



Universidad Politécnica de Puerto Rico
Graduate School
Doctor of Philosophy in Engineering
and Applied Sciences



Ph.D.

Doctor of Philosophy in Engineering and Applied Sciences

Principal Area of Study

Engineering Courses: 12 credit-hours

Supplementary Area of Study

Other Engineering Discipline or Related Area Courses: 9 credit-hours

Advanced Graduate Courses: 12 credit-hours

Doctoral Seminar: 6 credit-hours

Qualitative & Quantitative Research Methods Course: 3 credit-hours

Comprehensive Exam: 0 credit-hours

Dissertation: 18 credit-hours

Total: 60 credits

Principal Areas of Study

Select one (1) Principal Area of Study

Biomedical Engineering

Civil Engineering

- Construction
- Geotechnical
- Structures
- Water Resources & Water Treatment

Computer Engineering

Electrical Engineering

- Communication Systems
- Power Systems and Renewable Energy

Manufacturing Engineering

Mechanical Engineering

- Design
- Thermal and Fluid Mechanics
- Aerospace

Supplementary Areas of Study

Select one (1) Supplementary Area of Study

Computer Science

Geospatial Science and Technology

Management

- Business Administration
- Engineering Management
- Environmental Management

Manufacturing Competitiveness

Contact Information:

Graduate School

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Doctor of Philosophy in Engineering and Applied Sciences Courses

Principal Area of Study Core Courses*

* The student could substitute at most 3 credit-hours (one core course) by another graduate course if recommended and approved by his/her advisor or the graduate dean. The student could substitute at most 3 credit-hours (one core course) by other graduate courses if recommended and approved by his/her advisor or the graduate dean.

Biomedical Engineering

BME 6005 – Biosensors and Transducers
BME 6100 – Bioengineering and Physiological Systems
BME 6210 – Manufacture of Biotechnology Pharmaceutical Products
MMP 6000 – Advanced Statistics and Quality Improvement

Civil Engineering - Construction

CE 6520 – Construction Contracting and Procurement
CE 6530 – Schedule Impact Analysis
CE 6532 – Construction Cost Control

Select one of the following Math courses:

- CE 6512 – Value Engineering
- MMP 6000 – Advanced Statistics and Quality Improvement

Civil Engineering - Geotechnical

CE 6100 – Soil Shear Strength
CE 6335 – Advanced Foundations
CE 6355 – Advanced Earthquake Engineering

Select one of the following Math courses:

- CE 6370 – Finite Element Methods in Engineering
- MMP 6000 – Advanced Statistics and Quality Improvement

Civil Engineering - Structures

CE 6320 – Advanced Strength of Materials
CE 6330 – Advanced Topics in Structural Engineering
CE 6350 – Dynamics of Structures

Select one of the following Math courses:

- CE 6370 – Finite Element Methods in Engineering
- MMP 6000 – Advanced Statistics and Quality Improvement

Civil Engineering - Water Resources & Water Treatment

CE 6250 – Advanced Hydrologic and Hydraulic Models
CE 6410 – Water and Wastewater Treatment Applications
CE 6460 – Water Quality Control and Management

Select one of the following Math courses:

- CE 6210 – Probability and Statistics in Water Resources
- MMP 6000 – Advanced Statistics and Quality Improvement

Computer Engineering

CECS 6120 – Computer Architecture
CECS 6130 – Data Communication Networks
CECS 6150 – Object Oriented Design
CECS 6510 – Software Engineering I

Electrical Engineering – Communication Systems

EE 6010 – Mathematical Methods for Signal Processing
EE 6020 – Stochastic Processes
EE 6030 – Linear Systems
EE 6760 – Digital Communications Systems

Electrical Engineering – Power Systems and Renewable Energy

EE 6010 - Mathematical Methods for Signal Processing
EE 6400 - Direct Energy Conversion and Renewables
EE 6412 - Energy Management
EE 6402 - Market, Environmental, and Public Policy Issues of Energy Systems

Manufacturing Engineering

MMP 6000 – Advanced Statistics and Quality Improvement
MMP 6002 – Operations Planning And Control
MMP 6006 – Lean Manufacturing
MMP 6130 – Six Sigma

Mechanical Engineering – Design

ME 6014 – Advanced Engineering Mathematics
ME 6200 – Advanced Solid Mechanics
ME 6330 – Finite Element Analysis
ME 6360 – Optimization in Engineering Design

Mechanical Engineering – Thermal and Fluid Mechanics

ME 6014 – Advanced Engineering Mathematics
ME 6100 – Advanced Thermodynamics
ME 6120 – Advanced Fluid Mechanics
ME 6360 – Optimization in Engineering Design

Mechanical Engineering – Aerospace

ME 6014 – Advanced Engineering Mathematics
ME 6140 – High Speed Aerodynamics
ME 6300 – Advanced Aerospace Structures
ME 6350 – Mechanical and Aerospace Control Systems

Supplementary Area of Study Core Courses**

** The student must select 9 credit-hours. These credit-hours could be distributed between two Supplementary Areas of Study as recommended and approved by his/her advisor. Also, the student could substitute at most 3 credit-hours (one core course) by other graduate courses if recommended and approved by his/her advisor or the graduate dean.

Computer Science

CECS 7230 – Network Security
CECS 7235 – Computer Forensics
CECS 7530 – Data Mining and Data Warehousing
CECS 7570 – Computer Security

Geospatial Science and Technology

GEOM 6630 – Geospatial Modeling & Analysis
GEOM 6634 – Cartography, Map Design and Geovisualization
GEOM 6710 – Image Acquisition, Analysis and Processing

Select one of the following courses depending on field:

- GEOM 6646 – Environmental Assessment and Geospatial Technology
- GEOM 6648 – Business Geography

Business Administration

MBA 5600 – Managerial Economics
MBA 5700 – Managerial Marketing
MBA 6830 – Operations Management
MGM 6620 – Managerial Finances

Engineering Management

MEM 6110 – Engineering Management I
MEM 6120 – Engineering Management II
MGM 6690 – Decision Making Techniques
MMP 6000 – Advanced Statistics and Quality Improvement

Environmental Management

EPM 6800 – Solid Waste Management
EPM 6810 – Environmental Regulations
EPM 6850 – Management for Sustainable Future
MMP 6000 – Advanced Statistics and Quality Improvement

Manufacturing Competitiveness

MMP 6000 – Advanced Statistics and Quality Improvement
MMP 6002 – Operations Planning And Control
MMP 6006 – Lean Manufacturing
MMP 6130 – Six Sigma

Advanced Graduate Courses

EAS 8130 – Advanced Theory of Elasticity
EAS 8131 – Nonlinear Finite Element Methods
EAS 8140 – Sustainable Engineering
EAS 8200 – Manufacturing Systems Analysis
EAS 8210 – Statistical Modeling for Resources Optimization

EAS 8310 – Energy Management
EAS 8320 – Modeling and Simulation
EAS 8400 – Advanced Optimization and Modeling
EAS 8401 – Advanced Vibrations
EAS 8902 – Doctoral Independent Study

Advanced Graduate Courses

EAS 8900 – Comprehensive Examination (0 credit-hour)
EAS 8901 – Doctoral Seminar (1 credit-hour)
EAS 8910 – Qualitative & Quantitative Research Methods
EAS 9000 – Doctoral Dissertation (6 credit-hours per trimester)
EAS 9001 – Doctoral Dissertation Extension (0 credit-hour)