Preparing for and Passing the LS Licensing Exams

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NYSAPLS 59th Conference

Do Your Research

- What are the requirements for licensure?
- Do you meet them?
- Are you on a path to meet them?
- If not, but you would like to be, then your planning is achieving the requirements, not preparing for the exam
Mentors

- Find yourself a mentor
- Even better if you have more than one
- Not always “older” and not always a land surveyor
- But you do need at least one already licensed land surveyor in your mentor group

The Key Groups

- op.nysed.gov/prof/pels/survlic/htm
- nysapls.org
- ncees.org
- https://www.youtube.com/user/NCEESMedia/playlists

These hold the “keys”
To The Exams

- Basically three
  1. Fundamentals of Surveying (FS)
  2. Principles and Practice of Surveying (PS)
  3. New York State-Specific Exam (jurisdictional exam)

FS Exam

- Computer-based test (CBT)
- 6 hours
- Closed book except for NCEES-provided *FS Reference Handbook*
- Multiple choice and alternative item types (AITs)
- 110 questions
PS Exam

- Computer-based test (CBT)
- 7 hours
- Closed book except for NCEES-provided PS Reference Handbook
- Multiple choice and alternative item types (AITs)
- 100 questions

NY State Specific Exam

- Pencil/paper “fill-in-the-bubbles”
- 4 hours
- Open book (no loose sheets)
- Multiple choice
- 50 questions
New York State Specific Land Surveying Examination
Test Blueprint

Category: Survey Analysis
Domains: Computations/Analysis / Measurement/Location /Monumentation
8 questions 16%

Category: Survey Project Practices
Domains: Documentation/Land Info Systems / Land Planning/Design / Proj Mgmt
16 questions 32%

Category: Survey Legal & Ethical Practices
Domains: Ethics/Professional Responsibility / Legal Principles / Research
26 questions 52%

If You Think…

• I’ve been working in this business for 20 years, surely they’ll let me take the exam…
• I worked in engineering and construction surveying but very little on property boundary issues…
• Etc….

First, check on the requirements for licensure!
You Don’t Meet the Requirements?

• Don’t ask

You Have Circumstances That Are Untypical

• Talk to a mentor first
• Figure out how you can go about overcoming the obstacles
• That may include more experience in specific kinds of work and/or additional education
Exam Prep

- Build (buy, borrow, beg…) a library
- Start reviewing the material
- Read a general surveying text and something like *Brown’s Boundary Control and Legal Principles* cover-to-cover
- Subscribe to periodicals and read them
- Get an approved calculator

Belong to Your Professional Association

- Education
- Mentoring
- Networking
Library

- Look at NY Board’s references
- Include ACSM *Definitions*… book
- Black’s Law Dictionary

Plan Years Out

- Even if you began today, it is highly unlikely, if you meet all the education and experience requirements that you will be licensed in a year
- Instead submit your applications, take the three exams, step by step
- Budget your time and financial resources
$ $ $ - It Adds Up!

- Application fees
- Exam fees
- Review / license prep courses
- Books

Free Time

- To do a good job, kiss goodbye to many of your leisure activities
- Develop a regular schedule for reviewing your study materials
- Find others working on exam prep and form a study group that meets regularly
Test Prep Books

- Start with NCEES
- Many others (check NYSAPLS bookstore)
- Many, except NCEES exam, may not be set up for exact conditions of the exam
- As you become familiar with the material, time yourself

Reference Handbooks

- Download these from the NCEES site
- Review them; compare to formulas and equations you are familiar with to be sure you know what the terms are
- Equations not always formatted the way you might know them
LS Binder

• Three (minimum) parts
  1. Employers, contact information of supervisors, monthly summaries of work done
  2. Build your “I don’t know anything about this (or much)” list of topics with as much detail as you can
  3. Resource list, people, organizations, etc.

Start Paying Attention!

• Really pay attention!
• Work processes including client relations
• Regulations and statutes
• Work process
• Analyze ethics of situations
• Start acting like a professional
Early On...

- Investigate CST program and how it might benefit you
- Remedial courses (math, writing) at high school or college night classes
- Other educational resources including online

NY Specific Process

- Bigger library
- Seriously consider the NYSAPLS review course
- Talk to people who’ve taken the exam
Taking the Test

- Arrive collected, well-rested, well-fed but not stuffed
- For CBT, very strict limitations on what you can take to the exam room; the rest stays in a locker
- Calculators will be inspected
- NY Specific test allows books, but they will be inspected for loose sheets

Durable Clear Envelope

- Use a large plastic envelope for all your documentation (correspondence, permits, etc.) that will admit you to the test include backup
- If you get emails, print them for the envelope
- Photo ID
Know Your Route

- Advisable to get to the exam site on the day of the week you will take it, but a week or two ahead, and at the time you will travel
- Check out parking, meals if you don’t pack lunch, traffic patterns, etc.

Taking the Test

- Follow instructions exactly!
- Find out how to ask questions and how to request going to restroom
- Develop a time budget for each question
Answer the Easy Ones First

- Plan to make at least two passes through the exam
- I always recommend one additional pass to guess after narrowing choices (if you run out of time, or have no idea about the best choice)

CBT

- You will have two screens
- You can have the reference handbook and on-screen calculator available to you at the same time as the test pages
- You do not have to answer questions in sequence
- You can mark questions for review to quickly search for them
The Responses

• Logical distractors (not wrong answers)
• Select best answer, the right one may not be among your choices

NY Specific Exam

• Given twice per year
• Similar restrictions on items you can take to exam room
• But, references permitted
NY Specific Test

• Easy to mis-mark the bubbles
• Build in some time to quality check your responses

Good Luck!
A. New York State Laws, Rules, Regulations and Guidelines

1. NEW YORK STATE Business Corporation Law (BCL)
   A. 1 BCL §104 – Certificates of Incorporation
   B. 15 BCL §1503 – Ownership of PC
   C. 15 BCL §1512 – Name of PC

2. NYS Civil Practice Law & Rules
   A. 2 CPLR §212 Statute of Limitations to recover Real Property is 10 years.
   B. 2 CPLR §213 paragraph 2 Statute of Limitations for Breach-of-Contract (incl. omissions) is 6 years.
   C. 2 CPLR §214 paragraph 6 Statute of Limitations for Negligence including Malpractice is 3 years.
   D. 2 CPLR §214-c Statute of Limitations is measured from the date of discovery.
   E. 2 CPLR §214-d Allows injured third parties to sue PE’s and LS’s within 3 years of their loss, even if 100 years after PE or LS finished his work. See also Senate Bill S4782-2011.
   F. 52 CPLR §5206 – Homestead Exemption ($50,000.) from judgments.
   G. 78 CPLR §7801 Right to sue government.

   A. Article 130 – General Provisions §6500 - §6516
      1. §6502 Duration of License
      2. §6504 Regulation of Professions
      3. §6509 Definition of Professional Misconduct
      4. §6511 Penalties for Misconduct
      5. §6512 Unauthorized Practice a crime
      6. §6513 Unauthorized use of Professional title a crime
      7. §6514 Criminal Proceedings
      8. §6515 Injunctions against unlawful practice
      9. §6516 Civil enforcement & penalties
   B. Article 145 – Engineering & Surveying §7200 - §7212
      1. §7201 Defines Professional Engineering
      2. §7203 Defines Land Surveying
      3. §7205 Provides for State Board
      4. §7206 Requirements for licensure
      5. §7208 Exempt persons
      6. §7210 Requires Certificates of Authorization
      7. §7211 Requires Continuing Education for PE’s
      8. §7212 Requires Continuing Education for LS’s

4. NYS Environmental Conservation Law (ECL)
   A. Article 17, Title 15 Five or more lot subdivisions (March 2010)
      1. §17-1501 – Applies to 5 or more lot subdivisions
      2. §17-1503 – Local governments can regulate
      3. §17-1505 – Subdivision Plat must be filed
         a. §17-1505 (1) Cannot be filed w/o Health Dept Approval
         b. §17-1505 (2) Plan must show sewage systems
         c. §17-1505 (3) Health Dept must approve installations
         d. §17-1505 (4) Local Health Dept must follow rules
      4. §17-1511 – County Clerk must inspect and not file plat w/o Health Department Approval.
      5. §17-1513 – Remedy for owner of lot in unapproved subdivision
   B. DEC Reg §617 SEQRA www.dec.ny.gov
      1. §617.2 Definitions
      2. §617.4 Type I Actions
      3. §617.5 Type II Actions
      4. §617.6 Establishing Lead Agency
      5. §617.7 Determining Significance
      6. §617.9 Preparing Environmental Impact Statements

5. NYS Estates Powers & Trust Laws (EPTL)
   A. 2 EPTL §1-2-6.a Definition of Estate
   B. 2 EPTL §1-2.9-a Infant or Minor
   C. 2 EPTL §1-2.10 “Issue” includes adopted children
   D. 2 EPTL §1-2.11 Per Capita
6. NYS General Obligations Law (GOL)
   A. Article 5 §324 Contracts that indemnify Professional are void
   B. Article 5 §331 Restrictive Covenants
   C. Article 5 §703 Parole Evidence Rule
   D. Article 9 §105 Surveyor Right-of-Entry

7. NYS Public Health Laws (PHL)
   A. Article 11, title II §1115-§1120 – Water & Sewer for 5 or more lot subdivisions. (March 2010)
      1. §1115 – Subdivision means dividing into 5 or more lots
      2. §1116 – Plans must show means of adequate water and approved by local Health Dept.
      3. §1117 – Duty of County Clerk to File Plans
      4. §1118 – City or County can regulate
      5. §1119 – Health Dept Filing Fees
      6. §1120 – NYS Commissioner of Health can regulate

8. NYS Highway Laws (HWY)
   A. 7 HWY §140 (8) Town Highways
   B. 8 HWY §170 County Superintendent to make a Survey for laying out Town Highway
   C. 8 HWY §171 Town Highway Dedication
   D. 8 HWY §180 No highways shall be laid out < 3 rods wide, no encroachments allowed.
   E. 8 HWY §189 Highways-by-Use are 10 years, 3 rods wide
   F. 8-A HWY §222 Town Highway specifications
   G.8-A HWY §224 Town Bridge specifications

9. NYS Real Property Actions & Proceedings Law (RPAPL)
   A. 5 RPAPL §501 – §551 Adverse Possession
      1. §501 Adverse Possession
      2. §511 Written Claim
      3. §512 Elements of Adverse Possession
      4. §521 Adverse Possession w/o writing or enclosure
      5. §522 Adverse Possession w. Enclosure
      6. §543 De Minimus Encroachments

NYS statutes may be obtained online at http://public.leginfo.state.ny.us/lawssrch.cgi?NVLWO:
or complete sets from several reputable vendors such as:
- Consolidated Law Service
- Lawyers Cooperative Publishing
- Lexis Nexis
- Matthew Bender
- McKinneys
- West

10. Rules of the Board of Regents

11. Regulations of the Commissioner of Education
    b. Part 68 Engineering and Land Surveying http://www.op.nysed.gov/prof/pels/part68.htm

12. Practice Guidelines
    a. State Board for Engineering and Land Surveying Practice Guidelines
       http://www.op.nysed.gov/prof/pels/lsurvguide.htm
B. Miscellaneous

   
   [http://www.canals.ny.gov/about/compliance/canalstatutes.pdf](http://www.canals.ny.gov/about/compliance/canalstatutes.pdf)
   

2. *Guide to Planning and Zoning Laws of New York State (PDF on-line):*
   

C. SURVEYING TEXTS, MANUALS, ETC.

   (PDF on-line)

2. Control of land subdivision; a manual of subdivision regulations for municipal officials, subdivision developers and planning boards. (Book, 1967)
   

   

   

5. *Clark on Surveying & Boundaries, 8th Edition* Robillard & Bouman
   

   

   


    

11. *Definitions of Surveying & Associated Terms* ACSM
    


D. Additional Resources may be obtained from the following web sites:

1. Law Research Center - [www.caselaw.findlaw.com](http://www.caselaw.findlaw.com)

E. Other Helpful Resources

5. *Surveying, 10th Edition (or latest edition)*, Moffitt & Bossler
FUNDAMENTALS OF SURVEYING (FS)
CBT EXAM SPECIFICATIONS

Effective Beginning with the January 2014 Examinations

- The FS exam is a computer-based test (CBT). It is closed book with an electronic reference.
- Examinees have 6 hours to complete the FS exam, which contains 110 questions. The 6-hour time also includes a tutorial and a break.
- The FS exam uses the US Customary System (USCS) of units.

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Number of Questions</th>
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<tbody>
<tr>
<td>1. Mathematics</td>
<td>13–20</td>
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<tr>
<td>A. Algebra, trigonometry, and basic geometry</td>
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<tr>
<td>B. Spherical trigonometry</td>
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<tr>
<td>C. Linear algebra and matrix theory</td>
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<tr>
<td>D. Analytic geometry and calculus</td>
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<tr>
<td>2. Basic Sciences</td>
<td>5–8</td>
</tr>
<tr>
<td>A. Geology</td>
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<tr>
<td>B. Dendrology</td>
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<tr>
<td>C. Cartography</td>
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<tr>
<td>D. Environmental sciences</td>
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<tr>
<td>3. Spatial Data Acquisition and Reduction</td>
<td>6–9</td>
</tr>
<tr>
<td>A. Vertical measurement</td>
<td></td>
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<td>B. Distance measurement</td>
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<td>C. Angle measurement</td>
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<tr>
<td>D. Unit conversions</td>
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<tr>
<td>E. Redundancy</td>
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<tr>
<td>F. Knowledge and utilization of instruments and methods</td>
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<tr>
<td>G. Understanding of historical methods and instruments</td>
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<tr>
<td>4. Survey Computations and Computer Applications</td>
<td>19–29</td>
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<tr>
<td>A. Coordinate geometry</td>
<td></td>
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<tr>
<td>B. Traverse closure and adjustment</td>
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<tr>
<td>C. Area</td>
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<td>D. Volume</td>
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<tr>
<td>E. Horizontal curves</td>
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<tr>
<td>F. Vertical curves</td>
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<td>G. Spirals</td>
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<tr>
<td>H. Spreadsheets</td>
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<tr>
<td>5. Statistics and Adjustments</td>
<td>6–9</td>
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<tr>
<td>A. Mean, median, mode</td>
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<tr>
<td>B. Variance, standard deviation</td>
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<td>C. Error analysis</td>
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<td>D. Least squares adjustment</td>
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<td>E. Measurement and positional tolerance</td>
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<tr>
<td>F. Relative, network, and positional accuracy</td>
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<tr>
<td>Chapter</td>
<td>Title</td>
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<tr>
<td>6.</td>
<td>Geodesy</td>
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<tr>
<td>A.</td>
<td>Basic theory</td>
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<td>B.</td>
<td>Satellite positioning</td>
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<td>C.</td>
<td>Gravity</td>
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<tr>
<td>D.</td>
<td>Coordinate systems</td>
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<tr>
<td>E.</td>
<td>Datums</td>
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<tr>
<td>F.</td>
<td>Map projections</td>
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<tr>
<td>A.</td>
<td>Controlling elements</td>
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<tr>
<td>B.</td>
<td>Gathering and identifying evidence</td>
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<tr>
<td>C.</td>
<td>Records research</td>
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<td>D.</td>
<td>Legal descriptions</td>
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<td>E.</td>
<td>Case law</td>
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<td>F.</td>
<td>Riparian rights</td>
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<td>G.</td>
<td>Public land survey system</td>
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<tr>
<td>H.</td>
<td>Metes and bounds</td>
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<tr>
<td>I.</td>
<td>Simultaneously created parcels</td>
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<tr>
<td>J.</td>
<td>Easements and encumbrances</td>
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<tr>
<td>A.</td>
<td>Interpretation and analysis</td>
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<td>B.</td>
<td>Project and flight planning</td>
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<td>C.</td>
<td>Quality control</td>
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<td>D.</td>
<td>Ground control</td>
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<tr>
<td>E.</td>
<td>LiDAR</td>
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<tr>
<td>9.</td>
<td>Survey Processes and Methods</td>
</tr>
<tr>
<td>A.</td>
<td>Land development—principles, standards, and regulations</td>
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<tr>
<td>B.</td>
<td>Boundary location</td>
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<tr>
<td>C.</td>
<td>Mapping, cartography, and topography</td>
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<tr>
<td>D.</td>
<td>Construction</td>
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<tr>
<td>E.</td>
<td>Riparian surveys</td>
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<td>F.</td>
<td>Route surveying</td>
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<td>G.</td>
<td>Control surveys</td>
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<tr>
<td>A.</td>
<td>Feature collection and integration</td>
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<tr>
<td>B.</td>
<td>Database concepts and design</td>
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<td>C.</td>
<td>Accuracy and use</td>
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<td>D.</td>
<td>Metadata</td>
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<td>11.</td>
<td>Graphical Communication and Mapping</td>
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<tr>
<td>A.</td>
<td>Plans and specifications</td>
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<td>B.</td>
<td>Contours and slopes</td>
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<tr>
<td>C.</td>
<td>Scales</td>
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<td>D.</td>
<td>Planimetric features and symbols</td>
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<td>E.</td>
<td>Land forms</td>
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<tr>
<td>F.</td>
<td>Digital terrain modeling and digital elevation modeling</td>
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<tr>
<td>G.</td>
<td>Survey maps, plats, drawings, and reports</td>
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</tbody>
</table>
12. **Professional Communication** 4–6
   A. Oral
   B. Written
   C. Alternate forms of communication
   D. Documentation and recordkeeping

   A. Contracts
   B. Liability and risk management
   C. Financial practices
   D. Leadership and management principles
   E. Personnel management principles
   F. Project planning and design
   G. Ethics
   H. Safety
The exam topics have not changed since April 2013 when originally published. The number of questions and the order in which the topics appear on the exam is effective with computer-based testing (CBT) beginning October 1, 2016.

- The PS exam is computer-based. It is closed book with an electronic reference.
- Examinees have 7 hours to complete the exam, which contains 100 questions. The 7-hour time also includes a tutorial and an optional scheduled break.
- The exam uses the U.S. Customary System (USCS) of units.
- The exam is developed with questions that will require a variety of approaches and methodologies, including design, analysis, and application.
- The knowledge areas specified as examples of kinds of knowledge are not exclusive or exhaustive categories.

### 1. Legal Principles

<table>
<thead>
<tr>
<th>Number of Questions</th>
<th>22–33</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Common/case law boundary principles</td>
<td></td>
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<tr>
<td>B. Sequential and simultaneous conveyances</td>
<td></td>
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<tr>
<td>C. U.S. Public Land Survey System</td>
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<tr>
<td>D. Controlling elements in legal descriptions</td>
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<tr>
<td>E. Riparian and littoral rights</td>
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<tr>
<td>F. Property title issues (e.g., encumbrances, interpretation, deficiencies)</td>
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<tr>
<td>G. Sovereign land rights (e.g., navigable waters, eminent domain)</td>
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<td>H. Prescriptive rights/adverse possession</td>
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<td>I. Easement rights</td>
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<td>J. Parol evidence</td>
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### 2. Professional Survey Practices

<table>
<thead>
<tr>
<th>Number of Questions</th>
<th>22–33</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Public/private record sources</td>
<td></td>
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<tr>
<td>B. Project planning (e.g., photogrammetric, geodetic, boundary)</td>
<td></td>
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<tr>
<td>C. Control datums</td>
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<tr>
<td>D. Encumbrances (e.g., easements, rights of way, mineral rights, subsurface rights)</td>
<td></td>
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<tr>
<td>E. Control network accuracy standards</td>
<td></td>
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<tr>
<td>F. Supervision of and responsibility for field procedures</td>
<td></td>
</tr>
</tbody>
</table>
  1. Instrument operations and usage |
  2. Monumentation (e.g., identification, classification, perpetuation) |
  3. Vegetation identification (e.g., wetlands, bearing/corner trees, first line of vegetation, aquatic and upland species) |
  4. Survey control (e.g., boundary, topographic, photogrammetric) |
5. GPS operations
6. Construction surveying

G. Supervision of and responsibility for the application of surveying principles and computations
   1. Mapping methods and/or projections
   2. Graphical terrain representations
   3. Geoid, ellipsoid, and orthometric heights
   4. State plane or other coordinate systems
   5. GPS data reduction and analysis
   6. Control network calculations, analysis, and adjustments
   7. Bearings/azimuths
   8. Area/volume calculations
   9. Horizontal and vertical alignment calculations
   10. Construction surveying calculations (e.g., plan interpretation)
   11. Data preparation for importation into geographical information systems (GIS)

H. Grading and site preparation
I. Survey maps/plats
J. Survey report
K. Descriptions

3. Standards and Specifications
   A. Federal statutes, laws, rules and regulations
   B. State/local statutes, laws, rules and regulations
   C. Monumentation laws and ordinances
   D. U.S. Public Land Survey System
   E. American Land Title Association/American Congress on Surveying and Mapping (ALTA/ACSM) surveys
   F. Geodetic control network accuracy standards
   G. Federal Geographic Data Committee (FGDC) standards (digital mapping)
   H. U.S. National Map Accuracy Standards (analog mapping)
   I. Federal Emergency Management Agency (FEMA)

4. Business/Professional Practices
   A. Project planning (e.g., parameters, costs, budgeting)
   B. Contracts
   C. Risk management (e.g., liability, safety procedures, insurance)
   D. Ethics
   E. Communications (oral, written, graphical)
   F. Quality assurance procedures
   G. Activities, background, and skills of related professions (e.g., engineers, lawyers, architects, planners)
5. Types of Surveys

A. American Land Title Association/American Congress on Surveying and Mapping (ALTA/ACSM) surveys
B. Control and geodetic surveys
C. Construction surveys (e.g., construction calculations and staking)
D. Hydrographic surveys (e.g., elevations of submerged surfaces)
E. Boundary surveys
F. Route and right-of-way surveys
G. Topographic surveys (e.g., scanning, photogrammetry, LiDAR, field)
H. Condominium surveys
I. Subdivision surveys
J. Record drawing (as-built) surveys