ENERGY MANAGEMENT (NRG)

NRG 1101 Introduction to Energy and Systems (3 Credits)
Explore current issues surrounding the energy industry including climate change and sustainability. Understand the basic energy consuming components of buildings and opportunities in clean energy and resource conservation as building blocks to a sustainable future. Students are introduced to career opportunities in energy management, renewable energy and sustainability.
Previous: Legacy Equivalent(s): NRG* 101

NRG 1122 Commercial HVAC Systems and Analysis (3 Credits)
Familiarity with and the analysis of building HVAC systems is a basic necessity for commercial energy auditors. Students will gain an understanding of the operation, control, and application of various types of commercial HVAC Systems by touring mechanical rooms around campus to identify different parts of the commercial HVAC system (boilers, chillers, air handlers). Hands-on lab enables students to analyze the operation, efficiency, and programming of these systems. Data logging may be included for calculations and analysis.
Prerequisites: PHYS 1201 and NRG 1123, both with C- or higher
Additional fees may apply
Previous: Legacy Equivalent(s): NRG* 122

NRG 1123 Energy Efficiency Methods (3 Credits)
A systems approach is used to analyze the input, output, and efficiency of commonplace energy conversion devices. Included are motors, fans, pumps, heat engines, domestic hot water heaters, furnaces, boilers, refrigeration devices, and heat pumps. In so doing students (1) become fluent in the use of the many different units used to denote and measure energy/power (2) learn what quantities need to be measured to determine energy/power in different systems (3) determine the energy/cost savings associated with different efficiency improvement strategies.
Prerequisites: NRG 1101 with a C- or higher
Previous: Legacy Equivalent(s): NRG* 123

NRG 1130 Applied Renewable Energy Systems (3 Credits)
Focuses on the practical application of renewable energy technologies. Topics include energy and resource conservation and project siting, economics, financing, renewable energy and tax credits, technical and engineering aspects, regulatory issues, energy storage, monitoring and verification. Students study the advantages, limitations and potential of various energy sources. Wind, solar, small-scale hydro, ground-source heat pumps, combined heat and power, biofuels, fuel cells, and other technologies are examined. Students will learn the strategies and cost/benefit analyses employed by energy analysts to meet demand with clean energy production. Students will also complete their own study and proposal for a renewable energy project.
Prerequisites: PHYS 1201 and NRG 1123, both with C- or higher
Previous: Legacy Equivalent(s): NRG* 130

NRG 1132 Industrial Energy Systems (3 Credits)
Energy Managers are called upon to assess ways to save money by saving energy in industrial processes. Saving energy can typically lead to other direct benefits such as a more efficient process, better tolerances on parts, and less wear and tear on manufacturing equipment. Understanding these unique systems, accurately projecting energy savings, dealing with a business core operations and convincing reluctant managers that saving energy equals greater profit are valuable skills into today's energy market. Topics include Compressed Air Systems and Controls, Lighting, Steam Systems, Ventilation, Dust Collection and Energy Auditing.
Prerequisites: NRG 1123 with a C- or higher
Previous: Legacy Equivalent(s): NRG* 132

NRG 1133 Lighting Fundamentals and Applications (3 Credits)
Competence with lighting systems analysis is a basic necessity for commercial energy auditors. Topics include assessment of quantity and quality of light, light sources, luminaries, lighting controls, manufacturer lamp and ballast specifications, lighting power density, lighting-HVAC interactions, retrofit opportunities, cost savings analysis, and lighting codes/regulations. Students create a directly supervised lighting audit project.
Additional fees may apply
Previous: Legacy Equivalent(s): NRG* 133

NRG 2241 Commercial Energy Use Analysis and Simulations (3 Credits)
Provides students with exposure to the entire energy analysis process work flow with a hands-on implementation of an actual building energy study and an energy modeling using Building Information Modeling and AutoDesk Revit, eQuest software and other specialized modeling tools.
Prerequisites: NRG 1123 with a C- or higher
Additional fees may apply
Previous: Legacy Equivalent(s): NRG* 241

NRG 2242 Energy Accounting (3 Credits)
A comprehensive approach to energy cost reduction for commercial buildings. We will study advanced utility consumption analysis (trends, adjusted baselines, weather normalization, load factors, load shapes, baseload), the value of operation and maintenance improvements, energy saving capital improvement measures (energy conservation measures), measurement and verification of the operating conditions of energy-using equipment, and monitoring systems to maintain cost reduction, and methods of implementing energy conservation measure projects and explore different utility incentive programs.
Prerequisites: NRG 1123 with a C- or higher
Previous: Legacy Equivalent(s): NRG* 242