

# NSPS - ACSM Survey Technician Certification Examination

National Society of Professional Surveyors (NSPS)  
American Congress on Surveying and Mapping (ACSM)



# Preparing for and Taking one of the Certified Survey Technician Examinations

# Presentation Outline

## Part 1: How to Prepare for the Examinations

- At Which Level Should You Start
- Using the Work Elements list as a study guide
  - ◆ Listing Work elements
  - ◆ Detailed Topics List for W.E. & # of Questions
  - ◆ Set Up Study Schedule
- Reviewing Computational Areas

## Part 2: How to Successfully Take the Exams

- Testing Strategies
- What to Bring
- Take Practice Exams

## Part 3: Preparing Training Sessions



# Part One

HOW TO PREPARE FOR THE  
EXAMINATIONS



# A General Note About the Examinations

- ◆ The exam is a challenging timed test. You must be prepared to move purposefully through two to seven hours of testing.
- ◆ Study, review, and practice in the Work Element areas is important to prepare you for the questions and to be successful.
- ◆ These tests require a significant amount of computations.

# Which Level to Start At

- ◆ How many years in the industry?
  - doing what type of work?
- ◆ How many credits of “formal” education?
- ◆ How many credits of “formal” Surveying education?
- ◆ Can start at any level for which experience requirement is satisfied
- ◆ Level IV applicant must possess a Level III certification

# Using the Work Elements List as a Study Guide

## ◆ First, List the Work Elements: for Level II

(180 questions)

- 1. Types of Surveys (F = 10, O = 10)
- 2. Field Equipment and Instruments (F = 35, O = 15)
- 3. Survey Computations (F = 40, O = 55)
- 4. Control Points: Horizontal and Vertical (F = 10, O = 10)
- 5. Field Operations (F = 35, O = 10)
- 6. Field Notes (F = 10, O = 10)
- 7. Plan Reading and Preparation (F = 15, O = 45)
- 8. First Aid and Safety (F = 15, O = 15)
- 9. Principles of the Profession (F = 10, O = 10)

(Note the number of questions that will be asked in each)

# Now make a detailed listing of the components (topics) of each Work Element

## 1. Types of Surveys (F = 10, O = 10)

Performing the following surveys:

leveling

traversing

triangulation

trilateration

public land surveys

metes and bounds surveys

construction surveys

photo control surveys

GPS surveys

# A detailed listing of the components (topics) of each Work Element (Level II)

## 2. Field Equipment & Instruments (F = 35, O = 15)

Care and cleaning of surveying tools, equipment and radios.

The use, operation, checking and adjustment of:

transits

theodolites

total stations

robotic total stations

data collectors

levels

compass

tribrachs

tripods

GPS equipment

Historical equipment and instrument knowledge is required.

# A detailed listing of the components (topics) of each Work Element (Level II)

## 3. Survey Computations (F = 40, O = 55)

Trigonometry, geometry, algebra, coordinate geometry

Use of calculators and computers

Survey computations associated with:

- leveling

- traversing

- stadia

- topographic mapping

- construction stakeout

Field note reduction and checking

Using P.C.s (elementary computer literacy)

# A detailed listing of the components of each Work Element (Level II)

## 4. Control Points: Horizontal & Vertical (F = 10, O = 10)

Gathering information on and locating control points.

Know agencies who have this data and agencies who set control points.

## 5. Field Operations (F = 35, O = 10)

Coordinate field work under the direction of chief of parties

Sun and Polaris observation

Sources of measurement error

Stake out and stake marking

GPS field observation procedures

# A detailed listing of the components of each Work Element (Level II)

## 6. Field Notes (F = 10, O = 10)

Keeping notes for:

leveling

traversing

topographic mapping

layout

as-built surveys

boundary surveys

profile and cross-section surveys

# A detailed listing of the components of each Work Element (Level II)

## 7. Plan Reading & Preparation (F = 15, O = 45)

Reading and preparing:

site plans

boundary plans

highway plans

profile and cross sections

horizontal and vertical curves

pipeline plans

foundation plans

Developing existing and finished contours

Hand and CAD drafting

# A detailed listing of the components of each Work Element (Level II)

## 8. First Aid & Safety (F = 15, O = 15)

Treatment practices of medical emergencies

Traffic control and safety procedures

Following OSHA standards

## 9. Principles of the Profession (F = 10, O = 10)

Technical Standards for field operations for Types of Survey (Work Element #1)

Ethical standards and issues

Professional attitude, demeanor and dress

Know the related professional associations

# Study/Review Schedule

- ◆ Now use the detailed topic list from the Work Elements to set up a Study Plan.
  - Back off the time available from the scheduled Examination date.
  - Divide up the topics (by importance) with the time available.

# Reviewing Computational Areas

(Tom Snow, Orlando Fl.)

- Equipment Testing and Adjustment
- State Plane Coordinates, Angle Conversion and Scale and Sea Level Corrections
  - (Lambert and Transverse Mercator)
- Differential and Trigonometric and Metric Leveling
- Tape Corrections
- Percentages for Grading, Slope Ratios
- Proration
- Field Math and its Applications – Basic Math – Unit Conversion

# Reviewing Computational Areas (ctd) (Tom Snow, Orlando Fl.)

- Deflection Angles, Back Azimuth, Sets of Angles
- Bearing and Azimuth Calculations
- Traverse Calculations
  - 1) Mean Angle and Distance
  - 2) Closures and Adjustments
- Areas and Acreage Calculations
- Volume and Earthwork Calculations
- Horizontal Curve Layout Computations
- Vertical Curves
- Spiral Curves
- Stationing on Tangents and on Curves – Station Equations

# Reviewing Computational Areas (ctd) (Tom Snow, Orlando FL.)

- Distance Conversions “Slope to Horizontal”
- Error in Angles
- Polaris and Sun-shot Observation and Calculations
- Surveying Equipment from Old to New (in detail)
- History-Sectional Survey, Townships, Ranges, Metes and Bounds
- Horizontal and Vertical Control: Orders of Accuracy and Different Classes of Surveys
- Pipe Grades
- Side Slope Calculations, Slope Staking

# Reviewing Computational Areas (ctd) (Tom Snow, Orlando Fl.)

- Magnetic Bearing Conversions
- Scales and Conversion
- Working with Coordinates (Lengths, Bearing)
- Working with Angles, Angle Calculation

## In General

- ◆ Know how to look up surveying terms in index of books.
- ◆ Review Typical Formulas (See Formula Sheets)

# Presentation Outline

## ◆ How to Prepare for the Examinations

- Which Level to start at
- Using the Work Elements list as a study guide
- Reviewing Computational Areas

## ◆ How to Successfully Take the Examinations

- Testing Strategies
- What to Bring
- Take Practice Exams

## ◆ Preparing Training Sessions



# Part Two

HOW TO SUCCESSFULLY TAKE  
THE EXAMINATIONS



# TESTING STRATEGIES For Certified Survey Technician Program Examinations

- Approach the test confidently, take it calmly.
- Remember to review in the weeks before the test.
- Don't "cram." Be careful of your diet and sleep...especially as the test draws near.
- Arrive on time...and ready.
- Choose a good seat. Get comfortable and relax.
- Bring the complete kit of "tools" you'll need.
- Listen carefully to all directions.
- Apportion your time intelligently with an "exam budget."

# TESTING STRATEGIES For Certified Survey Technician Program Examinations

- Read all directions carefully. Twice if necessary. Pay particular attention to the scoring plan.
- Look over the whole test before answering any questions.
- Start right in, if possible. Stay with it. Use every second effectively.
- Do the easy questions first; postpone harder questions until later.
- All CST program questions are currently weighted the same.
- Determine the pattern of the test questions. If it is hard-easy, etc., answer accordingly.

# TESTING STRATEGIES For Certified Survey Technician Program Examinations

- Read each question carefully. Make sure you understand each one before you answer. Re-read, if necessary.
- Think! Avoid hurried answers, guess intelligently.
- Watch your watch and “exam budget,” but do a little balancing of the time you devote to each question.
- Get all the help you can from “cue” words.
- Rephrase difficult questions for yourself.
- Choose the “best” of all the possible answers (Very Important)

# TESTING STRATEGIES For Certified Survey Technician Program Examinations

- Refresh yourself with a few well-chosen rest pauses during the test.
- Use controlled association to see the relation of one question to another and with as many important ideas as you can develop.
- Answer all questions.
- Now that you're a "cool" test-taker, stay calm and confident throughout the test. Don't let anything throw you.
- Edit, check, proofread your answers. Be a "bitter ender," stay working until they make you go.

# What to Bring to the Examination

◆ Remember that this is an OPEN BOOK exam  
Bring at least the following

## ◆ Books

- Dictionary (ACSM Terms)
- Basic Surveying text(s)
- Boundary Surveying text(s)
- Basic First Aid Book (Red Cross)
- Survey Standards
  - ◆ ALTA/ACSM
  - ◆ FGCS

*(see bibliography/References in back of CST Program Book)*

# Other Things to Bring

- ◆ Formula (Equations) Lists (bound, not loose leaf)
- ◆ Your review notes (bound, not loose leaf)
- ◆ Extra Batteries
- ◆ Extra Pencils
- ◆ Straight Edge, Scales, Protractors

# Taking Practice Exams

- ◆ Use those in the CST Program Book
- ◆ Use chapter problems in text books  
(those with answers in the back)
- ◆ Use "Survey Problems" books.
- ◆ Time yourself
- ◆ List the areas where you need more study

# Presentation Outline

## ◆ How to Prepare for the Examinations

- Which Level to start at
- Using the Work Elements list as a study guide
- Reviewing Computational Areas

## ◆ How to Successfully Take the Examinations

- Testing Strategies
- What to Bring
- Take Practice Exams

## ◆ Preparing Training Sessions



# Part Three

## PREPARING A TRAINING SESSION



# Preparing a Training Session

- ◆ The first thing is to determine which specific Level (I, II, III) will be the focus.
- ◆ Provide sufficient time.
  - (One day sessions are not enough !)
  - Approximately one semester long (15 weeks @ 3 hours/week = 45 hours) format is most appropriate due to the breadth of the material that must be covered.

# Preparing a Training Session

- ◆ Use the detailed Work Elements Topics list to plan/schedule the course.
- ◆ Use the list of Computational Areas to plan/schedule the course
- ◆ Include time for preparatory reading.
- ◆ Include time for homework assignments.
- ◆ Include time for reviewing homework assignments.

# Self Preparation

- ◆ Prepare a list of Work Element Topics.
- ◆ Identify the areas that need the most attention.
- ◆ Gather together the needed resource materials.
- ◆ Establish a Study Schedule well in advance of the test day.
- ◆ Stick to it!!

# Presentation Review

- ◆ How to Prepare for the Examinations
  - Which Level to start at
  - Using the Work Elements list as a study guide
  - Reviewing Computational Areas
- ◆ How to Successfully Take the Examinations
  - Testing Strategies
  - What to Bring
  - Take Practice Exams
- ◆ Preparing Training Sessions

NSPS - ACSM

Survey Technician Certification  
Program

**GET CERTIFIED**