FS/CST Exam: Prep to Recovery

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Studying for an exam is like drinking from a firehose.

Exam Administration

FS: Fundamentals of Surveying

NCEES: National Council of Examiners for Engineering and Surveying

NCEES.org

CST: Certified Survey Technician

NSPS: National Society of Professional Surveyors

CSTNSPS.com

Exam Administration

Learn the Rules

- Exam Material Coverage
- Open-book rules
- Calculator policy
- Application process & fee
- Complaint/Follow-up policies

NCEES

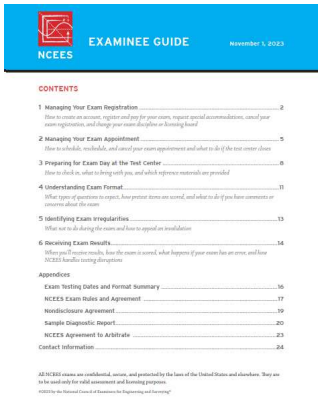
NSPS CST CERTIFIED SURVEY TECHNICIAN

FS Getting Ready: Downloads

1. Examinee Guide

Rules and regulations for all NCEES administered exams.

Pay particular attention to the Sample Diagnostic Report for Exams appendix.


NCEES EXAMINEE GUIDE November 1, 2023

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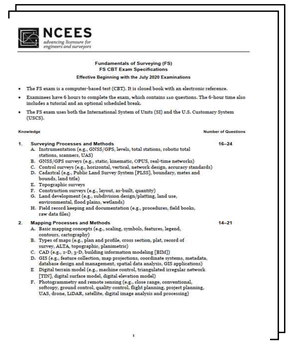
FS

Getting Ready: Downloads

2. FS Exam Specifications
   a. Computer-based
   b. 6 hour, 110 questions
   c. Seven Knowledge Areas (KA)
      1) Range of questions per KA
      2) Subjects/Topics



NCEES
advancing licensure for engineers and surveyors

Fundamentals of Surveying (FS)
FS CBT Exam Specifications
Effective Beginning with the July 2020 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 exam, which contains 110 questions. The 6-hour time also includes a tutorial and an optional scheduled break.
- The FS exam uses both the International System of Units (SI) and the U.S. Customary System (USCS).

Knowledge	Number of Questions
1. **Surveying Processes and Methods**	16–24
A. Instrumentation (e.g., GNSS/GPS, levels, total stations, robotic total stations, scanners, UAS)	
B. GNSS/GPS surveys (e.g., static, kinematic, OPUS, real-time networks)	
C. Control surveys (e.g., horizontal, vertical, network design, accuracy standards)	
D. Cadastral (e.g., Public Land Survey System [PLSS], boundary, metes and bounds, land title)	
E. Topographic surveys	
F. Construction surveys (e.g., layout, as-built, quantity)	
G. Land development (e.g., subdivision design/platting, land use, environmental, flood plains, wetlands)	
H. Field record keeping and documentation (e.g., procedures, field books, raw data files)	
2. **Mapping Processes and Methods**	14–21
A. Basic mapping concepts (e.g., scaling, symbols, features, legend, contours, cartography)	
B. Types of maps (e.g., plan and profile, cross section, plat, record of survey, ALTA, topographic, planimetric)	
C. CAD (e.g., 2-D, 3-D, building information modeling [BIM])	
D. GIS (e.g., feature collection, map projections, coordinate systems, metadata, database design and management, spatial data analysis, GIS applications)	
E. Digital terrain model (e.g., machine control, triangulated irregular network [TIN], digital surface model, digital elevation model)	
F. Photogrammetry and remote sensing (e.g., close range, conventional, softcopy, ground control, quality control, flight planning, project planning, UAS, drone, LiDAR, satellite, digital image analysis and processing)	

1

FS

Getting Ready: Downloads

3. FS Reference Handbook

The only open book reference you may use during the exam

188 pages long

Learn its content & organization

Familiarize yourself with differing nomenclature

FS

Getting Ready: Downloads

3. FS Reference Handbook

Sec 1. Abbreviations & Acronyms

Sec 2. Conversions and Other Useful Relationships

Sec 3. Mathematical & Surveying-Related Formulas

Sec 4. Economics

Sec 5. Ethics

Sec 6. Safety

FS

Getting Ready: Downloads

3. FS Reference Handbook

Appendices

- NSPS Model Standards
- Minimum Standard Detail Requirements for ALTA/NSPS Land Title Surveys
- United States National Map Accuracy Standards

FS

Getting Ready: Downloads

3. FS Reference Handbook

Appendices

- FGCS Specifications & Procedures to Incorporate Digital/Bar-Code Leveling Systems
- FEMA Elevation Certificate and Instructions
- Geospatial Positioning Accuracy Standards

FS

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4. FS Practice Exam - Optional

50 questions from previous exams

Same format as FS exam

Worked solutions

$18.95

Free preview with missing pages available

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FS fundamentals of surveying practice exam

CST

Getting Ready

Exam Levels

	Level I *no experience*	Level II *minimum 1.5 years total experience*	Level III *minimum 3.5 years total experience*	Level IV *minimum 5.5 years total experience*
Office Track	Entry Level Position	Computer Operator	Chief Computer Operator	Survey Office Manager
Field Track	Entry Level Position	Instrument Person	Party Chief: Boundary or Construction	Survey Field Manager

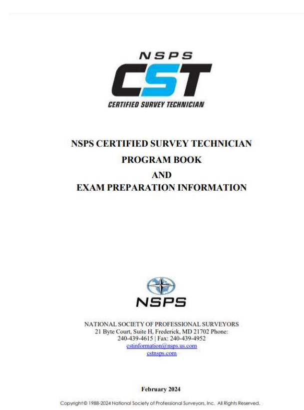
Level	# Quest	Time
I	200	4 hrs
II	130	4 hrs
III	110	4 hrs
IV	Single essay question take home exam.	
All exams are open-book.		

CST

Getting Ready: Downloads

Program Book

- General CST program info
- Application process
- Calculator policy



CST

Getting Ready: Downloads

Program Book

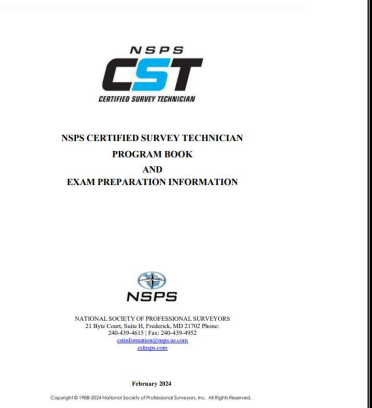
By Level:

Typical position description

Work Elements

Subjects/Topics

Number of questions for exam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NSPS CERTIFIED SURVEY TECHNICIAN
PROGRAM BOOK
AND
EXAM PREPARATION INFORMATION

NSPS

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A. Professional Library

Reference Material

You should have a set of reference materials

Not just exam prep – you will refer to the material in your practice.

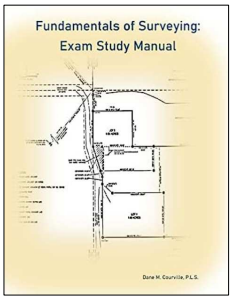
May be hard copy or digital

A. Professional Library

Area	Title or type
Basic principles	Recent editions of: a. General surveying textbook b. Photogrammetry textbook
Boundary principles	• Brown's Boundary Control and Legal Principles • Evidence and Procedures for Boundary Location • Clark on Surveying (optional) • Writing Legal Descriptions
PLSS [1] - General	• Manual of Surveying Instructions - 2009 • Manual of Surveying Instructions - 1973
PLSS [1] - Historic	• A History of the Rectangular Survey System • Previous Manuals of Instructions
Dictionaries	• Definitions of Surveying & Associated Terms; NSPS • Blacks' Law Dictionary • Glossary of BLM Surveying and Mapping Terms[1]

[1]Available online

B. Other Resources



1. FS Exam

WFPS: FS Video Study Course & Manual

https://www.wfps.org/publications.html

NLC Prep: FS Review Course

https://nlcprep.com

State Surveying Assoc.

Some offer review materials and/or sponsor review sessions.

B. Other Resources

2. CST Exam

Learn CST

https://learncst.com

Different courses & bundles

B. Other Resources

3. General/Specialized (free unless $)

Surveying and Mapping textbook

Open Textbook Library: https://open.umn.edu/opentextbooks/

The Nature of Geographic Information

Open Geospatial text: https://www.e-education.psu.edu/natureofgeoinfo/

GPS and GNSS for Geospatial Engineers

https://www.e-education.psu.edu/geog862/node/1407

B. Other Resources

3. General/Specialized

Open Access Surveying Library

https://jerrymahun.com

GeoLearn ($)

https://geolearn.wcea.education

HP-33s & -35s Programs

https://jerrymahun.com: Home | Software | HP Calculator Resources

B. Other Resources

3. General/Specialized

Mentoring Mondays – many applicable sessions

https://mentoringmondays.xyz

Wisdom Wednesdays

https://wisdomwednesdays.xyz

Past book: Evidence and Procedures for Boundary Location

Current: Writing Legal Descriptions

C. Pre-Exam

1. Identify Weak areas

Go through FS KA or CST WE and physically mark weak or unfamiliar areas.

Use to formulate a study plan.

The topics in the KA and WE aren't necessarily in learning order.

C. Pre-Exam

1. Surveying Processes and Methods

A. Instrumentation (e.g., GNSS/GPS, levels, total stations, robotic total stations, scanners, UAS)
B. GNSS/GPS surveys (e.g., static, kinematic, OPUS, real-time networks)
C. Control surveys (e.g., horizontal, vertical, network design, accuracy standards)
D. Cadastral (e.g., Public Land Survey System [PLSS], boundary, metes and bounds, land title)
E. Topographic surveys
F. Construction surveys (e.g., layout, as-built, quantity)
G. Land development (e.g., subdivision design/platting, land use, environmental, flood plains, wetlands)
H. Field record keeping and documentation (e.g., procedures, field books, raw data files)

5. Survey Computations and Computer Applications

A. Coordinate geometry
B. Traverse closure and adjustments
C. Leveling (e.g., differential, trigonometric, reciprocal, precise)
D. Least squares adjustments
E. Area
F. Horizontal curves
G. Vertical curves
H. Volume (e.g., mass diagrams, earthwork)
I. Spreadsheets
J. Slopes and grades

C. Pre-Exam

2. Reviewing or Learning?

Honest assessment: do you have the academic background?

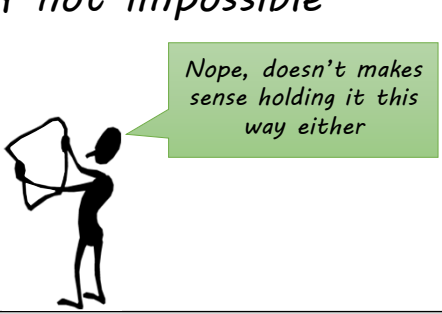
Review materials are intended to review surveying, not teach it.

You should have already been exposed to most of this material.

C. Pre-Exam

2. Reviewing or Learning?

Depending on review material without an adequate background will make passing exams that much harder if not impossible.



C. Pre-Exam

3. Study Time

- Consistent time and location.
- Fewest distractions
- Don't just read – do.

Working out problems and taking notes mentally reinforces the material

"I remember doing a similar problem…"

C. Pre-Exam

3. Study Time

Gonna use an HP-33s or -35s w/software and have never used an HP before? Learn how to:

perform basic RPN comps

set it up (display, angle mode, etc)

change batteries w/o trashing the software

do basic statistics

C. Pre-Exam

3. Study Time

Develop habits to use on the exam

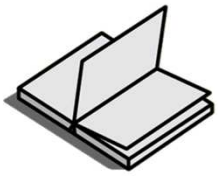
- Use sketches where applicable to illustrate narrative problems
- Perform comps neatly so they are easy to follow and/or track down errors.
- When you get an answer, ask yourself if it makes sense.

C. Pre-Exam

3. Study Time

- FS Exam: use the Reference Handbook for equations, conversion factors, etc.
- CST Exam: narrow down your references to a reasonably luggable pile.

Know material location to spend less time flipping pages



C. Pre-Exam

4. Getting More Help

Mentoring Mondays (MM)

- Check archives (ditto WW).
- If not covered and you think it beneficial, ask Trent if a session can be scheduled.
- MM contact spreadsheet – I added a column if a person would be willing to answer questions.

D. Taking the Exam

1. Don't Brute Force It!

Go through the exam doing the questions you can do immediately

- Skip over the ones you can't
- Later material may give you a hint/clue on the earlier difficult questions

Get an idea of content and organization

D. Taking the Exam

2. Read Each Question Carefully

Sometimes your mind sees something different from what your eyes do:

A Township is 6 miles square

vs

A Township is 6 square miles

D. Taking the Exam

2. Read Each Question Carefully

Determine exactly what's being asked to avoid extra comps.

Tough one: Answer non-computational questions based on what is provided, not on how your company may do things.

D. Taking the Exam

3. Don't Leave Any Questions Unanswered

No answer gets no points.

If all else fails you have a 25% chance guessing.

Can maybe narrow the odds: toss choices that don't make sense.

D. Taking the Exam

4. Done Ahead of Time?

Make sure all questions are answered.

Revisit questions that may have been difficult or confusing.

E. Post-Exam

1. Summarize your experience

Go through the FS KA or CST WE and make notes on which:

- were difficult
- you felt totally unprepared for
- you felt adequately prepared for

E. Post-Exam

1. Summarize your experience

Compare these notes (your interpretation) to the exam diagnostic (actual performance) when you receive it

Use this information to augment your study plan should you need to repeat the exam.

E. Post-Exam

2. Decompress

Have a beer, or

Play a vicious game of pickleball, or

Veg out on your favorite Netflix/Prime/Apple TV series, or

Spend some quality time with your family who's taken a back seat to that d*** exam.

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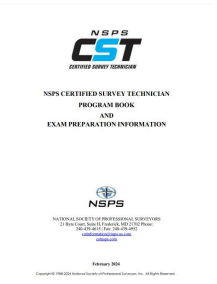

Questions?

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