

**Northampton Community College
Bethlehem, Pennsylvania
Community Education**

Course Title: Advanced Industrial Process Heating	Department: ETAC
Course Number: ETAC 0019	CEUs: 12.4
Contact Hours: Lecture <u>24</u> + Lab: <u>0</u> = Total <u>24</u>	
Reference. Resource or learning materials: IHEA Fundamentals; Industrial Furnaces, 6 th Edition; North American Manufacturing Combustion Handbook, Volumes I and II, 3 rd Edition	
Maximum Enrollment: <u>25</u>	Prerequisite: Fundamentals of Industrial Process Heating
<p>Course Description: This course is a compliment to the Fundamentals of Industrial Process Heating and provides the student with an in depth view of the control and efficient operation of industrial process heating equipment. Students will become familiar with a variety of oven, furnace and kiln types used in industry, Upon completion of the course, the student will have general knowledge of insruemtnaion and contgrol for efficient operation of furnaces and ovens in procedss heating. The student will learn about the wide variety of refractoriness and insulation used in process heating equipment as sell as their operating considerations. The use of vacuum heat processing, recuperators, regenerators, gas atmospheres, and quenching will also be presented. Particular attention is spent on efficient operation of process heating equipment and methods to achieve costs savings.</p>	
<p>Learning Outcomes: Students successfully completing this course will be able to: Demonstrate knowledge of the types of ovens, furnaces, and kilns. Develop an understanding of the types and operations of refractories and insulation Determine the energy savings associated with the use of recuperators and regenerators. Develop an understanding of the instrumentation and controls used in process heating equipment. Discuss the types of gas atmospheres used in process heating and the equipment used. Describe the mechanisms, metallurgical aspects, testing and evaluation associated with quenching. Develop an understanding of vacuum heat processing</p>	
<p>Topics or Learning Activities: Ovens and Furnaces Vacuum Heat Processing Refractories and Insulation Recuperators and Regenerators Infrared Heating (updated 2010) Instrumentation and Control I Instrumentation and Control II Furnace Atmospheres Quenching Media and Equipment</p>	

**Northampton Community College
Bethlehem, Pennsylvania
Community Education**

Topical Outline:

Workforce Development Objective:

Upon completion of the course the student will have general knowledge of instrumentation and control for efficient operation of furnaces and ovens in process heating.

Preparation Date: February 2006

Review Date:

Date of Initial Offering: September 11, 2006 – November 13, 2006

Approvals:

Director: _____ **Dean:** _____
Signature *Date* *Signature* *Date*