

# APEN - Applied Engineering

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Courses numbered 500 to 799 = *undergraduate/graduate*. (Individual courses may be limited to undergraduate students only.) Courses numbered 800 to 999 = *graduate*.

## **APEN 510. Solar and Wind Engineering (3).**

Covers types of solar generation, solar radiation, sun path charts, shading effect, sizing of solar panels, inverters, batteries, V-I curves for solar panels, grid connected and off-grid solar system, types of batteries, NEC codes for solar systems, economic analysis of PV system, carbon footprint, wind power generation, advantages and disadvantages of wind power, comparison between the wind energy and solar energy, wind energy system economics and environmental aspects and impacts. This course has a lab component. Prerequisite(s): APEN 320 or ECE 282.

## **APEN 572. Applied Machine Learning (3).**

Introduces the key ideas in machine learning. Emphasis is on constructing machine learning applications and assessing performance rather than the theoretical underpinnings. Through lectures, readings and programming projects, students learn how to apply machine learning algorithms to real applications, run evaluations and interpret results. There is a heavy project focus, and when students complete the course, they are fully prepared to attack new problems using machine learning. Prerequisite(s): APEN 354, PSY 301, STAT 370, or IME 254.

## **APEN 590. Independent Study in Engineering Technology (1-3).**

Arranged individual independent study in specialized areas of engineering technology under the supervision of a faculty member. Repeatable for credit. Prerequisite(s): consent of the supervising faculty member.

## **APEN 600. Water and Wastewater Treatment (3).**

Studies water quality constituents and introduces the design and operation of water and wastewater treatment processes. Prerequisite(s): APEN 323, APEN 370.

## **APEN 610. Hydraulics and Hydrology (3).**

Studies water resources engineering topics and methods. Hydraulic and hydrological concepts are explored through the application of fundamental conservation laws and ecologically-based design theory. Students apply the concept of fluid mechanics to pipe networks, hydraulic machinery, and open channel flow, flow control devices, flood routing, groundwater flow and management, and develop quantitative approaches for answering questions in engineering hydrology. Prerequisite(s): APEN 323 or departmental consent.

## **APEN 620. Structural Analysis and Design (3).**

Studies the functions of structure, design loads, reactions and force systems; analysis of statically determinate structures including beams trusses and arches; energy methods of determining deflections of structures; influence lines and criteria for moving loads; analysis of statically indeterminate structures including continuous beams and frames. Prerequisite(s): APEN 334 or departmental consent.

## **APEN 664. Engineering Project Management (3).**

Introduction to the design and control of technologically-based projects. Considers both the theoretical and practical aspects of systems models, organizational development, project planning and control, resource allocation, team development and personal skill assessment. Prerequisite(s): ECON 201 or IME 255. Pre- or corequisite(s): PHIL 385.