

**SOUTH DAKOTA BOARD OF TECHNICAL EDUCATION
ACADEMIC AFFAIRS
COMMITTEE RECOMMENDATION**

SUMMARY

Substantive Program Application

Southeast Technical College

Associate of Applied Science (AAS) in Pre-Engineering

COMMITTEE RECOMMENDATION

The Committee on Academic Affairs and Institutional Effectiveness ("Committee") met on 11/13/2023 to consider the merits of the above application. After review, the Committee makes the following action recommendation to the Board of Technical Education:

- ☒ Approval
- ☐ Disapproval
- ☐ Deferral
- ☐ Other:

PROGRAM DESCRIPTION

Institution	Southeast Technical College
Program Identifier Code (If applicable)	N/A
Program Title	Pre-Engineering
Program Award Level: Check all that apply	☐ Short-Term Certificate ☐ Long-Term Certificate ☐ Diploma ☒ Associate of Applied Science
CIP Code (6 Digit)	14.0102
Projected Implementation Date	8/19/2024
Location	☒ Main Campus ☐ Other:

SUMMARY

Type of Substantive Change	☒ New Program (B.1.1) ☐ Significant Curriculum Modification (B.1.2) ☐ Other:
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Describe the change the institution is seeking approval of.

Southeast Technical College (STC) is seeking approval to start a new academic program. The Associate of Applied Science in Pre-Engineering will provide students with a base foundational knowledge of engineering concepts to prepare them for entry-level positions in the engineering field while transitioning to a bachelor's in engineering program. The degree curriculum will meet guidelines set forth by industry professionals through the program advisory board and other collaborative partnerships.

The program will prepare students for employment in entry-level positions in engineering fields while pursuing a bachelor's degree in a designated engineering field. The program will allow STC to meet the growing demand for engineering professionals while exploring additional partnerships and alignments with 4-year institutions.

Graduates of the program can continue their education and pursue a Bachelor of Engineering degree. An example possibility is the Bachelor of Civil Engineering at the South Dakota School of Mines and Technology (SDSMT). STC is presently working to develop an articulation partnership with the SDSMT, further demonstrating a need for the Pre-Engineering program at STC. The degree will provide an entry-level workforce that can support and assist with essential support in the engineering industry.

CRITERION 1: MISSION

The program aligns with the system's mission and strategic priorities.

1.1. The program aligns with the system's mission of preparing a technically skilled workforce prepared to serve the state of South Dakota and its regions.

1.2. The program aligns with the system's strategic priorities.

1.1. Describe how the proposed program aligns with the system's mission.

The mission of Southeast Technical College (STC) is to educate individuals for dynamic and rewarding careers that promote lifetime success and meet the workforce needs of our region. STC works with industry partners to train and prepare students for high-demand careers. The Pre-Engineering program will allow STC to meet the growing demand for skilled engineering technicians. STC can identify workforce needs in the region by working closely and in concert with our industry and academic partners, along with reviewing state labor market trends. Reviewing workforce needs allows STC to identify prospective programs to meet the recognized demand.

Identifying new programs with opportunities to partner in articulation with academic partners aligns with the STC mission to promote lifetime success for the students in pursuit of advancing their education. The attached proposal for the Pre-Engineering program will assist in filling a much-needed workforce need in South Dakota and provide area partners with additional resources to meet the demand for skilled technicians within our communities.

CRITERION 2: DEMAND

The program leads to meaningful employment, adequate student enrollment, and/or fulfills needs not being met by existing education and training providers.

- 2.1. The program leads to high-wage occupations that have an average/mean wage greater than the median wage across all occupations.
- 2.2. The program leads to high-demand occupations that have project annual openings (a measure of demand for workers) greater than the average across all occupations or is shown as an economic and/or labor market emerging field for the state of South Dakota and its regions.
- 2.3. The program's student enrollment is adequate to justify program existence.
- 2.4. The program fulfills a demand not being met by existing education and training providers in the region and/or state.

2.1. Describe the wage projections for occupations associated with the proposed program by completing Appendix 2.A.

2.2. Describe the demand projections for occupations associated with the proposed program.

A. Complete Appendix 2.A.

B. If an emerging field for the state of South Dakota, describe the field. Letter(s) of support, detailing demand, should be attached as appendices.

This is not an emerging career field.

2.3. Describe projected student enrollment for the proposed program by completing Appendix 2.B.

2.4. Describe how the proposed program fulfills a demand not being met by existing education and training providers in the region and/or state.

A. Identify closely related program(s) that currently exist at other public higher education institutions in the system or state. If none, write "None."

An associate degree in Pre-Engineering does not currently exist at other public higher education institutions in South Dakota. However, various engineering pathways exist.

Western Dakota Technical College offers an associate degree in architectural and engineering Technology.

Southeast Technical College offers an associate degree in various engineering pathways: Civil Engineering, Architectural Engineering, Mechanical Engineering, or Land Surveying Technology.

- B. If applicable: Describe the ways in which the demand is not currently being met by the aforementioned program(s) and provide justification as to why the program should be approved by addressing the following conditions that warrant duplication ([BP 303.2](#)). Select all that apply.

☒ Unmet Demand (C.5.1.1)
☐ Industry Partnership (C.5.1.2)

☒ Increases Student Access (C.5.1.3)
☐ Other:

- I. For each condition selected above, provide a brief justification.

Completing the pre-engineering program provides an entry-level career opportunity for individuals interested in entering the very high-demand field in the region while completing the remaining credits toward the successful completion of a bachelor's program.

In addition, over the last 18 months, STC has been working collaboratively with the South Dakota School of Mines on an articulation agreement involving your Civil Engineering Technology program and, during that work, discussed the possibility of a pre-engineering associate degree. While this work is currently ongoing, the AAS degree program will allow students to begin engineering coursework and complete career exploration before selecting an educational pathway for degree completion.

Unmet Demand: The Pre-Engineering program is a new initiative to allow students to begin their education at a public 2-year technical college and begin coursework in general education and engineering. Students will have the opportunity to complete the general education requirements for a 4-year engineering program and obtain a base foundation in either civil, mechanical, or architectural engineering to prepare the student for entry-level employment and transition to a 4-year program.

Currently, the engineering industry is experiencing tremendous need for technicians to assist with meeting the community's needs. The South Dakota Department of Labor, as of July 2022, had approximately 339 average annual open job postings for various disciplines of Engineering Technicians throughout South Dakota. Adding this program to STC's breadth of programs will provide additional graduates to meet this high-demand career field.

CRITERION 3: DESIGN

The program's learning assessment strategy, program of study, and delivery methods are designed to provide students with the necessary competencies, as demonstrated through program learning outcomes.

- 3.1. The program is aligned to competencies, as demonstrated through program learning outcomes, that are developed with and continually validated by relevant stakeholders.
- 3.2. The program has a learning assessment strategy to validate student mastery of the program learning outcomes.
- 3.3. The program has an integrated program of study designed to develop and reinforce the program learning outcomes.
- 3.4. The program, when appropriate, includes a work-based learning component that develops and reinforces the program learning outcomes.
- 3.5. The program, when appropriate, offers flexible delivery methods to increase student access.

3.0. Describe the proposed program's alignment with the program award level requirements established in [BP 301.1](#).

A. Does the program align with the requirements?

- ☒ Yes
☐ No (Requesting Exemption)

B. If no: Provide a detailed rationale for program exemption. Specify which requirement(s) in BP 301.1 are not met; cite specific policy sections (e.g., B.3.4), when appropriate. If external organizations are involved (accreditation, regulatory, licensure, etc.), reference the organization name(s), specific requirements (including citations), and a justification for why the exemption should be approved.

N/A

3.1. Describe the program learning outcomes.

A. Provide a list of program learning outcomes for each proposed award level. Learning outcomes should be specific to the program.

Technical Outcomes

- Demonstrate technical skills in alignment with standards of engineering industry
- Produce quality engineering techniques

Problem solving/Critical Thinking Outcomes

- Demonstrate ability to troubleshoot complex situations in engineering and construction environments
- Define problem-solving criteria for engineering-specific situations

Professional Outcomes

- Defend engineering professionalism standards
- Maintain opportunities on professional organizations and memberships

Communication

- Articulate interpersonal communication skills effective in engineering and construction environments
- Promote effective teamwork

B. Describe the how the program learning outcomes were developed and validated.

The program learning outcomes were developed after consultation with industry experts and review of abilities and knowledge crucial for Engineering Technicians. Industry representatives with expertise in engineering provided input to the development of program learning outcomes. The program learning outcomes are in alignment with the Southeast Technical College's broad student learning outcomes, aligning with the mission and vision of the institution.

STC uses a specific process to develop and validate learning outcomes based on the following six principles.

- Learning outcomes should have two parts: an action verb and a content area. Utilize the action verb to specify the desired student performance, followed by a specific description of the course-specific content target.
- Keep statements short and focused on a single outcome. This allows instructors to determine whether or not an objective has been met without distinguishing between partial completion or complete success.
- To ensure that learning outcomes are effective and measurable, avoid using verbs that are vague or cannot be objectively assessed. Use active verbs that describe what a student can do once learning has occurred.
- Learning outcomes should be SMART (specific, measurable, acceptable to the instructor, realistic to achieve, and time-bound with a deadline).
- Include complex or higher-order learning outcomes when they are appropriate. Most instructors expect students to go beyond memorizing facts and terminology; learning outcomes should reflect instructors' expectations for student performance.
- Utilize learning outcomes as a basis for course preparation. Learning outcomes should match instructional strategies and assessment requirements. To ensure the connection between various course activities, it is useful to construct a table highlighting the relationship.

3.2. Describe the program's learning assessment strategy.

A. Describe how students will demonstrate mastery of the program learning outcomes. Description should be specific to the program's learning assessment plan vs. the institutional assessment plan.

The Academic Leadership Team oversees STC's Program Learning Outcomes (PLO) Assessment. It is coordinated and facilitated by the Dean of Curriculum and Instruction and Institutional Effectiveness. STC utilizes Watermark's Planning & Self-Study software, allowing the college to plan, assess, report, review, and improve the program and institutional common learning outcomes. With the Watermark software, all faculty and administrators can review and manage each academic program's assessment outcomes year over year. The software allows everyone to gather actionable insights from various reports to decide how students learn and aid in making decisions on program changes.

Academic programs align all program learning outcomes with the Institutional Common Learning Outcomes (ICLO). The ICLO Plan focuses on tracking students' abilities related to Problem-Solving/Critical Thinking, Technical Skills, Professionalism, and Communication. Celebrating Learning Team coaches support faculty. The Celebrate Learning team is a faculty-led committee reviewing each program's PLO plan and providing feedback to each academic program. The PLO Plans articulate the desired learning outcomes to be achieved by the program graduates. In addition, the required coursework in the program maps to the PLOs. A curriculum map is a chart that illustrates the connections between Program Learning Outcomes (PLOs) and Course Learning Outcomes (CLOs). The Curriculum Map also indicates to what extent a learning outcome is taught (introduced, reinforced, mastered). The maps assist in identifying redundancies and gaps in the curriculum.

Outcomes 	Courses 					
Digital Media Production Technology (AAS) Learning Out...	COMM ...	DMP 120	DMP 150	DMP 220	DMP 231	DM
Professionalism PLO1 Model workplace expectations for Digital Media Professionals.	A	+	+	A	+	
Professionalism PLO2 Appraise the strengths & weaknesses of one's/peers' completed work.	+	+	+	A	+	
Technical Skills PLO1 Apply appropriate industry software & techniques to meet	+	+	+	+	+	
Key: ✓ Aligned I Introduce R Reinforce M Master A Assessment Activity						

B. Is the program preparation for a professional licensure and/or certification examination?

- ☒ Yes (Detail in Appendix 4: Section 3)
☐ No

3.3. Describe the program of study by completing Appendix 3.

3.4. Describe the program's work-based learning component.

A. Does the program have a work-based learning component? If so, select all that apply.

- ☐ None ☐ Clinical
☐ Apprenticeship ☐ Capstone
☒ Internship or Externship ☐ Other:

B. If none, describe why.

3.5. Describe the program's delivery methods.

A. Select the program's primary delivery method(s)¹. Select all that apply.

- ☒ On Campus ☐ Apprenticeship
☒ Online ☐ Other:
☒ Blended

¹ **In Person:** 100 percent of courses are available in-person. **Online:** 100 percent of courses are available via distance learning. Delivery is only via the Internet. **Blended:** Delivery includes a required combination of both in-person and online courses. If a student has the option to take courses online, but is not required to do so, the program is not necessarily considered blended.

B. Describe how flexible delivery methods are being leveraged to increase student access.

Classes for the pre-engineering program will be offered in several formats to meet student needs. Most if not all courses will be offered in a traditional face-to-face format on campus. The core program courses will be offered on campus, face to face only. Students who select these courses will attend class in a traditional formation structure at STC's main campus in Sioux Falls. Students also could take certain general education courses in an online and/or hybrid format. The online and hybrid format will provide students with the flexibility to continue to work full-time, support their family needs, or provide the opportunity for students to learn in a non-traditional manner, meeting their personal educational needs. Specific courses, such as those with a laboratory component, will require students to attend class in person and will not be offered in either the online or hybrid format.

CRITERION 4: ALIGNMENT

The program is vertically aligned to an education and training pathway.

- 4.1. The program is vertically aligned to an education and training pathway, reflecting efficient articulation of:
 - 4.1.1. Non-degree credential/industry certification
 - 4.1.2. Certificate to diploma
 - 4.1.3. Diploma to associate of applied science
 - 4.1.4. Associate of applied science to baccalaureate

4.1. Describe the alignment of the proposed program along an education and training pathway.

A. Complete Appendix 4.

B. Describe the projected alignment between the proposed program and existing academic programs within the technical college system.

The core curriculum delivered for students enrolled in the associate degree in engineering program allows students the opportunity to transition to other engineering programs if indicated. The general education courses are transferrable within the STC college system. Students may transition to a different program at STC and transfer credits from the engineering program if other admission criteria are met. The engineering program aligns with various programs at Southeast Technical College to meet our region's industry needs and enhance graduates' versatility in employment. The general education credits and prerequisite requirements transition into several engineering programs. The pre-engineering AAS Degree is valuable in alignment with various programs, including AAS Land Survey Science, AAS Civil Engineering Technology, AAS Architectural Engineering, and AAS Mechanical Engineering.

C. As applicable: Insert any additional comments here.

CRITERION 5: CAPACITY

The institution demonstrates the internal and external resources necessary to develop, implement, and sustain the program.

- 5.1. The institution demonstrates the financial resources necessary to develop, implement, and sustain the program.
- 5.2. The institution demonstrates appropriately certified and qualified faculty are in place with expertise in content, pedagogy, and related industry to develop and validate the program learning outcomes.
- 5.3. The institution's physical facilities (e.g., classrooms, laboratories) reflect current industry and/or occupational standards necessary to develop and validate the program learning outcomes.
- 5.4. The institution's equipment and technology resources reflect current industry and/or occupational standards necessary to develop and validate the program learning outcomes.
- 5.5. The institution demonstrates the ability of the program to meet institutional and programmatic accreditation standards, as applicable.

5.1. Describe the institution's financial capacity to develop, implement, and sustain the proposed program.

A. Complete Appendix 5.

B. Describe the proposed program's anticipated local fee structure. Description of fee structure should be specific to the program.

The pre-engineering program fee structure will align with STC's current fee structure. There will not be any additional fees associated with implementing or maintaining the academic program. Total current total tuition is set at \$255.00 per credit. The tuition breakdown includes state tuition of \$124 per credit, State R&M fee of \$6 per credit, State facility fee of \$36 per credit, and local fees totaling \$89 per credit (local institutional fee, student government fee, and local R&M fee).

C. What is the proposed program weight factor (funding formula)?

- ☒ Standard Cost (1)
- ☐ High Cost (3)
- ☐ High Cost, Low Density (5)

I. Provide rationale related to the selection of proposed program weight factor.

The proposed program aligns with the state-level guidance for the standard-cost program weight factor.

D. Describe the contingency plans in case anticipated enrollments, income, or resources do not materialize.

STC does not anticipate low enrollment in the pre-engineering program. Several STC engineering programs are approved for Build Dakota programs. With substantial industry support, we anticipate sponsorship for this program to assist in filling these high-demand positions with graduates from STC. As for resources, all resources and infrastructure (classrooms and equipment) will be approved and in place before the start of the program at STC.

5.2. Describe how the institution will ensure the appropriate certified and qualified faculty are in place with the expertise in content, pedagogy, and the related industry to develop and validate the program learning outcomes.

A. Describe the necessary qualifications of faculty who will be involved in the program.

STC strictly follows the Higher Learning Commission's highly qualified faculty. Faculty will be required to hold a bachelor's degree in engineering or a related academic discipline or a master's degree plus 18

graduate hours in the field of Engineering. All General Education faculty must hold a Master's degree in the field.

In addition, STC is working with USD and Northern to provide academic degree pathways for degree completion options. Both BOR institutions require that STC hire faculty who hold a master's degree in field or a master's degree plus 18 graduate hours in field as defined as highly qualified by HLC.

STC has a robust faculty training and development program. All adjuncts hired are required to complete a series of five professional development and training programs. The five courses provide training and guidance on using the LMS, educational pedagogy, assessment at the program and course level, student engagement, classroom management, and use of instructional technology.

All full-time faculty are enrolled in a two-year mentor-based training and development program. The new faculty start training and development with an intensive two-week training course. Afterward, they are assigned another full-time faculty mentor whom they meet with monthly. The training and development continue throughout the academic year with additional classroom-based training and development.

B. Does the instructorship(s) currently exist in the roster of Instructor Salary Support market value determinations?

- ☒ Yes
☐ No

I. If no: Describe the SOC(s) codes and titles that will need to be added.

5.3. Describe the existing and/or new physical facilities that will be utilized or needed to reflect current industry and/or occupational standards. Outline short- and long-term investments in physical facilities.

Current facilities at STC will be utilized for all courses. STC currently has physics and chemistry laboratory facilities that will be utilized for this program. The lecture and laboratory facilities of existing engineering programs including civil engineering, architectural engineering, and mechanical engineering, will be utilized for this program. Short-term investments include a full-time faculty member and appropriate training. Long-term investments include lecture and laboratory space expansion and FTEs with program growth.

5.4. Describe the existing and/or new equipment and technology resources that will be utilized or needed to reflect current industry and/or occupational standards. Outline short- and long-term investments in equipment and technology resources.

There will not be specialized equipment or technology needed to deliver the curriculum. The current LMS will be utilized to assist in the delivery of this theory-based curriculum on campus.

5.5. Describe the institution's and proposed program's ability to meet institutional and programmatic accreditation standards, as applicable.

A. Specify Higher Learning Commission (HLC) requirements.

- ☒ Notification Only
☐ Approval Required
☐ None
☐ Other:

B. Is there an accrediting or professional organization that has established standards for the program?

- ☒ Yes
☐ No

- C. If yes: Describe the ability of the proposed program to meet professional accreditation standards. If the program does not or cannot meet those standards, describe the area(s) in which it is deficient and indicate steps needed to qualify the program for accreditation. Provide the date by which the program would be expected to be fully accredited.

If the institution does not plan to seek specialized accreditation, provide a rationale for not seeking.

STC will seek accreditation of all engineering programs through Accreditation Board for Engineering and Technology (ABET).

STC has a long history of holding programmatic accreditation for many of its academic programs. The campus does not foresee any issues meeting the accreditation standards set by ABET. The accreditation process will require preparing a self-study, hosting a site visit, and demonstrating alignment with ABET's accreditation standards. STC has started reviewing accreditation standards in the academic program design, facilities, and assignments. STC's Engineering programs should be fully accredited within three years of the pre-engineering program launch.

SOUTH DAKOTA BOARD OF TECHNICAL EDUCATION
Appendix 2.A: Labor Market Information

Southeast Technical College
Pre-Engineering AAS

SOUTH DAKOTA								
SOC* CODE	SOC* TITLE	AVERAGE ANNUAL OPENINGS	2023 EMPLOYMENT	2033 EMPLOYMENT	NUMERIC CHANGE: 2023-2033	PERCENT CHANGE: 2023-2033	MEDIAN: ANNUAL WAGE (2020)	AVERAGE: ANNUAL WAGE (2020)
00-0000	Total, All Occupations	62,664	491,588	526,251	34,663	7.1	\$36,823	\$44,961
17-3022	Civil Engineering Technologists and Technicians		457	480	23	5%	\$ 59,634.00	
17-3027	Mechanical Engineering Technologists and Technicians		190	202	12	6.10%	\$ 61,984.00	
17-3011	Architectural and Civil Drafters		596	596	0	0	\$ 60,389.00	

NATIONAL								
SOC* CODE	SOC* TITLE	AVERAGE ANNUAL OPENINGS	2023 EMPLOYMENT	2033 EMPLOYMENT	NUMERIC CHANGE: 2023-2033	PERCENT CHANGE: 2023-2033	MEDIAN: ANNUAL WAGE (2020)	AVERAGE: ANNUAL WAGE (2020)
17-3022	Civil Engineering Technologists and Technicians		63,580	66,715	3,135	4.90%	\$ 59,634.00	
17-3027	Mechanical Engineering Technologists and Technicians		41,043	43,558	5,515	6.10%	\$ 61,984.00	
17-3011	Architectural and Civil Drafters		195,350	199,198	3,848	2.00%	\$ 60,389.00	

SOURCE: South Dakota Department of Labor and Regulation, Labor Market Information Center (LMIC) (<https://dlr.sd.gov/lmic/>)
DATE:

NOTES:

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Appendix 2.B: Student Demand Projections

Southeast Technical College

Pre-Engineering AAS

	YEAR 1	YEAR 2	YEAR 3
Student Full-Time Equivalent (FTE)	30	40	40
Headcount: Full-Time	20	30	30
Headcount: Part-Time	10	10	10
Headcount: Total	30	40	40
Total Program or Site Capacity	30	40	40

SOUTH DAKOTA BOARD OF TECHNICAL EDUCATION

Appendix 3: Program of Study

Southeast Technical College

Pre-Engineering AAS

MONTHS:	24
SEMESTERS:	4
TOTAL CREDITS:	68

PREFIX AND NUMBER	TITLE	CREDITS	DESCRIPTION	EXISTING COURSE
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I. GENERAL EDUCATION CORE				
	Written and Oral Communications	6	6 Credits Required	
ENGL101	Composition	3	English Composition will help develop proficiency in writing concise, coherent essays, and in using correct English. Several modes of discourse will be explored and good grammar skills are emphasized. This course will improve the student's critical thinking skills as it provides students with practice in all stages of the writing process: planning, supporting, rewriting, analyzing, proofreading, and editing. This course will also require critical reading and writing.	Y
CMST101	Fundamentals of Speech	3	Based on the study of communication theory as applied to public speaking. The goals are to improve the student's public speaking and listening skills. Experiences in the class range from developing speech outlines, researching topics, and practicing delivery techniques for an informative, persuasive, and panel discussion assignment.	Y
	Mathematics	3	3 Credits Required	
MATH 101	Introductory Algebra	4	This course includes properties of real numbers, operations with real numbers, solving and graphing linear equations, solving and graphing quadratic equations, polynomials, factoring, and simplifying radical expressions.	Y
MATH 114	College Algebra	3	This is a first year, one semester College Algebra course. It begins with a review of the fundamental concepts of the real number system, polynomials, factoring, rational expressions and complex numbers. It continues with linear equations and inequalities, graphs of functions, polynomial and rational functions, exponential functions and logarithmic functions. Systems of equations, matrices and determinants, and probability will be covered as time allows. Throughout the course there is extensive use of the graphing calculator.	Y
	Natural Sciences	4	4 Credits Required	
CHEM 112	General Chemistry I	3	An introduction to the basic principles of chemistry for students needing an extensive background in chemistry (including chemistry majors, science majors, and pre-professional students).	N
CHEM 112L	General Chemistry Lab	1	Laboratory designed to accompany CHEM 112.	N
	Social Sciences	3	3 Credits Required	
PSYC 101	General Psychology	3	Provides the student with an introduction to the basic psychological processes underlying human behavior. Topics include the functions of the brain and nervous system, the characteristics of sensation, perception and altered states of consciousness, learning and memory, the nature of thinking skills and intelligence, theories of motivation, emotion and personality, a survey of psychological disorders and approaches to therapy, social/interpersonal relations, and practical applications.	Y
	Arts/Humanities	3	3 Credits Required	

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Southeast Technical College

Pre-Engineering AAS

SPAN 103	Conversational Spanish I	3	Conversational Spanish I is an introductory Spanish course that emphasizes the development of conversational Spanish skills. Students will learn and practice in the four modes of communication—reading, writing, speaking, and listening. However, the course will focus on developing speaking and listening comprehension skills. This course is highly recommended for students with little to no prior experience with the Spanish language. Furthermore, it is designed for students who wish to begin to develop conversational Spanish skills for use in the workplace.	Y
SUBTOTAL OF GENERAL EDDUCATION CREDITS:		19	TOTAL NEW COURSES:	2
II. PROGRAM CORE				
MATH 123	Calculus I	4	The study of limits, continuity, derivatives, applications of the derivative, antiderivatives, the definite and indefinite integral, and the fundamental theorem of calculus.	N
CAD 120	CAD I	3	This introductory CAD class will help the student develop primary skills through the use of AutoCAD software. The primary focus will be to draw, edit, text, zoom, print, blocks, and dimension. Word processing and spreadsheets will be used along with e-mail. The students will use these skills to produce small miscellaneous drawings.	Y
CET 102 OR MECH 102 OR ACT 102	*Introduction to Engineering (Student will select either civil, manufacturing, or architecture/structural).	2	This course is an introduction to the Engineering field and technical professions including the various disciplines of engineering, architecture and land surveying. The technician's role in the engineering environment will be covered. Topics will also include an overview of problem solving, general print reading, and use of engineering drafting tools.	Y
CHEM 114	General Chemistry II	3	A continuation of CHEM 112. An introduction to the basic principles of chemistry for students needing an extensive background in chemistry.	N
MATH 125	Calculus II	4	A continuation of the study of calculus, including the study of sequences, series, polar coordinates, parametric equations, techniques of integration, applications of integration, indeterminate forms, and improper integrals.	N
EM 214	Statics	3	Expanding on the concept of mechanics, emphasizing the action of forces on rigid bodies. Calc. based. Includes analysis of planar force systems, friction, first moments and centroids, and moments of inertia. These concepts will be treated as they relate to the functions performed by technicians.	N
PHYS 211	Physics I and Lab	4	This is the first course in a two semester calculus-level sequence, covering fundamental concepts of physics. This is the preferred sequence for students majoring in physical science or engineering. Topics include classical mechanics and thermodynamics.	Y
CET 123	CAD II	3	An introduction to the software and applications of Civil 3D through laboratory exercises. These exercises will illustrate the practical uses in Points, Lines, Curves, Surfaces, Annotation, Tables, Parcels, Survey Field Books, Figures and Lines, Traversing, Grading, and working with Survey Data.	Y
MATH 225	Calculus III	4	A continuation of the study of calculus, including an introduction to vectors, vector calculus, partial derivatives, and multiple integrals.	N

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Appendix 3: Program of Study

Southeast Technical College
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PHYS 213	Physics II and Lab	4	This course is the second course in a two semester calculus-level sequence, covering fundamental concepts of physics. This is the preferred sequence for students majoring in physical science or engineering. Topics include electricity and magnetism, sound, light, and optics.	N
CET 226	CAD III	3	An advanced course in CAD design utilizing software to cover alignments, profiles, cross sections, corridors, volumes, and piping.	Y
ME 221	Dynamics	3	This course will provide a review of kinematics of two and three dimensional mechanisms. A brief review of dynamics of a particle will be included. Additional review will include coordinate systems, free body diagrams, and vector methods.	N
MATH 321	Differential Equations	3	This course will cover ordinary differential equations including development and applications of linear equations, general solutions and initial-value problems using matrices. Laplace transforms and power series solutions may be included.	N
EM 331	Fluid Mechanics	3	This course will provide an introduction to application of fluid mechanics and analysis of fluid behavior, internal and external flows, hydrostatics, boundary layers, and control volume analysis.	N
CET 211	Construction Materials	3	This course will give the student the opportunity to learn the fundamental properties of construction materials including concrete and asphalt. The course will concentrate on the use of concrete and asphalt in construction, and will examine mixing, placing, finishing, reinforcing, jointing and curing. Emphasis will be placed on field procedures and laboratory testing. This course will prepare the student to take the examination for an ACI Certified Concrete Testing Technician, Grade I.	Y
SUBTOTAL OF PROGRAM CREDITS:		49	TOTAL NEW COURSES:	9

SOUTH DAKOTA BOARD OF TECHNICAL EDUCATION

Appendix 4: Alignment Projection

Southeast Technical College

Pre-Engineering AAS

TOTAL CREDITS IN PROPOSED PROGRAM:

68

I. STACKABLE OPPORTUNITIES						
PROGRAM NAME		Short-term Certificate		Existing	If Forthcoming: Projected Timeline	Total Credits in Stackable Program
		Long-term Certificate		Forthcoming		How many PROPOSED PROGRAM credits are in this stackable program opportunity?
		Diploma				
		AAS				
PROGRAM NAME		Short-term Certificate		Existing	If Forthcoming: Projected Timeline	Total Credits in Stackable Program
		Long-term Certificate		Forthcoming		How many PROPOSED PROGRAM credits are in this stackable program opportunity?
		Diploma				
		AAS				
PROGRAM NAME		Short-term Certificate		Existing	If Forthcoming: Projected Timeline	Total Credits in Stackable Program
		Long-term Certificate		Forthcoming		How many PROPOSED PROGRAM credits are in this stackable program opportunity?
		Diploma				
		AAS				
PROGRAM NAME		Short-term Certificate		Existing	If Forthcoming: Projected Timeline	Total Credits in Stackable Program
		Long-term Certificate		Forthcoming		How many PROPOSED PROGRAM credits are in this stackable program opportunity?
		Diploma				
		AAS				

II. ARTICULATION AGREEMENTS (BACCALAUREATE)						
PROGRAM NAME	COLLEGE OR UNIVERSITY		Existing	If Forthcoming: Projected Timeline	Total Credits in Bachelor's Degree	How many PROPOSED PROGRAM credits are projected to be accepted in the articulation agreement?
Bachelor of Science in Engineering (Mechanical, Civil, Architechtrual)	South Dakota School of Mines	xx	Forthcoming		120	60
PROGRAM NAME	COLLEGE OR UNIVERSITY		Existing	If Forthcoming: Projected Timeline	Total Credits in Bachelor's Degree	How many PROPOSED PROGRAM credits are projected to be accepted in the articulation agreement?
			Forthcoming			
PROGRAM NAME	COLLEGE OR UNIVERSITY		Existing	If Forthcoming: Projected Timeline	Total Credits in Bachelor's Degree	How many PROPOSED PROGRAM credits are projected to be accepted in the articulation agreement?
			Forthcoming			

III. LICENSURE AND CERTIFICATION OPPORTUNITIES		
<i>The PROPOSED PROGRAM will qualify students to pursue the following licensure and/or certification opportunities:</i>		
LICENSURE/CERTIFICATION	OVERSIGHT ORGANIZATION	Will the licensure/certification require reporting per SDCL 13-1-61?
LICENSURE/CERTIFICATION	OVERSIGHT ORGANIZATION	Will the licensure/certification require reporting per SDCL 13-1-61?
LICENSURE/CERTIFICATION	OVERSIGHT ORGANIZATION	Will the licensure/certification require reporting per SDCL 13-1-61?

SOUTH DAKOTA BOARD OF TECHNICAL EDUCATION

Appendix 5: Financial Projections

Southeast Technical College

Pre-Engineering AAS

	YEAR 1	YEAR 2	YEAR 3
Student FTE	30	40	40

I. PROJECTED EXPENDITURES

A. ONE-TIME			
New/Renovated Facilities	\$ -	\$ -	\$ -
Equipment	\$ -	\$ -	\$ -
Other	\$ 5,000.00	\$ 5,000.00	\$ -
Sub-Total: One-time	\$ 5,000.00	\$ 5,000.00	\$ -

B. RECURRING			
B.1. PERSONNEL			
FTE (Faculty and Staff)			
Salary & Benefits	\$ 86,450.00	\$ 89,044.00	\$ 91,715.00
B.2. OPERATING			
Rental / Lease	\$ -	\$ -	\$ -
Contractual Services	\$ -	\$ -	\$ -
Equipment	\$ 10,000.00	\$ -	\$ -
Supplies	\$ -	\$ -	\$ -
Travel	\$ 5,000.00	\$ 2,500.00	\$ 2,500.00
Other	\$ 2,500.00	\$ 15,000.00	\$ 15,000.00
Sub-Total: Operating	\$ 17,500.00	\$ 17,500.00	\$ 17,500.00
Total: Recurring	\$ 103,950.00	\$ 106,544.00	\$ 109,215.00

TOTAL EXPENDITURES (A + B)	\$ 108,950.00	\$ 111,544.00	\$ 109,215.00
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II. PROJECTED REVENUE

Tuition	\$ 111,600.00	\$ 148,800.00	\$ 148,800.00
State Fees	\$ 37,800.00	\$ 50,400.00	\$ 50,400.00
Local Fees	\$ 75,600.00	\$ 100,800.00	\$ 100,800.00
Location-Based Fees	\$ -	\$ -	\$ -
State Sources	\$ -	\$ 113,127.30	\$ 150,836.40
Federal Sources	\$ -	\$ -	\$ -
Private Grants or Gifts	\$ -	\$ -	\$ -
Other	\$ -	\$ -	\$ -

TOTAL REVENUE	\$ 225,000.00	\$ 413,127.30	\$ 450,836.40
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REVENUE - EXPENDITURES	\$ 116,050.00	\$ 301,583.30	\$ 341,621.40
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**Projections are held constant based on current fiscal year. Inflation or rate changes are not factored.*

Notes:

September 29, 2023

Mr. Nick Wendell
Executive Director
South Dakota Board of Technical Education
C/O Southeast Technical College
2320 N. Career Avenue
Sioux Falls, South Dakota 57107

RE: Letter of support for development of a Pre-Engineering program at Southeast Technical College

Dear Mr. Wendell:

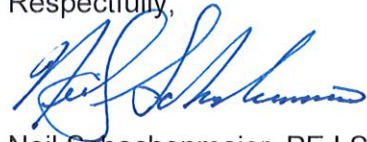
At a recent annual meeting of the Committee on Design for the American Association of State and Highway Transportation Officials, every State Department of Transportation expressed the inability to find applicants to apply for open engineering positions. Consequently, many states, including South Dakota, are relying more and more on consultants to fill the engineering shortage. Unfortunately, consultants too, are having difficulty filling open engineering positions.

As it is estimated that across the United States, enrollment in post-secondary engineering degree programs is down by as much as 30%, I am excited to hear that Southeast Technical College is developing a program to allow those interested in engineering the opportunity to gain a broad engineering knowledge before transitioning to a 4-year engineering program.

In addition to a shortage of engineering candidates, the South Dakota Department of Transportation is also in great need of engineering technicians. Engineering technicians play a key roll in ensuring roadway projects are constructed as designed. Perhaps those students that graduate from the Pre-Engineering program that may not want to continue their education in the engineering profession will consider becoming an engineering technician with the SDDOT.

I believe Southeast Technical College is on the right track with developing this program and encourage the South Dakota Board of Technical Education to approve the curriculum and program.

Respectfully,



Neil Schochenmaier, PE LSIT
700 East Broadway Avenue
Pierre, South Dakota 57501

Jon Brown
President
Stockwell Engineers, Inc.
801 N Phillips Avenue, Suite 100
Sioux Falls, South Dakota 57104

September 29, 2023

Mr. Nick Wendell
Executive Director
South Dakota Board of Technical Education

Re: Letter of Support for Development of Pre-Engineering Program at Southeast Technical College

Dear Mr. Wendell:

I am writing to express Stockwell Engineers' enthusiastic support for the establishment of a Pre-Engineering program at Southeast Technical College. This initiative holds immense promise not only for the aspiring engineers of our community but also for the sustained growth and vitality of our local engineering industry.

In today's rapidly evolving technological landscape, the demand for skilled engineers and technicians has never been greater. The creation of an ABET-Accredited, Pre-Engineering Associate Degree program at Southeast Technical College would address this demand by providing students with a comprehensive foundation in engineering principles, problem-solving skills, and practical hands-on experience. A program like this offers a practical and efficient pathway for students to explore their passion for engineering and gain the fundamental knowledge required to excel in the field.

As a local engineering firm deeply invested in the success of our community, we recognize the potential of this program to nurture a pool of talented individuals. These graduates would not only meet the needs of our industry but also drive innovation and contribute to the economic prosperity of our region.

In closing, we firmly believe that a Pre-Engineering program at Southeast Technical College is a strong step towards a brighter future for our community and our industry.

Thank you for considering our endorsement of this program. We look forward to seeing the positive impact it will undoubtedly have on our community and industry.

Respectfully submitted,

STOCKWELL ENGINEERS, INC.



Jon Brown, PE
President

Stacy DuChene, PE
Senior Region Design Manager
South Dakota Department of Transportation
5316 W 60th St N
Sioux Falls, SD 57107

September 29, 2023

Dr. Britney Mower
Dean of Curriculum and Instruction
South Dakota Board of Technical Education
C/O Southeast Technical College
2320 N. Career Ave
Sioux Falls, SD 57107

RE: Letter of support for development of an Associate Degree program in Pre-Engineering at Southeast Technical College

Dear Dr. Mower:

Engineering is intertwined throughout each of our daily lives. From the bridges and roads we drive on with our highly-efficient cars, to the phone in our hand or the computer on our desk, an engineer has most likely had a hand in it. As a nation, we will need skilled engineers and engineering technicians to continue to develop and build critical infrastructure for our cities and towns.

As a Senior Region Design Manager with the South Dakota Department of Transportation, I rely on a skilled engineering workforce to help produce plans and administer construction projects throughout the state. These engineering professionals have unique skills that provide technical guidance for projects of all sizes. They prepare project documents, develop preliminary design plans, review plans and plats, develop final design plans, provide technical guidance to peers, managers and others. Furthermore, after plans are bid and awarded to a Contractor, they inspect the Contractor's work, inspect materials, and provide information to the public, other agencies, the media, and the private sector.

As retirements of the older generation continue in the field of engineering, the need for a skilled engineering workforce has never been greater. There is a growing demand for engineers for our aging infrastructure needs. Resiliency and sustainability have ever-increasing importance as we strive to come up with new ways to meet the demands of the future. Unfortunately, due to a dwindling workforce, the engineers are asked to do more and more each day. This increase in demand for their services can only be met with an increase in skilled workers, which is why I am in favor of development of an Associate Degree program in Pre-Engineering at your institution in South Dakota.

Thank you for your consideration of this matter.

Very Respectfully,

Stacy DuChene, PE



Civil Engineering Technologists and Technicians in the United States

Contents

What is Lightcast Data?	1
Report Parameters	2
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Compensation	7
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Occupational Programs	15
Appendix A	17

What is Lightcast Data?

Lightcast data is a hybrid dataset derived from official government sources such as the US Census Bureau, Bureau of Economic Analysis, and Bureau of Labor Statistics. Leveraging the unique strengths of each source, our data modeling team creates an authoritative dataset that captures more than 99% of all workers in the United States. This core offering is then enriched with data from online social profiles, resums, and job postings to give you a complete view of the workforce.

Lightcast data is frequently cited in major publications such as *The Atlantic*, *Forbes*, *Harvard Business Review*, *The New York Times*, *The Wall Street Journal*, and *USA Today*.



Report Parameters

1 Occupation

17-3022 Civil Engineering Technologists and Technicians

1 Nation

0 United States

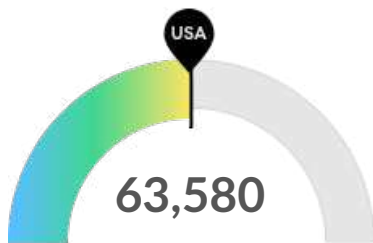
Class of Worker

QCEW Employees

The information in this report pertains to the chosen occupation and geographical area.

Executive Summary

Average Job Posting Demand Over an Average Supply of Regional Jobs



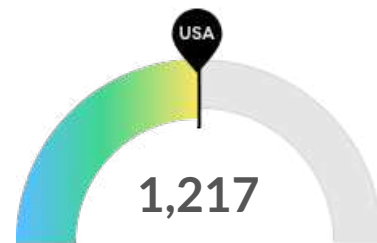
Jobs (2023)

United States is about average for this kind of job. The national average for an area this size is 63,580* employees, while there are 63,580 here.



Compensation

Earnings are about average in United States. The national median salary for Civil Engineering Technologists and Technicians is \$59,634, compared to \$59,634 here.



Job Posting Demand

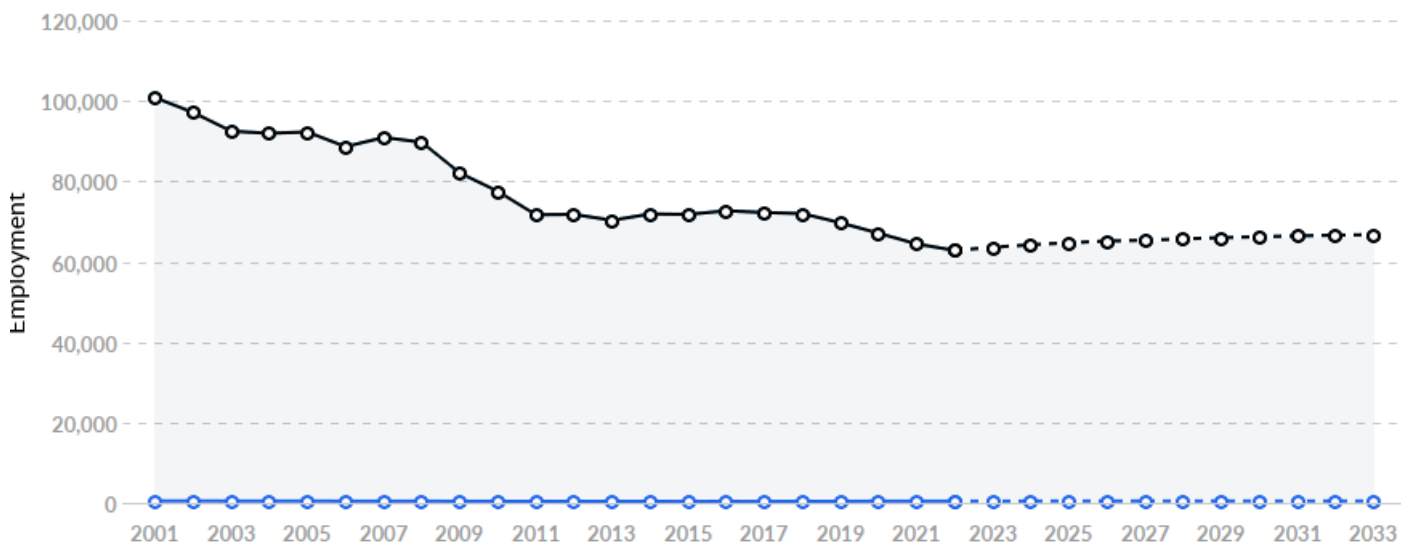
Job posting activity is about average in United States. The national average for an area this size is 1,217* job posting/mo, while there is 1,217 here.

*National average values are derived by taking the national value for Civil Engineering Technologists and Technicians and scaling it down to account for the difference in overall workforce size between the nation and United States. In other words, the values represent the national average adjusted for region size.

Jobs

Regional Employment Is About Equal to the National Average

An average area of this size typically has 63,580* jobs, while there are 63,580 here.



	Region	2023 Jobs	2033 Jobs	Change	% Change
●	United States	63,580	66,715	3,135	4.9%
●	National Average	63,580	66,715	3,135	4.9%
●	South Dakota	457	480	23	5.0%

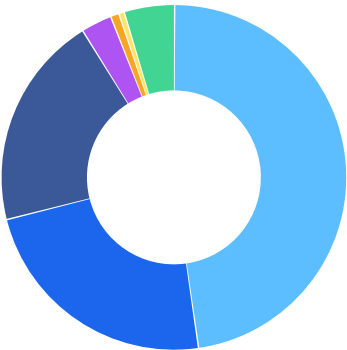
*National average values are derived by taking the national value for Civil Engineering Technologists and Technicians and scaling it down to account for the difference in overall workforce size between the nation and United States. In other words, the values represent the national average adjusted for region size.

Regional Breakdown



State	2023 Jobs
South Dakota	457

Most Jobs are Found in the Architectural, Engineering, and Related Services Industry Sector

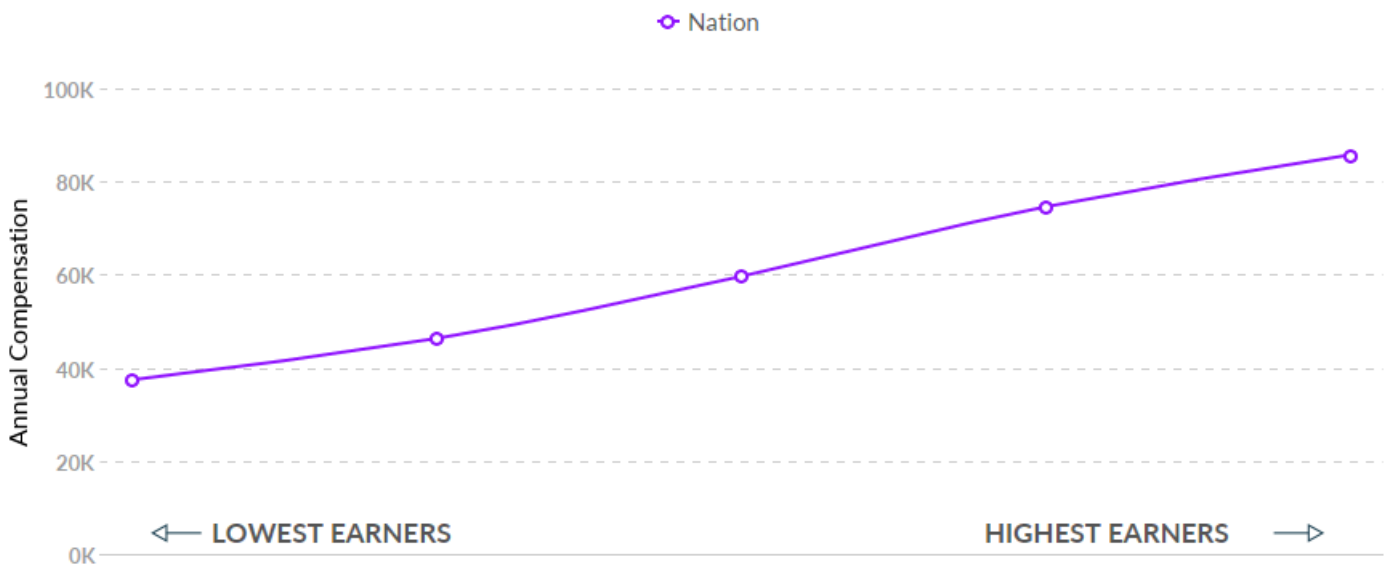


Industry	% of Occupation in Industry (2023)
Architectural, Engineering, and Related Services	47.6%
State Government, Excluding Education and Hospitals	23.3%
Local Government, Excluding Education and Hospitals	20.1%
Management, Scientific, and Technical Consulting Services	2.9%
Nonresidential Building Construction	0.8%
Education and Hospitals (State Government)	0.5%
Other	4.7%

Compensation

Regional Compensation Is the Same Cost as the Nation

In 2022, the median compensation for Civil Engineering Technologists and Technicians in the United States is \$59,634.



Job Posting Activity



10,950 Unique Job Postings

The number of unique postings for this job from Jan 2023 to Sep 2023.



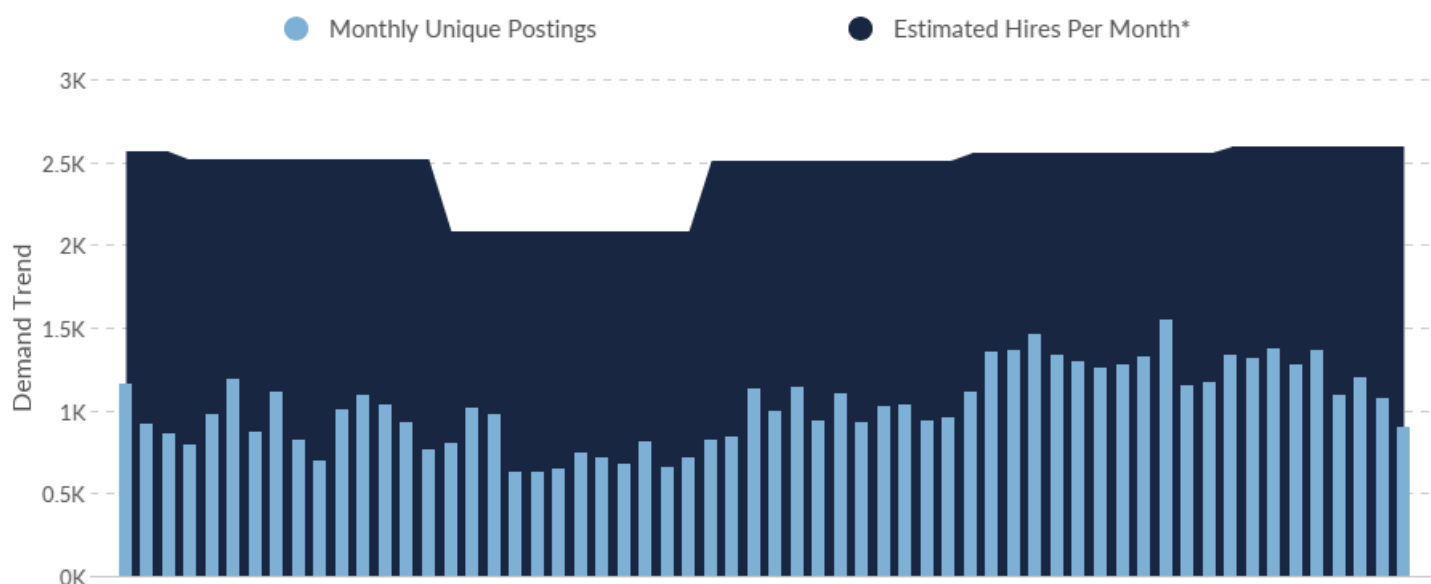
2,586 Employers Competing

All employers in the region who posted for this job from Jan 2023 to Sep 2023.



30 Day Median Duration

Posting duration is 1 day longer than what's typical in the region.



Occupation	Avg Monthly Postings (Jan 2023 - Sep 2023)	Avg Monthly Hires (Jan 2023 - Sep 2023)
Civil Engineering Technologists and Technicians	1,217	2,595

*A hire is reported by the Quarterly Workforce Indicators when an individual's Social Security Number appears on a company's payroll and was not there the quarter before. Lightcast hires are calculated using a combination of Lightcast jobs data, information on separation rates from the Bureau of Labor Statistics (BLS), and industry-based hires data from the Census Bureau.

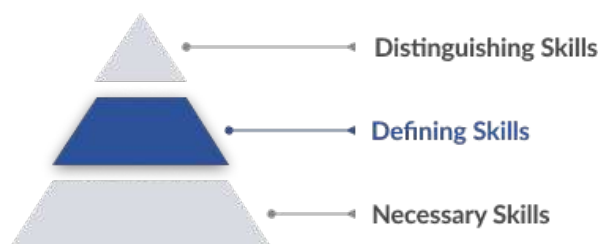
Top Companies	Unique Postings	Top Job Titles	Unique Postings
Black & Veatch	456 	Engineering Technicians	1,718 
State of Louisiana	306 	Field Technicians	744 
Actalent	264 	Civil Engineering Technicians	657 
CBRE	233 	Survey Technicians	512 
GPAC	110 	Occupancy Planners	345 
CompuCom	103 	Design Technicians	229 
Builders FirstSource	80 	Construction Engineering Techn...	228 
State of South Carolina	75 	Construction Technicians	207 
System One	73 	CADD Technicians	205 
Jacobs Engineering Group	72 	Transportation Engineering Tech...	204 

Top Distinguishing Skills by Demand

Not enough data to display Distinguishing Skills for this occupation.

Top Defining Skills by Demand

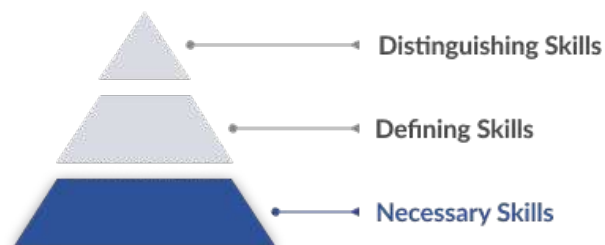
An occupation's Defining Skills represent the day-to-day tasks and responsibilities of the job. An employee needs these skills to qualify for and perform successfully in this occupation.



Skill	Salary Boosting	Job Postings Requesting
Valid Driver's License	×	3,441
Construction	×	3,384
Civil Engineering	×	3,082
Computer-Aided Design	×	2,762
Project Management	×	2,389
AutoCAD	×	2,309

Top Necessary Skills by Demand

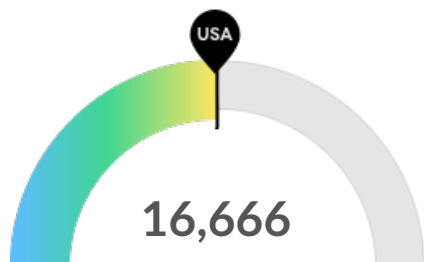
An occupation's Necessary Skills are the specialized skills required for that job and relevant across other similar jobs. An employee needs these skills as building blocks to perform the more complex Defining Skills.



Skill	Salary Boosting	Job Postings Requesting
Surveying	×	2,040
AutoCAD Civil 3D	×	1,369
Construction Management	×	1,138
Soil Science	×	1,086
MicroStation (CAD Design Software)	×	1,015
Construction Inspection	×	973
Geographic Information Systems	×	932
Engineering Design Process	×	859
Public Works	×	792
Data Collection	×	732

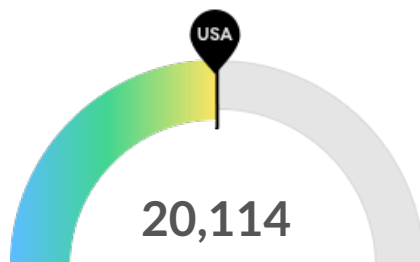
Demographics

Retirement Risk Is About Average, While Overall Diversity Is About Average



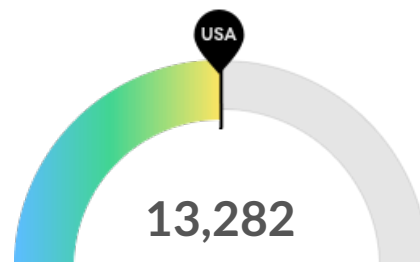
Retiring Soon

Retirement risk is about average in the United States. The national average for an area this size is 16,666* employees 55 or older, while there are 16,666 here.



Racial Diversity

Racial diversity is about average in the United States. The national average for an area this size is 20,114* racially diverse employees, while there are 20,114 here.

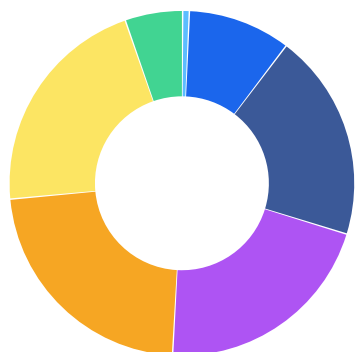


Gender Diversity

Gender diversity is about average in the United States. The national average for an area this size is 13,282* female employees, while there are 13,282 here.

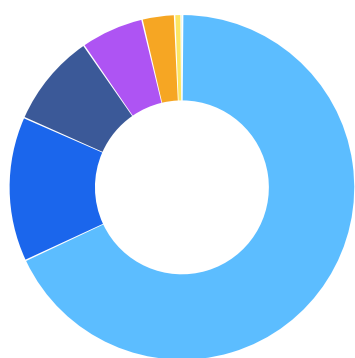
*National average values are derived by taking the national value for Civil Engineering Technologists and Technicians and scaling it down to account for the difference in overall workforce size between the nation and the United States. In other words, the values represent the national average adjusted for region size.

Occupation Age Breakdown



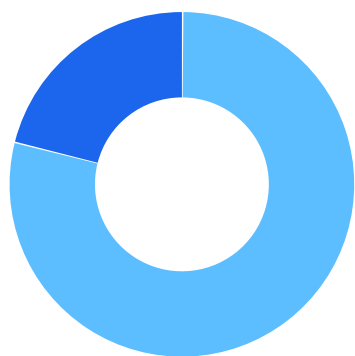
	% of Jobs	Jobs
14-18	0.6%	392
19-24	9.6%	6,049
25-34	19.4%	12,204
35-44	21.1%	13,257
45-54	22.7%	14,234
55-64	21.1%	13,277
65+	5.4%	3,389

Occupation Race/Ethnicity Breakdown



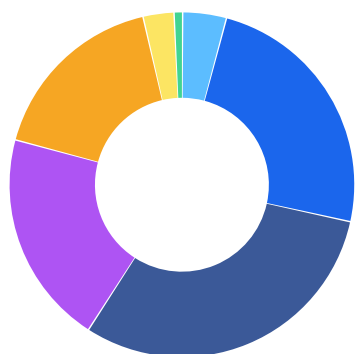
	% of Jobs	Jobs
White	68.0%	42,689
Hispanic or Latino	13.6%	8,530
Black or African American	8.8%	5,496
Asian	5.9%	3,709
Two or More Races	3.0%	1,908
American Indian or Alaska Native	0.6%	377
Native Hawaiian or Other Pacific Islander	0.1%	94

Occupation Gender Breakdown



	% of Jobs	Jobs
Males	78.9%	49,520
Females	21.1%	13,282

National Educational Attainment



	% of Jobs
 Less than high school diploma	4.1%
 High school diploma or equivalent	24.3%
 Some college, no degree	30.7%
 Associate's degree	20.1%
 Bachelor's degree	17.2%
 Master's degree	2.9%
 Doctoral or professional degree	0.8%

Occupational Programs



8 Programs

Of the programs that can train for this job, 8 have produced completions in the last 5 years.



19,301 Completions (2021)

The completions from all regional institutions for all degree types.



10,061 Openings (2021)

The average number of openings for an occupation in the region is 34,529.

CIP Code	Top Programs	Completions (2021)
45.0701	Geography	4,941
15.0000	Engineering Technologies/Technicians, General	4,500
15.1001	Construction Engineering Technology/Technician	4,330
15.9999	Engineering/Engineering-Related Technologies/Technicians,...	1,765
15.0101	Architectural Engineering Technologies/Technicians	1,290
46.0415	Building Construction Technology/Technician	1,174
15.0201	Civil Engineering Technologies/Technicians	1,170
15.1103	Hydraulics and Fluid Power Technology/Technician	131

Top Schools	Completions (2021)	
Texas A & M University-College Station	339	
Mississippi Gulf Coast Community College	287	
The Pennsylvania State University	266	
Purdue University-Main Campus	264	
Pasadena City College	256	
Berklee College of Music	224	
University of Houston	224	
New Jersey Institute of Technology	221	
University of Florida	214	
Texas State University	213	

Appendix A

Civil Engineering Technologists and Technicians (SOC 17-3022):

Apply theory and principles of civil engineering in planning, designing, and overseeing construction and maintenance of structures and facilities under the direction of engineering staff or physical scientists.

Sample of Reported Job Titles:

Transportation Engineering Technician
Field Technician
Engineering Technician
Design Technician
Civil Engineering Technician
Engineering Assistant
Engineer Technician
Engineer Assistant
Civil Engineering Assistant
Civil Designer

Related O*NET Occupation:

Civil Engineering Technologists and Technicians (17-3022.00)

Appendix B - Data Sources and Calculations

Location Quotient

Location quotient (LQ) is a way of quantifying how concentrated a particular industry, cluster, occupation, or demographic group is in a region as compared to the nation. It can reveal what makes a particular region unique in comparison to the national average.

Occupation Data

Emsi occupation employment data are based on final Emsi industry data and final Emsi staffing patterns. Wage estimates are based on Occupational Employment Statistics (QCEW and Non-QCEW Employees classes of worker) and the American Community Survey (Self-Employed and Extended Proprietors). Occupational wage estimates are also affected by county-level Emsi earnings by industry.

Staffing Patterns Data

The staffing pattern data in this report are compiled from several sources using a specialized process. For QCEW and Non-QCEW Employees classes of worker, sources include Occupational Employment Statistics, the National Industry-Occupation Employment Matrix, and the American Community Survey. For the Self-Employed and Extended Proprietors classes of worker, the primary source is the American Community Survey, with a small amount of information from Occupational Employment Statistics.

Cost of Living Data

Emsi's cost of living data is based on the Cost of Living Index published by the Council for Community and Economic Research (C2ER).

Lightcast Job Postings

Job postings are collected from various sources and processed/enriched to provide information such as standardized company name, occupation, skills, and geography.

Institution Data

The institution data in this report is taken directly from the national IPEDS database published by the U.S. Department of Education's National Center for Education Statistics.

Drafters in the United States

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Occupational Programs	11
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What is Lightcast Data?

Lightcast data is a hybrid dataset derived from official government sources such as the US Census Bureau, Bureau of Economic Analysis, and Bureau of Labor Statistics. Leveraging the unique strengths of each source, our data modeling team creates an authoritative dataset that captures more than 99% of all workers in the United States. This core offering is then enriched with data from online social profiles, resumés, and job postings to give you a complete view of the workforce.

Lightcast data is frequently cited in major publications such as *The Atlantic*, *Forbes*, *Harvard Business Review*, *The New York Times*, *The Wall Street Journal*, and *USA Today*.

The AtlanticForbesHarvard
Business
ReviewThe
New York
TimesWSJUSA
TODAY

Report Parameters

1 Occupation

17-3010 Drafters

1 Nation

0 United States

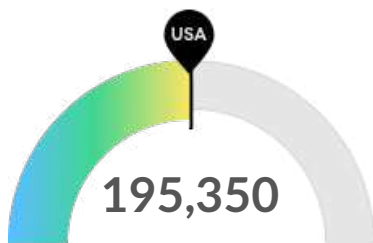
Class of Worker

QCEW Employees

The information in this report pertains to the chosen occupation and geographical area.

Executive Summary

Average Job Posting Demand Over an Average Supply of Regional Jobs



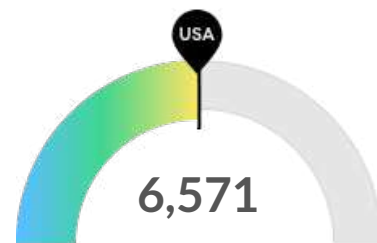
Jobs (2023)

United States is about average for this kind of job. The national average for an area this size is 195,350* employees, while there are 195,350 here.



Compensation

Earnings are about average in United States. The national median salary for Drafters is \$60,389, compared to \$60,389 here.



Job Posting Demand

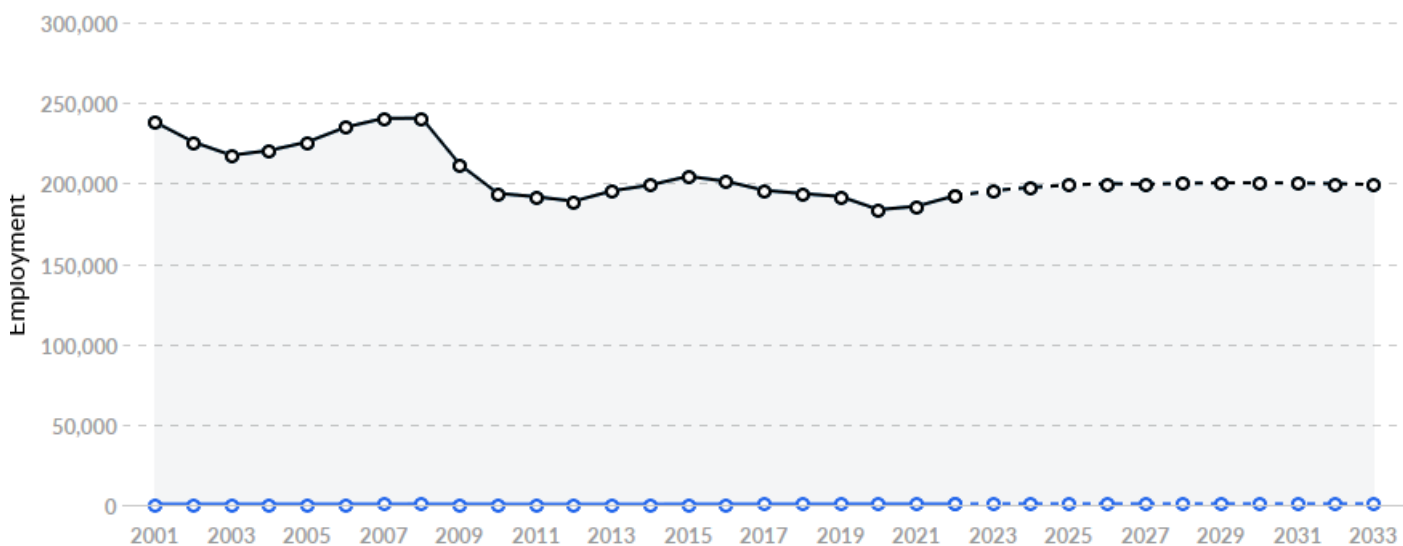
Job posting activity is about average in United States. The national average for an area this size is 6,571* job postings/mo, while there are 6,571 here.

*National average values are derived by taking the national value for Drafters and scaling it down to account for the difference in overall workforce size between the nation and United States. In other words, the values represent the national average adjusted for region size.

Jobs

Regional Employment Is About Equal to the National Average

An average area of this size typically has 195,350* jobs, while there are 195,350 here.



	Region	2023 Jobs	2033 Jobs	Change	% Change
●	United States	195,350	199,198	3,848	2.0%
●	National Average	195,350	199,198	3,848	2.0%
●	South Dakota	596	596	0	0.0%

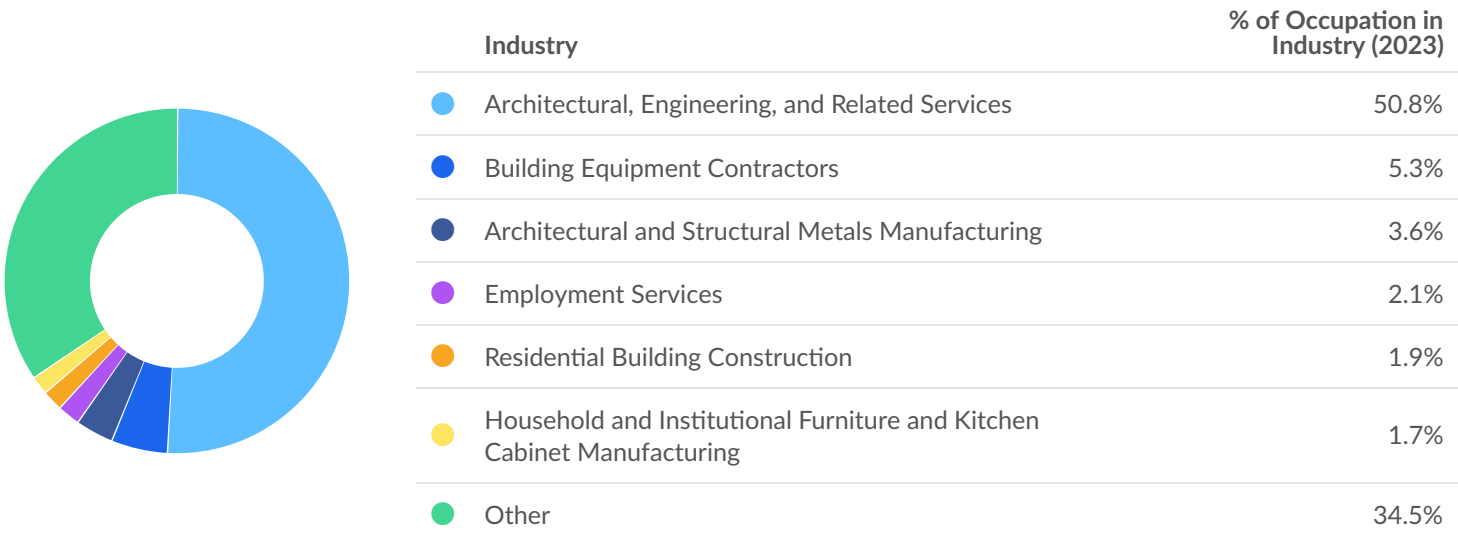
*National average values are derived by taking the national value for Drafters and scaling it down to account for the difference in overall workforce size between the nation and United States. In other words, the values represent the national average adjusted for region size.

Regional Breakdown



State	2023 Jobs
South Dakota	596

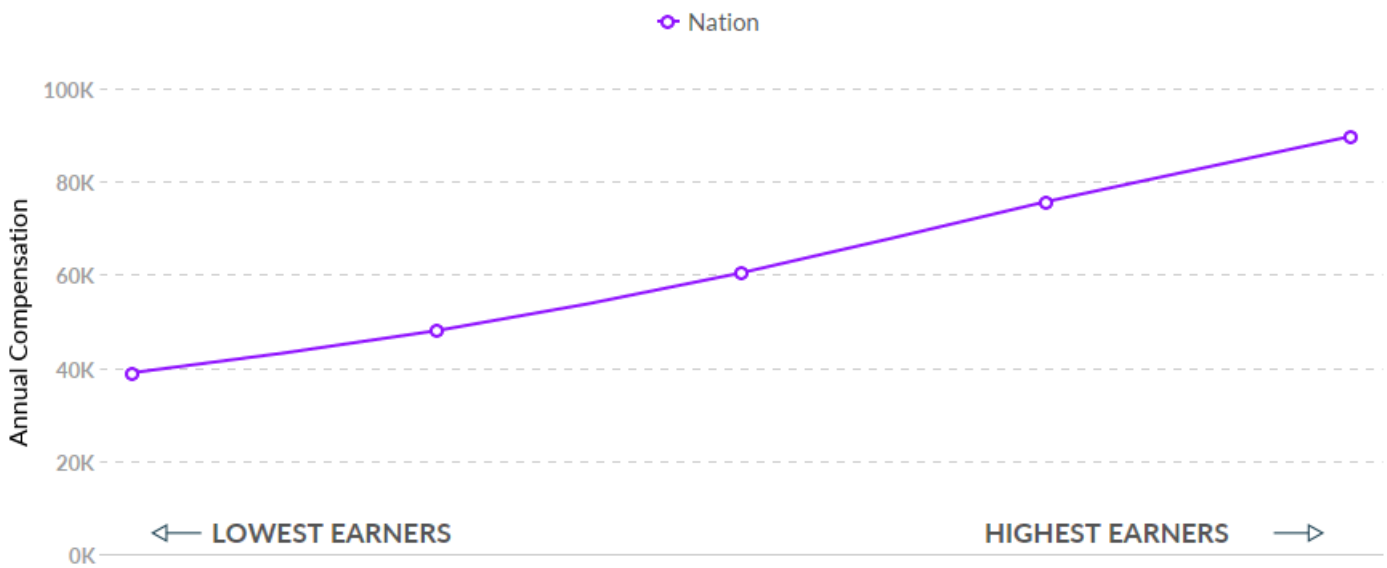
Most Jobs are Found in the Architectural, Engineering, and Related Services Industry Sector



Compensation

Regional Compensation Is the Same Cost as the Nation

In 2022, the median compensation for Drafters in the United States is \$60,389.



Job Posting Activity



59,140 Unique Job Postings

The number of unique postings for this job from Jan 2023 to Sep 2023.



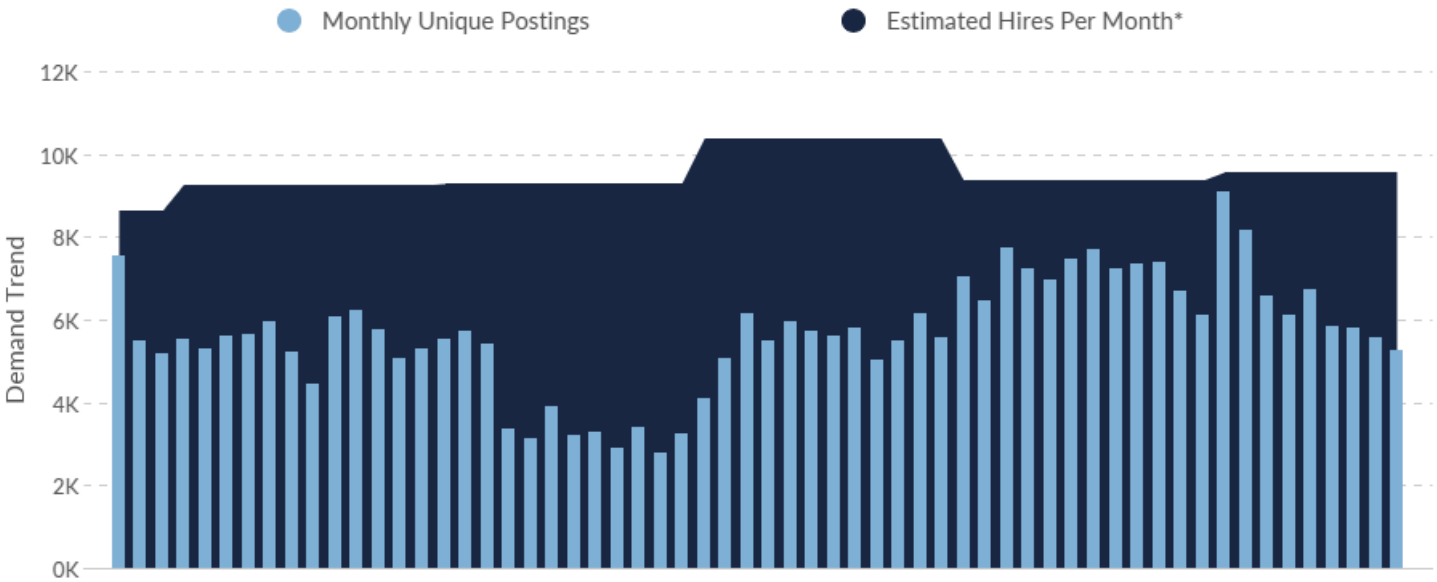
12,385 Employers Competing

All employers in the region who posted for this job from Jan 2023 to Sep 2023.



28 Day Median Duration

Posting duration is 1 day shorter than what's typical in the region.



Occupation	Avg Monthly Postings (Jan 2023 - Sep 2023)	Avg Monthly Hires (Jan 2023 - Sep 2023)
Drafters	6,571	9,558

*A hire is reported by the Quarterly Workforce Indicators when an individual's Social Security Number appears on a company's payroll and was not there the quarter before. Lightcast hires are calculated using a combination of Lightcast jobs data, information on separation rates from the Bureau of Labor Statistics (BLS), and industry-based hires data from the Census Bureau.

Top Companies	Unique Postings	Top Job Titles	Unique Postings
Actalent	3,764 	CAD Designers	3,718 
GPAC	1,417 	Drafters	3,619 
Randstad	822 	Electrical Designers	3,131 
CDM Smith	449 	Mechanical Designers	2,731 
PepsiCo	367 	Civil Designers	2,265 
Sargent & Lundy	349 	CAD Technicians	1,933 
Avis Budget Group	317 	CAD Drafters	1,814 
Frito Lay	300 	Detailers	1,182 
System One	277 	Piping Designers	1,033 
Jacobs Engineering Group	266 	AutoCAD Drafters	1,011 

Top Distinguishing Skills by Demand

Not enough data to display Distinguishing Skills for this occupation.

Top Defining Skills by Demand

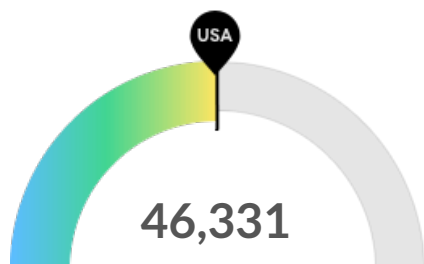
Not enough data to display Defining Skills for this occupation.

Top Necessary Skills by Demand

Not enough data to display Necessary Skills for this occupation.

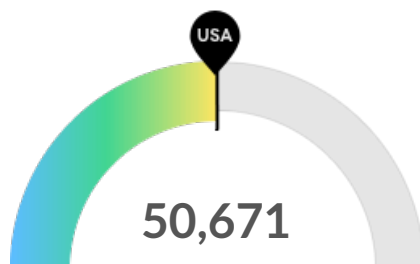
Demographics

Retirement Risk Is About Average, While Overall Diversity Is About Average



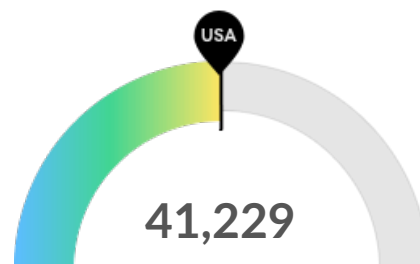
Retiring Soon

Retirement risk is about average in the United States. The national average for an area this size is 46,331* employees 55 or older, while there are 46,331 here.



Racial Diversity

Racial diversity is about average in the United States. The national average for an area this size is 50,671* racially diverse employees, while there are 50,671 here.

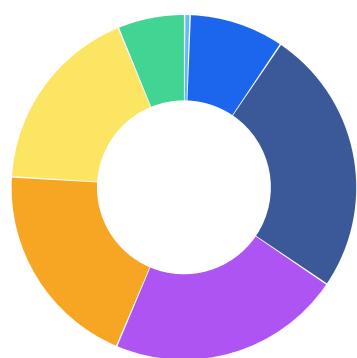


Gender Diversity

Gender diversity is about average in the United States. The national average for an area this size is 41,229* female employees, while there are 41,229 here.

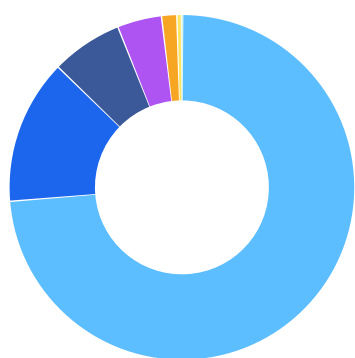
*National average values are derived by taking the national value for Drafters and scaling it down to account for the difference in overall workforce size between the nation and the United States. In other words, the values represent the national average adjusted for region size.

Occupation Age Breakdown



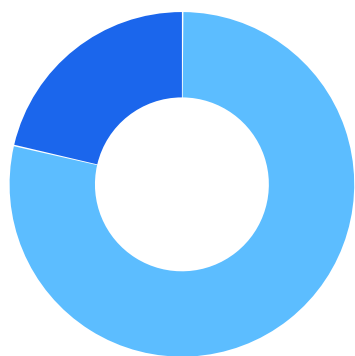
	% of Jobs	Jobs
14-18	0.5%	977
19-24	8.9%	17,076
25-34	25.0%	48,094
35-44	21.9%	42,091
45-54	19.6%	37,655
55-64	17.8%	34,263
65+	6.3%	12,067

Occupation Race/Ethnicity Breakdown



	% of Jobs	Jobs
White	73.6%	141,551
Hispanic or Latino	13.6%	26,066
Asian	6.7%	12,845
Black or African American	4.2%	7,987
Two or More Races	1.4%	2,732
American Indian or Alaska Native	0.4%	835
Native Hawaiian or Other Pacific Islander	0.1%	206

Occupation Gender Breakdown



	% of Jobs	Jobs
Males	78.6%	150,993
Females	21.4%	41,229

Occupational Programs



23 Programs

Of the programs that can train for this job, 23 have produced completions in the last 5 years.



45,136 Completions (2021)

The completions from all regional institutions for all degree types.



36,709 Openings (2021)

The average number of openings for an occupation in the region is 34,529.

CIP Code	Top Programs	Completions (2021)
15.0303	Electrical, Electronic, and Communications Engineering Tech...	6,136
04.0902	Architectural and Building Sciences/Technology	6,003
04.0201	Architecture	4,788
15.0000	Engineering Technologies/Technicians, General	4,500
15.1001	Construction Engineering Technology/Technician	4,330
15.1301	Drafting and Design Technology/Technician, General	4,189
15.0805	Mechanical/Mechanical Engineering Technology/Technician	3,592
15.1302	CAD/CADD Drafting and/or Design Technology/Technician	2,270
15.9999	Engineering/Engineering-Related Technologies/Technicians,...	1,765
15.0101	Architectural Engineering Technologies/Technicians	1,290

Top Schools	Completions (2021)	
Texas A & M University-College Station	565	
CUNY New York City College of Technology	560	
Purdue University-Main Campus	543	
Mississippi Gulf Coast Community College	445	
University of Houston	442	
Dallas College	351	
Arizona State University Campus Immersion	345	
University of North Carolina at Charlotte	328	
New Jersey Institute of Technology	314	
Ivy Tech Community College	308	

Appendix A

Drafters in United States

Appendix B - Data Sources and Calculations

Location Quotient

Location quotient (LQ) is a way of quantifying how concentrated a particular industry, cluster, occupation, or demographic group is in a region as compared to the nation. It can reveal what makes a particular region unique in comparison to the national average.

Occupation Data

Emsi occupation employment data are based on final Emsi industry data and final Emsi staffing patterns. Wage estimates are based on Occupational Employment Statistics (QCEW and Non-QCEW Employees classes of worker) and the American Community Survey (Self-Employed and Extended Proprietors). Occupational wage estimates are also affected by county-level Emsi earnings by industry.

Staffing Patterns Data

The staffing pattern data in this report are compiled from several sources using a specialized process. For QCEW and Non-QCEW Employees classes of worker, sources include Occupational Employment Statistics, the National Industry-Occupation Employment Matrix, and the American Community Survey. For the Self-Employed and Extended Proprietors classes of worker, the primary source is the American Community Survey, with a small amount of information from Occupational Employment Statistics.

Cost of Living Data

Emsi's cost of living data is based on the Cost of Living Index published by the Council for Community and Economic Research (C2ER).

Lightcast Job Postings

Job postings are collected from various sources and processed/enriched to provide information such as standardized company name, occupation, skills, and geography.

Institution Data

The institution data in this report is taken directly from the national IPEDS database published by the U.S. Department of Education's National Center for Education Statistics.

A man wearing safety glasses and a blue shirt is working on a large industrial machine. He is holding a tool and looking intently at his work. The machine has various components, including a large blue panel and a metal structure. The background is slightly blurred, showing more of the industrial setting.

Mechanical Engineering Technologists and Technicians in the United States

Contents

What is Lightcast Data?	1
Report Parameters	2
Executive Summary	3
Jobs	4
Compensation	6
Job Posting Activity	7
Demographics	10
Occupational Programs	13
Appendix A	14

What is Lightcast Data?

Lightcast data is a hybrid dataset derived from official government sources such as the US Census Bureau, Bureau of Economic Analysis, and Bureau of Labor Statistics. Leveraging the unique strengths of each source, our data modeling team creates an authoritative dataset that captures more than 99% of all workers in the United States. This core offering is then enriched with data from online social profiles, resumés, and job postings to give you a complete view of the workforce.

Lightcast data is frequently cited in major publications such as *The Atlantic*, *Forbes*, *Harvard Business Review*, *The New York Times*, *The Wall Street Journal*, and *USA Today*.

The AtlanticForbesHarvard
Business
ReviewThe
New York
TimesWSJUSA
TODAY

Report Parameters

1 Occupation

17-3027 Mechanical Engineering Technologists and Technicians

1 Nation

0 United States

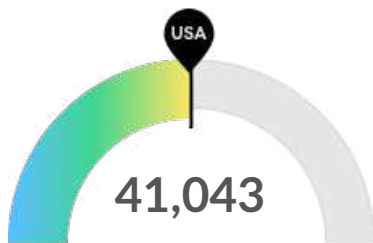
Class of Worker

QCEW Employees

The information in this report pertains to the chosen occupation and geographical area.

Executive Summary

Average Job Posting Demand Over an Average Supply of Regional Jobs



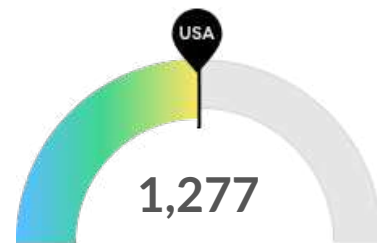
Jobs (2023)

United States is about average for this kind of job. The national average for an area this size is 41,043* employees, while there are 41,043 here.



Compensation

Earnings are about average in United States. The national median salary for Mechanical Engineering Technologists and Technicians is \$61,984, compared to \$61,984 here.



Job Posting Demand

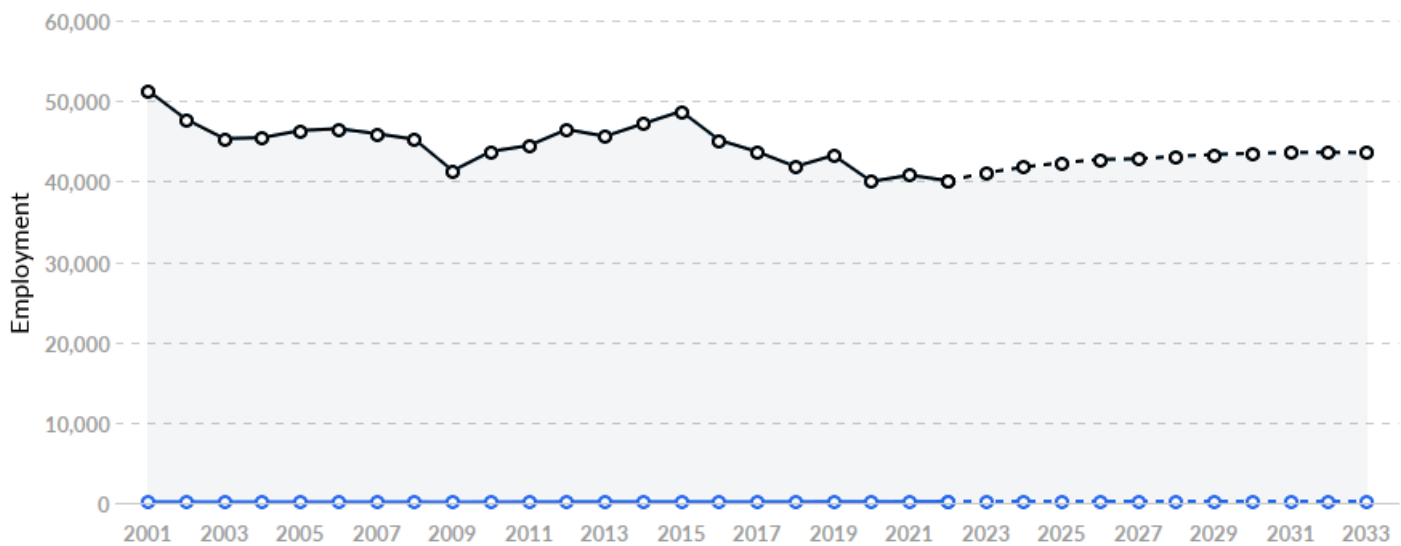
Job posting activity is about average in United States. The national average for an area this size is 1,277* job posting/mo, while there is 1,277 here.

*National average values are derived by taking the national value for Mechanical Engineering Technologists and Technicians and scaling it down to account for the difference in overall workforce size between the nation and United States. In other words, the values represent the national average adjusted for region size.

Jobs

Regional Employment Is About Equal to the National Average

An average area of this size typically has 41,043* jobs, while there are 41,043 here.



	Region	2023 Jobs	2033 Jobs	Change	% Change
●	United States	41,043	43,558	2,515	6.1%
●	National Average	41,043	43,558	2,515	6.1%
●	South Dakota	190	202	12	6.1%

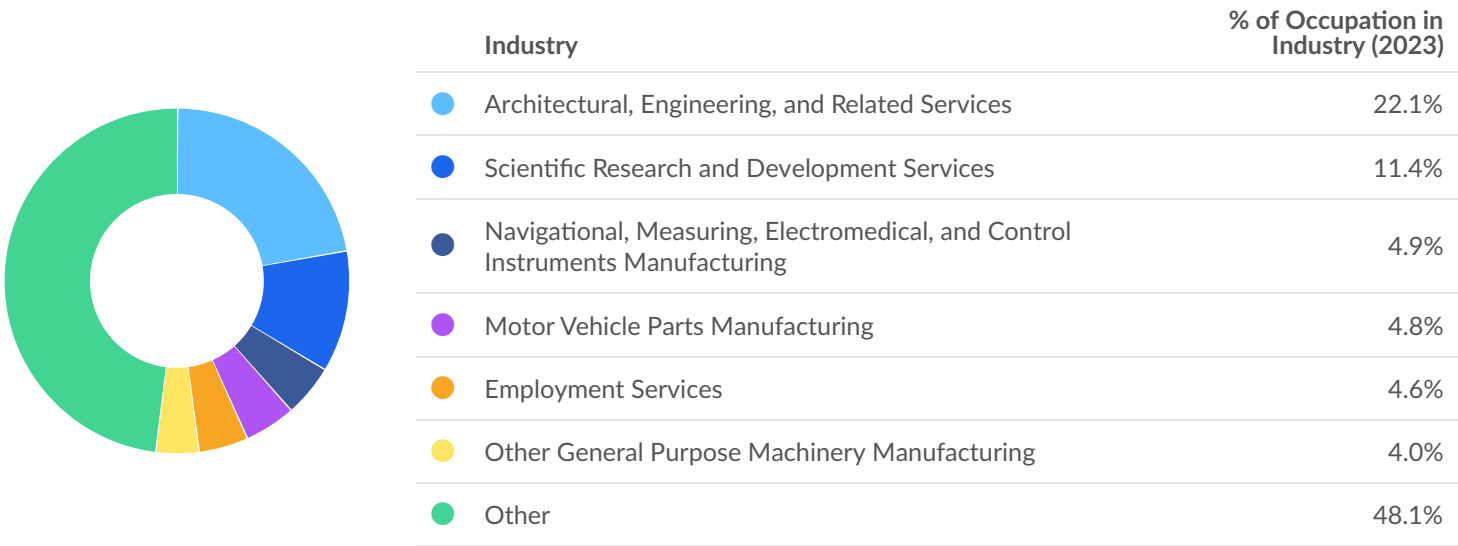
*National average values are derived by taking the national value for Mechanical Engineering Technologists and Technicians and scaling it down to account for the difference in overall workforce size between the nation and United States. In other words, the values represent the national average adjusted for region size.

Regional Breakdown



State	2023 Jobs
South Dakota	190

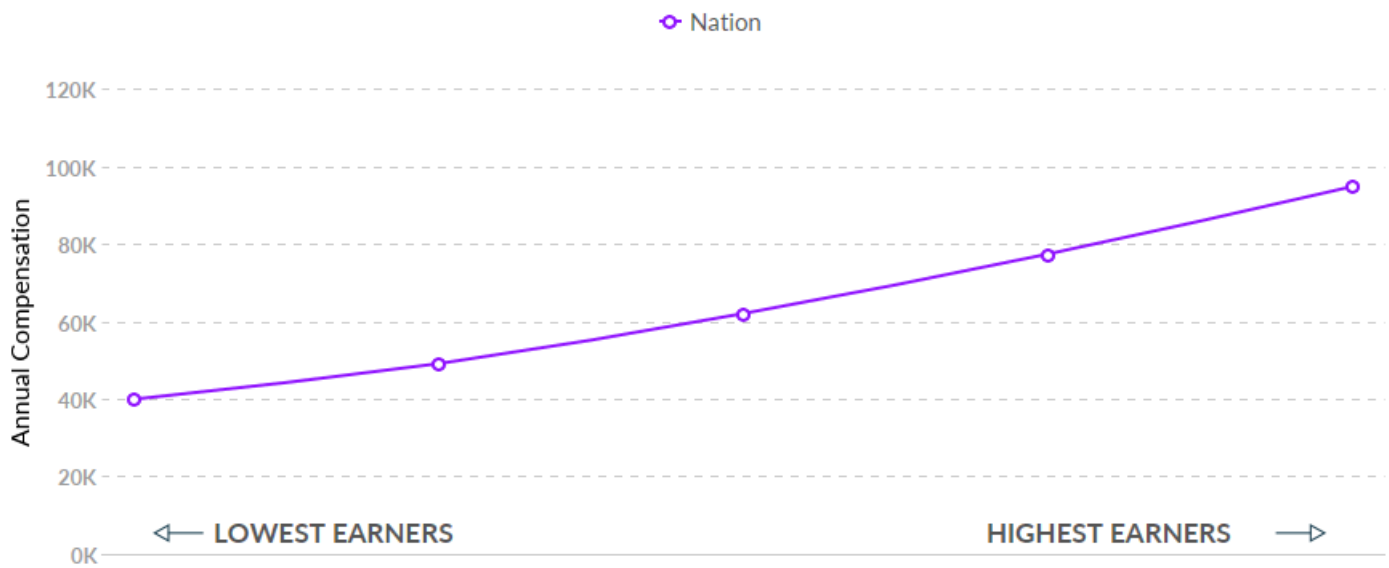
Most Jobs are Found in the Architectural, Engineering, and Related Services Industry Sector



Compensation

Regional Compensation Is the Same Cost as the Nation

In 2022, the median compensation for Mechanical Engineering Technologists and Technicians in the United States is \$61,984.



Job Posting Activity



11,489 Unique Job Postings

The number of unique postings for this job from Jan 2023 to Sep 2023.



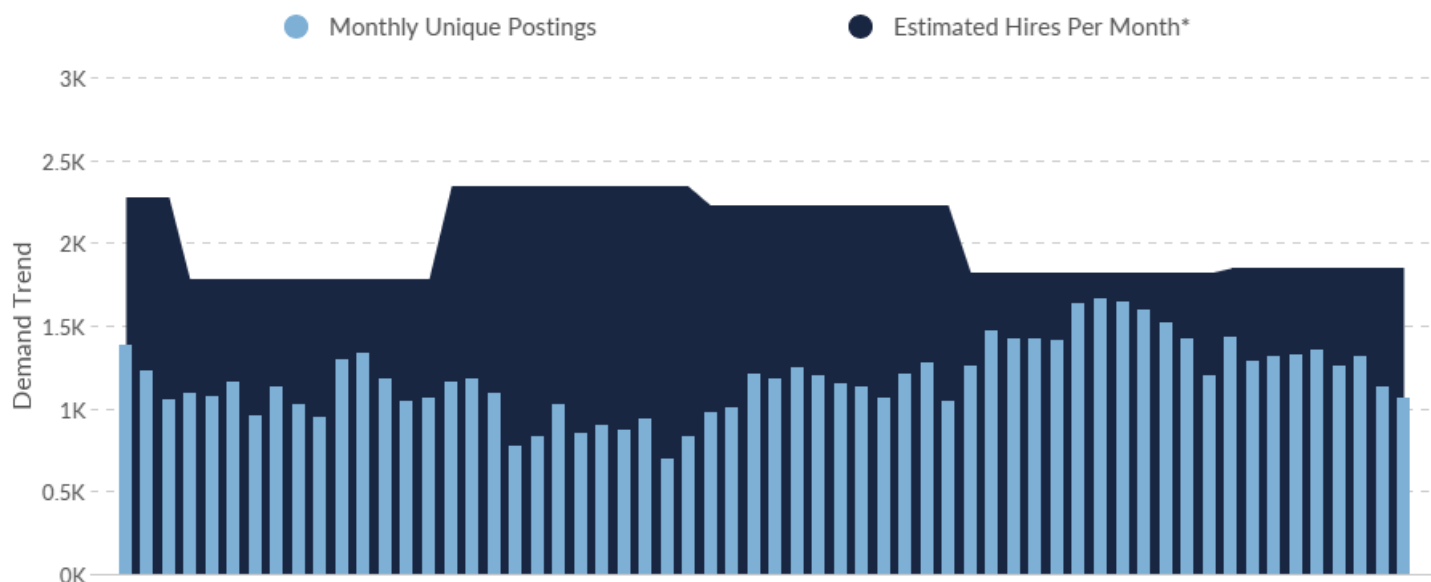
3,410 Employers Competing

All employers in the region who posted for this job from Jan 2023 to Sep 2023.



28 Day Median Duration

Posting duration is 1 day shorter than what's typical in the region.



Occupation	Avg Monthly Postings (Jan 2023 - Sep 2023)	Avg Monthly Hires (Jan 2023 - Sep 2023)
Mechanical Engineering Technologists and Technicians	1,277	1,846

*A hire is reported by the Quarterly Workforce Indicators when an individual's Social Security Number appears on a company's payroll and was not there the quarter before. Lightcast hires are calculated using a combination of Lightcast jobs data, information on separation rates from the Bureau of Labor Statistics (BLS), and industry-based hires data from the Census Bureau.

Top Companies	Unique Postings
Black & Veatch	422
Aerotek	227
Raytheon Technologies	174
Lockheed Martin	153
Kimley-Horn	149
Randstad	145
Actalent	116
Sqa Services	94
Boeing	89
Beacon Hill Staffing Group	71

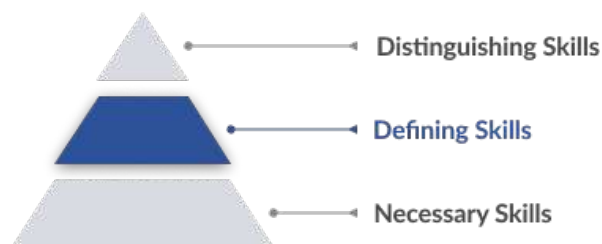
Top Job Titles	Unique Postings
Mechanical Technicians	2,450
Mechanical Engineering Technic...	665
Mechanical Assembly Technicians	545
Mechanical Inspectors	512
Electrical/Mechanical Technicians	363
Engineering Aides	353
Engineering Analysts	252
Engineering Technicians	243
Mechanical Service Technicians	202
Mechanical Repair Technicians	170

Top Distinguishing Skills by Demand

Not enough data to display Distinguishing Skills for this occupation.

Top Defining Skills by Demand

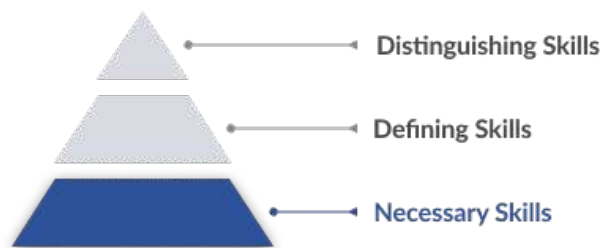
An occupation's Defining Skills represent the day-to-day tasks and responsibilities of the job. An employee needs these skills to qualify for and perform successfully in this occupation.



Skill	Salary Boosting	Job Postings Requesting
Mechanical Inspection		799

Top Necessary Skills by Demand

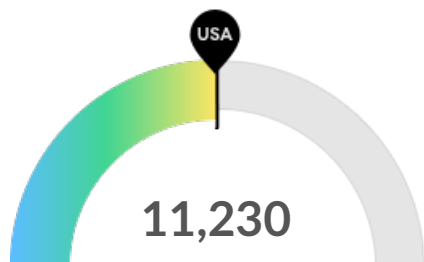
An occupation's Necessary Skills are the specialized skills required for that job and relevant across other similar jobs. An employee needs these skills as building blocks to perform the more complex Defining Skills.



Skill	Salary Boosting	Job Postings Requesting
Mechanical Engineering	×	1,716
Hand Tools	×	1,627
Valid Driver's License	×	1,482
Project Management	×	1,152
Machinery	×	1,105
Power Tool Operation	×	1,098
Machining	×	1,061
Blueprinting	×	1,024
Computer-Aided Design	×	963
Test Equipment	×	872

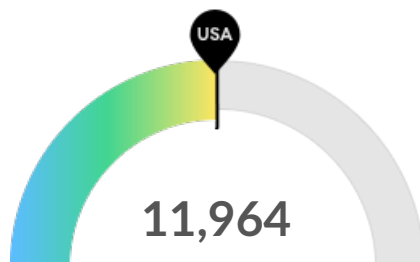
Demographics

Retirement Risk Is About Average, While Overall Diversity Is About Average



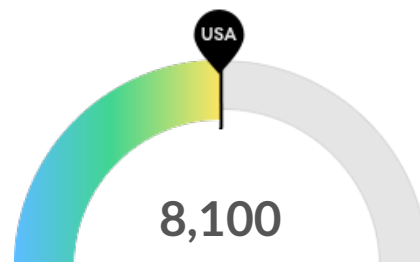
Retiring Soon

Retirement risk is about average in the United States. The national average for an area this size is 11,230* employees 55 or older, while there are 11,230 here.



Racial Diversity

Racial diversity is about average in the United States. The national average for an area this size is 11,964* racially diverse employees, while there are 11,964 here.

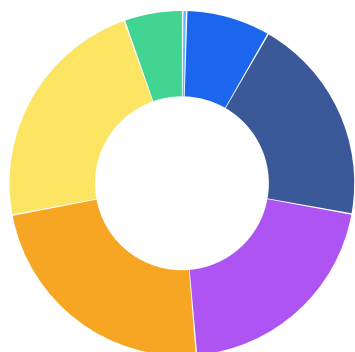


Gender Diversity

Gender diversity is about average in the United States. The national average for an area this size is 8,100* female employees, while there are 8,100 here.

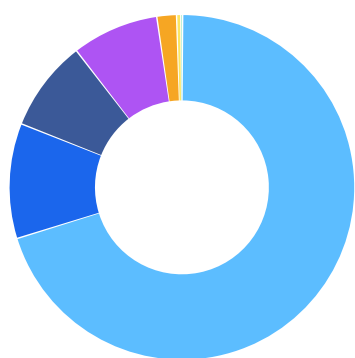
*National average values are derived by taking the national value for Mechanical Engineering Technologists and Technicians and scaling it down to account for the difference in overall workforce size between the nation and the United States. In other words, the values represent the national average adjusted for region size.

Occupation Age Breakdown



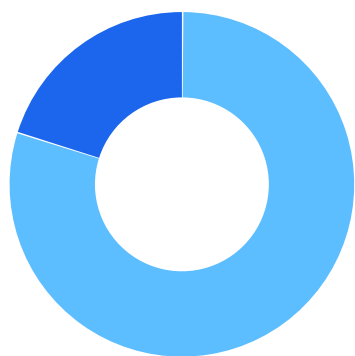
	% of Jobs	Jobs
14-18	0.4%	150
19-24	7.9%	3,159
25-34	19.5%	7,821
35-44	20.8%	8,333
45-54	23.4%	9,375
55-64	22.6%	9,036
65+	5.5%	2,193

Occupation Race/Ethnicity Breakdown



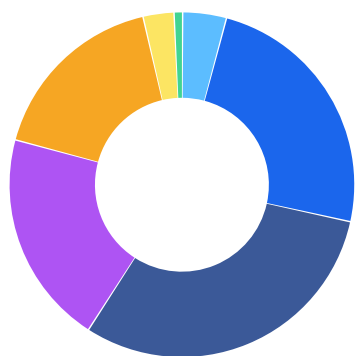
	% of Jobs	Jobs
White	70.1%	28,105
Hispanic or Latino	10.8%	4,321
Black or African American	8.5%	3,422
Asian	8.1%	3,258
Two or More Races	1.8%	737
American Indian or Alaska Native	0.4%	157
Native Hawaiian or Other Pacific Islander	0.2%	69

Occupation Gender Breakdown



	% of Jobs	Jobs
Males	79.8%	31,969
Females	20.2%	8,100

National Educational Attainment



	% of Jobs
Less than high school diploma	4.1%
High school diploma or equivalent	24.3%
Some college, no degree	30.7%
Associate's degree	20.1%
Bachelor's degree	17.2%
Master's degree	2.9%
Doctoral or professional degree	0.8%

Occupational Programs



5 Programs

Of the programs that can train for this job, 5 have produced completions in the last 5 years.



11,147 Completions (2021)

The completions from all regional institutions for all degree types.



7,574 Openings (2021)

The average number of openings for an occupation in the region is 34,529.

CIP Code	Top Programs	Completions (2021)
15.0000	Engineering Technologies/Technicians, General	4,500
15.0805	Mechanical/Mechanical Engineering Technology/Technician	3,592
15.9999	Engineering/Engineering-Related Technologies/Technicians,...	1,765
15.0803	Automotive Engineering Technology/Technician	897
15.0899	Mechanical Engineering Related Technologies/Technicians, ...	393

Top Schools	Completions (2021)
Purdue University-Main Campus	274
Mississippi Gulf Coast Community College	237
Pasadena City College	235
Berklee College of Music	224
New Jersey Institute of Technology	221
Pellissippi State Community College	198
Old Dominion University	167
CUNY New York City College of Technology	161
University of North Carolina at Charlotte	154
Jefferson State Community College	149

Appendix A

Mechanical Engineering Technologists and Technicians (SOC 17-3027):

Apply theory and principles of mechanical engineering to modify, develop, test, or adjust machinery and equipment under direction of engineering staff or physical scientists.

Sample of Reported Job Titles:

Mechanical Technician (Mechanical Tech)
Mechanical Engineering Technician (Mechanical Engineering Tech)
Manufacturing Engineering Technician (Manufacturing Engineering Tech)
Engineering Technician (Engineering Tech)
Research and Development Technician (R and D Tech)
Research Technician
Laboratory Technician (Lab Technician)
Transportation Engineering Technician
Performance Technician
Durability Technician

Related O*NET Occupations:

Mechanical Engineering Technologists and Technicians (17-3027.00)
Automotive Engineering Technicians (17-3027.01)

Appendix B - Data Sources and Calculations

Location Quotient

Location quotient (LQ) is a way of quantifying how concentrated a particular industry, cluster, occupation, or demographic group is in a region as compared to the nation. It can reveal what makes a particular region unique in comparison to the national average.

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