



***Fundamental of Engineering
Examination
Review Sessions***

***January 20, 2016
6:00 PM***

2228 Patrick F. Taylor Hall





Coordinator of the Review Sessions

- **Dr. Louay Mohammad**
- **Civil and Environmental Engineering**
- **E-mail: Louaym@Lsu.Edu**





Fundamental of Engineering Examination -- Outline

- **Computer Based Testing**



Why take the FE Exam?

➤ Employment

- State agencies requires FE certification

➤ Pursue PE license

- Regulations established by state licensing boards
- General requirements
 - » Graduate from an ABET-accredited engineering program
 - » Pass FE exam
 - » Obtain 4 or more years of engineering experience (some credit given for advanced engineering degree)

➤ Professional Career Advancement



Review Session Overview

- **Review of subjects covered on national FE Exam**
- **January 20 – March 30, 2016**
 - Wednesday
 - 6:00pm to 8:00pm
 - Review schedule
 - <http://www.eng.lsu.edu/students/current/resources/fe>
 - Example problems



Review Session Schedule

DATE	TOPIC COVERED	INSTRUCTOR	Contact
January 20	Introduction	Mohammad	louaym@lsu.edu
January 27	Statics	Moorthy	moorthy@lsu.edu
February 3	Electrical Engineering	Rabalais	mrabal3@lsu.edu
February 10	Strength of Materials	Moorthy	moorthy@lsu.edu
February 24	Dynamics	Waggenpack	mewagg@lsu.edu
March 2	Thermodynamics	Schoegl	ischoegl@tigers.lsu.edu
March 9	Fluid Mechanics	Tsai	ftsai@lsu.edu
March 16	Math	Hongchao Zhang	hozhang@math.lsu.edu
March 30	Engineering Economy	Liao	ieliao@lsu.edu

***All sessions are from 6:00 PM to 8:00 PM**

Exam Administration

- NCEES computer-based exams are administered exclusively at approved Pearson VUE test centers
- NCEES Examinee Guide – 37 Pages
 - https://cdn.ncees.org/wp-content/uploads/2013/10/ExamGuide_December-2014.pdf

➤ Website:

– www.ncees.org




NCEES
EXAMINEE
GUIDE

DECEMBER 2014




Reference Materials

- **NCEES FE Supplied Reference Handbook**
 - free download
 - **http://www.ncees.org/Exams/Study_materials/Download_FE_Supplied-Reference_Handbook.php**
 - **Familiarize yourself with the e-version of hand book prior to the test**
 - Watch the Video
 - 4:35 minutes
- 



Eligibility

- No longer apply to *LAPELS* for approval.
 - Register for the exam directly with NCEES
 - www.ncees.org/Exams.php
 - *Watch video*
 - » 1.06 minutes
 - Follow directions
 - Exam fee: \$225 Paid directly to NCEES
 - » Check website for cancelation/re-fund policy
- 

FE CBT Exam Specifications

- **Greater scheduling flexibility for candidates, year-round.**
 - Exams will be administered 175 days a year
 - Monday through Friday
- **Test can be taken up to 3 times a year, but only once per testing window**
- **Year-Round Testing (Windows)**
 - January - February
 - April - May
 - July - August
 - October - November
- **Best time available: Register as far in advance as possible**
- **Fifteen available seats per testing session.**
- **Results (P/F): e-mail notification from NCEES within 7-10 days.**



Eligibility / Venue

- **Can I choose to take pencil and paper version?**
 - No
 - FE and FS exams will be offered only on computers at approved Pearson VUE testing centers.
 - » <http://cbt.ncees.org/where-will-i-take-my-exam/>
 - » Baton Rouge, Metairie, Shreveport



FE Exam specifications

- **Total Duration of Exam: 6:00**
 - Exam length: 5:20
 - Break: 0:20
 - Tutorial, disclaimer, and end of exam survey: 0:20

- **Test make up**
 - 7 Discipline Specific Exams: <http://ncees.org/exams/fe-exam/>
 - » Chemical
 - » Civil
 - » Electrical/ Computer
 - » Environmental
 - » Industrial
 - » Mechanical
 - » Others
 - 110 multiple choice questions
- **Answer all questions**
- **Passing score**
 - Expert committee
 - Level of performance
 - » Corresponds with minimal competence in that discipline

Discipline Specific Specifications can be found at:

- **Chemical**
 - http://cvt.ncees.org/wp-content/uploads/2013/01/FE-Chem-CBT_with-ranges.pdf
- **Civil**
 - http://cvt.ncees.org/wp-content/uploads/2013/01/FE-Civil-CBT-specs_with-ranges.pdf
- **Electrical and Computer**
 - http://cvt.ncees.org/wp-content/uploads/2013/01/FE-Ele-CBT-specs_with-ranges.pdf
- **Environmental**
 - http://cvt.ncees.org/wp-content/uploads/2013/01/FE-Env-CBT-specs_with-ranges.pdf
- **Industrial**
 - http://cvt.ncees.org/wp-content/uploads/2013/01/FE-Ind-CBT-specs_with-ranges.pdf
- **Mechanical**
 - http://cvt.ncees.org/wp-content/uploads/2013/01/FE-Mec-CBT-specs_with-ranges.pdf
- **Other Disciplines**
 - http://cvt.ncees.org/wp-content/uploads/2013/01/FE-Other-CBT-specs_with-ranges.pdf

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or we can put this:

<http://cbit.ncees.org/major-domains-for-the-fe-exams-beginning-in-2014/>

This is the website that lists the links for each discipline spec

Student, 6/21/2013

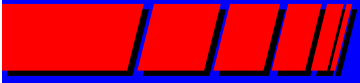
FE Exam specifications – Example of Industrial 13 Topics

Knowledge	Number of Questions
1. Mathematics	6–9
A. Analytic geometry	
B. Calculus	
C. Matrix operations	
D. Vector analysis	
E. Linear algebra	
2. Engineering Sciences	5–8
A. Work, energy, and power	
B. Material properties and selection	
C. Charge, energy, current, voltage, and power	
3. Ethics and Professional Practice	5–8
A. Codes of ethics and licensure	
B. Agreements and contracts	
C. Professional, ethical, and legal responsibility	
D. Public protection and regulatory issues	
4. Engineering Economics	10–15
A. Discounted cash flows (PW, EAC, FW, IRR, amortization)	
B. Types and breakdown of costs (e.g., fixed, variable, direct and indirect labor)	
C. Cost analyses (e.g., benefit-cost, breakeven, minimum cost, overhead)	
D. Accounting (financial statements and overhead cost allocation)	
E. Cost estimation	
F. Depreciation and taxes	
G. Capital budgeting	
5. Probability and Statistics	10–15
A. Combinatorics (e.g., combinations, permutations)	
B. Probability distributions (e.g., normal, binomial, empirical)	
C. Conditional probabilities	
D. Sampling distributions, sample sizes, and statistics (e.g., central tendency, dispersion)	
E. Estimation (e.g., point, confidence intervals)	
F. Hypothesis testing	
G. Regression (linear, multiple)	
H. System reliability (e.g., single components, parallel and series systems)	
I. Design of experiments (e.g., ANOVA, factorial designs)	
6. Modeling and Computations	8–12
A. Algorithm and logic development (e.g., flowcharts, pseudocode)	
B. Databases (e.g., types, information content, relational)	
C. Decision theory (e.g., uncertainty, risk, utility, decision trees)	
D. Optimization modeling (e.g., decision variables, objective functions, and constraints)	
E. Linear programming (e.g., formulation, primal, dual, graphical solutions)	
F. Mathematical programming (e.g., network, integer, dynamic, transportation, assignment)	
G. Stochastic models (e.g., queuing, Markov, reliability)	
H. Simulation	
7. Industrial Management	8–12
A. Principles (e.g., planning, organizing, motivational theory)	

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H. Simulation	
7. Industrial Management	8–12
A. Principles (e.g., planning, organizing, motivational theory)	
B. Tools of management (e.g., MBO, reengineering, organizational structure)	
C. Project management (e.g., scheduling, PERT, CPM)	
D. Productivity measures	
8. Manufacturing, Production, and Service Systems	8–12
A. Manufacturing processes	
B. Manufacturing systems (e.g., cellular, group technology, flexible)	
C. Process design (e.g., resources, equipment selection, line balancing)	
D. Inventory analysis (e.g., EOQ, safety stock)	
E. Forecasting	
F. Scheduling (e.g., sequencing, cycle time, material control)	
G. Aggregate planning	
H. Production planning (e.g., JIT, MRP, ERP)	
I. Lean enterprises	
J. Automation concepts (e.g., robotics, CIM)	
K. Sustainable manufacturing (e.g., energy efficiency, waste reduction)	
L. Value engineering	
9. Facilities and Logistics	8–12
A. Flow measurements and analysis (e.g., from/to charts, flow planning)	
B. Layouts (e.g., types, distance metrics, planning, evaluation)	
C. Location analysis (e.g., single- and multiple-facility location, warehouses)	
D. Process capacity analysis (e.g., number of machines and people, trade-offs)	
E. Material handling capacity analysis	
F. Supply chain management and design	
10. Human Factors, Ergonomics, and Safety	8–12
A. Hazard identification and risk assessment	
11. Work Design	8–12
A. Methods analysis (e.g., charting, workstation design, motion economy)	
B. Time study (e.g., time standards, allowances)	
C. Predetermined time standard systems (e.g., MOST, MTM)	
D. Work sampling	
E. Learning curves	
12. Quality	8–12
A. Six sigma	
B. Management and planning tools (e.g., fishbone, Pareto, QFD, TQM)	
C. Control charts	
D. Process capability and specifications	
E. Sampling plans	
F. Design of experiments for quality improvement	


FE Exam specifications

Discipline						
Chemical	Civil	Electrical	Environmental	Industrial	Mechanical	Other
Mathematics	Mathematics	Mathematics	Mathematics	Mathematics	Mathematics	Mathematics and Advanced Engineering Mathematics
Probability and Statistics	Probability and Statistics	Probability and Statistics	Probability and Statistics	Engineering Sciences	Probability and Statistics	Probability and Statistics
Engineering Sciences	Computational Tools	Ethics and Professional Practice	Ethics and Professional Practice	Ethics and Professional Practice	Computational Tools	Chemistry
Computational Tools	Ethics and Professional Practice	Engineering Economics	Engineering Economics	Engineering Economics	Ethics and Professional Practice	Instrumentation and Data Acquisition
Material Science	Engineering Economics	Properties of Electrical Materials	Material Science	Probability and Statistics	Engineering Economics	Ethics and Professional Practice
Chemistry	Statics	Engineering Sciences	Environmental Science and Chemistry	Modeling and Computations	Electricity and Magnetism	Safety, Health, and Environment
Fluid Mechanics/Dynamics	Dynamics	Circuit Analysis (DC and AC Steady State)	Risk Assessment	Industrial Management	Statics	Engineering Economics
Thermodynamics	Mechanics of Materials	Linear Systems	Fluid Mechanics	Manufacturing, Production, and Service Systems	Dynamics, Kinematics, and Vibrations	Statics
Material /Energy Balances	Materials	Signal Processing	Thermodynamics	Facilities and Logistics	Mechanics of Materials	Dynamics
Heat Transfer	Fluid Mechanics	Electronics	Water Resources	Human Factors, Ergonomics, and Safety	Material Properties and Processing	Strength of Materials
Mass Transfer and Separation	Hydraulics and Hydrologic Systems	Power	Water and Wastewater	Work Design	Fluid Mechanics	Materials Science
Chemical Reaction Engineering	Structural Analysis	Electromagnetics	Air Quality	Quality	Thermodynamics	Fluid Mechanics and Dynamics of Liquids
Process Design and Economics	Structural Design	Control Systems	Solid and Hazardous Waste	Systems Engineering	Heat Transfer	Fluid Mechanics and Dynamics of Gases
Process Control	Geotechnical Engineering	Communications	Groundwater and Soils		Measurements, Instrumentation, and Controls	Electricity, Power, and Magnetism
Safety, Health, and Environment	Transportation Engineering	Computer Networks			Mechanical Design and Analysis	Heat, Mass, and Energy Transfer
Ethics and Professional	Environmental Engineering	Digital Systems				



FE Exam specifications -- What can you bring to the exam room?

- **Enhanced security for exam content**
 - Check-in: government issued ID, photo taken, and palm-vein scan
 - *Watch the video*
 - http://www.ncees.org/Exams/Study_materials/Download_FE_Supplied-Reference_Handbook.php

 - **Permitted**
 - Calculators
 - Check Calculator Policy
 - » <http://ncees.org/exams/calculator-policy/>
 - Small dry-erase board will be supplied for calculations
 - FE Reference Manual will be embedded in the computer in a searchable pdf file format
 - Watch the video
 - http://www.ncees.org/Exams/Study_materials/Download_FE_Supplied-Reference_Handbook.php
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Suggestions for Taking the FE Exam

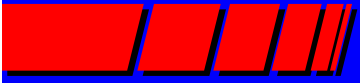
- **Start with subject areas you are familiar with**
 - Stronger areas to weaker areas.
- **Manage your time wisely**
 - Don't spend more than 3-5 minutes on a question
 - return to the question later
 - At about 20 minutes before finish time
 - » return to the skipped questions
 - At about 5 minutes from the end, guess
 - » Wrong answers have no penalty



Useful Web site

- www.eng.lsu.edu
- www.ncees.org
- www.lapels.com





***Good
Luck***

