	3
Area 1	Graduate Elective ⁹	3

ENGR 6999	Thesis Research	3
Credit Hours		12
Spring		
Area 1	Graduate Elective ⁹	3
Area 1	Graduate Elective ⁹	3
ENGR 6999	Thesis Research	3
ENGR 6999	Thesis Research	3
ENGR 6000	Thesis Defense	0
Credit Hours		12
Total Credit Hours		147

Footnotes

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- Area H: ENGR 1000+, MATH/STAT 3000+, CPSC 3000+, MATH 2125, Science 1000+
- ECON 2105 or ECON 2106 (recommended)
- B1: COMM 1110 or FL 1001, 1002, 2001, 2002
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- HIST 2111 or HIST 2112
- World Culture: ANTH 1105, 1107, 2105, 2136; HIST 1111, 1112; ENGL 2136, GEOG 1101, ITDS 1156
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 - ENGR 6162 Machine Intelligence and Synthesis
 - ENGR 6167 Multi-Robot Systems
 - ENGR 6172 Multivariable Linear Controls
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 - ENGR 6178 Biomechanics
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