

# The Basics of Fundamentals of Engineering Examination

**Mohan M. Venigalla, PhD, PE**  
**Volgenau School of**  
**Information Technology and Engineering**  
**George Mason University**

# Morning Exam Content - General

Time Allowed: Four Hours

Module/Subject	Percent Weight	Approx. no. of Questions
Chemistry	9%	11
Computers	7%	8
Electricity and Magnetism	9%	11
Engineering Economics	8%	10
Ethics and Business Practice	7%	8
Fluid Mechanics	7%	8
Materials Science/Structure of Matter	7%	8
Mathematics + Probability & Stat	15+7%	26
Mechanics (Strength) of Materials	7%	8
Engineering Mechanics (Statics & Dynamics)	10%	12
Thermodynamics	7%	8
Total	100%	118 + 2

Source: NCEES

© 2009: Mohan M. Venigalla



# Afternoon Exam Content - General

**Time Allowed: Four Hours**

Module/Subject	Percent Weight	Approx. no. of Questions
Advanced Engineering Mathematics	10%	6
Engineering Probability and Statistics	9%	5
Biology	5%	3
Engineering Economics	10%	6
Application of Engineering Mechanics	13%	8
Engineering Materials	11%	7
Fluids	15%	9
Electricity and Magnetism	12%	7
Thermodynamics and Heat Transfer	15%	9
Total	100%	60

**Source: NCEES**

© 2009: Mohan M. Venigalla



# Afternoon - Civil Engineering Content

(For other disciplines, consult handout and NCEES web page  
[http://www.ncees.org/exams/fundamentals/fe\\_exam\\_specs.pdf](http://www.ncees.org/exams/fundamentals/fe_exam_specs.pdf))

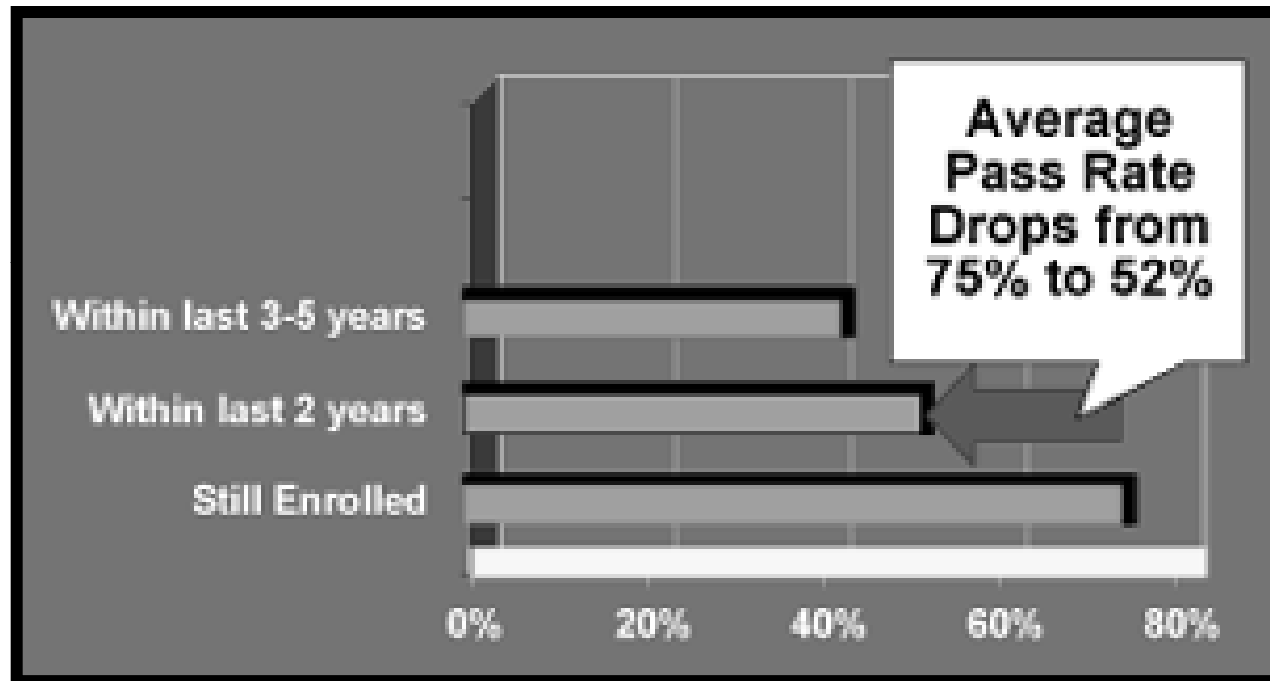
Module/Subject	Percent Weight	Approx. no. of Questions
Surveying	11%	7
Hydraulics & Hydrologic Systems	12%	7
Soil Mechanics & Foundations	15%	9
Environmental Engineering	12%	7
Transportation	12%	7
Structural Analysis	10%	6
Structural Design	10%	6
Construction Management	10%	6
Materials	8%	5
Total	100%	60

Source: NCEES

© 2009: Mohan M. Venigalla



# Pass Rates by Graduation Date



Source: NCEES

© 2009: Mohan M. Venigalla

# Most Recent Pass Rates

<u>Examination Module</u>	<u>October 2006</u>		<u>October 2005</u>	
	<u>First-time takers</u>	<u>Repeat takers</u>	<u>First-time takers</u>	<u>Repeat takers</u>
Chemical	83%	50%	84%	34%
Civil	73%	29%	68%	16%
Electrical	67%	27%	67%	19%
Environmental	73%	32%	76%	24%
Industrial	64%	30%	66%	16%
Mechanical	81%	32%	78%	22%
General	73%	25%	67%	14%

Source: NCEES

© 2009: Mohan M. Venigalla



# Pass Rates for Afternoon General (1)

Examinees' college/university degree discipline	October 2006		October 2005	
	First-time takers	Repeat takers	First-time takers	Repeat takers
Aeronautical	82%	40%	80%	0%
Agricultural	68%	52%	76%	19%
Architectural	70%	25%	63%	16%
Biological	75%	50%	65%	33%
Chemical	72%	39%	63%	30%
Civil	69%	22%	63%	10%
Computer	59%	14%	48%	17%
Electrical	55%	17%	51%	14%
Industrial	66%	11%	36%	3%
Mechanical	81%	28%	76%	21%
General Engineering	77%	31%	79%	17%

# Pass Rate Comparisons

Examination Module	1st Time Takers			Repeat Takers		
	10/02	10/03	10/05	10/02	10/03	10/05
Chemical	88	85	84	49	42	34
Civil	81	82	68	36	38	16
Electrical	80	76	67	36	32	19
Environmental	79	85	76	45	49	24
Industrial	70	68	66	33	33	16
Mechanical	85	85	78	26	36	22
General	76	79	67	27	32	14

2

Source: NCEES

© 2009: Mohan M. Venigalla



# Pass Rate Comparisons

## Afternoon General Exam Takers

Graduated Discipline	First time takers		Repeat takers	
	April 01	Oct 03	April 01	Oct 03
Chemical	78	83	NA	42
Civil	52	77	NA	31
Electrical	51	68	NA	25
Environmental	NA	75	NA	32
Industrial	40	50	NA	19
Mechanical	80	86	NA	38
Others	NA	NA	NA	37

Source: NCEES

© 2009: Mohan M. Venigalla



# PE Exam Pass Rates

Examination	1 <sup>st</sup> time	Rpt
PE Agricultural	28%	20%
PE Chemical	77%	27%
PE Civil	59%	26%
PE Control Systems	78%	37%
PE Electrical and Computer	58%	27%
PE Environmental	73%	28%
PE Structural I	46%	41%
PE Industrial	62%	26%
PE Mechanical	65%	32%

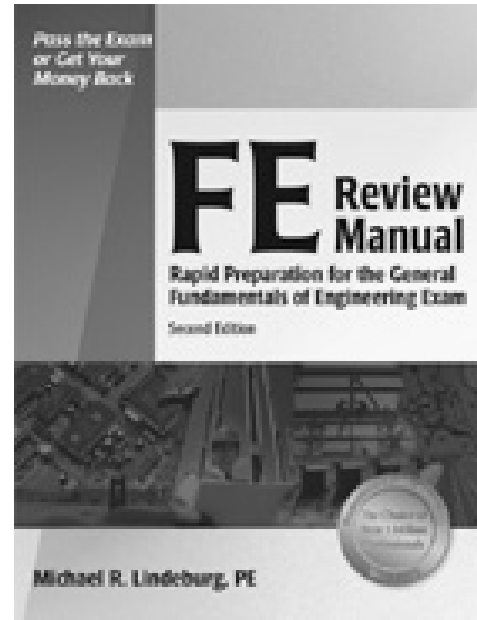
Source: NCEES (Oct 2005)

© 2009: Mohan M. Venigalla



# Books and other Material

- ❖ **FE Review Manual:**
  - Michael Lindeburg, FE Review Manual: Rapid Preparation for the General Fundamentals of Engineering Exam. Professional Publications Inc. Belmont, CA 94002.
- ❖ **NCEES FE Reference Manual; 7<sup>th</sup> Edition (Supplied in the Examination).**
  - Your life will be much easier if you get to know this one better
- ❖ **GMU Material (very little duplication with Lindeburg book)**



© 2009: Mohan M. Venigalla

# Preparing for the Exam

## ❖ Three factors to success

- commitment
- plan of action
- time management

## ❖ Commitment

- "No, try not. Do or do not. There is no try."
- Attitude is important
  - I got to do this. I can do this. I shall pass the examination

# Plan of Action

- ❖ Know your strengths and weaknesses
  - Helps you focus on your strengths
    - “I shall ace the questions on engineering economy”
  - Weak in certain areas? Not the end of the world
    - “I will focus the least on electrical circuits” (not the same as omit or quit)

# Time Management

- ❖ Attend this class regularly
- ❖ Pay attention
- ❖ Be willing to spend at least 2 more hrs per week (other than the 4hrs in this class)
  - Some of you may need to spend more time than this (depending on when you had these classes the last time)

# Strategies - Before the Examination

- ❖ Don't memorize - get the concepts
- ❖ Spend at least 2 more hrs per week
- ❖ Study at the same spot each time
- ❖ Work as many problems as you can
- ❖ Get yourself familiarized with:
  - What topics are in each subject
  - And where they are in the NCEES supplied reference book
  - (I CANNOT EMPHASIZE this point ENOUGH)

# Some Tips from Past Exam Takers

- ❖ The Sooner, the Better
- ❖ “Ten years out of school, I found the FE exam to be among the worst 8 hours of my life. Profit by my example--don't wait so long. Take it while you're in school or just graduated, whether you think you might need it or not. You'll thank me later!”
- ❖ “I graduated 8 years ago with a 3.8 and thought I was still sharp, but I was wrong. Do yourself a favor and take this exam when you're still in school or just graduated. Otherwise you make it twice as hard for yourself. “
- ❖ Study Tips
- ❖ No need for several references. Use one book. NCEES Handbook (Michael Lindeberg) is good enough.

© 2009: Mohan M. Venigalla

# Some Tips from Past Exam Takers (2)

- ❖ If you get a copy of the NCEES FE Handbook before the exam from your state board, realize that the Handbook they give you the day of the test may have a few changes. Apparently they keep changing it.
- ❖ The NCEES FE Supplied-Reference Handbook is a necessity. When you work your practice problems, use **ONLY** the NCEES FE Handbook as your reference, because that's what you'll have to use during the exam.
- ❖ The test is **NOT** in the same order as the NCEES FE Handbook.
- ❖ Don't expect to go neatly through the handbook.
- ❖ Don't expect to study for all subjects.

# Some Tips from Past Exam Takers (3)

- ❖ Know what information is actually relevant.
- ❖ Know where to find things in the NCEES FE Handbook.
- ❖ Start early. Many say you need at least 3 months. 6-7 weeks is good enough.
- ❖ Work a lot of problems.
- ❖ Study subjects that have the most questions on the exam, and move down to those that have the fewest questions.
- ❖ Focus more on subject that are your strengths and work down in the list of your strengths.
- ❖ Math is a key subject. If you know your math, you're OK. If not, study up.
- ❖ Can't Beat a Practice Exam

# The Week of the Exam

- ❖ Drive to the exam site
  - see the room/hall in which you will take the exam
- ❖ Plan to finish all your other commitments by Thursday
  - finish your homework early
  - disengage from your routine by 6 PM on Thursday
  - do a quick review Thursday night

# The Day (Friday) Before the Test

- ❖ Remember - FE is not just a mental examination, it is also a physical examination
- ❖ Do NOTHING today - that is,
  - take time off from your routine
  - try not to review for the exam any more
    - light review is OK
    - but don't start reviewing a new subject today
  - Go to a movie
    - do something that relaxes you, but
    - don't do something that has potential for
      - injury, or
      - making you tired for the exam day
- ❖ Most of all - get a good night's sleep
- ❖ And... absolutely, positively - NO ALCOHOL

© 2009: Mohan M. Venigalla

# The Day (Friday) Before the Test

- ❖ Check the calculator batteries
- ❖ have a backup
- ❖ Check pencils
  - have enough leads for mechanical pencils?
- ❖ Don't forget - you need a good eraser
- ❖ Most of all - get a good night's sleep
- ❖ And...

**Absolutely, positively -  
NO ALCOHOL!!!**

# The Day of the Exam

- ❖ Get there early
  - don't drive 50 miles in the morning to get there
- ❖ Don't drink too much coffee
- ❖ Don't drink too much water either
- ❖ Don't munch any crunchy - you could annoy others
- ❖ Between morning and AN sessions, don't talk to anyone - especially not about the morning exam

# The Day of the Exam (2)

- ❖ Stay focussed
- ❖ Most importantly, stay relaxed
- ❖ if you miss a question, it is not the end of the world
- ❖ If you don't know the answer, the answer is always C (or B) - choose only one!
- ❖ Do not torture any whales....

# NCEES Rules

## ❖ Strictly enforced

- Use only NCEES supplied Mechanical pencils
- Prohibited items include but are not limited to:
  - cameras; cell phones; desktop, hand-held, laptop, and palmtop computers; databanks; data collectors; organizers; pagers or beepers; PDAs; radios; headsets; tape players; portable fax machines; calculator watches; reproduction equipment; electronic dictionaries; electronic translators; and recorders.
- Don't leave the hall in the last half hour
- Give the book to proctor if you need to go to rest room, get it on the way back
- Proctors guard in front of the restrooms to make sure that people cannot talk to each other at the break)

# Calculator Policy

- ❖ Only models of calculators approved by NCEES are permitted in the exam room. *No other models of calculators or variations of the models listed below are permitted in the exam room.*
- ❖ Approved List of Calculators for the 2006 exam administrations.
  - Casio: All fx-115 models. Any Casio calculator must contain fx-115 in its model name.
  - Hewlett Packard: The HP 33s and HP 35s 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.

# FE Examination: Students and the Dept

- ❖ Good pass rates = good for the program = ABET positive = Good students = good pass rates
- ❖ Not Prepared? Don't take it

# Useful Websites

- ❖ **NCEES:** <http://www.ncees.org/exams/fundamentals/>
  - Make sure that you check this website for all rules and regulations
  - Reference guide (can get individual chapters also here):
    - [http://www.ncees.org/exams/study\\_materials/fe\\_handbook/single](http://www.ncees.org/exams/study_materials/fe_handbook/single)
  - Virginia Board: <http://www.state.va.us/dpor/indexie.html>
- ❖ **Maryland Board:** <http://www.dllr.state.md.us/>
- ❖ **Professional Publications:**
  - <http://www.ppi2pass.com>