


Introduction to the FE, PE, and SE Licensing Exams

Nabeal W. Khatib, M.S., E.I.



Introduction to the FE Licensing Exam

Nabeal W. Khatib, M.S., E.I.

Fundamental Engineering (FE) Exam

About the presenter:

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Tetra Tech – Structural Engineer

Univ. of Colorado – Affiliate Professor

MSU Denver – Affiliate Professor

Legendfortutoring, LLC. – CEO & Founder

Director of Education of NAAAEA & Founder of the Colorado Chapter

Education: B.S. (2016), M.S. (2017), Ph.D. (expected in 2024)

Fundamentals of Engineering (FE) Exam

- It is considered to be the very first-step to in the process of becoming professional licensed engineer (P.E.)
- Governing body is the NCEES (National Council of Examiners for Engineering and Surveying)
- Fee = \$175 to NCEES
- Computer-based exam administered year-round at NCEES-approved Pearson VUE test centers.
- Result: Pass/Fail exam (diagnostic report if failed)

Format – FE Exam

- **6 hours**
 - a. Nondisclosure agreement (2 minutes)
 - b. Tutorial (8 minutes)
 - c. Exam (5 hours and 20 minutes)
 - d. Scheduled break (25 minutes)
- **110 Questions (2.91 minutes/ question)**
 - a. Session 1 (57 questions)
 - b. Session 2 (53 questions)

Why do I need to take the FE (EIT)?

- To be eligible for the PE Exam (Ultimate Goal for most states)
- Prestige
- Career Development
- More \$\$

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Common Tasks

Exams

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- [FE Reference Handbook 10.2 \(effective with exams beginning July 1\)](#)
- [FS Reference Handbook 2.1](#)
- [PE Agricultural and Biological Engineering Reference Handbook 1.0](#)
- [PE Architectural Engineering Reference Handbook 1.1](#)
- [PE Chemical Reference Handbook 2.2](#)
- [PE Civil Reference Handbook 1.1](#)
- [PE Control Systems Reference Handbook 1.0](#)
- [PE Electrical and Computer: Computer Engineering Reference Handbook 1.0.1](#)
- [PE Electrical and Computer: Electronics, Controls, and Communications Reference Handbook 1.1.1](#)
- [PE Electrical and Computer: Power Reference Handbook 1.1.2](#)
- [PE Environmental Reference Handbook 1.3](#)
- [PE Fire Protection Reference Handbook 1.2](#)

Topics for the FE Civil

- Mathematics and Statistics
- Ethics and Professional Practice
- Engineering Economics
- Statics
- Dynamics
- Mechanics of Materials
- Materials
- Fluid Mechanics
- Surveying
- Water Resources and Environmental Engineering
- Structural Engineering
- Geotechnical Engineering
- Transportation Engineering
- Construction Engineering

How do I study for the FE?


- Familiarize yourself with the reference manual (most important tip)
- Locate the right equation(s) in the handbook
- Practice tons of practice exams, simply put in the work
- Time for yourself!
- Trust yourself!
- Make sure to have consistent units
- Caution needs to be exercised (i.e., read the problem minutely, etc.)
- Not a difficult test (in my opinion)

About the FE Reference Handbook

- 502 pages (Version 10.2)
- Available in exam
- Searchable during exam (ctrl F)
- No other books allowed in the exam

Resources

- FE Reference Handbook (V. 10.2)
 - Free digitally
 - May purchase a hard copy if you prefer (But, Do not buy it)
- Practice exams
 - NCEES practice exam and
 - Other practice exams (i.e., School of PE, PPI, Legendfortutoring, etc.)



Introduction to the PE Licensing Exam

Nabeal W. Khatib, M.S., E.I.

The Principles and Practice of Engineering (PE)

About the presenter:

Nabeal W. Khatib, M.S., E.I.

Tetra Tech – Structural Engineer

Univ. of Colorado – Affiliate Professor

MSU Denver – Affiliate Professor

Legendfortutoring, LLC. – CEO & Founder

Director of Education of NAAAEA & Founder of the Colorado Chapter

Education: B.S. (2016), M.S. (2017), Ph.D. (expected in 2024)

What is a PE License?

It is a certification that demonstrates...

- Technical proficiency
- Commitment to quality
- High standard of ethics
- Legal credentials to work

Why do I need to take the PE?

- Prestige
- Career Development
- Authority
 - To sign/seal/stamp drawings for most states
- Career Flexibility
 - To run your own projects or even your own firm (legally required!)
- More \$\$\$

How do I Get a PE?

- 1) Earn a four-year degree in engineering from an accredited program
- 2) Pass the Fundamentals of Engineering (FE) Exam
- 3) Complete four years of engineering experience under a licensed PE
 - This requirement varies by state
 - Make sure you will be working under a license PE at your prospective employer
- 4) Pass the NCEES PE Exam (CA requires seismic and surveying)
- 5) Complete an application and paperwork to be officially PE

PE Exam



- The exam tests examinees for a minimum level of competency in a particular engineering discipline
- Governing body is the NCEES (National Council of Examiners for Engineering and Surveying)
- Fee = \$375 to NCEES
- Computer-based exam administered year-round at NCEES-approved Pearson VUE test centers.
- Result: Pass/Fail exam (diagnostic report is provided if examinee did not pass)

Format – PE Exam

- **9 hours**
 - a. Nondisclosure agreement (2 minutes)
 - b. Tutorial (8 minutes)
 - c. Exam (8 hours)
 - d. Scheduled break (50 minutes)
- **80 Questions (6 minutes/ question)**
 - a. Session 1 (Breadth - 41 questions)
 - b. Session 2 (Depth - 39 questions)

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- [PE Electrical and Computer: Electronics, Controls, and Communications Reference Handbook 1.0.2](#)
- [PE Electrical and Computer: Power Reference Handbook 1.1.2](#)
- [PE Environmental Reference Handbook 1.3](#)
- [PE Fire Protection Reference Handbook 1.2](#)

Topics – AM (Breadth for PE Civil)

- Project Planning
- Means and Methods
- Soil Mechanics
- Structural Mechanics
- Hydraulics and Hydrology
- Geometrics
- Materials
- Site Development

Topics – PM (Depth)



- This is generally after the first 8 topics (breadth).
- Topics are more closely on a single area of practice (chosen engineering discipline).
Link for the depth topics: <https://ncees.org/engineering/pe/civil-cbt/>


How do I study for the PE?

- Familiarize yourself with the reference manual (most important tip)
- Locate the right equation(s) in the handbook
- Familiarize yourself with the design standards (they are not going to be available before the day of the exam) – bummer!
- Practice tons of practice exams, simply put in the work
- Try to mimic the exam's atmosphere
- Time for yourself. **Tip: You do not have to consume the first 4 hours for the breadth, you can save some minutes/ hours for the depth (highly recommended!)**
- Trust yourself!
- Make sure to have consistent units
- Caution needs to be exercised
- Not a difficult test (in my opinion)

About the PE and Design Standards



- 497 pages (Version 1.1)
- Available in exam alongside with other design standards as needed.
 - Note: I highly recommend to get electronics copies of the design standards, and read through them intensively, visualize the hot topics.
- Searchable during exam (ctrl F)
- No other books allowed in the exam



Introduction to the SE Licensing Exam

Nabeal W. Khatib, M.S., E.I.

16-hour PE Structural exam (SE)

About the presenter:

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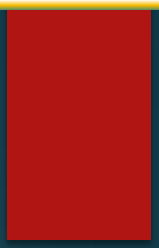
Education: B.S. (2016), M.S. (2017), Ph.D. (expected in 2024)

What is the SE License?

It is a certification that demonstrates...

- Technical proficiency at a higher level from PE
- Commitment to quality at a higher level from PE
- High standard of ethics at a higher level from PE
- Legal credentials to work at a higher level from PE

Why do I need to take the SE?



- Some states require the SE in order to be a practice structural engineer and seal plans (i.e., IL)
- If you are dealing with areas of high seismicity and high wind
- Prestige
- Career Development
- Authority
 - To sign/seal/stamp drawings (in some states!)
- Career Flexibility
 - To run your own projects or even your own firm (legally required in some states!)
- More \$\$\$

How do I Get the SE?

- 1) Earn a four-year degree in engineering from an accredited program
- 2) Pass the Fundamentals of Engineering (FE) Exam
- 3) Complete four years of engineering experience under a licensed PE/ SE
 - This requirement varies by state
- 4) Pass the Principles and Practice of Engineering (PE) Exam
- 5) You might take the SE right in some states, skipping the PE (i.e., WY)

SE Exam



- The exam tests examinees for a minimum level of competency in a particular engineering discipline especially in areas of high seismicity and high wind
- Governing body is the NCEES (National Council of Examiners for Engineering and Surveying)
- Fee = \$500/ each to NCEES + associated fees for your state board
- The PE Structural exam is currently offered in pencil-and-paper (P&P) format and available twice per year (April and October). In 2024, NCEES is thinking of convert this exam to CBT, too!
- Result: Acceptable results must be attained on both components

Format – SE Exam

- 16 hours on 2 days
 - a. Day 1, *Vertical*: 8 hours (breadth in the morning and 4 essay questions in the afternoon)
 - b. Day 2, *Lateral*: 8 hours (breadth in the morning and 4 essay questions in the afternoon)

Notes:

Vertical contains gravity loads.

Lateral contains wind and seismic loads.

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Exam Registration

[Fundamentals of Engineering](#)

[Principles and Practice of Engineering](#)

[Structural Engineering](#)

[Fundamentals of Surveying](#)

[Principles and Practice of Surveying](#)

Select an exam type

Topics (SE) – Overall

Day 1 (Vertical)

- a. Morning breadth (4 hours of breadth, 40 questions)
- b. After noon depth (4 hours of depth, either building (4 questions) or bridges (3 question))

Day 2 (Lateral)

- a. Morning breadth (4 hours of breadth, 40 questions)
- b. After noon depth (4 hours of depth, either building (4 questions) or bridges (3 question))

Topics (Day 1)

Day 1 (Vertical)

- a. **Morning breadth (4 hours of breadth, 40 questions): Contains Analysis of Structures and Design & Details of Structures**
- b. **After noon depth (either building (4 questions) or bridges (3 question))**

Buildings: steel, concrete, wood, and masonry structures

Bridges: Concrete superstructure, Other elements of bridges (e.g., culverts, abutments, retaining walls), and Steel superstructure

Topics (Day 2)

Day 1 (Lateral)

- a. Morning breadth (4 hours of breadth, 40 questions):
Contains Analysis of Structures and Design & Details of Structures
- b. After noon depth (either building (4 questions) or bridges (3 question))

Buildings: steel, concrete, wood, and masonry structures

Bridges: Concrete superstructure, Other elements of bridges (e.g., culverts, abutments, retaining walls), and Steel superstructure

How do I study for the SE?

- Familiarize yourself with the design standards (most important tip)
- Locate the right equation(s) in the manuals
- Practice tons of practice exams, simply put in the work
- Mimic the real deal!
- Time for yourself!
- Trust yourself!
- Make sure to have consistent units
- Caution needs to be exercised

About the SE Design Standards



- AASHTO
- IBC
- ASCE 7
- ACI 318
- AISC
- ASIC (Seismic)
- AISI S100
- NDS
- NDS (Wind & Seismic)
- TMS 402/602

