

Degree-Audit-Format Program Plan Effective Fall 2024 and Beyond

Department: **Engineering and Aviation Science**
 Updated Program: **Engineering (Sub-plan: Electrical, Mechanical, Computer Aerospace)**
 Updated Date: **9/8/24**

University Wide General Education Program www.umes.edu/gep

GEP Curriculum Area 1.1 Arts & Humanities: 1 course (3 credits)

Options: ARTS 101, ARTS 310, ARAB 101, ASLS 203, CHIN 101, ENGL 204, ENGL 205, ENGL 206, ENGL 207, FREN 101, HIND 101, HONR 101, JAPN 101, KORE 101, PORT 101, SPAN 101, THAR 101

GEP Curriculum Area 1.2 Arts & Humanities; REQUIRED: ENGL 203 (3 credits)**GEP Curriculum Area 2 Social & Behavioral Sciences: 2 courses (6 credits)**

Options: CRJS 101, ECON 201, ECON 202, GEOG 201, GEOG 202, HIST 101, HIST 102, HIST 201, HIST 202, HONR 201, HUEC 203, HUEC 220, HUEC 361, PHIL 201, PHIL 202, POLI 200, POLI 220, POLI 342, PSYC 100, SOCI 101, SOCI 201

GEP Curriculum Area 3 Biological & Physical Sciences: 2 courses and 1 lab (7 credits)**(GEP SC)**

Non-STEM options: ANPT 114, BIOL 101, BIOL 103 (LAB), CHEM 102, CHEM 104 (LAB), ENVS 101, NUDT 210, PLSC 184, PLSC 185 (LAB)

STEM options: BIOL 111, BIOL 113 (LAB), BIOL 112, BIOL 114 (LAB), BIOL 118, BIOL 120 (LAB), CHEM 111, CHEM 113 (LAB), PHYS 121, PHYS 123 (LAB), PHYS 122, PHYS 124 (LAB), PHYS 161, PHYS 163 (LAB), PHYS 181, PHYS 183 (LAB), PHYS 182, PHYS 184 (LAB)

GEP Curriculum Area 4 Math (3-4 credits) (GEP SC)

Humanities non-STEM option: MATH 103

STEM options: MATH 102, MATH 109, MATH 110, MATH 111, MATH 112

GEP Curriculum Area 5.1 Composition; REQUIRED: ENGL 101 (3 credits)**GEP Curriculum Area 5.2 Composition; REQUIRED: ENGL 102 (3 credits)**

GEP Curriculum Area 5.3 Composition: **Options:** ENGL 305 or ENGL 310 (3 credits) **(GEP SC)**

GEP Curriculum Area 6.1 First-Year Experience (1 credit) (GEP SC)

Options: AGNR 111, ARTS 100, AVSC 100, BUED 100, CRJS 100, CSDP 100, DNSC 100, EDCI 100, ENGE 100, ENGL 100, EXSC 100, GNST 100, HUEC 100, REHA 100, SOSC 100

GEP Curriculum Area 6.2 Computer Literacy (3 credits)

Options: BUAD 213, BUED 212, EDCI 306, ETGE 110, ETGE 111, ETGE 112

GEP Curriculum Area 6.3 JEDI (Justice, Equity, Diversity, Inclusion) (3 credits)

Options: BUAD 311, CRJS 455, DMST 440, EDCI 408, ENGL 348, ENGL 359, EXSC 111, EXSC 265, EXSC 382, HUEC 230, HUEC 463

Total Required for General Education: 39 (if requiring a 4-credit Math)

Program Specific GEP Courses (Specific Requirements for BS Engineering Majors)

Area 1.1 Arts & Humanities; 1 course (3 credits): (All options)

Area 1.2 Arts & Humanities; REQUIRED: ENGL 203 (3 credits)

Area 2 Social & Behavioral Sciences: 2 courses (6 credits): (All options)

Area 3 Biological & Physical Sciences: 2 courses and 1 lab (7 credits): PHYS 161 (3), PHYS 163 (1) **AND** BIOL 111 (3) or CHEM 111 (3)

Area 4 Math: MATH 112 (4)

Area 5.1 ENGL 101 Basic Composition I (3 credits)

Area 5.2 ENGL 102 Basic Composition II (3 credits)

Area 5.3 ENGL 305 Technical Writing (3 credits)

Area 6.1 ENGE 100 Freshmen Experience (1 credit)

Area 6.2 (3 credits) (All options)

Area 6.3 (3 credits) (All options)

GEP Total: 39 credits

General Education Courses:	39 credits
Required Major Courses:	48 credits
Support Science and Math Courses:	20 credits
Specialization Elective	17 credits

Total credits: 124

Required Major Courses: 48 credits

- ENGE 150 Modern Engineering Design (3 credits)
- ENGE 170 Programming Concepts for Engineers (3 credits)
- ENGE 240 Basic Circuit Theory (3 credits)
- ENGE 241 Analog Circuits Lab (3 credits)
- ENGE 250 Digital Logic Design (3 credits)
- ENGE 251 Digital Logic Lab (3 credits)
- ENGE 260 Statics (3 credits)
- ENGE 261 Dynamics (3 credits)
- ENGE 270 Computer Aided Design (3 credits)
- ENGE 320 Statistics & Probability for Engineers (3 credits)
- ENGE 340 Analog and Digital Electronics (3 credits)
- ENGE 341 Analog and Digital Electronics Lab (1 credits)

- ENGE 362 Mechanics of Materials (3 credits)
- ENGE 370 Computational Methods in Engineering (3 credits)
- ENGE 380 Instrumentations (3 credits)
- ENGE 382 Control Systems (3 credits)
- ENGE 383 Control Lab (1 credit)
- ENGE 475 Engineering Seminar (1 credit)
- ENGE 476 Senior Design Project I (2 credits)
- ENGE 477 Senior Design Project II (2 credits)

Supportive Science and Math Courses: 20 credits

- MATH 211 Calculus II (4 credit)
- MATH 212 Calculus III (4 credits)
- MATH 241 Differential Equations for Engineers (3 credits)
- PHYS 262 General Physics II (3 credits)
- PHYS 263 General Physics III (3 credits)
- PHYS 264 General Physics Laboratory II (1 credit)
- PHYS 265 General Physics Laboratory III (1 credit)
- BIOL 113 Biology I Lab (1 credit) or CHEM 113 Chemistry I Lab (1 credit)

Specialization Electives: 17 credits

Aerospace Specialization (ENAE)

- ENAE 342 Fluid Mechanics (3)
- ENAE 345 Thermodynamics (3)
- ENAE 412 Space Systems Design (3)
- ENAE 389 Space Navigation and Guidance (3)
- ENAE 420 Aerodynamics (3)
- ENAE 430 Finite Element Analysis (3)
- ENAE 440 Mechatronics (3)
- ENAE 442 Micro-Electro-Mechanical Systems (3)
- ENAE 462 Digital Control System (3)
- ENAE 464 Embedded System Design Lab (2)
- ENAE 465 Remote Sensing and Image Processing (3)
- ENAE 467 Design of Autonomous Aerial System (3)
- ENAE 472 Selected Topics in Engineering (3)

Computer Specialization (ENCE)

- ENCE 330 Signals and Systems (3)
- ENCE 350 Computer Organization (3)
- ENCE 352 Microprocessors and Microcomputers (3)
- ENCE 372 Computer Networks (3)
- ENCE 387 Simulation and Virtual Reality (3)
- ENCE 422 Introduction to Machine Learning (3)
- ENCE 452 Artificial Intelligence (3)
- ENCE 454 Computer System Architecture (3)
- ENCE 456 Microprocessor Design Lab (2)
- ENCE 458 VLSI Design (3)
- ENCE 460 Digital Signal Processing (3)
- ENCE 462 Digital Control System (3)
- ENCE 464 Embedded System Design Lab (2)
- ENCE 468 Robotics (3)
- ENCE 469 Robotics and Automation Design Lab (2)
- ENCE 472 Selected Topics in Engineering (3)

Electrical Specialization (ENEE)

- ENEE 330 Signals and Systems (3)
- ENEE 348 Electromagnetic Theory (3)
- ENEE 372 Computer Networks (3)
- ENEE 385 Power Electronics (3)
- ENEE 387 Simulation and Virtual Reality (3)
- ENEE 422 Introduction to Machine Learning (3)
- ENEE 443 Communication Systems (3)
- ENEE 444 Communication System Design Lab (2)
- ENEE 452 Artificial Intelligence (3)
- ENEE 460 Digital Signal Processing (3)
- ENEE 462 Digital Control System (3)
- ENEE 464 Embedded System Design Lab (2)
- ENEE 465 Remote Sensing and Image Processing (3)
- ENEE 468 Robotics (3)
- ENEE 469 Robotics and Automation Design Lab (2)
- ENEE 472 Selected Topics in Engineering (3)

Mechanical Specialization

- ENME 342 Fluid Mechanics (3)
- ENME 345 Thermodynamics (3)
- ENME 346 Heat Transfer (3)
- ENME 422 Mechanisms and Machine Design (3)
- ENME 425 Rapid Prototyping and Product Development (3)
- ENME 430 Finite Element Analysis (3)
- ENME 440 Mechatronics (3)
- ENME 442 Micro-Electro-Mechanical Systems (3)
- ENME 462 Digital Control System (3)
- ENME 464 Embedded System Design Lab (2)
- ENME 468 Robotics (3)
- ENME 469 Robotics and Automation Design Lab (2)
- ENME 472 Selected Topics in Engineering (3)

Semester-by-Semester-Format Program Plan Effective Fall 2024 and Beyond: Engineering

Department: Engineering and Aviation Sciences

Updated Program: Engineering (Sub-plan: Electrical, Aerospace, Mechanical, Computer)

Updated Date: 1/11/25

Color Legend:

GEP credits	Yellow
Supportive Science and Math credits	Green
Engineering Major Required credits	Blue
Engineering Specialization Elective credits	Grey

Freshman Year: 29 credits

Fall: 15 credits

- GEP Curriculum Area 6.1 ENGE 100 Freshman Experience (1 credit)
- GEP Curriculum Area 5.1 Composition ENGL 101 (3 credits)
- GEP Curriculum Area 3.1 BIOL 111 Principles of Biology I (OR CHEM 111) (3 credits)
- BIOL 113 Principles of Biology I Laboratory (OR CHEM 113) (1 credit)
- GEP Curriculum Area 4 MATH 112 Calculus I (4 credits)
- ENGE 150 Modern Engineering Design (3 credits)

Spring: 14 credits

- GEP Curriculum Area 5.2 Composition ENGL102 Principles of Composition II (3 credits)
- GEP Curriculum Area 3.2 PHYS 161 General Physics I (3 credits)
- GEP Curriculum Area 3.3 PHYS 163 General Physics I Laboratory (1 credit)
- ENGE 170 Programming Concepts for Engineers (3 credits)
- MATH 211 Calculus II (4 credits)

Sophomore Year: 36 credits

Fall: 18 credits

- GEP Curriculum Area 1.2 ENGL 203 Fundamentals of Contemporary Speech (3 credits)
- PHYS 262 General Physics II (3 credits)
- PHYS 264 General Physics II Lab (3 credits)
- ENGE 250 Digital Logic Design (3 credits)
- ENGE 251 Digital Logic Design Lab (1 credit)
- ENGE 260 Statics (3 credits)

- MATH 241 Differential Equations for Engineers (3 credits)

Spring: 18 credits

- PHYS 263 General Physics III (3 credits)
- PHYS 265 General Physics III Lab (1 credit)
- ENGE 240 Basic Circuit Theory (3 credits)
- ENGE 241 Analog Circuits Lab (1 credit)
- MATH 212 Calculus III (4 credits)
- ENGE 270 CAD Design (3 credits)
- ENGE 261 Dynamics (3 credits)

Junior Year: 32 credits

Fall: 16 credits

- GEP Curriculum Area 5.3 Composition ENGL 305 Technical Writing (3 credits)
- ENGE 340 Analog and Digital Electronics (3 credits)
- ENGE 341 Analog and Digital Electronics Lab (1 credit)
- ENGE 362 Mechanics of Materials (3 credits)
- ENGE 380 Instrumentation (3 credits)
- ENGE 370 Computational Methods for Engineers (3 credits)

Spring: 16 credits

- ENGE 320 Statics and Probability for Engineers (3 credits)
- ENGE 382 Control System (3 credits)
- ENGE 383 Control Lab (1 credit)
- Specialization Elective (3 credits)
- Specialization Elective (3 credits)
- GEP Curriculum Area 2.1 Social & Behavioral Sciences choice (3 credits)

Senior Year: 28 credits

Fall: 14 credits

- ENGE 476 Senior Design Project (2 credits)
- ENGE 475 Senior Seminar (1 credits)
- Specialization Elective (3 credits)
- Specialization Elective Lab (2 credits)
- GEP Curriculum Area 2.2 Social & Behavioral Sciences choice (3 credits)
- GEP Curriculum Area 1.1 Arts and Humanities choice (3 credits)

Spring: 14 credits

- ENGE 477 Senior Design Project II (2 credits)
- Specialization Elective (3 credits)
- Specialization Elective (3 credits)
- GEP Curriculum Area 6.3 JEDI choice (3 credits)
- GEP Curriculum Area 6.2 Computer Literacy choice (3 credits)