COURSES

CORE COURSES
SELECT FIVE

Course substitutions can be made at the discretion of the program chair.

595.460 Introduction to Project Management
595.465 Communications in Technical Organizations
595.466 Financial and Contract Management
595.731 Business Law for Technical Professionals
595.762 Management of Technical Organizations
595.781 Executive Technical Leadership
595.792 Management of Innovation

COURSES BY CONCENTRATION

APPLIED AND COMPUTATIONAL MATHEMATICS

Select five courses from the Applied and Computational Mathematics program [ep.jhu.edu/acm] 625.xxx. Selected courses include

625.403 Statistical Methods and Data Analysis
625.414 Linear Optimization
625.423 Introduction to Operations Research: Probabilistic Models
625.441 Mathematics of Finance: Investment Science
625.442 Mathematics of Risk, Options, and Financial Derivatives
625.740 Data Mining
625.741 Game Theory
625.744 Modeling, Simulation, and Monte Carlo

One course (with significant math content) outside of Applied and Computational Mathematics may be taken with advisor approval.

APPLIED BIOMEDICAL ENGINEERING

SELECT FIVE

Courses not on the list can be approved by the student's advisor.

585.408 Medical Sensors and Devices
585.605 Medical Imaging
585.608 Biomaterials
585.629 Cell and Tissue Engineering
585.800 Special Project in Applied Biomedical Engineering

APPLIED PHYSICS

SELECT FIVE (AT LEAST FOUR MUST BE 615.XXX COURSES)

Students must complete five courses approved by their advisor. At least four courses must be from Applied Physics. The following courses are recommended for this concentration, but the advisor can approve courses that do not appear on this list.

525.406 Electronic Materials
525.407 Introduction to Electronic Packaging
615.444 Fundamentals of Space Systems and Subsystems I
615.445 Fundamentals of Space Systems and Subsystems II
615.447 Fundamentals of Sensors
615.448 Alternate Energy Technology
615.465 Modern Physics
615.471 Principles of Optics
615.480 Materials Science
615.731 Photovoltaic & Solar Thermal Energy Conversion
615.746 Nanoelectronics: Physics and Devices
615.747 Sensors and Sensor Systems
615.761 Introduction to Oceanography
615.765 Chaos and Its Applications
615.775 Physics of Climate
615.780 Optical Detectors and Applications
COMMUNICATIONS, CONTROLS, AND SIGNAL PROCESSING

CORE COURSES
- 525.409 Continuous Control Systems
- 525.414 Probability and Stochastic Processes for Engineers
- 525.416 Communication Systems Engineering
- 525.427 Digital Signal Processing

Plus one additional Electrical and Computer Engineering (525.xxx) course with advisor approval. One course outside of the program may be taken provided it has significant technical content.

COMPUTER ENGINEERING

CORE COURSES
- 525.412 Computer Architecture
- 525.415 Embedded Microprocessor Systems
- 525.442 FPGA Design Using VHDL
- 525.743 Embedded Systems Development Laboratory

Plus one additional Electrical and Computer Engineering (525.xxx) course with advisor approval. One course outside of the program may be taken provided it has significant technical content.

COMPUTER SCIENCE

CORE COURSES
- 605.401 Foundations of Software Engineering
- 605.411 Foundations of Computer Architecture
- 605.421 Foundations of Algorithms

SELECT ONE
- 605.431 Principles of Cloud Computing
- 605.441 Principles of Database Systems
- 605.445 Artificial Intelligence
- 605.451 Principles of Bioinformatics
- 605.471 Principles of Data Communications Networks
- 605.481 Principles of Enterprise Web Development
- 695.401 Foundations of Information Assurance

Plus one additional Computer Science course with advisor approval.

CYBERSECURITY

CORE COURSES
- 605.421 Foundations of Algorithms
- 695.401 Foundations of Information Assurance
- 695.421 Public Key Infrastructure and Managing E-Security
- 695.701 Cryptology

Plus one additional Cybersecurity course with advisor approval.

ENGINEERING MANAGEMENT

GEOTECHNICAL ENGINEERING

Select four courses in Geotechnical Engineering [ep.jhu.edu/ce] 565.xxx, plus one course in mathematics. Selected Geotechnical Engineering courses include
- 565.475 Advanced Soil Mechanics
- 565.480 Earth Engineering
- 565.625 Advanced Foundation Design
- 565.745 Retaining Structures and Slope Stability

RECOMMENDED MATHEMATICS COURSES
- 535.441 Mathematical Methods for Engineers
- 615.441 Mathematical Methods for Physics and Engineering

INFORMATION SYSTEMS ENGINEERING

CORE COURSES
- 605.401 Foundations of Software Engineering
- 635.401 Foundations of Information Systems Engineering
- 695.401 Foundations of Information Assurance

SELECT ONE
- 635.411 Principles of Network Engineering
- 635.461 Principles of Human-Computer Interaction
- 635.476 Information Systems Security
- 635.482 Website Development
- 635.483 E-Business: Models, Architecture, Technologies, and Infrastructure
- 635.775 Cyber Policy, Law, and Cyber Crime Investigation

Plus one additional Information Systems Engineering course with advisor approval.

MATERIALS SCIENCE AND ENGINEERING

Select five courses from the Materials Science and Engineering program [ep.jhu.edu/mse] 515.xxx. The advisor from the concentration will have the flexibility to work with each student to determine the appropriate mix of technical courses.

MECHANICAL ENGINEERING

Select five courses from the Mechanical Engineering program [ep.jhu.edu/me] 535.xxx. The advisor from the concentration will have the flexibility to work with each student to determine the appropriate mix of technical courses.

OPTICS AND PHOTONICS

CORE COURSES
- 525.405 Intermediate Electromagnetics
- 525.413 Fourier Techniques in Optics
- 525.425 Laser Fundamentals
- 525.491 Fundamentals of Photonics

Plus one additional Electrical and Computer Engineering (525.xxx) course with advisor approval. One course outside of the program may be taken provided it has significant technical content.
RF AND MICROWAVE ENGINEERING

CORE COURSES
525.405 Intermediate Electromagnetics
525.418 Antenna Systems
525.423 Principles of Microwave Circuits
525.484 Microwave Systems and Components

Plus one additional Electrical and Computer Engineering (525.xxx) course with advisor approval. Courses outside of the program may be taken provided they have significant technical content.

STRUCTURAL ENGINEERING

Select four courses in Structural Engineering [ep.jhu.edu/ce]
565.xxx, plus one course in mathematics. Selected Structural Engineering courses include
565.600 Structural Mechanics
565.620 Advanced Steel Design
565.630 Prestressed Concrete Design
565.784 Bridge Design and Evaluation

RECOMMENDED MATHEMATICS COURSES
535.441 Mathematical Methods for Engineers
615.441 Mathematical Methods for Physics and Engineering

Please refer to the course schedule (ep.jhu.edu/schedule) published each term for exact dates, times, locations, fees, and instructors.