

Introduction

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Course Outline

Lesson I	Introduction	Lesson 10	Thermodynamics
Lesson 1	Math 1	Lesson 11	Heat Transfer
Lesson 2	Math 2	Lesson 12	Material Science
Lesson 3	Math 3	Lesson 13	Mechanics of Materials
Lesson 4	Economics	Lesson 14	DC Electricity
Lesson 5	Biology	Lesson 15	AC Electricity
Lesson 6	Chemistry	Lesson 16	Electronics
Lesson 7	Statics	Lesson 17	Computers
Lesson 8	Dynamics	Lesson 18	Ethics
Lesson 9	Fluid Mechanics		

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Syllabus



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• insert homework here

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Engineering Registration

The Licensing Process

NCEES: www.ncees.org

Engineering Registration in the United States

Engineering registration (also known as licensure or certification) is the United States' way of ensuring that engineers are qualified to practice their profession. The process of becoming a registered professional engineer (RPE) involves a series of steps, including education, experience, and examination. The process is designed to ensure that engineers are competent and ethical, and that they are held to a high standard of practice. The process is also designed to protect the public from the potential harm that can be caused by unqualified engineers.

Most engineers do not need to be registered. In particular, those engineers who are not involved in the design and construction of structures or systems are not required to be registered. However, those engineers who are involved in the design and construction of structures or systems are required to be registered. The process of becoming a registered professional engineer (RPE) involves a series of steps, including education, experience, and examination. The process is designed to ensure that engineers are competent and ethical, and that they are held to a high standard of practice. The process is also designed to protect the public from the potential harm that can be caused by unqualified engineers.

Once you have met the registration requirements, you will be able to use the title "Professional Engineer" (PE). This title is a mark of distinction and is recognized by the public. It also allows you to sign and seal your work. The process of becoming a registered professional engineer (RPE) involves a series of steps, including education, experience, and examination. The process is designed to ensure that engineers are competent and ethical, and that they are held to a high standard of practice. The process is also designed to protect the public from the potential harm that can be caused by unqualified engineers.

THE U.S. REGISTRATION PROCEDURE

The registration process is a multi-step process. It begins with the candidate taking the Fundamentals of Engineering (FE) exam. If the candidate passes the FE exam, they will become a Fundamentals Engineer (FE). The next step is to gain the required amount of work experience. After completing the required work experience, the candidate will take the Professional Engineering (PE) exam. If the candidate passes the PE exam, they will become a Registered Professional Engineer (RPE).

NATIONAL COUNCIL OF EXAMINERS FOR ENGINEERING AND SURVEYING

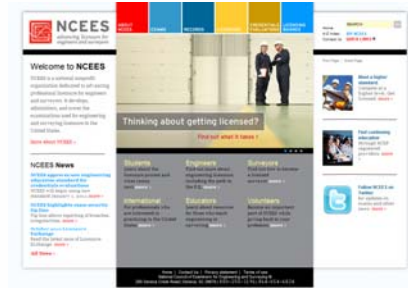
The National Council of Examiners for Engineering and Surveying (NCEES) is a national organization that provides a variety of services to engineers and surveyors. NCEES is the only organization that provides a single, unified process for engineering registration in the United States. NCEES also provides a variety of other services, including continuing education and certification.

REQUIREMENTS AMONG STATES

All states use the NCEES requirements. If you take and pass the FE or PE examination in one state, you will be able to use the title of PE or FE in all other states. This is known as reciprocity. The process of becoming a registered professional engineer (RPE) involves a series of steps, including education, experience, and examination. The process is designed to ensure that engineers are competent and ethical, and that they are held to a high standard of practice. The process is also designed to protect the public from the potential harm that can be caused by unqualified engineers.

THE FE EXAMINATION

The Fundamentals of Engineering (FE) examination is a national examination that is taken by all candidates who are seeking registration as a professional engineer. The exam is designed to test the candidate's knowledge of the basic principles of engineering. The exam is a multiple-choice exam and is taken by computer. The exam is a one-day exam and is taken at a testing center.



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Further Information

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- insert state board of registration email and phone info

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FE Exam Format

Morning FE Exam Subjects

subject	percentage of total questions (%)
mathematics	15
engineering probability and statistics	7
chemistry	9
computers	7
ethics and business practices	7
engineering economics	8
engineering mechanics (statics and dynamics)	10
strength of materials	7
material properties	7
fluid mechanics	7
electricity and magnetism	9
thermodynamics	7

Afternoon FE Exam Subjects
Other Disciplines Exam

subject	percentage of total questions (%)
advanced engineering mathematics	10
engineering probability and statistics	9
biology	5
engineering economics	10
application of engineering mechanics	13
engineering of materials	11
fluids	15
electricity and magnetism	12
thermodynamics and heat transfer	15

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Discipline-Specific Exams

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Afternoon FE Exam Subjects (Discipline-Specific Exams)

The following tables list the FE afternoon discipline-specific exam subjects with their corresponding categories and percentage of each type of question as released by NCEES.

Chemical Engineering		Environmental Engineering	
subject	percentage of total questions (%)	subject	percentage of total questions (%)
air/water	10	water resources	10
materials/energy balances	10	water and wastewater engineering	10
chemical engineering thermodynamics	10	air quality engineering	10
fluid operations	10	solid and hazardous waste engineering	10
heat transfer	10	environmental systems and management	10
mass transfer	10		
chemical reaction engineering	10		
process design and economic optimization	10		
control design in chemical engineering	2		
process control	2		
safety, health, and environmental	2		
Civil Engineering		Industrial Engineering	
subject	percentage of total questions (%)	subject	percentage of total questions (%)
surveying	11	engineering economics	10
hydraulics and hydrologic systems	10	probability and statistics	10
soil mechanics and foundations	10	modeling and simulation	10
environmental engineering	10	industrial management	10
transportation	10	manufacturing and production systems	10
structural analysis	10	facilities and logistics	10
structural design	10	human factors, productivity, ergonomics, and work design	11
construction management	10		
materials	8		
Electrical Engineering		Mechanical Engineering	
subject	percentage of total questions (%)	subject	percentage of total questions (%)
circuits	10	mechanical design and analysis	10
power	10	thermodynamics, refrigeration, and air-conditioning	10
electromagnetics	10	materials and processing	10
control systems	10	manufacturing, instrumentation, and controls	10
communications	8	thermodynamics and energy	10
signal processing	8	computer processes	10
electronics	10	fluid mechanics and fluid machinery	10
digital systems	10	heat transfer	10
computer systems	10	refrigeration and HVAC	10

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Grading and Scoring

- not graded on a curve
- modified Angoff procedure to determine suggested passing score
- passing score somewhat less than 50% (raw score of approximately 110 points out of 240)
- The actual score may be slightly more or slightly less than 110 as determined from the performance of all examinees on the equating subtest.
- 20% of each FE exam consists of questions repeated from previous examinations—equating subtest.
- all states adopt NCEES's suggested passing score
- results from your state board by mail (allow at least four months for notification)
- pass or fail notice only
- diagnostic report to fails only

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Historical Passing Rates (1st Time Examinees Only)

FE Exam	Oct. 02	Apr. 03	Oct. 03	Apr. 04	Oct. 04	Apr. 05	Oct. 05	Apr. 06	Oct. 06	Apr. 07	Oct. 07	Apr. 08	Oct. 08	Apr. 09	Oct. 09	Apr. 10
Other Disciplines	76%	82%	79%	76%	76%	76%	67%	73%	73%	82%	72%	78%	74%	77%	73%	78%
Chemical	88%	86%	85%	85%	87%	87%	84%	85%	83%	82%	84%	86%	82%	83%	87%	86%
Civil	81%	81%	79%	82%	78%	77%	68%	73%	73%	71%	73%	73%	70%	80%	74%	75%
Electrical	80%	83%	76%	77%	76%	76%	67%	70%	67%	58%	68%	74%	67%	73%	71%	72%
Environmental	79%	78%	85%	84%	81%	81%	76%	78%	73%	83%	79%	75%	76%	85%	82%	82%
Industrial	70%	69%	68%	71%	61%	61%	66%	65%	64%	47%	68%	66%	66%	74%	65%	69%
Mechanical	85%	88%	85%	83%	83%	83%	78%	79%	81%	84%	81%	85%	81%	83%	78%	83%

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Permitted Reference Material

NCEES FE Supplied-Reference Handbook

Permitted Reference Material

Since October 1993, the FE examination has been what NCEES calls a “limited-reference” exam. This means that no books or references other than those supplied by NCEES may be used. Therefore, the FE examination is really an “NCEES-publication only” exam. NCEES provides its own Handbook for use during the examination. No books from other publishers may be used.

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Calculators

Casio: All fx-115 models. Any Casio calculator must contain fx-115 in its model name. Examples of acceptable Casio fx-115 models include (but are not limited to)

- fx-115 MS
- fx-115 MS Plus
- fx-115 MS SR
- fx-115 ES

Hewlett Packard: The HP 335 and HP 355 models, but no others.

Texas Instruments: All TI-30X and TI-36X models. Any Texas Instruments calculator must contain either TI-30X or TI-36X in its model name. Examples of acceptable TI-30X and TI-36X models include (but are not limited to)

- TI-30Xa
- TI-30Xa SOLAR
- TI-30Xa SE
- TI-30XS Multiview
- TI-30X IIB
- TI-30X IIS
- TI-36X II
- TI-36X SOLAR

last updated: Nov. 16, 2010
next update: Nov. 15, 2011

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- “Study a lot more than you think you need to.”
- “Do every kind of practice problem that is on this planet. You cannot do enough homework problems in preparation for this test. This test is geared toward the graduating senior, not for people who have been out of school for a while.”
- “Attempt every problem in the *FE Review Manual*. There will be no surprises in the exam, which will help you maintain focus and confidence, even if you make errors.”
- “Learn the basics. Don’t get caught up in all the detail. It will only slow you down on the exam. Most of the questions are specific.”
- “Do as many sample problems as possible.”
- “Take a review course, particularly if you have been out of school for a while.”
- “Don’t get bogged down with memorization exercises. All the equations you need to pass the test are in the NCEES Handbook. You just need to know how to apply them.”

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