

# WELCOME TO THE ENGINEERING PRO GUIDES POWER 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.

## Step 1 - Read Textbook & Take Notes

You will receive your hard copy textbook in the mail. **Shipping is included in your course cost.** You will also receive an electronic copy (PDF) of the textbook as well. Please follow the schedule and read the appropriate chapters in the textbook. *(Included in all courses)*

## Step 2 - Watch On-Demand Videos & Take Notes

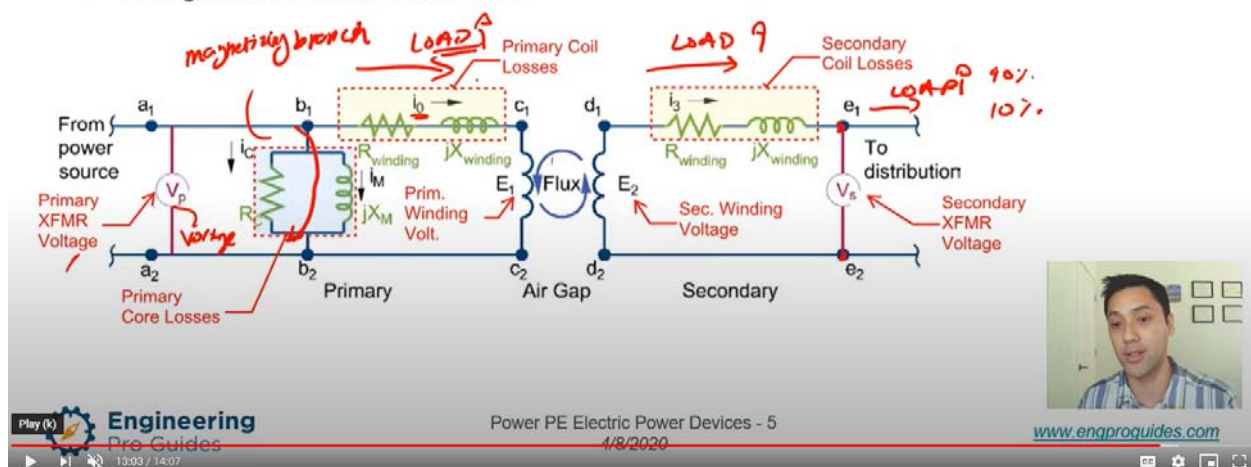
Next, watch the on-demand videos. The on-demand videos go over the key concepts and skills that you need to know for the PE exam. These videos are shorter and specific to each concept or skill. There are also videos that show you how to complete the common exam problems. *(Included in all courses)*

### Step 2: Watch Lecture Videos

Single Phase Transformers (21 Minutes) <a href="#">Video 1</a>	Transformer Cooling Methods (16 minutes) <a href="#">Video 5</a>
Three Phase Transformers (24 Minutes) <a href="#">Video 2A</a>	Buck/Boost Autotransformers (8 Minutes) <a href="#">Video 6</a>
3-Ph Wye-Wye Transformer (4 Minutes) <a href="#">Video 2B</a>	Autotransformers (17 Minutes) <a href="#">Video 7</a>

## Real Transformer, Equivalent Circuit

- The Equivalent Circuit illustrates losses within a transformer.
- Power enters the transformer at *a*, and leaves at *e*.
- Distinguish the Coil and Core Losses

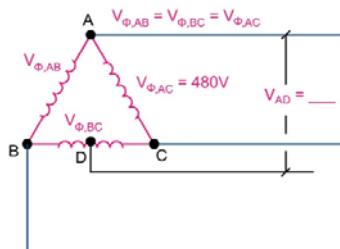


### Step 3 - Work Practice Problems in Textbook

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)

#### 7.4 PROBLEM 4 – THREE-PHASE CIRCUITS

A three-phase, delta power source provides power to a three-phase, wye load (3-wire). Assume that a ground is placed on the center of phase C, what is the voltage at the location shown in the diagram?



- (A) 240V
- (B) 480V
- (C) 416V
- (D) 720V

### Step 4 - Attend Class Problem Solving Session

I will take you through sample practice problems. This session will be live for the 16 and 8 week courses. 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 16 and 8-week courses only)

### Practice Problem 1 Part 1

Current conditions – 1 pu power, 2.5 pu maximum power. Fault occurs.

What is the power steady state governing equation? What is the steady state load angle?

*real*

$P = \frac{V_s V_r \sin(\delta)}{X_L}$

$P = C \sin(\delta)$

$2.5 = \frac{C \sin(90^\circ)}{1}$

$2.5 = C$

*real*

Current conditions – 1 pu power, 2.5 pu maximum power. Fault occurs.

What is the power steady state governing equation? What is the steady state load angle?

$P = 2.5 \sin(\delta)$

Area B

$1 = 2.5 \sin(\delta)$

$\delta = 23.58^\circ$

Area A = (1 pu) ( $\delta_{cr} - \delta_{ss}$ )

Area A =  $1 (\delta_{cr} - 0.4116 \text{ rad})$

$1 = 2.5 \sin(\delta)$

$\delta = \text{LIAD}$

$23.58^\circ$  ANGLE

$180 - 23.58^\circ$

$156.42^\circ$

$P = \frac{V_s V_r \sin(\delta)}{X_L}$

$P = C \sin(\delta)$

$2.5 = \frac{C \sin(90^\circ)}{1}$

$2.5 = C$

$\delta_{cr} = 186.42^\circ$

Area B =  $\int_{\delta_{cr}}^{180} 2.5 \sin(\delta) d\delta$

$= 1 (156.42 - \delta_{cr})$

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## Step 5 - Complete Practice Exams

Once you have completed steps 1 through 4, you should now be ready to take a practice exam. There are at least two practice exams for each section. When you take the practice exam, please 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.

Question 1: The fault duty available at a utility line is 5 MVA. The utility feeds two commercial transformers rated at 2.5 KVA, 13.2KV/480 V, 3 PH, 60 Hz and  $Z = 12\%$ . The transformers are in parallel. What is the three phase short circuit current at the 480 V bus? \*

- (a) 39 A
- (b) 49 A
- (c) 86 A
- (d) 100 A

## 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 those that previously took 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.

## 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.

Problem 3 - Applications: The mean time between failures for a transformer is 11,000 years. What is most nearly the probability that the transformer will last 30 years? \*

- (A) 99.0%
- (B) 99.3%
- (C) 99.7%
- (D) 99.9%

## Step 8 – Read Reviews

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.

<https://www.engproguides.com/power-pe-exam-survey.html>

## COMPARISON OF ENGINEERING PRO GUIDES PE COURSES

PE	16-Week Course	8-Week Course	On-Demand Course
<b>Cost</b>	\$950	\$595	\$750
<b>Access Time</b>	6 months	2 months	6 months
<b>Free Retake?</b>	Yes*	No**	Yes*
<b>Hard copy Class Textbook?</b>	Yes (shipping included)	Yes (shipping included)	Yes (shipping included)
<b>On-Demand Videos</b>	36 hours	36 hours	36 hours
<b>On-Demand Practice Exams</b>	Yes (100+ problems) Compare your score with past test takers	Yes (100+ problems) Compare your score with past test takers	Yes (100+ problems) Compare your score with past test takers
<b>Live/Recorded Classes</b>	32 hours (160 problems solved together in class)	16 hours (80 problems solved together in class)	N/A
<b>Practice Exam Problems from Live Class</b>	Yes, PDF provided. (160 problems)	Yes, PDF provided. (160 problems)	Yes, PDF provided. (160 problems)
<b>Technical Study Guide (PDF)</b>	Yes (100+ problems)	Yes (100+ problems)	Yes (100+ problems)
<b>Full Exam (PDF)</b>	Yes (90+ problems)	Yes (90+ problems)	Yes (90+ problems)
<b>Final Exam (PDF)</b>	Yes (80 problems)	Yes (80 problems)	Yes (80 problems)
<b>References Exam (PDF)</b>	Yes (40+ problems)	Yes (40+ problems)	Yes (40+ problems)
<b>Ask the Author Questions?</b>	Yes (email)	Yes (email)	Yes (email)
<b>Class Forum?</b>	Yes	Yes	Yes

\* In order to qualify for the free re-take, please 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 16-week course for the free re-take and continued access to the live classes AND the on-demand portion. You can also upgrade to the on-demand course for free re-take and continued access to ONLY the on-demand portion.