POWER & CONSTRUCTION ENGINEERING TECHNOLOGY (PCET), BACHELOR OF SCIENCE

OVERVIEW

At Dunwoody College of Technology, the Power & Construction Engineering Technology program provides a bachelor's completion degree option for graduates of related two-year programs looking to advance into positions as electrical engineers, designers, estimators, or drafters as well as project managers. Related programs include degrees in electrical design and estimating or electrical construction and maintenance.

Power & Construction Engineering Technology is a specialized electrical engineering degree that focuses on the built environment — from vertical and horizontal buildings to infrastructure, including utilities.

The curriculum focuses on the design of power and advanced control systems; advanced design, building and energy codes (including National Electrical Code and National Electrical Safety Code); and advanced training for project managers. Other topics covered include construction law, construction accounting, integrative field technologies (such as surveying), and IoTs (Internet of Things). Students also become familiar with or increase their skills in industry-standard software, including Microstation, Revit, Accubid, and Navisworks.

Learning is project-based with an emphasis on best practices in industry and emerging topics in the field, including renewable energy.

Arts & Sciences curriculum supports the technical coursework by enhancing the students' communication and critical thinking skills.

The program also incorporates a senior capstone project in its final semester that gives students the chance to demonstrate industry-relevant experience with an emphasis on either commercial building or utilities or both.

Credential Earned: BS
Length of Program: 2 Years (4 semesters)
Classes Offered: Evening
Available Starts: Fall Semester; Spring Semester

PROGRAM OUTCOMES

- ETAC 1: An ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve broadly-defined engineering problems appropriate to the discipline.
- ETAC 2: An ability to design systems, components, or processes meeting specified needs for broadly-defined engineering problems appropriate to the discipline.
- ETAC 3: An ability to apply written, oral, and graphical communication in broadly-defined technical and non-technical environments; and an ability to identify and use appropriate technical literature.
- ETAC 4: An ability to conduct standard tests, measurements, and experiments and to analyze and interpret the results to improve processes.
- ETAC 5: An ability to function effectively as a member, as well as a leader, on technical teams.

DEGREE REQUIREMENTS

Admitted students to Power & Construction Engineering Technology (PCET) can transfer up to 35 technical credits. A transfer evaluation is required. Not all credits may transfer into the degree program.

Power & Construction Engineering Technology (PCET) also has the following prerequisite courses, which may be taken at Dunwoody after acceptance into the program if the requirements have not been met during prior study: ECDM2003, ECDM2205.

Code	Title	Credits
Transfer Credits		**35**
General Requirements		
MATH1700	Pre Calculus	3
MATH1810	Calculus I	3
MATH1820	Calculus II	3
MATH2260	Probability & Statistics	4
HUMN2900	Ethics of Artificial Intelligence	3
PHYS1800	Physics I with Lab	4
PHYS1820	Physics II with Lab	4
Social Sciences Elective		3
Communications Elective		3
General Electives		14
Technical Requirements		
CMGT3111	Construction Law	3
ECDM2003	Introduction to 3D Drafting & Design	2
ECDM2205	Electrical Estimating	3
PCET3001	Advanced Electrical Codes	3
PCET3002	Energy Production	3
PCET3003	Safety Engineering	3
PCET3004	Digital Design	2
PCET3006	Renewable Energy Systems	3
PCET4001	Electrical Utility Design and Estimating	4
PCET4002	Advanced 3D Power System Design	3
PCET4003	Power Protection and Controls	4
PCET4004	Power Limited Systems	2
PCET4005	Integrated Field Systems	2
PCET4006	MEP Integration	2
PCET4007	Existing Buildings & Structures	3
PCET4100	Capstone	3
Total Credits		**120**

COURSES

CMGT3111 | Construction Law | Lecture (3 Credits)
Examine the components of Construction Law using case law studies and construction documents to understand and identify the legal issues and liabilities encountered in connection with a construction project.

ECDM2003 | Introduction to 3D Drafting & Design | Laboratory (2 Credits)
Examine and implement construction graphics and conventions into electrical designs using industry specific 3D drawing software.

ECDM2205 | Electrical Estimating | Lecture/Laboratory (3 Credits)
Detailed estimation and project management of electrical construction projects using industry software. Scheduling and bidding of construction projects and project documentations.

PCET3001 | Advanced Electrical Codes | Lecture (3 Credits)
Examine and research the different codes utilized in the building and power industries including the National Electrical Code, the National Electrical Safety Code, Energy Code, and the International Building Codes as they apply to electrical buildings, energy production and transmission systems.

PCET3002 | Energy Production | Lecture/Laboratory (3 Credits)
Investigate how electrical power is produced and distributed through the examination of conventional and renewable methods of energy production including energy storage, transmission, and distribution methods and techniques for design solutions.

PCET3003 | Safety Engineering | Lecture (3 Credits)
Examination of applicable safety codes to assure that engineered systems provide acceptable levels of safety through analysis of safety codes, case studies, and best practices that provides for the safe installation, operation, and maintenance of electric power and communication utility systems and electrical construction.

PCET3004 | Digital Design | Lecture/Laboratory (2 Credits)
Examine digital and electronic systems through the use of Boolean algebra, logic gates, combination and sequential logic through problem solving methods connection to real-world examples, and the design of sequential logic systems.

PCET3006 | Renewable Energy Systems | Lecture (3 Credits)
Investigate the expanding energy industry with an emphasis on existing and emerging renewable energy systems, including the economics of generation and transmission with an emphasis on future usage as a design principle.

PCET4001 | Electrical Utility Design and Estimating | Lecture/Laboratory (4 Credits)
Electrical design and estimate of a simulated utility project covering the generation, transmission and distribution of an electrical power system. This project will include materials, storage solutions, cost estimates with an emphasis on practical design implementations through the utilization of 2D, 3D, and other modeling and analysis software to produce a final portfolio.

PCET4002 | Advanced 3D Power System Design | Lecture/Laboratory (3 Credits)
Electrical design of a complex building project. This project covers the utility to outlets, with a focus on generation and distribution of high, medium, and low voltage interfacing and protection through utilization of building and electrical codes. Practical design implementation is emphasized. Detailed documentation of all aspects of the project through the utilization of 2D, 3D, and other modeling and analysis software to produce a final portfolio.

PCET4003 | Power Protection and Controls | Lecture/Laboratory (4 Credits)
Analyze the components and operation of protective devices and controls in electric utility generation stations, distribution substations, and building services and feeders. Examination of protective device functions, control systems, design perimeters, and coordination from generation to end user. Practical design implementation and coordination is emphasized with utilization of 2D and 3D modeling and analysis software.

PCET4004 | Power Limited Systems | Lecture/Laboratory (2 Credits)
Examine power limited systems including fire, security, controls and information technology utilized in power plants, utility distribution, and automated systems integrated in the built environment. Practical design implementation with application of codes and standards and the utilization of 2D and 3D modeling and analysis software.

PCET4005 | Integrated Field Systems | Lecture/Laboratory (2 Credits)
Application of the principles of geographic information systems for electrical utility and building electrical systems with data modeling, integration methods, and various geospatial analysis utilizing 2D and 3D mapping and modeling software.

PCET4006 | MEP Integration | Lecture/Laboratory (2 Credits)
Employing a holistic approach, integrate electrical design through coordination with mechanical and plumbing (MEP) systems into building information modeling (BIM) software for design decision-making, production of accurate documentation, predicting performance, cost-estimating and construction planning.

PCET4007 | Existing Buildings & Structures | Lecture/Laboratory (3 Credits)
Design medium, low-voltage, and power-limited systems that integrate with existing building electrical systems employing electrical codes and standards and energy appraisals. Practical design implementation is emphasized with utilization of 2D and 3D modeling and analysis.

PCET4100 | Capstone | Capstone (3 Credits)
Integration of all knowledge gained in previous coursework to create a real-world comprehensive electrical construction project. Working in teams, the capstone project is presented and reviewed by industry experts and leaders, providing valuable feedback from their own experiences.

HUMN2900 | Ethics of Artificial Intelligence | Lecture (3 Credits)
Artificial Intelligence (AI) is changing how we work and how we live our everyday lives, and new tools are being developed at an astounding pace. From chatbots to robots, AI tools--especially for those in technical fields--are embedded in our professional and personal lives. Making sure they are developed and used ethically, and transparently, is imperative. In this course, you will learn how to identify, analyze, and debate the philosophical issues raised by contemporary and future AI systems.

MATH1700 | Pre Calculus | Lecture (3 Credits)
Preparation for Calculus. Topics include understanding functions from symbolic, tabular, and graphical perspectives. Explore function transformations and composition, polynomial functions, rational polynomial functions, trigonometric functions, exponential functions, and conic sections. The focus is on problem solving using mathematical models to represent real world situations.
General Education: Mathematics

MATH1810 | Calculus I | Lecture (3 Credits)
The fundamental tool used by engineers and scientists to determine critical measurements, such as maximums, minimums and allowable rates of change. Computer software will enable the application of limits, derivatives, transcendental functions, implicit differentiation and related rates.
Prerequisite(s): MATH1700
General Education: Mathematics

MATH1820 | Calculus II | Lecture (3 Credits)
The fundamental tool used by engineers and scientists to determine critical measurements, such as calculating the area under curves or the capacities inside of complex geometries. Computer software will enable the application of the definite integral, the fundamental theorem of calculus, applications of integration, and numerical methods of integration.
Prerequisite(s): MATH1810, Or MATH1811, Or MATH1812
General Education: Mathematics

MATH2260 | Probability & Statistics | Lecture (4 Credits)
Introduction to probability and statistics with applications. Topics include: basic combinatorics, random variables, probability distributions, hypothesis testing, confidence intervals, and linear regression.
Prerequisite(s): MATH1810, Or MATH1811, Or MATH1812
General Education: Mathematics

PHYS1800 | Physics I with Lab | Lecture/Laboratory (4 Credits)
Introduction to mechanics using differential calculus as a foundation. Topics include kinematics and dynamics of linear motion, static equilibrium, the conservation of energy and momentum, mechanics of solids and fluids, and thermodynamics. The laboratory portion incorporates experimentation, instrumentation, and graphical tools to verify calculations in motion, mechanics and thermodynamics.
Prerequisite(s): MATH1810 Or MATH1811
General Education: Physical Sciences with Lab

PHYS1820 | Physics II with Lab | Lecture/Laboratory (4 Credits)
An introductory calculus-based course in electromagnetic fields and their applications. Topics include: Coulomb's and Gauss' Law, electric fields and potentials, electrical and magnetic properties of matter, Ampere's and Faraday's laws, elementary DC and AC circuits, Maxwell's equations, and electromagnetic waves.
Prerequisite(s): MATH1821, Or MATH1820, And PHYS1800
General Education: Physical Sciences with Lab