

CAREER GUIDE FOR SURVEYING TECHNICIANS

Standard Occupational Code: SOC Code: 17-3031.01

Pay Band(s): 3, 4 ([Salary Structure](#))

Standard Occupational Description: Adjust and operate surveying instruments, such as the theodolite and electronic distance-measuring equipment, and compile notes, make sketches and enter data into computers.

Surveying and Mapping Technician positions in the Commonwealth are assigned to the following Roles in the [Engineering Technology Career Group](#):

[Engineering Technician II](#)
[Engineering Technician III](#)

While Surveying Technicians within the Commonwealth are all located within the Engineering Technology Career Group, individuals may want to pursue other opportunities within the Commonwealth depending upon individual training, education, knowledge, skills, abilities, and interests.

Other Career Group(s) that may be of interest are:

[Building Trades](#)
[General Administration](#)
[Transportation Operations](#)

SKILLS, KNOWLEDGE, ABILITIES AND TASKS

(Technical and Functional Expertise)

Skills

Note: *The technical and functional skills listed below are based on general occupational qualifications for Surveying Technicians commonly recognized by most employers. Typically, you will not be required to have all of the skills listed to be a successful performer. Recruitment and selection standards for an individual state job must be based on the specific knowledge, skills, and abilities for that job as indicated in the job announcement and job description in the Employee Work Profile.*

1. Using mathematics to solve problems.
2. Understanding written sentences and paragraphs in work related documents.
3. Communicating effectively in writing as appropriate for the needs of the audience.
4. Teaching others how to do something.
5. Controlling operations of equipment or systems.
6. Talking to others to convey information effectively.
7. Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.
8. Managing one's own time and the time of others.
9. Determining the kind of tools and equipment needed to do a job.
10. Resources Motivating, developing, and directing people as they work, identifying the best people for the job.
11. Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions.

12. Understanding the implications of new information for both current and future problem-solving and decision-making.
13. Monitoring/Assessing performance of yourself, other individuals, or organizations to make improvements or take corrective action.
14. Adjusting actions in relation to others' actions.

Knowledge

Note: *The technical and functional knowledge statements listed below are based on general occupational qualifications for Surveying Technicians commonly recognized by most employers. Typically, you will not be required to have all of the knowledge listed to be a successful performer. Recruitment and selection standards for an individual state job must be based on the specific knowledge, skills, and abilities for that job as indicated in the job announcement and job description in the Employee Work Profile.*

The **Knowledge** of:

1. Practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.
2. Arithmetic, algebra, geometry, calculus, statistics, and their applications.
3. Design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.
4. Principles and methods for describing the features of land, sea, and air masses, including their physical characteristics, locations, interrelationships, and distribution of plant, animal, and human life.
5. Business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.
6. Administrative and clerical procedures and systems such as word processing, managing files and records, stenography and transcription, designing forms, and other office procedures and terminology.
7. Machines and tools, including their designs, uses, repair, and maintenance.
8. The structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar.
9. The prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.
10. Principles and methods for curriculum and training design, teaching and instruction for individuals and groups, and the measurement of training effects.
11. Relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.

Abilities

Note: *The technical and functional abilities listed below are based on general occupational qualifications for Surveying Technicians commonly recognized by most employers. Typically, you will not be required to have all of the abilities listed to be a successful performer. Recruitment and selection standards for an individual state job must be based on the specific knowledge, skills, and abilities for that job as indicated in the job announcement and job description in the Employee Work Profile.*

The **Ability** to:

1. Communicate information and ideas in writing and in speaking so others will understand.
2. Know your location in relation to the environment or to know where other objects are in relation to you.
3. See details at a distance.
4. Arrange things or actions in a certain order or pattern according to a specific rule or set of rules (e.g., patterns of numbers, letters, words, pictures, mathematical operations).
5. Quickly and repeatedly adjust the controls of a machine or a vehicle to exact positions.

6. Add, subtract, multiply, or divide quickly and correctly.
7. Listen to and understand information and ideas presented through spoken words and sentences.
8. Speak clearly so others can understand you.
9. Choose the right mathematical methods or formulas to solve a problem.
10. Apply general rules to specific problems to produce answers that make sense.
11. Read and understand information and ideas presented in writing.
12. Keep your hand and arm steady while moving your arm or while holding your arm and hand in one position.
13. See details at close range (within a few feet of the observer).
14. Combine pieces of information to form general rules or conclusions (includes finding a relationship among seemingly unrelated events).
15. Quickly make sense of, combine, and organize information into meaningful patterns.

Tasks

Note: *The following is a list of sample tasks typically performed by Surveying Technicians. Employees in this occupation will not necessarily perform all of the tasks listed.*

1. Obtains land survey data, such as angles, elevations, points, and contours, using electronic distance measuring equipment and other surveying instruments.
2. Compiles notes, sketches, and records of survey data obtained and work performed.
3. Directs work of subordinate members of party, performing surveying duties not requiring licensure.

INTERESTED?

Like people, occupations have traits or characteristics. These characteristics give important clues about the nature of the work and work environment, and give you an opportunity to match your own personal interests to a specific occupation. When you choose a job in an occupation that matches your own interests you have taken an important step in planning a successful and rewarding career.

Surveying Technician work is called a “Realistic Occupation” because it involves work activities that include practical, hands-on problems and solutions. They often deal with plants, animals, and real-world materials like wood, tools, and machinery. Many of the occupations require working outside, and do not involve a lot of paperwork or working closely with others. It is also referred to as a “Conventional Occupation” since it frequently involves following set procedures and routines. These occupations can include working with data and details more than with ideas. Usually there is a clear line of authority to follow. It can also be an “Investigative Occupation” since it frequently involves working with ideas, and require an extensive amount of thinking. These occupations can involve searching for facts and figuring out problems mentally.

LICENSURE, REGISTRATION, OR CERTIFICATION REQUIREMENTS

Generally this is not required for Surveying Technician positions in state government. However, to improve career advancement opportunities, you should consider the advantages of certification and include this step in your self-development plan. *There are 2 recognized apprenticeable specialties associated with this occupation: Chief of Party and Surveyor Assistant, Instruments.* For more information, continue reading the Guide (Educational, Training and Learning Opportunities).

EDUCATIONAL, TRAINING, AND LEARNING OPPORTUNITIES

Employees in this occupation usually need two to four years of work-related skill, knowledge, or experience and usually need several years of work-related experience, on-the-job training, and/or vocational training. Some methods of getting that training and/or experience are listed below.

1. Graduate from an engineering curriculum accredited by the Accreditation Board for Engineering and Technology.
2. US Military Service
3. On-the-job Training
4. One of the Commonwealth's technical high schools. (Check with your local school district for technical high school information.)
5. Virginia Community College System
6. Talk to a supervisor or supervisor whom you believe "has it all together".
7. Skilled trades organizations that you may wish to join.

To learn about specific apprenticeship opportunities, on these and other apprenticeable occupations, including sponsorship:

- Visit the Virginia Department of Labor and Industry's web site at <http://www.doli.state.va.us>
- Consult the US Department Of Labor, 400 North 8th Street, Federal Building - Suite 404, Richmond, Virginia 23219-23240, (804) 771-2488.
- Visit the [Office of Apprenticeship Training, Employer and Labor Services \(OATELS\)](#) for general information about apprenticeships, training, and partnerships with business.

COMMONWEALTH COMPETENCIES

Competencies are a set of identified behaviors, knowledge, skills, and abilities that directly and positively impact the success of employees and the organization. Competencies can be observed and measured. When consistently demonstrated, competencies make employees particularly effective in their work. Competencies help lay out a road map to career success. You can use the Commonwealth Competencies to help improve your individual performance by adopting behaviors that make high performing employees successful in their jobs. In this way, you can use the Commonwealth Competencies for your further professional development.

The Commonwealth Competencies are:

1. Technical and Functional Expertise
2. Achieve Results
3. Serve the Customer
4. Teamwork
5. Understanding the Business
6. Interpersonal and Communication Skills
7. Leadership and Personal Effectiveness

The above competencies may be applied to employees throughout the Commonwealth of Virginia. They can be rank-ordered by agencies and hiring managers to represent the needs of a specific job. The rank ordering will change depending upon the occupation, an organization's priorities, the actual job requirements, and the supervisor's preferences.

Career success is both about what you do (applying your technical knowledge, skills, and ability) and how you do it (the consistent behaviors you demonstrate and choose to use) while interacting and communicating with others. Hopefully, by studying the Commonwealth competencies, identifying your developmental opportunities, and working to refine your own competence, you can take charge of your career!

For additional information about the **Commonwealth Competencies** go to: http://jobs.state.va.us/cc_planningctr.htm. For the competencies, we first list the competencies and then define each. Finally, we list competency indicators; to describe what successful performance looks like.

COMMONWEALTH CAREER PATH

Career opportunities in the Commonwealth are not limited to moving “up” to the next highest role and pay band, changing positions, or to becoming a supervisor. That’s because most roles describe a broad group of occupationally related positions that perform a range of work that requires increased knowledge and skills. For that reason, Commonwealth roles describe the career paths within the same or higher-level role for the same or different Career Group. The broad salary range and the Commonwealth’s pay practices provide flexibility in recognizing career development and advancement. ([Salary Structure](#))

Many employers, including the Commonwealth, expect trades professionals to gain knowledge, skills, and abilities in more than one area. Multi-skilled workers can add value to the organization and often find that a variety of work assignments can be rewarding.

Sample Career Path

PAY BAND	PRACTITIONER ROLES
2	Engineering Technician I →
3	Engineering Technician II →
4	Engineering Technician III →
5	Engineering Technician IV →

Engineering Technician I

The Engineering Technician I role provides career tracks for engineering technicians who perform or provide assistance to others who perform engineering activities. Duties range from trainee to entry level and are of limited scope and require knowledge of principles/techniques in a specific/narrow area of technical assignment and/or acquired through a formal training program

Engineering Technician II

The Engineering Technician II role provides career tracks for engineering technicians performing at the journey level who apply technical skills in support of specialized tasks, phases and/or segments of a specialty-engineering project or assignment. Duties include drafting and sketching of engineering plans or maps; conducting on-site bridge/structure and project construction inspections; performing materials sampling and testing; calculating geometrics; or other specialty activities to ensure accurate program execution and compliance with Department, State and Federal regulations and standards.

Engineering Technician III

The Engineering Technician III role provides career tracks for engineering technicians performing responsibilities ranging from advanced level to supervisory in support of a broad range of engineering specialty activities. Duties involve interpreting engineering guidelines; coordinating varied activities; performing engineering drafting and design work, traffic engineering improvements, materials acceptance evaluations, bridge/structure inspections and construction inspections for moderate to major scale projects; providing technical assistance to others; and performing detailed reviews of engineering related projects. This role also provides career tracks for photogrammetrists who perform entry level to advanced level responsibilities.

Engineering Technician IV

The Engineering Technician IV role provides career tracks for engineering technicians who perform as experts and/or supervisors of technical specialty engineering support and/or coordination of research, planning, design, construction and/or rehabilitation of comprehensive engineering projects and activities. Duties range from ensuring that projects, programs and procedures are effectively and efficiently administered to providing practical technical expertise in making decisions in the review, analysis, coordination and delivery of a specialty engineering function.

ADDITIONAL OCCUPATIONAL INFORMATION CAN BE FOUND AT:

O*NET

<http://online.onetcenter.org/>

Virginia Employment Commission

<http://www.alex.vec.state.va.us/>

Department of Professional & Occupation Regulation

http://www.state.va.us/dpor/conNEW_reg.pdf

Career One Stop

<http://www.careeronestop.org/>

Virginia Career Resource Network

<http://www.vacrn.net/>