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

Civil Engineering
  – Construction
  – Geotechnical
  – Structures
  – Water Resources & Water Treatment
Computer Engineering
Electrical Engineering
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 must 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 

**Civil Engineering - Geotechnical**
CE 6100 – Soil Shear Strength 
CE 6105 – Advanced Geotechnical Engineering Applications 
CE 6130 – Geotechnical Earthquake Engineering 
Select one of the following Math courses: 
  - CE 6174 – Finite Element Methods for Geotechnical Engineering 
  - 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 

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

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

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

**Mechanical Engineering – Design**
ME 6014 – Advanced Engineering Mathematics 
ME 6200 – Advanced Solid Mechanics 
ME 6330 – Finite Element Analysis 
ME 6380 – 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 6380 – 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. 

**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 6640 – Geospatial Urban and Regional Applications 
  - 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 
MEM 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 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 8802 – Doctoral Independent Study 

**Common Doctoral 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)