ENGINEERINTRAININGEXAM.COM | JUSTIN DICKMEYER, PE

A complete Study Guide
to Setting Yourself up
for Success on the
Engineer In Training Exam

# THE EIT PREPARATION BOOT CAMP

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BY JUSTIN DICKMEYER, PE OF

ENGINEERINTRAININGEXAM.COM

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**A Note from Me to You:**

You probably made your way to this eBook via my website, EngineerInTrainingExam.com, or maybe it was passed on by a friend. Whichever is the case, I want to begin by thanking you for taking the time to absorb the information within.

I put together this guide simply to help you focus in on taking and dominating the Engineer in Training Exam, to attempt to give you an option to the ordinary routine of 'most people'. It wasn't too long ago that I myself began the journey of becoming a Registered Professional Engineer. **I was motivated from the start and had the desire to succeed, but found myself locked behind a mind overwhelmed with the massive task of studying for the Engineer in Training exam.** Looking for simple guidance in preparing for the exam, I turned to the internet, only to find myself failing to uncover any source of real value dedicated to preparing for the EIT exam. With no time to spare, I delved forward on my journey creating my own path to success.

This eBook is a guide, and the purpose of it is simply to do just that, guide you. It is not a system, and definitively is not the only resource needed to take and pass the Engineer in Training exam. However, it will walk you through a beginning, middle, and end game to setting up and dominating your EIT exam journey. If I am able to help just one person dominate the Engineer in Training Exam, then I feel the time I have spent to put together this eBook will be well worth it.

To all my subscribers, followers, and friends, thank you for the gift of your support and time. If you are not a subscriber, I hope that this free guide will pay forward the opportunity for EngineerInTrainingExam.com to be your all in one EIT exam preparation resource. If at anytime during this eBook you need to contact me, don't hesitate to shoot me a personal email at Justin@EngineerInTrainingExam.com. So for now, take care of yourself and your loved ones. Good Luck!

Justin Dickmeyer, PE

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# EIT PREPARATION | **BOOT CAMP**

## DEFINING THE ENGINEER IN TRAINING EXAM

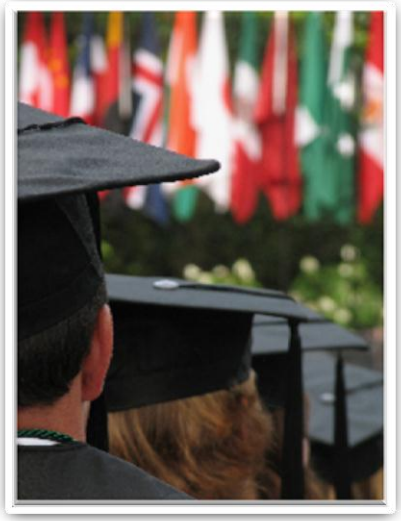
The Engineer in Training (EIT) exam, formally known as the Fundamentals of Engineering (FE) exam, is the first step in acquiring your Professional Engineer (PE) License.

The road to acquiring the Professional Engineer license can be broken down to three step process, each step with its unique requirements and characteristics; the steps are as follows:

1. **Take and pass the Engineer in Training exam**
2. **Gain the required experience as an Engineer in Training (EIT) while working under a Registered Professional Engineer**
3. **Take and pass the Professional Engineering exam**

When you become a Professional Engineer, you become part of an elite group of Engineers that are given an array of exclusive benefits. Such benefits include running your own Engineering Firm, stamping and sealing drawings, and a wider range of available job positions with greater personal compensation. For the sake of keeping our focus, let's return to covering step 1 of the PE process, the Engineer in Training exam.

The EIT exam is developed by the National Council of Examiners for Engineering and Surveying (NCEES) and is taken over an 8 hour period in one day. The exam is broken up in to two independent testing sessions, morning and afternoon, each 4 hours in length. The exam as a whole is comprised of 180 multiple choice questions and is currently taken on paper, but soon NCEES is aiming to move the exam to a computer format in all States.



The exam is administered by the NCEES semiannually (typically April and October) and at specific locations throughout every state. The specific date of the tests are not universal but are defined by each State's Board of Engineers. The cost also varies, but can range anywhere from free to a few hundred dollars. A page dedicated to the State by State Requirements can be referenced further for your specific State's information.

## EDUCATIONAL REQUIREMENTS

The Education requirements set forth to sit for the Engineer in Training exam vary widely from state to state. For the majority, if you are attending or have graduated from an EAC/ABET accredited engineering program, you will be good to go to sit for the exam. However, it is not uncommon that states accept degrees from other accredited programs such as TAC/ABET and ASAC/ABET; again it is dependent on the specific state. Some states even allow individuals who have graduated from Non EAC/ABET, Non TAC/ABET and Non ASAC/ABET to sit for the exam. These states may require some further educational requirements during step 2 of the PE process.

I probably just completely confused you, and that was not my intent, but my point is, educational requirements vary, so don't let anyone tell you that you must have this degree or that degree, make sure to check for yourself. The State by State Requirements page at EngineerInTrainingExam.com can shed some nice light on your specific State's guidelines.

If you were raised outside the United States and received your degree from a foreign country, there is no need to worry, you still have a chance to take the Engineer in Training exam. Most states nowadays accept equivalent foreign education by determining eligibility through services such as the Center for Professional Engineer Education Services (CPEES) and American Association of Collegiate Registrars and Admissions Officers (AACRA). If you fall in to this category, make sure to contact your State Board immediately prior to setting forth on your journey to get accurate details on their requirements. This is important because they will determine when, how, and what steps are required to obtain the opportunity to sit for the EIT Exam.

So that's the test in a nut shell. Now that you are well primed with what the test is all about, it's time to consider committing yourself and applying. The registration process for the EIT exam is fairly straight forward, but there is a sequence and deadlines that must be considered, and unfortunately it can't be done all in one place. The steps to take are:

1. ***Register for the examination with NCEES***
2. ***Register for the examination through your State Board***

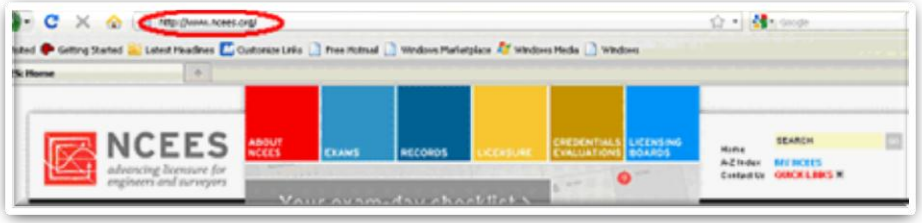
## APPLYING FOR THE ENGINEER IN TRAINING EXAM

The first step in applying for the Engineer in Training Exam starts with registering on the NCEES website. This requirement just recently became a standard in Fall of 2010, and all applicants, regardless of whether they have already taken the exam and are re-filing or not, must follow this specific process.

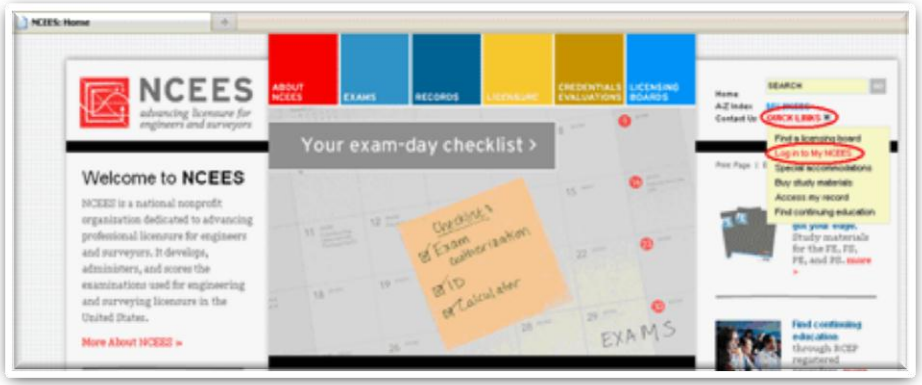
The NCEES does have a specific time frame for open registration, so refer to your State's guidelines to ensure you don't miss it. However, the registration time frame usually opens around 4 months prior to the exam date and runs up until about a month prior to the exam. As an example, say you are registering for an early October exam date, registration would typically open in early July (4 months prior) and close down in early September (1 month prior). Make sure not to procrastinate, sign up early and get it out of the way. The registration is open 24 hours a day via the internet, so you will be able to complete the process anytime and at your own convenience.

## NCEES REGISTRATION PROCEDURE

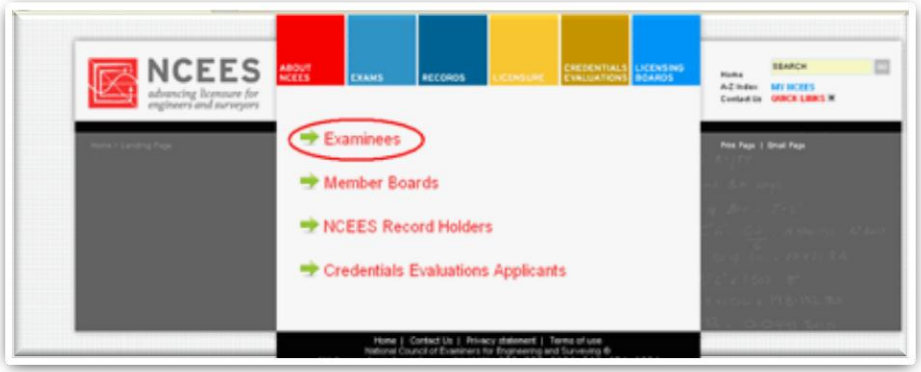
Visit the NCEES website



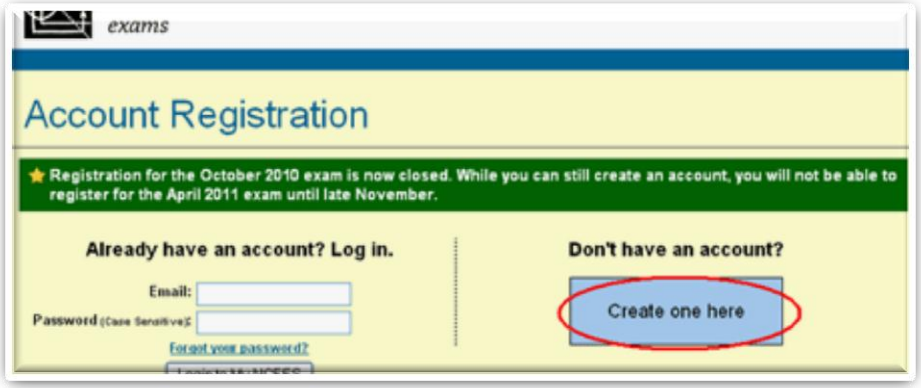

On the right hand side of the website, locate the Quick Links navigation bar and hover over it with your cursor. A drop down menu will pop up, locate and click "Log in to My NCEES"



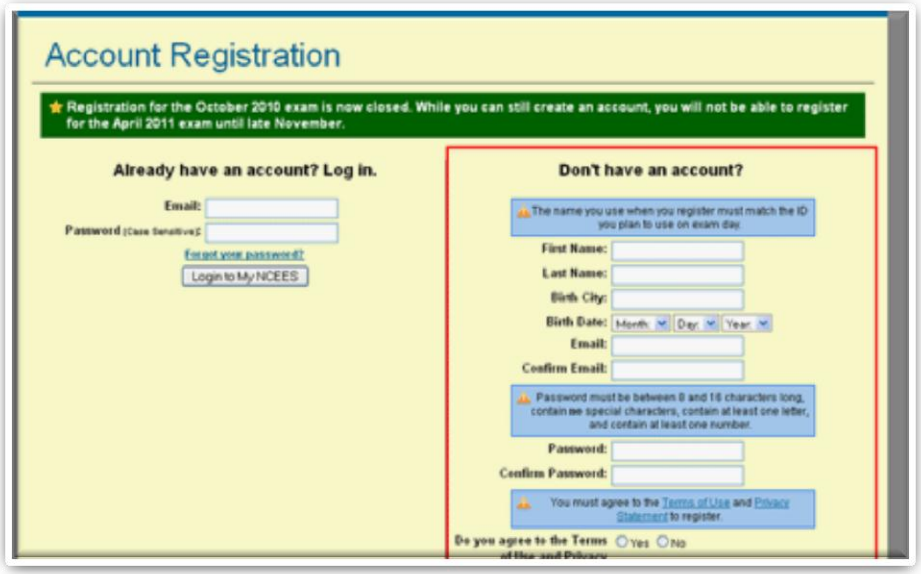

Once you are on the NCEES sign in page, click on the first link titles "Examinees"



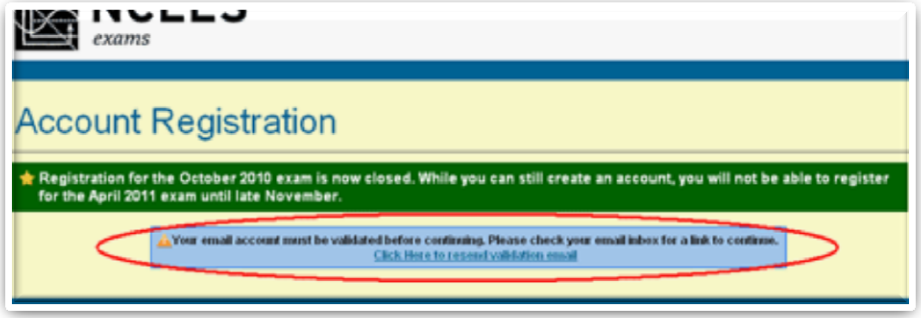

You will be routed to an Account Registration page, where you will either be able to sign in with your current account information or create a new account. We are going to create a new account to fulfill our registration requirements with NCEES. On the right side of the screen, click "Create one here"




At this point, fill out your personal information on the right side, First Name, Last Name, Birth City, etc. Once you get your password entered in, make sure to read the Terms of Use and Privacy Statement. When you agree, click to fill in the bubble that you agree, and submit your form.



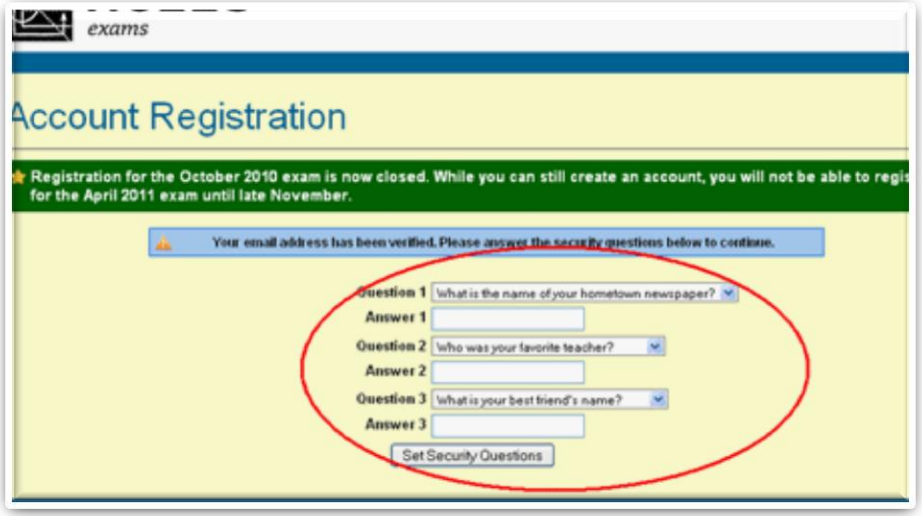

Once you submit your form, you will be redirected to a landing page informing you that a confirming email was sent to you for validation.



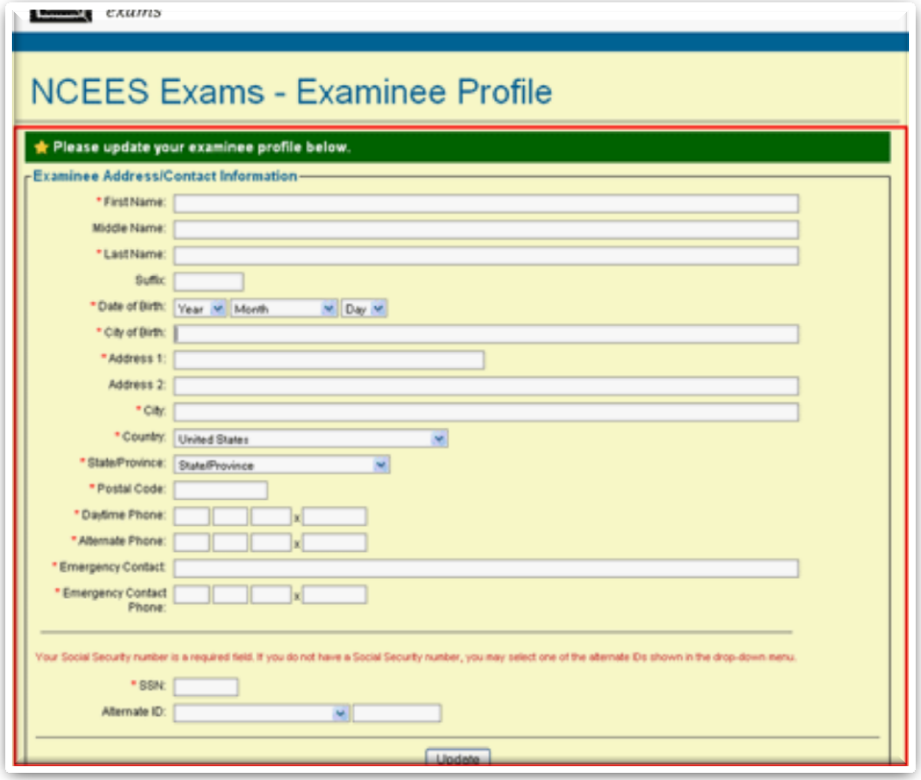

Go to your email and validate your account. When you click the link in your email, you will be taken back to the NCEES site where you will now use your newly activated account login information to sign in.

Once you login, there are a few more steps you need to take to ensure you profile is fully complete and activated.

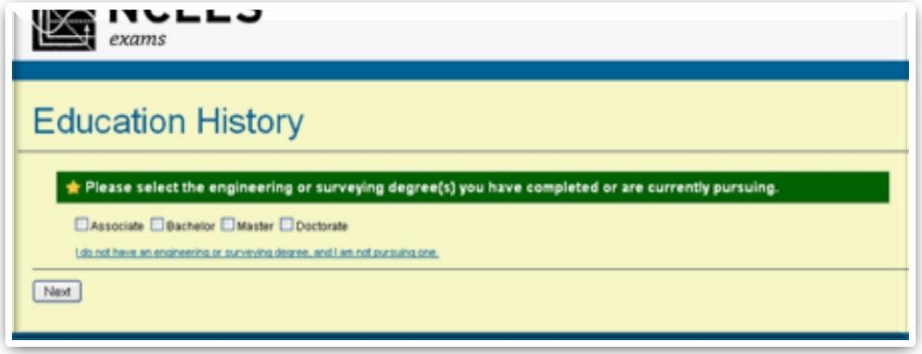
Fill in your security questions, make sure you can remember them, then click
"Set Security Questions" to move on to the next page.



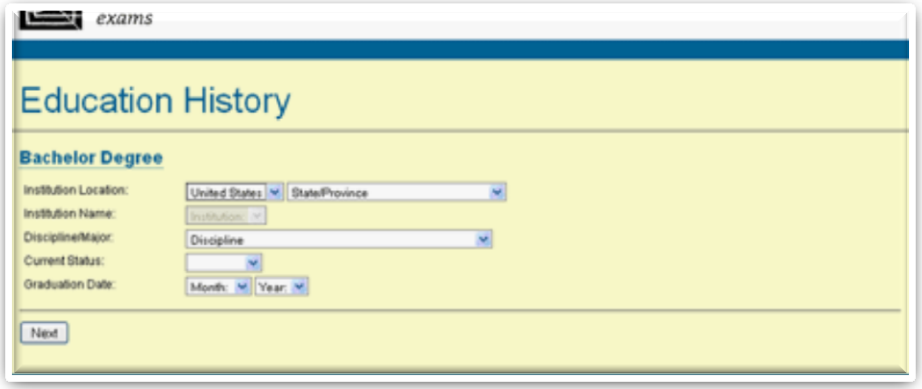

With the Security questions set, finish off you profile by filling out the remaining information NCEES requires. This includes a Social Security Number, but if you don't have one, there a few more options. Just choose the one that best fits and provide the information.




Give NCEES some information regarding the degree that you currently are pursuing or graduated with.




Fill out the information regarding you educational background and confirm when prompted.




And there you are, complete with the first step in registering for the Engineer in Training Exam registration. Remember, the NCEES registration is open around the clock during the open registration period, but

this period of registration is limited, so make sure to determine early when this period is so you don't miss out.

If the current registration is open, you can now move on to registering with your State Board.

## REGISTERING WITH THE STATE

The second step in applying for the Engineer in Training Exam is to register through your State Board of Engineer's. This can be done at any point in time after registering with the NCEES.

> ***Make sure your registration/application is postmarked prior to the final filing date as defined by your Board, don't test it.***

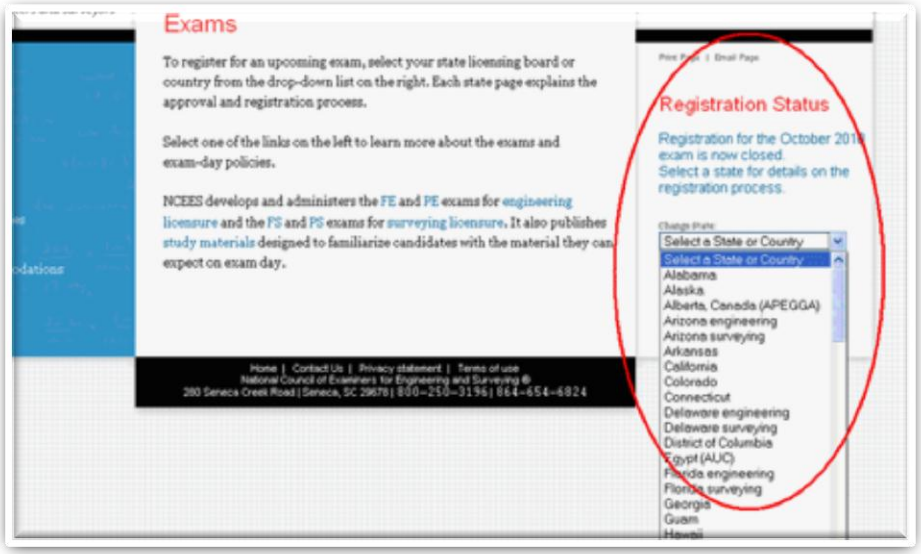
Again, be sure not to delay registering, that filing date comes fast and furious.

The following is the process of registering through the California Board. The particulars of the process may be different for other states, but the concepts will remain the same.

The first stage in applying with your Board is to head over to the NCEES website and sign in using the information you created in the previous section of the registration process. If you didn't sign out and are going straight through both of the registration steps of this process, then you will be redirected at the final step of the NCEES registration form to a print out a PDF document for your specific state.

If you did sign out though, revisit the homepage of NCEES and click on "Exams" to get started.


Once on the Exam page, refer to the right column where you will see a drop down menu of all the States, choose yours.




On the page following, you will be prompted for your sign in information. If the registration is open, it will allow you to sign in where you can then print and/or download your Application.


Run through the steps that are outlined in your application making sure to keep your handwriting legible for reviewers to process efficiently.

In your application, when prompted, choose one of the seven disciplines to be your main focus for the afternoon portion of the exam. The module you choose to take does not affect or determine the branch of engineering in which you are eligible to apply for when you go to become a Professional Engineer; so choose whichever one you feel most comfortable with at this time in your career. I personally chose to take the General portion of the exam even though I went on to become registered as a Mechanical Engineer.

***Modules to choose from: General, Chemical, Civil, Electrical, Environmental, Mechanical, or Industrial Engineering.***

When you are completed with filling out your application, take a copy of it for your records, there is always a chance that your application could be lost in the shuffle.

After you have all your paperwork situated, submit the completed and signed State application together with a check (or money order) in the amount set forth by your Board to the noted address on the application. Most states will notify you when your application is received if you include a self-addressed and stamped postcard with your application.

***I recommend that you do this, as it will take a lot of stress of your shoulders knowing that your application wasn't lost in transit.***

***Otherwise, you can expect to receive a notice via email, to the address provided during your NCEES Open Registration process, 2-3 weeks prior to the exam. This email will confirm your entry in to the exam as well as provide you with login instructions to download and print the Admission Notice. The Admission Notice must be printed and taken with you to the exam to be granted entry in to the building.***

When you mail your application make sure you provide ample postage to get it to the destination. Applications received requiring postage due will not be accepted by your Board office. These applications will be sent back, but the final filing dates will not be extended for this situation. I have personally known people who get slapped for this and its devastating to say the least.

If after you submit your application you change your home or email address, make sure to notify the Board immediately. If it is a change in your home address, use the resources and processes of your State Board to officially update it. If you change you email, update it electronically through NCEES and your Board website. Keeping these records up to date will ensure you do not miss out on any pertinent information related to the exam. This is an avoidable obstacle, make sure to avoid it.

SPECIAL ACCOMMODATIONS

***If for any reason you have the need for special testing accommodations due to Religious beliefs or for reasons falling under the Americans with Disabilities Act (ADA), don't hesitate to contact your State Board. All requests must be submitted to NCEES for approval prior to the final filing date. If you have already submitted a request for special accommodations on a previous exam, you must reapply for the most current regardless of whether or not the situation has changed.***

## WHAT TO EXPECT ON EXAM DAY

The Engineer in Training exam is an 8 hour exam taken during a 1 day period at a specified testing facility within your State. You can see where each exam site is by visiting your State Board website; find your State's Information here.

The test is 180 multiple choice questions in length and is broken up in to two 4 hour sessions, a morning and an afternoon. During the morning session, you will be asked to answer 120 multiple choice questions, each question worth one point, covering a broad range of engineering topics, ranging from general Mathematics and Calculus to Engineering Dynamics and Fluid Mechanics. During this morning session, all people taking the exam will receive the same test covering the same general engineering topics; this session is designed to verify the engineer's overall knowledge of the core engineering disciplines as a whole. Each examinee can acquire 120 total points during this session of the test.

In the afternoon session, another 60 multiple choice questions are answered, each worth two points, covering a specific discipline usually chosen by the examinee prior to the exam; typically one in line with their undergraduate engineering background. Most States require this discipline to be chosen prior to the exam, during the application process, but others allow the candidates to identify and choose the subject area during the examination.

> ***The discipline you choose to take in the PM does not affect or determine the branch of engineering in which you are eligible to apply for when you go to pursue your professional licensure, so choose the one you feel most comfortable with regardless of your planned career path.***

The questions on the PM portion of the EIT exam are tailored to hone in on the specified discipline and are completely stand-alone from those on the AM portion. This session is designed to verify the engineer's in depth knowledge of their dedicated engineering discipline. Each examinee can acquire 120 total points during this session of the test, for a total of 240 points possible for the exam as a whole.

## AM SESSION (BREADTH PORTION COVERING 12 SUBJECT AREAS)

The 12 subject areas that follow outline and further define what to expect when you sit to take the AM portion of the

Engineer in Training Exam. Each subject area is broken down in to the subtopics and can be used to focus your studies when preparing for the exam.

The percentage next to the subject is approximately how much of the total content of the AM session that particular subject will make up. This breakdown is as outlined by NCEES on their website.

I. Mathematics (15%)

A. Analytic geometry
B. Integral calculus
C. Matrix operations
D. Roots of equations
E. Vector analysis
F. Differential equations
G. Differential calculus

II. Engineering Probability and Statistics (7%)

A. Measures of central tendencies and dispersions (e.g., mean, mode, standard deviation)
B. Probability distributions (e.g., discrete, continuous, normal, binomial)
C. Conditional probabilities
D. Estimation (e.g., point, confidence intervals) for a single mean
E. Regression and curve fitting
F. Expected value (weighted average) in decision-making
G. Hypothesis testing

III. Chemistry (9%)

A. Nomenclature
B. Oxidation and reduction
C. Periodic table
D. States of matter
E. Acids and bases
F. Equations (e.g., stoichiometry)
G. Equilibrium
H. Metals and nonmetals

> ***If you don't go after what you want, you'll never have it. If you don't ask, the answer is always no. If you don't step forward, you're always in the same place*** **- Nora Roberts**

IV. Computers (7%)

A. Terminology (e.g., memory types, CPU, baud rates, Internet)
B. Spreadsheets (e.g., addresses, interpretation, "what if," copying

formulas)
C. Structured programming (e.g., assignment statements, loops and branches, function calls)

V. Ethics and Business Practices (7%)

A. Code of ethics (professional and technical societies)
B. Agreements and contracts
C. Ethical versus legal
D. Professional liability
E. Public protection issues (e.g., licensing boards)

VI. Engineering Economics (8%)

A. Discounted cash flow (e.g., equivalence, PW, equivalent annual FW, rate of return)
B. Cost (e.g., incremental, average, sunk, estimating)
C. Analyses (e.g., breakeven, benefit-cost)
D. Uncertainty (e.g., expected value and risk)

## PM SESSION (IN DEPTH DISCIPLINE SPECIFIC)

The following breakdown represents the 7 specific modules you are able to choose from for the PM portion of the Engineer in Training Exam. It is good to take a hard look at each discipline, as you may be better fit to choose a module that you wouldn't usually choose. Again, the percentage next to the subject is approximately how much of the total content of the PM session that particular area will make up. This breakdown is as outlined by NCEES on their website.

## CHEMICAL PM

The following is a breakdown of the 11 topics covered in the Chemical PM portion of the Engineer in Training Exam.

The percentage next to the subject is approximately how much of the total content of the PM session that particular subject makes up. This breakdown is as outlined by NCEES on their website.

I. Chemistry (10% )

A. Inorganic chemistry (e.g., molarity, normality, molality, acids, bases, redox, valence, solubility product, pH, pK,

electrochemistry)
B. Organic chemistry (e.g., nomenclature, structure, qualitative and quantitative
analyses, balanced equations, reactions, synthesis)

II. Material/Energy Balances (15%)

A. Mass balance
B. Energy balance
C. Control boundary concept (e.g., black box concept)
D. Steady-state process
E. Unsteady-state process
F. Recycle process
G. Bypass process
H. Combustion

III. Chemical Engineering Thermodynamics (10%)

A. Thermodynamic laws (e.g., 1st Law, 2nd Law)
B. Thermodynamic properties (e.g., internal thermal energy, enthalpy, entropy, free energy)
C. Thermodynamic processes (e.g., isothermal, adiabatic, isentropic)
D. Property and phase diagrams (e.g., T-s, h-P, x-y, T-x-y)
E. Equations of state (e.g., van der Waals, Soave-Redlich-Kwong)
F. Steam tables
G. Phase equilibrium and phase change
H. Chemical equilibrium
I. Heats of reaction
J. Cyclic processes and efficiency (e.g., power, refrigeration, heat pump)
K. Heats of mixing

IV. Fluid Dynamics (10%)

A. Bernoulli equation and mechanical energy balance
B. Hydrostatic pressure
C. Dimensionless numbers (e.g., Reynolds number)
D. Laminar and turbulent flow
E. Velocity head
F. Friction losses (e.g., pipe, valves, fittings)
G. Pipe networks
H. Compressible and incompressible flow
I. Flow measurement (e.g., orifices, Venturi meters)
J. Pumps, turbines, and compressors
K. Non-Newtonian flow
L. Flow through packed beds

V. Heat Transfer (10%)

A. Conductive heat transfer
B. Convective heat transfer

C. Radiation heat transfer
D. Heat transfer coefficients
E. Heat exchanger types (e.g., plate and frame, spiral)
F. Flow configuration (e.g., cocurrent/countercurrent)
G. Log mean temperature difference (LMTD) and NTU
H. Fouling
I. Shell-and-tube heat exchanger design (e.g., area, number of passes)

VI. Mass Transfer (10%)

A. Diffusion (e.g., Fick's 1st and 2nd laws)
B. Mass transfer coefficient
C. Equilibrium stage method (efficiency)
D. Graphical methods (e.g., McCabe-Thiele)
E. Differential method (e.g., NTU, HETP, HTU, NTP)
F. Separation systems (e.g., distillation, absorption, extraction, membrane processes)
G. Humidification and drying

VII. Chemical Reaction Engineering (10%)

A. Reaction rates and order
B. Rate constant (e.g., Arrhenius function)
C. Conversion, yield, and selectivity
D. Series and parallel reactions
E. Forward and reverse reactions
F. Energy/material balance around a reactor
G. Reactions with volume change
H. Reactor types (e.g., plug flow, batch, semi-batch, CSTR)
I. Homogeneous and heterogeneous reactions
J. Catalysis

VIII. Process Design and Economic Optimization (10%)

A. Process flow diagrams (PFD)
B. Piping and instrumentation diagrams (P&ID)
C. Scale-up
D. Comparison of economic alternatives (e.g., net present value, discounted cash flow, rate of return)
E. Cost estimation

IX. Computer Usage in Chemical Engineering (5%)

A. Numerical methods and concepts (e.g., convergence, tolerance)
B. Spreadsheets for chemical engineering calculations
C. Statistical data analysis

X. Process Control (5%)

A. Sensors and control valves (e.g., temperature, pressure)

B. Dynamics (e.g., time constants, 2nd order, underdamped)
C. Feedback and feedforward control
D. Proportional, integral, and derivative (PID) controller concepts
E. Cascade control
F. Control loop design (e.g., matching measured and manipulated variables)
G. Tuning PID controllers and stability (e.g., Method of Ziegler-Nichols, Routh Test)
H. Open-loop and closed-loop transfer functions

XI. Safety, Health, and Environmental (5%)

A. Hazardous properties of materials (e.g., corrosive, flammable, toxic), including MSDS
B. Industrial hygiene (e.g., noise, PPE, ergonomics)
C. Process hazard analysis (e.g., using fault-tree analysis or event tree)
D. Overpressure and underpressure protection (e.g., relief, redundant control, intrinsically safe)
E. Storage and handling (e.g., inerting, spill containment)
F. Waste minimization
G. Waste treatment (e.g., air, water, solids)

## CIVIL PM

The following is a breakdown of the 9 topics covered in the Civil PM portion of the Engineer in Training Exam.

The percentage next to the subject is approximately how much of the total content of the PM session that particular subject makes up. This breakdown is as outlined by NCEES on their website.

I. Surveying (11%)

A. Angles, distances, and trigonometry
B. Area computations
C. Closure
D. Coordinate systems (e.g., GPS, state plane)
E. Curves (vertical and horizontal)
F. Earthwork and volume computations
G. Leveling (e.g., differential, elevations, percent grades)

II. Hydraulics and Hydrologic Systems (12%)

A. Basic hydrology (e.g., infiltration, rainfall, runoff, detention, flood flows, watersheds)
B. Basic hydraulics (e.g., Manning equation, Bernoulli theorem, open-channel flow, pipe flow)
C. Pumping systems (water and wastewater)
D. Municipal water distribution systems
E. Reservoirs (e.g., dams, routing, spillways)
F. Groundwater (e.g., flow, wells, drawdown)
G. Sewer collection systems (storm and sanitary)

III. Soil Mechanics and Foundations (15%)

A. Index properties and soil classifications
B. Phase relations (air-water-solid)
C. Laboratory and field tests
D. Effective stress (buoyancy)
E. Retaining walls (e.g., active pressure/passive pressure)
F. Shear strength
G. Bearing capacity (cohesive and noncohesive)
H. Foundation types (e.g., spread footings, piles, wall footings, mats)
I. Consolidation and differential settlement
J. Seepage
K. Slope stability (e.g., fills, embankments, cuts, dams)
L. Soil stabilization (e.g., chemical additives, geosynthetics)

IV. Environmental Engineering (12%)

A. Water quality (ground and surface)
B. Air quality
C. Solid/hazardous waste
D. Sanitary sewer system loads
E. Basic tests (e.g., water, wastewater, air)
F. Environmental regulations
G. Water treatment and wastewater treatment (e.g., primary, secondary, tertiary)

V. Transportation (12%)

A. Streets and highways

1. geometric design
2. pavement design
3. intersection design

B. Traffic analysis and control

1. safety
2. capacity
3. traffic flow
4. traffic control devices

VI. Structural Analysis (10%)

A. Force analysis of statically determinant beams, trusses and frames
B. Deflection analysis of statically determinant beams, trusses and frames
C. Stability analysis of beams, trusses and frames
D. Column analysis (e.g., buckling, boundary conditions)
E. Loads and load paths (e.g., dead, live, moving)
F. Elementary statically indeterminate structures

VII. Structural Design (10%)

A. Codes (e.g., AISC, ACI, NDS, AISI)
B. Design procedures for steel components (e.g., beams, columns, beam-columns, tension members, connections)
C. Design procedures for concrete components (e.g., beams, slabs, columns, walls, footings)

VIII. Construction Management (10%)

A. Procurement methods (e.g., design-build, design-bid-build, qualifications based)
B. Allocation of resources (e.g., labor, equipment, materials, money, time)
C. Contracts/contract law
D. Project scheduling (e.g., CPM, PERT)
E. Engineering economics
F. Project management (e.g., owner/contractor/client relations, safety)
G. Construction estimating

IX. Materials (8%)

A. Concrete mix design
B. Asphalt mix design
C. Test methods (e.g., steel, concrete, aggregates, asphalt)
D. Properties of aggregates
E. Engineering properties of metals

## MECHANICAL PM

The following is a breakdown of the 8 topics covered in the Mechanical PM portion of the Engineer in Training Exam.

The percentage next

to the subject is approximately how much of the total content of the PM session that particular subject makes up. This breakdown is as outlined by NCEES on their website.

I. Mechanical Design and Analysis (15%)

A. Stress analysis (e.g., combined stresses, torsion, normal, shear)
B. Failure theories (e.g., static, dynamic, buckling)
C. Failure analysis (e.g., creep, fatigue, fracture, buckling)
D. Deformation and stiffness
E. Components (e.g., springs, pressure vessels, beams, piping, bearings, columns, power screws)
F. Power transmission (e.g., belts, chains, clutches, gears, shafts, brakes, axles)
G. Joining (e.g., threaded fasteners, rivets, welds, adhesives)
H. Manufacturability (e.g., fits, tolerances, process capability)
I. Quality and reliability
J. Mechanical systems (e.g., hydraulic, pneumatic, electro-hybrid)

II. Kinematics, Dynamics, and Vibrations (15%)

A. Kinematics of mechanisms
B. Dynamics of mechanisms
C. Rigid body dynamics
D. Natural frequency and resonance
E. Balancing of rotating and reciprocating equipment
F. Forced vibrations (e.g., isolation, force transmission, support motion)

III. Materials and Processing (10%)

A. Mechanical and thermal properties (e.g., stress/strain relationships, ductility, endurance, conductivity, thermal expansion)
B. Manufacturing processes (e.g., forming, machining, bending, casting, joining, heat treating)
C. Thermal processing (e.g., phase transformations, equilibria)
D. Materials selection (e.g., metals, composites, ceramics, plastics, bio-materials)
E. Surface conditions (e.g., corrosion, degradation, coatings, finishes)
F. Testing (e.g., tensile, compression, hardness)

IV. Measurements, Instrumentation, and Controls (10%)

A. Mathematical fundamentals (e.g., Laplace transforms, differential equations)

B. System descriptions (e.g., block diagrams, ladder logic, transfer functions)
C. Sensors and signal conditioning (e.g., strain, pressure, flow, force, velocity, displacement, temperature)
D. Data collection and processing (e.g., sampling theory, uncertainty, digital/analog, data transmission rates)
E. Dynamic responses (e.g., overshoot/time constant, poles and zeros, stability)

V. Thermodynamics and Energy Conversion Processes (15%)

A. Ideal and real gases
B. Reversibility/irreversibility
C. Thermodynamic equilibrium
D. Psychrometrics
E. Performance of components
F. Cycles and processes (e.g., Otto, Diesel, Brayton, Rankine)
G. Combustion and combustion products
H. Energy storage
I. Cogeneration and regeneration/reheat

VI. Fluid Mechanics and Fluid Machinery (15%)

A. Fluid statics
B. Incompressible flow
C. Fluid transport systems (e.g., pipes, ducts, series/parallel operations)
D. Fluid machines: incompressible (e.g., turbines, pumps, hydraulic motors)
E. Compressible flow
F. Fluid machines: compressible (e.g., turbines, compressors, fans)
G. Operating characteristics (e.g., fan laws, performance curves, efficiencies, work/power equations)
H. Lift/drag
I. Impulse/momentum

VII. Heat Transfer (10%)

A. Conduction
B. Convection
C. Radiation
D. Composite walls and insulation
E. Transient and periodic processes
F. Heat exchangers
G. Boiling and condensation heat transfer

VIII. Refrigeration and HVAC (10%)

A. Cycles
B. Heating and cooling loads (e.g., degree day data, sensible heat, latent heat)
C. Psychrometric charts
D. Coefficient of performance
E. Components (e.g., compressors, condensers, evaporators, expansion valve)

## INDUSTRIAL PM

The following is a breakdown of the 8 topics covered in the Industrial PM portion of the Engineer in Training Exam.

The percentage next to the subject is approximately how much of the total content of the PM session that particular subject makes up. This breakdown is as outlined by NCEES on their website.

I. Engineering Economics (15%)

A. Discounted cash flows (equivalence, PW, EAC, FW, IRR, loan amortization)
B. Types and breakdown of costs (e.g., fixed, variable, direct and indirect labor, material, capitalized)
C. Analyses (e.g., benefit-cost, breakeven, minimum cost, overhead, risk, incremental, life cycle)
D. Accounting (financial statements and overhead cost allocation)
E. Cost estimating
F. Depreciation and taxes
G. Capital budgeting

II. Probability and Statistics (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 (point estimates, confidence intervals)
F. Hypothesis testing
G. Regression (linear, multiple)
H. System reliability (single components, parallel and series systems)
I. Design of experiments (e.g., ANOVA, factorial designs)

III. Modeling and Computation (12%)

A. Algorithm and logic development (e.g., flow charts, pseudo-code)
B. Spreadsheets
C. Databases (e.g., types, information content, relational)
D. Decision theory (e.g., uncertainty, risk, utility, decision trees)
E. Optimization modeling (decision variables, objective functions, and constraints)
F. Linear programming (e.g., formulation, primal, dual, graphical solution)
G. Math programming (network, integer, dynamic, transportation, assignment)
H. Stochastic models (e.g., queuing, Markov, reliability)
I. Simulation (e.g., event, process, Monte Carlo sampling, random number generation, steady-state vs. transient)

IV. Industrial Management (10%)

A. Principles (e.g., planning, organizing) and tools of management (e.g., MBO, re-engineering)
B. Organizational structure (e.g., functional, matrix, line/staff)
C. Motivation theories (e.g., Maslow, Theory X, Theory Y)
D. Job evaluation and compensation
E. Project management (scheduling, PERT, CPM)

V. Manufacturing and Production Systems (13%)

A. Manufacturing systems (e.g., cellular, group technology, flexible, lean)
B. Process design (e.g., number of machines/people, equipment selection, and line balancing)
C. Inventory analysis (e.g., EOQ, safety stock)
D. Forecasting
E. Scheduling (e.g., sequencing, cycle time, material control)
F. Aggregate planning (e.g., JIT, MRP, MRPII, ERP)
G. Concurrent engineering and design for manufacturing
H. Automation concepts (e.g., robotics, CIM)
I. Economics (e.g., profits and costs under various demand rates, machine selection)

VI. Facilities and Logistics (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 facility location, multiple facility location, storage location within a facility)
D. Process capacity analysis (e.g., number of machines/people, trade-offs)
E. Material handling capacity analysis (storage & transport)
F. Supply chain design (e.g., warehousing, transportation, inventories)

VII. Human Factors, Productivity, Ergonomics, and Work Design (12%)

A. Methods analysis (e.g., improvement, charting) and task analysis (e.g., MTM, MOST)
B. Time study (e.g., time standards, allowances)
C. Workstation design
D. Work sampling
E. Learning curves
F. Productivity measures
G. Risk factor identification, safety, toxicology, material safety data sheets (MSDS)
H. Environmental stress assessment (e.g., noise, vibrations, heat, computer-related)
I. Design of tasks, tools, displays, controls, user interfaces, etc.
J. Anthropometry, biomechanics, and lifting

VIII. Quality (11%)

A. Total quality management theory (e.g., Deming, Juran) and application
B. Management and planning tools (e.g., fishbone, Pareto, quality function deployment, scatter diagrams)
C. Control charts
D. Process capability and specifications
E. Sampling plans
F. Design of experiments for quality improvement
G. Auditing, ISO certification, and the Baldridge award

## ELECTRICAL PM

The following is a breakdown of the 9 topics covered in the Electrical PM portion of the Engineer in Training Exam.

The percentage next to the

subject is approximately how much of the total content of the PM session that particular subject makes up. This breakdown is as outlined by NCEES on their website.

I. Circuits (16%)

A. KCL, KVL
B. Series/parallel equivalent circuits
C. Node and loop analysis
D. Thevenin/Norton theorems
E. Impedance
F. Transfer functions
G. Frequency/transient response
H. Resonance
I. Laplace transforms
J. 2-port theory
K. Filters (simple passive)

II. Power (13%)

A. 3-phase
B. Transmission lines
C. Voltage regulation
D. Delta and wye
E. Phasors
F. Motors
G. Power electronics
H. Power factor (pf)
I. Transformers

III. Electromagnetics (7%)

A. Electrostatics/magnetostatics (e.g., measurement of spatial relationships, vector analysis)
B. Wave propagation
C. Transmission lines (high frequency)

IV. Control Systems (10%)

A. Block diagrams (feed forward, feedback)
B. Bode plots
C. Controller performance (gain, PID), steady-state errors
D. Root locus
E. Stability

V. Communications (9%)

A. Basic modulation/demodulation concepts (e.g., AM, FM, PCM)
B. Fourier transforms/Fourier series
C. Sampling theorem
D. Computer networks, including OSI model
E. Multiplexing

VI. Signal Processing (8%)

A. Analog/digital conversion
B. Convolution (continuous and discrete)
C. Difference equations
D. Z-transforms

VII. Electronics (15%)

A. Solid-state fundamentals (tunneling, diffusion/drift current, energy bands, doping bands, p-n theory)
B. Bias circuits
C. Differential amplifiers
D. Discrete devices (diodes, transistors, BJT, CMOS) and models and their performance
E. Operational amplifiers
F. Filters (active)
G. Instrumentation (measurements, data acquisition, transducers)

VIII. Digital Systems (12%)

A. Numbering systems
B. Data path/control system design
C. Boolean logic
D. Counters
E. Flip-flops
F. Programmable logic devices and gate arrays
G. Logic gates and circuits
H. Logic minimization (SOP, POS, Karnaugh maps)
I. State tables/diagrams
J. Timing diagrams

IX. Computer Systems (10%)

A. Architecture (e.g., pipelining, cache memory)
B. Interfacing
C. Microprocessors
D. Memory technology and systems
E. Software design methods (structured, top-down bottom-up, object-oriented design)
F. Software implementation (structured programming, algorithms, data structures)

## ENVIRONMENTAL PM

The following is a breakdown of the 5 topics covered in the Environmental PM portion of the Engineer in Training Exam.

The percentage next to the subject is approximately how much of the total content of the PM session that particular subject makes up. This breakdown is as outlined by NCEES on their website.

I. Water Resources (25%)

A. Water distribution and wastewater collection
B. Water resources planning
C. Hydrology and watershed processes
D. Fluid mechanics and hydraulics

II. Water and Wastewater Engineering (30%)

A. Water and wastewater
B. Environmental microbiology/ecology
C. Environmental chemistry

III. Air Quality Engineering (15%)

A. Air quality standards and control technologies
B. Atmospheric sciences

IV. Solid and Hazardous Waste Engineering (15%)

A. Solid waste engineering
B. Hazardous waste engineering
C. Site remediation
D. Geohydrology
E. Geotechnology

V. Environmental Science and Management (15%)

A. Industrial and occupational health and safety
B. Radiological health and safety
C. Radioactive waste management
D. Environmental monitoring and sampling
E. Pollutant fate and transport (air/water/soil)
F. Pollution prevention and waste minimization
G. Environmental management systems

## OTHER PM

The following is a breakdown of the 9 topics covered in the Other PM portion of the Engineer in Training Exam.

The percentage next to the subject is approximately how much of the total content of the PM session that particular subject makes up. This breakdown is as outlined by NCEES on their website.

I. Advanced Engineering Mathematics (10%)

A. Differential equations
B. Partial differential calculus
C. Numerical solutions (e.g., differential equations, algebraic equations)
D. Linear algebra
E. Vector analysis

II. Engineering Probability and Statistics (9%)

A. Sample distributions and sizes
B. Design of experiments
C. Hypothesis testing
D. Goodness of fit (coefficient of correlation, chi square)
E. Estimation (e.g., point, confidence intervals) for two means

III. Biology (5%)

A. Cellular biology (e.g., structure, growth, cell organization)
B. Toxicology (e.g., human, environmental)
C. Industrial hygiene [e.g., personnel protection equipment (PPE), carcinogens]
D. Bioprocessing (e.g., fermentation, waste treatment, digestion)

IV. Engineering Economics (10%)

A. Cost estimating
B. Project selection
C. Lease/buy/make
D. Replacement analysis (e.g., optimal economic life)

V. Application of Engineering Mechanics (13%)

A. Stability analysis of beams, trusses, and frames
B. Deflection analysis
C. Failure theory (e.g., static and dynamic)
D. Failure analysis (e.g., creep, fatigue, fracture, buckling)

VI. Engineering of Materials (11%)

A. Material properties of:

1. metals
2. plastics
3. composites
4. concrete

VII. Fluids (15%)

A. Basic hydraulics (e.g., Manning equation, Bernoulli theorem, open-channel flow, pipe flow)
B. Laminar and turbulent flow
C. Friction losses (e.g., pipes, valves, fittings)
D. Flow measurement
E. Dimensionless numbers (e.g., Reynolds number)
F. Fluid transport systems (e.g., pipes, ducts, series/parallel operations)
G. Pumps, turbines, and compressors
H. Lift/drag

VIII. Electricity and Magnetism (12%)

A. Equivalent circuits (Norton, Thevenin)
B. AC circuits (frequency domain)
C. Network analysis (Kirchhoff laws)
D. RLC circuits
E. Sensors and instrumentation
F. Electrical machines

IX. Thermodynamics and Heat Transfer (15%)

A. Thermodynamic properties (e.g., entropy, enthalpy, heat capacity)
B. Thermodynamic processes (e.g., isothermal, adiabatic, reversible, irreversible)
C. Equations of state (ideal and real gases)
D. Conduction, convection, and radiation heat transfer
E. Mass and energy balances
F. Property and phase diagrams (e.g., T-s, h-P)
G. Tables of thermodynamic properties
H. Cyclic processes and efficiency (e.g., refrigeration, power)
I. Phase equilibrium and phase change
J. Thermodynamic equilibrium
K. Combustion and combustion products (e.g., CO, CO2, NOX, ash, particulates)
L. Psychrometrics (e.g., humidity)

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## PREPARING FOR THE ENGINEER IN TRAINING EXAM

The most frequent obstacle in the way of people passing the Engineer in Training exam is the simple task of preparation. Failing to employ effective study techniques or simply ignoring them all together is the root cause for most unsuccessful exam takers. We are engineers, gifted with the ability to retain an inordinate amount of technical information. We all have what it takes to pass the exam, but if you are like many, the prospect of sitting for 8 hours while being milled with questions covering all the subjects we were taught in our college years can be a bit overwhelming. If you are asking yourself, "Where do I even start studying for the EIT exam?", then reading the suggestions below will provide you with a simple guideline to becoming more effective in the upcoming months of pounding books.

### THE MINUTIA UP FRONT

The following are my suggestions of what to do immediately prior to setting forth on your journey of dominating the Engineer in Training exam.

### ENGINEER IN TRAINING EXAM REVIEW BOOK

Before anything, you should consider getting your hands on a quality review manual. Having a concise resource composed with all relevant information really helps focus your studies. Most any manual should suffice, as the roots of the Engineering discipline is what it is, and doesn't evolve away from the basics. Though, if you are purchasing new, having the most updated version never hurts. I used Michael Lindeburg's FE Review Manual and found that it was worth every penny I spent. You can read reviews and purchase the book from Amazon HERE.

### ENGINEER IN TRAINING EXAM SAMPLE QUESTIONS

Practice exams are a vital part in successfully preparing for the Engineer in Training Exam. Being able to apply what you learn against a structured

practice exam is beyond valuable. Not only does it allow you to prepare yourself for what to expect on the test, but it also mentally prepares you for working under the timed conditions. The timing factor is something people tend to overlook, you have 120 total problems on the EIT exam and 480 minutes to complete them; that breaks down to 4 minutes per problem. I used Michael Lindeburg's FE/EIT Sample Examinations in my preparation. You can read reviews and purchase the book from Amazon HERE…

**TIP:** ***You are unable to use any of your personal books for the Engineer in Training Exam. However, their is a huge resource that NCEES provides you prior to taking the exam, the NCEES Reference Manual. Knowing from the beginning what information is inside this manual is a must and will pay dividends in your preparation. Over time, you will learn how to be efficient in finding the information you need. Remember, you have 4 minutes to solve each problem, no need to waste that time flipping pages. You can purchase or download the Engineer in Training FE Exam HERE.***

## SETTING YOURSELF UP FOR SUCCESS

After you have gathered all your resources together, it is time to sit down and prepare yourself for the journey. It is important not to just jump in without a plan. There is a lot of information to cover, delving full force into the content with no strategic planning can feel productive at first, but eventually prove to be debilitating to the success of your studies. This planning doesn't have to take days or weeks, but the time you do spend up front will render benefits through the extent of your studying.

### SO WHAT IS YOUR GOAL?

I know this is probably an obvious question and one easy to answer..."I want to pass the Engineer in Training exam!" There, so, I answered it for you, good let's move on, or not.

> ***Begin with the end in mind***
> **- Stephen Covey**

The process of becoming a Professional Engineer is a serious endeavor taking pure dedication and commitment to a long journey that lasts more than the short period of time you study for the EIT exam. We are Engineers, and it's not easy becoming one, if it was, everyone would do it. So

ask yourself, are you committed for this journey? Do you have a support group around you that understands the undertaking of such a journey? Think long term, think about the ultimate goal. Doing this will allow your mind to focus on the big picture, helping you keep steady when you encounter the small obstacles along the way.

Think about this, your goal has already partially been set and you have already been making progress even if you don't realize it. You have made it through an Engineering program that is formulated to test your limits daily. We all know there are 'weed out' classes, we made it through them, dominated them. Preparing for the Engineer in Training exam is no different, it's just another test of your limits, a 'weed out' process, to ensure only the best are left to be registered as Professional Engineers. I know that you have what it takes, believe in yourself.

## WHY DO YOU WANT TO GO THROUGH THIS?

You have established the goal in taking the Engineer in Training exam and acknowledged the commitment it takes to dominate the journey. You have also placed the task in to perspective, enveloping the exam into the bigger goal of obtaining a Professional Engineer License, which will help you weather the small obstacles along the way.

Now you must assess your motivation.

> ***Why is it you want to take on this journey? Are you motivated by the money that comes from it in the end? Are you pressured from outside expectations, such as family members, employers, etc? These are motivations, but the root of them is negative, and is not sustainable for the long haul.***

Be honest with yourself and assess what naturally is coming from within. Define your positive natural motivations that do exist. Our society tends to push the negatives ahead of the positives, but transcend that trend, and re-work your

mind to think positive. Doing this will uncover the motivations that will sustain the long haul of the journey.

### DO YOU HAVE ANY CONSTRAINTS THAT WILL NEED TO BE MANAGED TO ENSURE SUCCESS?

Think about the time that you have until the planned Engineer in Training exam date. This finite piece of information will be the driving factor in how your studies are designed. There will be other factors that will contend for your time and are in need of definition. Are you working a full time job? Do you have a Family to support? Do you have classes to attend and other exams to take? Write down what these constraints are so you can define a realistic study plan moving forward.

#### ARE YOU PREPARED TO FAIL?

***A little blunt, I know. But this is something I had to ask myself prior to taking the exam. Ask yourself this question and use it, as I did, as motivation to stay on track and focused on the goal to dominate the exam.***

## SCHEDULING FOR SUCCESS

You are probably thinking right about now that there is way to much up front groundwork to the actual real preparation for the Engineer in Training exam. I know, but from going through the process, hear me out. It's typical for us Engineers to think this way, to want to jump past all the "fluff" and get on to meat of the business; hold that thought.

Think about the times that you were successful in your past

Engineering projects. I am sure for the most part, all the engineering projects we have worked on were of some success or another. But were they completed efficiently and in productive manner? For the ones that were, I bet there was a common characteristic that was shared; that being solid scheduling.

When we sit back and brainstorm how to get from point A to point B, we are setting ourselves up with a greater probability for success. By scheduling, we have the opportunity to expose possible obstacles, processes, and other restraints that are ineffective in getting the job

done. We are able to effectively weed out the "fluff" that will really bog up the end result.

Preparing for the Engineer in Training exam is no different, scheduling how you are going to get from being uncertified to a certified EIT is worth your time.

## DEFINE PRACTICAL MILESTONES FOR YOUR STUDY SCHEDULE

So far we have determined that we want to:

A. Start Studying for the Engineer in Training exam

B. Take the EIT exam and pass.

This is our starting and ending point, but dang, there is a lot of space in between, we need to define realistic steps for success. The most logical way to define milestones while studying for the Engineer in Training exam, and the way I did it, is by using the chapters in Michael Lindeburg's FE Review Manual. This defines for us 17 steps that we have to work with, starting with "Units and Fundamental Constants" to "Engineering Ethics". Reaching success of a goal is always easier when broken up in to increments. Could you imagine doing a Marathon without first testing yourself in a 5K, 10K, Half Marathon, etc?

## FILL IN YOUR SCHEDULE

Now that you have defined your milestones, you can move forward with filling in the space between your start and end points. How you complete this step can vary and is mostly dependent on the amount of time you have until your exam date. For simple explanation purposes, I am going to propose we use 4 months (16 weeks) as our time between point A and point B.

> ***In most cases, the Engineer in Training exam is on a Saturday. I wouldn't suggest any studying be done the day before the exam, so run your schedule back a bit so your Point B falls on that Thursday prior to the exam.***

This gives you 16 full weeks (Thursday to Thursday) open for studying. Use the 17 milestones, as explained above, to fill in each block (week) of time, further defining what material will be covered in your studies during each period. For example:

Week 1: Units of Fundamental Constants and Conversion Factors

Week 2: Mathematics

Week 3: Statics

Week 4: Dynamics

Week 5: Mechanics of Materials

And so on…

Continue until you have filled in your schedule through the Thursday prior to your exam date.

Producing a schedule like this will not only put the task at hand in to perspective, but help you maintain a grasp on your progress. It will give you a tangible product that you can gauge against, helping you adjust or reinforce your focus if you fall behind or get slightly ahead. This also releases the mind from worry, reassuring you that you have the time scheduled to cover all the subjects prior to the exam.

Defining your studies graphically on a calendar, spreadsheet, or any other document is the way to put massive tasks in to perspective. Being able to break down your journey in to a number of smaller milestones allows you to stay focused on your priorities, calm when difficulties arise, and productive for longer periods of time. It also ensures that time is being used most effectively, and allows you to recognize when you need to adjust without wasting too much time spinning your wheels.

## PRACTICE EXAM

Take a baseline practice exam at the beginning of you preparation. I guarantee when you go to take that final practice exam before the test, you will feel a lot better going through it, giving you the added confidence you need going in to the Engineer in Training exam.

## DEVELOPING SELF DISCIPLINE

With your resources in hand and study schedule close by, you are well on your way to dominating the Engineer in Training exam even without having done one second of actual review. To use an analogy, you have taken off from the airport and the wheels are locked in, but now is the time to assess your gauges, your study habits, to ensure the

flight continues to be smooth as you trek towards your goal.

Disciplined study habits can be a skill in itself. If you have them, you are good to move forward, but if you don't have them, it may take some thought as to how you are going to bear down for your journey. Practicing discipline may seem like pulling teeth, but it shouldn't be, as controlling tasks in your preparation could be the difference between you passing or failing the Engineer in Training exam. As you control tasks, you build self-discipline. As you build self-discipline, you build time management. As you build time management, you build self-confidence. And self-confidence is the key to succeed.

> ***He who conquers himself has won a greater victory than he who conquers a city* - Proverbs**

With that, take into account the following tips to build self-discipline and keep it in check and on point throughout your studies:

## TIME MANAGEMENT

Consider when the best time period you have to study to ensure all distractions are at a minimum and your study environment is most conducive to retaining knowledge. Develop smaller blocks of time during this period, say 50 minutes, and hit the books. After 50 minutes, get up and take a break (10 minutes), stretch, get some food, anything really just to revive your mind. Shorten the time block if you find yourself getting anxious after 30 minutes, 45 minutes, etc. The point is to stay actively involved in your studies for the allotted time you set aside to ensure you are maximizing the time you have.

Keep a note of your study sessions and adjust accordingly. Write down the times you are most efficient (Morning, Night). How long are you sessions? What block of time makes for a good break for you? Are you able to control your breaks and return to studying?

## DISTRACTIONS AND ESCAPES

Do not deny that distractions and other escapes exist. You're Blackberry, iPhone, computer, TV, magazines,

and environment can all be distractions to progressing in your studies. Come to grips with these temptations and do your best to minimize them. You will be better off, distracting activities will be more enjoyable later without the pressure of the Engineer in Training Exam hanging over your head.

## EMOTIONS

Emotions definitely got to me when I sat down to study for the Engineer in Training Exam. I was overwhelmed, and at times, I found myself stalling and doing near nothing to progress in my studies. It's best to admit when these emotions of being overwhelmed, frustrated, etc arise. Doing so will allow you to realize that you have a problem, allowing your mind to naturally adjust while giving yourself a sense of control because you know you are doing something about it.

## STUDY SPACE

This reemphasizes a few checks from above. I struggled with defining an ideal place to study that was free from the distractions at first. It wasn't until I realized that I was spending more time chatting with my buddies on IM and falling behind in my defined study calendar. Always have a backup space, maybe a space that you switch out to every other day or two. A library, coffee shop, keep it fresh and distraction free.

## ROUTINE

Are you allocating many hours on one day to studying and little to none on other days? Develop a routine where you are dedicating the same amount of time every day to studying for the Engineer in Training Exam and hold firm on starting and stopping at the specified times. This will give you a boost in your studies and your mental state, producing progress in constant small increments. Choppy progress (a lot one day, none the next) can really kill momentum, so establish the momentum through routine and develop the habit, and then let the habit take it from there.

As an added strategy for your routine, begin with a difficult subject or task. You'll be fresh, and have more energy to take it on when you are at your best. What subject has always caused you problems?

***Routine gives you a clear idea of what you want to achieve for the day from the start, because it is clear, the probability is high that you will be able to proactively accomplish your tasks.***

## DISCOURAGEMENT

There will be without a doubt at times during your studies that you will become discouraged. Don't let it wreck shop in your mind. This is something that is natural, acknowledge it, and take a break from studying for a day or so to recharge your mind and get back on track to dominating your studies.

## ROLE MODELS

Take a minute to think about the people in your life that have great self-discipline. See how it interconnects with their daily tasks and how it helps them accomplish their goals. Approach them with some questions, ask for advice on how they go about setting up their daily tasks and let them help guide you in your goals.

## IDENTIFY MENTORS

A mentor could be your greatest asset in dominating the Engineer in Training exam. They can assist you with questions that you otherwise wouldn't tend to seek answers for. I developed this site as a means to close the gap between you and a mentor. Don't hesitate to approach me with any of your questions or concerns regarding the exam, I am here to help you succeed.

Have a question burning on your mind? Let me help you out, shoot me an email now!

## DOMINATE YOUR STUDIES

I have touched on this a couple of times throughout my guide, and I will stress the importance once again. Practice Exams are a must in your preparation for the Engineer in Training Exam. Ther e is no point to going in to arguably one of the most important exams of your life blind, with no knowledge of what the format and type of questions will be asked.

> ***Twenty years from now you will be more disappointed by the things that you didn't do than by the ones you did do. So throw off the bowlines. Sail away from the safe harbor. Catch the trade winds in your sails. Explore. Dream. Discover* - Mark Twain**

Practice exams should be used early and often throughout your studies. Prior to opening up your book for your first study session, set aside a good couple of hours to sit down and take a high quality practice exam. This will not only set a baseline for where you started in your studies, but also give you a metric to compare against as you progress. The results of these exams will show you where you stand and how much you need to work on in the certain areas you lack knowledge.

## GET STARTED!

There is a Chinese proverb that states that the longest journey is started with a simple first step. In this they mean that it isn't until you start a project, or in this case hitting the books, that you really understand how much of what needs to be done to complete it. There is only so much theory one can develop, details aren't always evident until you are in the midst of it all.

There is another proverb that states that "perfection is the enemy of good". This is especially true when this perfection holds you back from starting something. Are you waiting to get out of that certain class to start studying? Maybe you are waiting to see if you get promoted to that new position? What's holding you back from taking the first step, to commit to dominating the Engineer in Training exam?

What I am getting at here is simple, at this point, you have all the planning, you have thought out your journey, get something done! Given that you have ample time to prepare for the exam, you will be able adjust on the fly as needed after you begin.

> ***Only those who will risk going too far can possibly find out how far one can go* - T. S. Elliot**

So before we go any further, what can you get done today? Open that book, turn to the first chapter, and crank out some review, get those wheels rolling, let's do this together.

## DOMINATE THE BOOK

### TAKE GOOD NOTES

I am sure we can all go pro when it comes to taking notes. Through all the college classes we have had, we could probably all publish a thousand books each. I know it's a basic concept, but stemming from my experience with the Engineer in Training exam, it's one point the must be rehashed. Here are some tips on maintaining good notes throughout your studies.

- Take notes during all your study sessions. Use a single large spiral bound notebook to consolidate all your notes in to one easy to reference location.
- Give high priority to vocabulary. I make this point because language is a fundamental tool that can make or break you on exam day. If you run through an exam problem and don't know what a term means, you are going to spend unnecessary time boggling it in your mind. This can be a huge handicap in your efficiency.
- Cruise through the chapter you will be studying and give it a cursory review to get a gist of what you will be covering in your session. When you have finished, return to the beginning and review it in more detail making sure to focus on understanding the concepts. Don't just read the words, engage in the concepts. If you come across a term you don't understand, write

it down in your notes and look it up using the internet or some other resource.

- Don't write down every word that you read, but at the same time, don't leave out major theories and/or topics just to save space. If you feel the information you are reading is something that needs to be retained, write it down. Focus on capturing the sequence of the subject starting with the main topic, flowing into each subtopic and on to their subsequent equations, definitions, etc.

- Write your notes down in an outline type format. The organization of the theories is as significant as the substance of those theories.

- Color highlight the important points in both your book and written notes to reemphasize and further retain.

It may also be useful to you to write notes, points, or reminders in the margins of each chapter.

Stay organized with your note taking, if you are confused, it can become your worst enemy and a major roadblock to any progress.

## REVIEW YOUR NOTES

Wax on, wax off. Sometimes it's hard for us to grasp just how important repeating a task can be. In sports they say practice makes perfect, but it's not just practice, its perfect practice that makes perfect. Writing notes and forgetting about them can be seen as sloppy practice. You aren't really doing much to retain the information that you are flagging as important. To maximize the information you retain, dedicate time before each study session to sit down and rehash your written notes.

There is research out there that proves that reviewing notes within 24 hours of being exposed to the information will increase you rate of retention by 60%! Think about the progress that can be made within a couple of days; you will rapidly be building a knowledge empire in your mind. If you want to significantly cut down on the time spent studying, this is the task to start incorporating.

On top of reviewing prior to every study session, dedicate some time weekly to do a full review of what was covered in the week prior. If you developed a study schedule based of my recommendations, then you will be starting a new section every Wednesday. With that, take time on the

Tuesday prior to starting the new week to review your notes and assess your overall understanding.

## PREPARING FOR EXAM DAY

Maintaining and reviewing your notes is the foundation in the process of retention. If I may use another sports analogy, your notes preserve your progress, they are the Starting Pitcher of the study process. The Closer, however, is the practice problems that are found throughout and at the end of each chapter. These practice problems are written in a manner to reiterate the important fundamentals outlined in each section. They are designed to hammer home theories and further infuse the information deep in to your memory banks. Introducing this form of engagement mixes up the delivery of information, reinforcing your overall ability to comprehend in any way it's presented. Make sure to work each and every problem, taking your time to completely understand them from the beginning to the end, treating them as if they are true exam questions. The following are some other ways to reinforce your studies.

> ***Do not go where the path may lead, go instead where there is no path and leave a trail -***
> **Ralph Waldo Emerson**

> ***To dominate in your preparation for the Engineer in Training exam, you must maintain an active mind throughout your studies. An active mind, as opposed to a passive mind, is one that is continually engaging in the information it is receiving, manipulating it into multiple formats that can be easily recognized and understood. Engaging in the material you are studying in as many ways possible maximizes your ability to pull it to the forefront instantly when called upon.***

### INDEX CARDS

When you reach a solid point that must be memorized, write it down on an index card. On one side, write down the point, and on the opposite side, write down the

definition or key points in full. Use the cards to quiz yourself when you are sitting at lunch or have any other spare time. This is a good flexible way to cash in on some extra studying throughout your day.

### EXPAND YOUR INDEX CARDS

Go further than just the basic points and start defining symbols on index cards to help you better recall them at the time of the exam.

### DREAM ABOUT YOUR STUDIES

I started doing this sometime while in college. Prior to falling asleep, I would take out my notes and run through them one last time while I was lying in bed. I would then throw them on the ground and hit the sack. It's a miracle, but my brain would actually continue to process the information, and somehow, I would wake up the next day with more knowledge retained than the day before.

### DIAGRAMS

If the subject matter includes diagrams (i.e. statics, electrical circuits, etc), practice drawing them using different configurations. Free Body diagrams are basic, but it's amazing how many people freeze up when asked to produce one, you will be asked, so practice now.

### PUT THE MIND TO THE TEST

Challenge yourself as much as you can, don't reference back to your book for definitions, equations, etc, make you mind work and see what comes from it.

Bottom line, knowledge is not retained when you become stagnate. Keep your mind moving, keep it fresh, and continue to reiterate your knowledge through consistent review of notes in as many different formats as possible.

#### INGEST NOTES FOR BREAKFAST

***To nail down even more information, go over your notes immediately upon waking while you lie in bed, it works.***

## YOUR FINAL DAYS

Going in to the final days before the exam, you need to have confidence that you have put in your time. What you know on the Thursday prior to the Engineer in Training exam is what you will know they day of the exam. Trust that you have prepared yourself through your journey, now

is not the time to panic. This is a time to reassure yourself of your knowledge, worth and build your self-confidence going in to the exam. Assert to yourself "I have studied hard and know my stuff, I am ready for this exam" and "Others can pass, so can I". The power of positive thinking is real, use it.


Don't attempt to "cram" during every spare moment you have leading in to the Engineer in Training Exam. Doing so will only increase the feeling of desperation which will lead to panic; panic will lead to test anxiety. Test anxiety will most likely lead to you feeling that you need to pull a mega session, or even an all-nighter, the day prior to the exam. You probably already know, but if you don't, trust me that pulling an all-nighter prior to exam day will be virtually ineffective, and destructive to your chances of success. What you may gain from extra study time won't compensate for the loss of alertness and ability to concentrate due to the lack of sleep you received prior to test day. With 8 hours and 180 questions, alertness and concentration are your allies; make sure you have them on your side.

If you have established well organized notes during your studies, spend the Thursday prior to the exam running through them. This kind of memory reinforcement not only improves your performance on the test, it also improves your long-term memory of the material. Leave everything alone on that Friday prior to the exam. Let things simmer, your body and mind need a bit of recovery before you take your seat the next day.

> ***All that we are is the result of what we have thought* - Buddha**

When you awake on exam day, make yourself a high quality breakfast, this will ensure that your energy levels are sustained while you take your exam. Give yourself ample time to mitigate any travel issues that may come up, you don't want to be rushing to your exam. Keep things even keel, focusing on staying in a confident mindset, reinforcing yourself that you have done all that you can, and that you are prepared to dominate the exam.

If you get to the exam site with extra time prior to the test, don't go and begin cramming. This will produce the same feeling of desperation, panic, and test anxiety as it would any other time. Let the mind free and maintain those positive thoughts. They say 1 positive thought can destroy 99 negative thoughts, make it happen.

### HIT THE HEAD

***This may seem a little ridiculous, but make it a priority to go to the bathroom just before the exam. Once you begin, you will be able to use the restroom, but its one person at a time, so you may be waiting, with the thoughts going through your head just how bad you need to go. This kills concentration and destroys the already minimal time you have to answer the questions, nip it up front.***

# RESOURCES

- **EngineerInTrainingExam.com Practice Exam** - Throughout my studies, I found that many of the resources I was spending my money on were falling short in some keys areas important to us aspiring engineers. Recognizing this, I decided to fill a portion of this void by developing a Practice Exam targeting expansion of these weak points. I am not going to give you some fluff sales pitch, this is practice exam developed with you in mind, and what you want is a high quality, well organized exam to practice with that doesn't require you to empty your wallet…you got it.
- **YouTube Video Reviews** (http://www.youtube.com/user/EngineerInTrainingTV)
- **iTunes Podcast**
- **EngineerInTrainingExam.com on Facebook**

# CONGRATULATIONS!

I want to congratulate you for getting to this point in the study guide. I have no doubt that you have what it takes to pass the Engineer in Training exam.

In closing, I want to get a little bit more personal with you. I am not a genius, or even naturally smart for that matter. I graduated High School and College with a decent GPA, but certainly not at the top, with all the cum laude blue robe wearing “smart people”. However, despite this, I sit in a position in my Engineering career where I am controlling exactly where I want to be. I have come far in a short period, and have dominated many endeavors I have set out to conquer; at the same time I have failed just as many. However, I couldn’t have endured the journey of becoming a Registered Professional Engineer without realizing one super powerful trait that we all have, Passion.

Do not ever underestimate the power of your Passion. Through Passion, a number of other powers emerge. Confidence, self-discipline, motivation, inspiration, determination, perseverance...to name a few. When applied to your personal life, it is the one thing that can turn us ordinary folk in to powerful society changing Goliaths. Every invention, every innovation, every idea at some point did not exist. Throughout time, ordinary people have worked hard, trying a lot of stuff, failing often, but always learning, and never giving up. Passion has driven the greatest innovators of our day, why not become an innovator of your life. Take control now, when you do, nothing can stand in your way of success.

This is your life, your time, dream big, do big things.

Now I have a request of you, If you have found this eBook helpful, I would be honored to have you as a subscriber to my website by clicking HERE. You'll receive the most valuable new features, content, tips, updates, and guidance relating to the Engineer in Training exam. My strict privacy policy keeps your email address 100% safe & secure and it will never be given away, traded, or sold. So join the many who have given me their trust in providing them with the guidance they are looking for now. You will always have the ability to unsubscribe at anytime.

For now, Good Luck, take care of yourself and your loved ones.

Justin Dickmeyer, PE

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Thank you so much for helping me spread the word and I look forward to guiding you as you continue on your journey of becoming a registered Professional Engineer! - Justin Dickmeyer, PE