

B.S. in Mechanical Engineering

Daytona Beach Program Requirements

General Education Requirements	42
Core Requirements	52
Area of Concentration	29
Electives	6
Total Credits	129

Program Details

The Bachelor of Science in Mechanical Engineering program requires successful completion of a minimum of 129 semester hours. The program may be completed in eight regular semesters, assuming appropriate background and full-time enrollment. Students pursuing this undergraduate degree must earn a minimum cumulative grade point average (CGPA) of 2.00 for all work completed at the University.

General Education Requirements

Communication	9
COMM 122 English Composition	
COMM 221 Technical Communication	
COMM 219 Speech	
or COMM 420 Advanced Technical Communication I and Advanced Technical Communication II & COMM 430	
Humanities - Lower Level	3
Social Sciences - Lower Level	3
ECON 225 Engineering Economics	
Humanities/Social Sciences - Lower or Upper Level	3
Humanities/Social Sciences - Upper Level	3
Computer Science/Information Technology	3
ENGR 115 Introduction to Computing for Engineers	
Mathematics	8
MATH 241 Calculus and Analytical Geometry I	
MATH 242 Calculus and Analytical Geometry II	
Physical/Life Sciences	10
CHEM 110 General Chemistry I	
or CHEM 113 General Chemistry for Engineering	
PHYS 150 Physics with Calculus I	
& PHYS 160 and Physics with Calculus II	
& CHEM 110L and General Chemistry I Laboratory	
or *	
MATH 335 Introduction to Linear and Abstract Algebra	
& PHYS 161 and Physics with Calculus I and II	
Total Credits	42

* Students may take MATH 335 or Math Elective.

Core Requirements

UNIV 101	College Success	1
MATH 243	Calculus and Analytical Geometry III	4
MATH 345	Differential Equations and Matrix Methods	4
ENGR 101	Introduction to Engineering	2
ENGR 120	Graphical Communications	3
or ENGR 201	Computer Aided Design of Mechanical Systems	
ESCI 201	Statics	3
ESCI 202	Solid Mechanics	3

ESCI 204	Dynamics	3
ESCI 208	Thermodynamics	3
MECH 200L	Machine Shop Laboratory	1
or MECH 208L	Manufacturing Laboratory	
MECH 309	Fluid Dynamics	3
or ESCI 206	Fluid Mechanics	
ESCI 320	Engineering Materials Science	2
ESCI 320L	Engineering Materials Science Laboratory	1
MECH 304	Introduction to Machine Design	3
MECH 400	Mechanical Vibrations	3
ESCI 403	Heat Transfer	3
ELEC 327	Electrical Engineering Fundamentals	3
or ELEC 335 & 335L	Electrical Engineering I and Electrical Engineering I Laboratory	
MECH 402 & 402L	Model-Based Control System Design and Model-Based Control System Design Laboratory	3
or AERO 430	Control System Analysis and Design	
PHYS 250	Physics with Calculus III	3
PHYS 250L	Physics with Calculus III Laboratory	1
Total Credits		52

Area of Concentration

Biomedical Systems

COIN 396	Co-Operative Education	3
or AFAS 402	National Security/Commissioning Preparation II	
or MILS 402	The Army Officer II	
or NSCI 402	Naval Leadership and Ethics	
or MECH 496	Engineering Practice and Entrepreneurship	
ESCI 324	Measurements and Instrumentation	2
ESCI 324L	Measurements and Instrumentation Laboratory	1
MECH 307	Modeling and Simulation of Complex Engineering Problems	2
MECH 307L	Modeling and Simulation of Complex Engineering Problems Laboratory	1
MECH 330	Fundamentals of Biomechanics	3
MECH 404	Advanced Machine Design	3
MECH 430	Biofluid Mechanics	3
MECH 431	Biosolid Mechanics	3
MECH 438	Biomedical Systems Preliminary Design	4
MECH 439	Biomedical Systems Detail Design	4
Total Credits		29

Energy Systems

COIN 396	Co-Operative Education	3
or AFAS 402	National Security/Commissioning Preparation II	
or MILS 402	The Army Officer II	
or NSCI 402	Naval Leadership and Ethics	
or MECH 496	Engineering Practice and Entrepreneurship	
ESCI 324	Measurements and Instrumentation	2
ESCI 324L	Measurements and Instrumentation Laboratory	1
MECH 307	Modeling and Simulation of Complex Engineering Problems	2
MECH 307L	Modeling and Simulation of Complex Engineering Problems Laboratory	1
MECH 404	Advanced Machine Design	3
MECH 440	Thermal Power Systems	3
MECH 443	Environment Control and HVAC Systems	3
MECH 445	Sustainable Design	3

MECH 448	Energy Systems Preliminary Design	4
or MECH 468	Propulsion System Preliminary Design	
MECH 449	Energy Systems Detail Design	4
or MECH 469	Propulsion System Detail Design	
Total Credits		29

High Performance Vehicles

COIN 396	Co-Operative Education	3
or AFAS 402	National Security/Commissioning Preparation II	
or MILS 402	The Army Officer II	
or NSCI 402	Naval Leadership and Ethics	
or MECH 496	Engineering Practice and Entrepreneurship	
ESCI 324	Measurements and Instrumentation	2
ESCI 324L	Measurements and Instrumentation Laboratory	1
MECH 307	Modeling and Simulation of Complex Engineering Problems	2
MECH 307L	Modeling and Simulation of Complex Engineering Problems Laboratory	1
MECH 350	Longitudinal and Vertical Vehicle Dynamics	3
MECH 404	Advanced Machine Design	3
MECH 450	Combined Vehicle Dynamics	3
MECH 451	Vehicle Aerodynamics	3
MECH 458	High Performance Vehicles Preliminary Design	4
MECH 459	High Performance Vehicles Detail Design	4
Total Credits		29

Robotics and Autonomous Systems

COIN 396	Co-Operative Education	3
or AFAS 402	National Security/Commissioning Preparation II	
or MILS 402	The Army Officer II	
or NSCI 402	Naval Leadership and Ethics	
or MECH 496	Engineering Practice and Entrepreneurship	
ESCI 324	Measurements and Instrumentation	2
ESCI 324L	Measurements and Instrumentation Laboratory	1
MECH 307	Modeling and Simulation of Complex Engineering Problems	2
MECH 307L	Modeling and Simulation of Complex Engineering Problems Laboratory	1
MECH 371	Robotic Technologies for Uncrewed Systems	3
MECH 372	Robotic Architecture	3
MECH 404	Advanced Machine Design	3
MECH 470	Mechatronics	3
MECH 478	Robotic Systems Preliminary Design	4
MECH 479	Robotic Systems Detail Design	4
Total Credits		29

Electives

Technical Electives *	6
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* One technical elective must be a 300-500 level engineering course designated by the prefixes AERO, CESC, CIVE, CPSC, ELEC, ENGR, ENGP, MECH, PHYS, SFTW, or SYSE that is not listed in the student's degree requirements. Students may take one 300-500 level math course designated by the prefix MATH or DSCI. The following courses cannot be used as technical electives: AERO 316, AERO 318, CIVE 304, CIVE 307/L, and ELEC 327L. Students enrolled in combined program pathways should refer to the program catalog for alternative technical electives. ROTC students may use one upper-level ROTC elective as a technical elective. Students who have completed more than 9 credit hours of internships may use up to 6 credit hours as a substitution for a technical elective.

Students in the Biomedical Systems Track may also select from the following courses as upper-level technical electives: CHEM 310/CHEM 310L, HFCT 312, HFCT 440, BIOL 305/BIOL 305L, BIOL 306/BIOL 306L, BIOL 405/BIOL 405L, or BIOL 440

Suggested Plans of Study

Biomedical Systems

Year One

Requirements	Credits
COMM 122 - English Composition	3
CHEM 110 - General Chemistry I	3
CHEM 110L - General Chemistry I Laboratory	1
ENGR 101 - Introduction to Engineering	2
ENGR 115 - Introduction to Computing for Engineers	3
MATH 241 - Calculus and Analytical Geometry I	4
UNIV 101 - College Success	1
Semester Hours	17

Requirements	Credits
COMM 219 - Speech	3
ENGR 120 - Graphical Communications	3
MATH 242 - Calculus and Analytical Geometry II	4
PHYS 150 - Physics with Calculus I	3
Humanities - Lower Level	3
Semester Hours	16

Total Credits

Total Hours for All Requirements: 33

Year Two

Requirements	Credits
COMM 221 - Technical Communication	3
ESCI 201 - Statics	3
MATH 243 - Calculus and Analytical Geometry III	4
PHYS 160 - Physics with Calculus II	3
Humanities/Social Sciences - Lower or Upper Level	3
Semester Hours	16

Requirements	Credits
ESCI 202 - Solid Mechanics	3
ESCI 204 - Dynamics	3
MATH 345 - Differential Equations and Matrix Methods	4
MECH 208L - Manufacturing Laboratory	1
PHYS 250 - Physics with Calculus III	3
PHYS 250L - Physics with Calculus III Laboratory	1
Semester Hours	15

Requirements	Credits
Professional Development Elective	3
Semester Hours	3

Total Credits

Total Hours for All Requirements: 34

Year Three

Requirements	Credits
ELEC 327 - Electrical Engineering Fundamentals	3
ESCI 208 - Thermodynamics	3
MECH 304 - Introduction to Machine Design	3
MECH 307 - Modeling and Simulation of Complex Engineering Problems	2
MECH 307L - Modeling and Simulation of Complex Engineering Problems Laboratory	1
MECH 309 - Fluid Dynamics	3
Semester Hours	15

Requirements	Credits
ESCI 320 - Engineering Materials Science	2
ESCI 320L - Engineering Materials Science Laboratory	1
ESCI 324 - Measurements and Instrumentation	2
ESCI 324L - Measurements and Instrumentation Laboratory	1
ESCI 403 - Heat Transfer	3
MECH 330 - Fundamentals of Biomechanics	3
MECH 430 - Biofluid Mechanics	3
Semester Hours	15

Total Credits

Total Hours for All Requirements: 30

Year Four

Requirements	Credits
MECH 400 - Mechanical Vibrations	3
MECH 402 - Model-Based Control System Design	2
MECH 402L - Model-Based Control System Design Laboratory	1
MECH 404 - Advanced Machine Design	3
MECH 431 - Biosolid Mechanics	3
MECH 438 - Biomedical Systems Preliminary Design	4
Semester Hours	16

Requirements	Credits
ECON 225 - Engineering Economics	3
MECH 439 - Biomedical Systems Detail Design	4
Humanities/Social Sciences - Upper Level	3
COE/COAS Technical Elective	3

COE/COAS Technical Elective	3
Semester Hours	16

Total Credits

Total Hours for All Requirements: 32

Energy Systems

Year One

Requirements	Credits
COMM 122 - English Composition	3
CHEM 110 - General Chemistry I	3
CHEM 110L - General Chemistry I Laboratory	1
ENGR 101 - Introduction to Engineering	2
ENGR 115 - Introduction to Computing for Engineers	3
MATH 241 - Calculus and Analytical Geometry I	4
UNIV 101 - College Success	1
Semester Hours	17

Requirements	Credits
COMM 219 - Speech	3
ENGR 120 - Graphical Communications	3
MATH 242 - Calculus and Analytical Geometry II	4
PHYS 150 - Physics with Calculus I	3
Humanities - Lower Level	3
Semester Hours	16

Total Credits

Total Hours for All Requirements: 33

Year Two

Requirements	Credits
COMM 221 - Technical Communication	3
ESCI 201 - Statics	3
MATH 243 - Calculus and Analytical Geometry III	4
PHYS 160 - Physics with Calculus II	3
Humanities/Social Sciences - Lower or Upper Level	3
Semester Hours	16

Requirements	Credits
ESCI 202 - Solid Mechanics	3
ESCI 204 - Dynamics	3
MATH 345 - Differential Equations and Matrix Methods	4
MECH 208L - Manufacturing Laboratory	1
PHYS 250 - Physics with Calculus III	3
PHYS 250L - Physics with Calculus III Laboratory	1
Semester Hours	15

Requirements	Credits
Professional Development Elective	3
Semester Hours	3

Total Credits

Total Hours for All Requirements: 34

Year Three

Requirements	Credits
ELEC 327 - Electrical Engineering Fundamentals	3
ESCI 208 - Thermodynamics	3
MECH 304 - Introduction to Machine Design	3
MECH 307 - Modeling and Simulation of Complex Engineering Problems	2
MECH 307L - Modeling and Simulation of Complex Engineering Problems Laboratory	1
MECH 309 - Fluid Dynamics	3
Semester Hours	15

Requirements	Credits
ESCI 320 - Engineering Materials Science	2
ESCI 320L - Engineering Materials Science Laboratory	1
ESCI 324 - Measurements and Instrumentation	2
ESCI 324L - Measurements and Instrumentation Laboratory	1
ESCI 403 - Heat Transfer	3
MECH 440 - Thermal Power Systems	3
MECH 443 - Environment Control and HVAC Systems	3
Semester Hours	15

Total Credits

Total Hours for All Requirements: 30

Year Four

Requirements	Credits
MECH 400 - Mechanical Vibrations	3
MECH 404 - Advanced Machine Design	3
MECH 402 - Model-Based Control System Design	2
MECH 402L - Model-Based Control System Design Laboratory	1
MECH 445 - Sustainable Design	3
MECH 448 - Energy Systems Preliminary Design	4
Semester Hours	16

Requirements	Credits
ECON 225 - Engineering Economics	3
MECH 449 - Energy Systems Detail Design	4
Humanities/Social Sciences - Upper Level	3
COE/COAS Technical Elective	3

COE/COAS Technical Elective	3
Semester Hours	16

Total Credits

Total Hours for All Requirements: 32

High Performance Vehicles

Year One

Requirements	Credits
CHEM 110 - General Chemistry I	3
CHEM 110L - General Chemistry I Laboratory	1
COMM 122 - English Composition	3
ENGR 101 - Introduction to Engineering	2
ENGR 115 - Introduction to Computing for Engineers	3
MATH 241 - Calculus and Analytical Geometry I	4
UNIV 101 - College Success	1
Semester Hours	17

Requirements	Credits
COMM 219 - Speech	3
ENGR 120 - Graphical Communications	3
MATH 242 - Calculus and Analytical Geometry II	4
PHYS 150 - Physics with Calculus I	3
Humanities - Lower Level	3
Semester Hours	16

Total Credits

Total Hours for All Requirements: 33

Year Two

Requirements	Credits
COMM 221 - Technical Communication	3
ESCI 201 - Statics	3
MATH 243 - Calculus and Analytical Geometry III	4
PHYS 160 - Physics with Calculus II	3
Humanities/Social Sciences - Lower or Upper Level	3
Semester Hours	16

Requirements	Credits
ESCI 202 - Solid Mechanics	3
ESCI 204 - Dynamics	3
MATH 345 - Differential Equations and Matrix Methods	4
MECH 208L - Manufacturing Laboratory	1
PHYS 250 - Physics with Calculus III	3
PHYS 250L - Physics with Calculus III Laboratory	1
Semester Hours	15

Requirements	Credits
Professional Development Elective	3
Semester Hours	3

Total Credits

Total Hours for All Requirements: 34

Year Three

Requirements	Credits
ELEC 327 - Electrical Engineering Fundamentals	3
ESCI 208 - Thermodynamics	3
MECH 304 - Introduction to Machine Design	3
MECH 307 - Modeling and Simulation of Complex Engineering Problems	2
MECH 307L - Modeling and Simulation of Complex Engineering Problems Laboratory	1
MECH 309 - Fluid Dynamics	3
Semester Hours	15

Requirements	Credits
ESCI 320 - Engineering Materials Science	2
ESCI 320L - Engineering Materials Science Laboratory	1
ESCI 324 - Measurements and Instrumentation	2
ESCI 324L - Measurements and Instrumentation Laboratory	1
ESCI 403 - Heat Transfer	3
MECH 350 - Longitudinal and Vertical Vehicle Dynamics	3
MECH 451 - Vehicle Aerodynamics	3
Semester Hours	15

Total Credits

Total Hours for All Requirements: 30

Year Four

Requirements	Credits
MECH 400 - Mechanical Vibrations	3
MECH 402 - Model-Based Control System Design	2
MECH 402L - Model-Based Control System Design Laboratory	1
MECH 404 - Advanced Machine Design	3
MECH 450 - Combined Vehicle Dynamics	3
MECH 458 - High Performance Vehicles Preliminary Design	4
Semester Hours	16

Requirements	Credits
ECON 225 - Engineering Economics	3
MECH 459 - High Performance Vehicles Detail Design	4
Humanities/Social Sciences - Upper Level	3
COE/COAS Technical Elective	3

COE/COAS Technical Elective	3
Semester Hours	16

Total Credits

Total Hours for All Requirements: 32

Robotics and Autonomous Systems

Year One

Requirements	Credits
CHEM 110 - General Chemistry I	3
CHEM 110L - General Chemistry I Laboratory	1
COMM 122 - English Composition	3
ENGR 101 - Introduction to Engineering	2
ENGR 115 - Introduction to Computing for Engineers	3
MATH 241 - Calculus and Analytical Geometry I	4
UNIV 101 - College Success	1
Semester Hours	17

Requirements	Credits
COMM 219 - Speech	3
ENGR 120 - Graphical Communications	3
MATH 242 - Calculus and Analytical Geometry II	4
PHYS 150 - Physics with Calculus I	3
Humanities - Lower Level	3
Semester Hours	16

Total Credits

Total Hours for All Requirements: 33

Year Two

Requirements	Credits
COMM 221 - Technical Communication	3
ESCI 201 - Statics	3
MATH 243 - Calculus and Analytical Geometry III	4
PHYS 160 - Physics with Calculus II	3
Humanities/Social Sciences - Lower or Upper Level	3
Semester Hours	16

Requirements	Credits
ESCI 202 - Solid Mechanics	3
ESCI 204 - Dynamics	3
MATH 345 - Differential Equations and Matrix Methods	4
MECH 208L - Manufacturing Laboratory	1
PHYS 250 - Physics with Calculus III	3
PHYS 250L - Physics with Calculus III Laboratory	1
Semester Hours	15

Requirements	Credits
Professional Development Elective	3
Semester Hours	3

Total Credits

Total Hours for All Requirements: 34

Year Three

Requirements	Credits
ELEC 327 - Electrical Engineering Fundamentals	3
ESCI 208 - Thermodynamics	3
MECH 304 - Introduction to Machine Design	3
MECH 307 - Modeling and Simulation of Complex Engineering Problems	2
MECH 307L - Modeling and Simulation of Complex Engineering Problems Laboratory	1
MECH 309 - Fluid Dynamics	3
Semester Hours	15

Requirements	Credits
ESCI 324 - Measurements and Instrumentation	2
ESCI 324L - Measurements and Instrumentation Laboratory	1
ESCI 320 - Engineering Materials Science	2
ESCI 320L - Engineering Materials Science Laboratory	1
ESCI 403 - Heat Transfer	3
MECH 371 - Robotic Technologies for Uncrewed Systems	3
MECH 470 - Mechatronics	3
Semester Hours	15

Total Credits

Total Hours for All Requirements: 30

Year Four

Requirements	Credits
MECH 372 - Robotic Architecture	3
MECH 400 - Mechanical Vibrations	3
MECH 402 - Model-Based Control System Design	2
MECH 402L - Model-Based Control System Design Laboratory	1
MECH 404 - Advanced Machine Design	3
MECH 478 - Robotic Systems Preliminary Design	4
Semester Hours	16

Requirements	Credits
ECON 225 - Engineering Economics	3
MECH 479 - Robotic Systems Detail Design	4
Humanities/Social Sciences - Upper Level	3
COE/COAS Technical Elective	3

COE/COAS Technical Elective	3
Semester Hours	16

Total Credits

Total Hours for All Requirements: 32