

# Welcome to the Engineering Pro Guides Thermal & Fluids PE Course

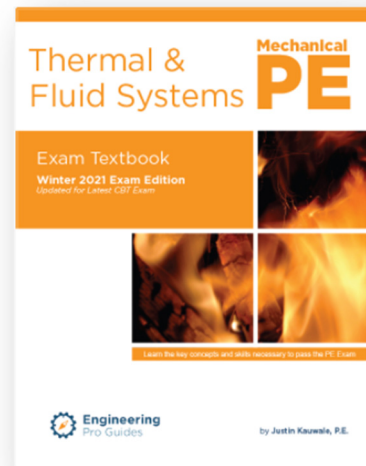
This document will explain how the course works and our recommendations on how to use the course to pass the PE exam. The course uses multiple teaching methods to enforce your understanding of the necessary key concepts and skills.

## FOR EACH WEEK, COMPLETE THE FOLLOWING:

### STEP 1 - READ TEXTBOOK & TAKE NOTES

You will receive your hard copy textbook in the mail. Shipping to the US is included in your course cost. You may also access an electronic copy (PDF) of the textbook on the course website. Please follow the schedule and read the appropriate chapters in the textbook.

*(Included in all courses)*



### STEP 2 - WATCH VIDEOS & TAKE NOTES

Next, watch the on-demand videos. The on-demand videos go over the key concepts and skills that you need to know for the PE exam. These videos are shorter and specific to each concept or skill. There are also videos that show you how to complete the common exam problems.

➔ **Step 2b: Watch Lecture Videos** 📺

The lecture videos will provide another viewpoint to your reading and further explain the topics as it relates to the exam and the NCEES® Handbook.

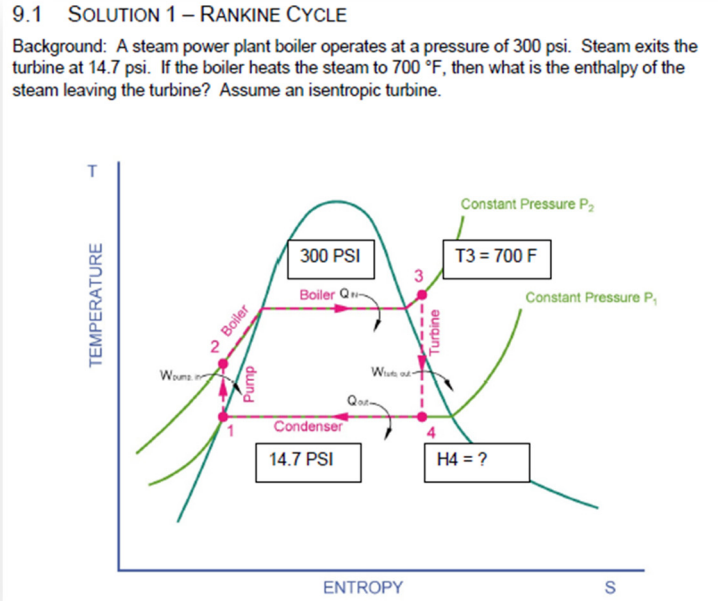
HOME **LECTURES** PRACTICE PROBLEMS MINI EXAMS FINAL EXAMS FORUM RESOURCES

*(Included in all courses)*



### STEP 3 - WORK PRACTICE PROBLEMS IN TEXTBOOK

The practice problems in the hard copy textbook (technical study guide) are on the easy to medium level of difficulty. Please complete steps 1 through 3 before the class problem solving session. *(Included in all courses)*



### STEP 4 - ATTEND CLASS PROBLEM SOLVING SESSION

I will take you through the material and sample practice problems. This session will be live for a 16-week study period, which consists of two 8 week sessions. The first 8-weeks will focus on learning concepts and developing skills. The second 8-weeks will review the concepts and focus on problem solving. You can ask questions live and if you miss a session, the session will be recorded and will be uploaded the next day. *(Included in all courses)*

Practice Problem 1

A 1/8" glass window with an aluminum frame with a k-factor of 10 Btu-in/h-ft<sup>2</sup>-F. What is the U-factor of the section of the window that consists of 1 layer of window and 2 layers of aluminum? What is the R-value of the entire window assembly, assume the frame has an area of 2 ft<sup>2</sup> and the inner window has an area of 16 ft<sup>2</sup>.

*Handwritten notes:*

ALUM WINDOW ALUM

$10 \frac{\text{Btu}}{\text{h}\cdot\text{ft}^2\cdot\text{F}}$      $1.04 \frac{\text{Btu}}{\text{h}\cdot\text{ft}^2\cdot\text{F}}$      $10 \frac{\text{Btu}}{\text{h}\cdot\text{ft}^2\cdot\text{F}}$

$R_{\text{total}} = \frac{1}{10} + \frac{1}{1.04} + \dots$

$U = \frac{k}{t} = \frac{10 \frac{\text{Btu}\cdot\text{h}}{\text{h}\cdot\text{ft}^2\cdot\text{F}}}{1 \text{ in}}$



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## STEP 5 - COMPLETE PRACTICE PROBLEMS (Pre-Recorded)

Navigate to the Practice Problems tab of the course website and select the section of the week. Download the PDF problems for that section, complete these problems on your own, then watch the video for a step-by-step explanation. Be sure to practice using the PDF version of the *NCEES Mechanical PE Reference Handbook*.

 **Step 2: Watch Practice Problem Videos** 

After attempting the problem on your own, watch the video for step-by-step solutions.

 <a href="#">Problem 1 - Units &amp; Conversions - Temperature, Viscosity and Pressure</a> 4 Minutes	 <a href="#">Problem 7 - Engineering Economics - Straight Line and MACRS Depreciation</a> 4 Minutes
 <a href="#">Problem 2 - Units &amp; Conversions - EER, COP, KWH, Efficiency</a> 6 Minutes	 <a href="#">Problem 8 - Engineering Economics - Sum of Years Digits Depreciation</a> 4 Minutes

## STEP 6 - COMPLETE PRACTICE EXAMS

Once you have completed steps 1 through 5, you should now be ready to take the mini exams. There are at least two practice exams for each section. When you take the practice exam, your ultimate goal is 6 minutes per problem, but feel free to take as much time as possible. The practice exams are another teaching method to challenge you. Also feel free to use any of your resources, EXCEPT the

solutions. The solutions will be provided to you after you complete the exam. The exam is given online, there is no hard copy given. In our experience, the people that seem to struggle the most with the PE exam, all seem to have one thing in common. They tend to look at the solutions before challenging themselves to solve a practice exam problem. Don't be afraid to spend 30 minutes solving a single problem. The research you do to solve the problem will be very beneficial in the long run. *(Included in all courses)*

Section 3 - Heat Transfer Mini Exam, Part 1

PROBLEM 1 (Full Exam Q13). A 4" diameter copper pipe carries hot water from the heater to the equipment. The surface temperature of the pipe is 200°F. The ambient temperature is 75°F. Assume that the convective heat transfer coefficient is 1.85 Btu/(hr-ft<sup>2</sup>-F). What is the total heat loss per 100 feet of pipe? Assume black body radiation. \* 1 point

- (a) 24,300 Btuh
- (b) 31,900 Btuh
- (c) 43,600 Btuh
- (d) 67,100 Btuh



## STEP 6 - REVIEW & REPEAT

After your practice exams, you may want to revisit the completed section. You should compare your score on the practice exams with others in the class. If you are performing at the median, then you should be on track to pass the exam. If you are scoring below, then you may need to revisit the section. *(Included in all courses)*

## STEP 7 - FINAL EXAM

Once you have completed Steps 1 through 6 for all of the sections, then you can gauge where you stand with the final exam. The final exam has scores from past test takers, so you can compare yourselves to those people and see your level of preparedness. *(Included in all courses)*

Problem 2 (Final Exam Q42) - Thermodynamics: A compressor has an isentropic efficiency of 85%. It is used to compress R 134a refrigerant from 50 PSIA to 150 PSIA. What is the resulting enthalpy of the refrigerant at the outlet of the compressor? Assume the refrigerant enters the compressor as a saturated vapor (no superheat). \*

- (A) 92 Btu/lb
- (B) 109 Btu/lb
- (C) 121 Btu/lb
- (D) 125 Btu/lb

## STEP 8 – READ REVIEWS

Survey Link: <https://www.engproguides.com/thermalsurvey.html>

Read past reviews and recommendations. Lastly, please read through the reviews and recommendations of the past test takers. The survey shows who passed and what they did to pass. It shows you what they recommend you do and what they wished they studied more. Newer versions coming soon. *(Included in all courses)*

What do you wish you practiced or studied more?

22 responses

I didn't work the entire NCEES practice exam.

More complex heat transfer problems and engineering basics

Practiced more

Thermodynamics

Heat transfer, unit conversion

Mach number (first attempt) / forces and moments

HVAC and Ventilation



## SCHEDULE: YEAR ROUND

See the link below for the year round EPG course schedule. Courses are intended for a 16 week study period (two unique 8-week increments). The following page provides a sample outline.

<https://www.engproguides.com/online-thermal-pe-course.html#schedule>

Week	Live Class Date	Topic	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
Break	12/22/2021	Review					Self Study		Self
Break	12/29/2021	Review					Self Study		Self
Break	1/5/2022	Review					Self Study		Self
Week 1A	1/12/2022	Basic Eng Practice & Fluid Mechanics	Read textbook & practice problems, watch on-demand videos (Self Study)				Live class @5pm PST/ Recording posted at end of day	Read textbook & practice problems, watch on-demand videos (Self Study)	Exam 1 (€)
Week 2A	1/19/2022	Heat Transfer & Mass Balance	Read textbook & practice problems, watch on-demand videos (Self Study)				Live class @5pm PST/ Recording posted at end of day	Read textbook & practice problems, watch on-demand videos (Self Study)	Exam 1 (€)

\* In order to qualify for the free re-take, you must be enrolled in the 6-month course and provide a diagnostic report. We want to make sure that you are actually taking the exam. A diagnostic report is provided by NCEES if you take the exam and do not pass. You can upgrade to the 6-month course at any time for the free re-take and continued access to the live classes AND the on-demand portion.



## TYPICAL 16-WEEK LIVE COURSE SCHEDULE

Classes are on Wednesdays at 5 PM PST. Please complete the reading in the technical study guide and the on-demand videos of the subject matter for that week PRIOR to the class. In the class, we will solve practice exam problems of that subject matter together.

WEEK	SUBJECT	LIVE CLASS	SELF-STUDY
<b>WEEK 1A</b>	Heat Transfer & Mass Balance	Wed, 5pm PST	Read textbook, complete practice problems, watch on-demand videos
<b>WEEK 2A</b>	Thermodynamics & Supportive Knowledge	Wed, 5pm PST	
<b>WEEK 3A</b>	Hydraulic & Fluid Equipment	Wed, 5pm PST	
<b>WEEK 4A</b>	Hydraulic & Fluid Distribution	Wed, 5pm PST	
<b>WEEK 5A</b>	Energy & Power Equipment	Wed, 5pm PST	
<b>WEEK 6A</b>	Energy & Power Equipment / Cooling & Heating	Wed, 5pm PST	
<b>WEEK 7A</b>	Energy Recovery & Combined Cycles	Wed, 5pm PST	
<b>WEEK 8A</b>	Basic Eng Practice & Fluid Mechanics	Wed, 5pm PST	
<b>WEEK 1B</b>	Heat Transfer & Mass Balance	Wed, 5pm PST	
<b>WEEK 2B</b>	Thermodynamics & Supportive Knowledge	Wed, 5pm PST	
<b>WEEK 3B</b>	Hydraulic & Fluid Equipment	Wed, 5pm PST	
<b>WEEK 4B</b>	Hydraulic & Fluid Distribution	Wed, 5pm PST	
<b>WEEK 5B</b>	Energy & Power Equipment	Wed, 5pm PST	
<b>WEEK 6B</b>	Energy & Power Equipment / Cooling & Heating	Wed, 5pm PST	
<b>WEEK 7B</b>	Energy Recovery & Combined Cycles	Wed, 5pm PST	
<b>WEEK 8B</b>	Heat Transfer & Mass Balance	Wed, 5pm PST	

*16 weeks of content per course cycle. Weeks 1-8 (A) and 1-8 (B) contain unique lectures and problems. Weeks with (A) are focused on learning concepts and developing skills. Weeks with (B) review the concepts with a focus on problem solving.*

