

2019-2020 Florida Job Growth Grant Fund Workforce Training Grant Proposal

Proposal Instructions: The Florida Job Growth Grant Fund Proposal (this document) must be completed and signed by an authorized representative of the entity applying for the grant. Please read the proposal carefully as some questions may require a separate narrative to be completed. If additional space is needed, attach a word document with your entire answer.

Entity Information

Name of Entity: Santa Fe College

Federal Employer Identification Number (if applicable): ██████████

Primary Contact Name: Kathryn Lehman

Title: Director for Sponsored Projects

Mailing Address: 3000 NW 83rd Street, Bldg. F, Room 217
Gainesville, Florida 32606

Phone Number: 352-395-5496

Email: kathryn.lehman@sfccollege.edu

Secondary Contact Name: Liam McClay

Title: Senior Advisor to the President / Acting Associate Vice President, Facilities Services

Phone Number: 352-395-5199

Workforce Training Grant Eligibility

Pursuant to 288.101, F.S., the Florida Job Growth Grant Fund was created to promote economic opportunity by improving public infrastructure and enhancing workforce training. This includes workforce training grants to support programs offered at state colleges and state technical centers.

Eligible entities must submit proposals that:

- Support programs and associated equipment at state colleges and state technical centers.
- Provide participants with transferable and sustainable workforce skills applicable to more than a single employer.
- Are offered to the public.
- Are based on criteria established by the state colleges and state technical centers.
- Prohibit the exclusion of applicants who are unemployed or underemployed.

1. Program Requirements:

(If additional space is needed, attach a word document with your entire answer.)

Each proposal must include the following information describing how the program satisfies the eligibility requirements listed on page 1.

- A.** Provide the title and a detailed description of the proposed workforce training.

Please see Attachment 1 - Narrative

- B.** Describe how this proposal supports programs at state colleges or state technical centers.

Please see Attachment 1 - Narrative

- C.** Describe how this proposal provides participants transferable, sustainable workforce skills applicable to more than a single employer.

Please see Attachment 1 - Narrative

- D.** Describe how this proposal supports a program(s) that is offered to the public?

Please see Attachment 1 - Narrative

- E.** Describe how this proposal is based on criteria established by the state colleges and state technical centers.

Please see Attachment 1 - Narrative

- F.** Does this proposal support a program(s) that will not exclude unemployed or underemployed individuals?



Yes



No

- G.** Describe how this proposal will promote economic opportunity by enhancing workforce training. Please include the number of program completers anticipated to be created from the proposed training. Further, please include the economic impact on the community, region, or state and the associated metrics used to measure the success of the proposed training.

Please see Attachment 1 - Narrative

2. Additional Information:

(If additional space is needed, attach a word document with your entire answer.)

- A.** Is this an expansion of an existing training program? Yes No
 If yes, please provide an explanation for how the funds from this grant will be used to enhance the existing program.

Please see Attachment 1 - Narrative

- B.** Does the proposal align with Florida’s Targeted Industries? Yes No
 (View Florida’s Targeted Industries here.)
 If yes, please indicate the specific targeted industries with which the proposal aligns.
 If no, with which industries does the proposal align?

Please see Attachment 1 - Narrative

- C.** Does the proposal align with an occupation(s) on the Statewide Demand Occupations List and/or the Regional Demand Occupations List? (View Florida’s Demand Occupations List here.) Yes No

If yes, please indicate the specific occupation(s) with which the proposal aligns.
 If no, with which occupation does the proposal align?

Please see Attachment 1 - Narrative

- D.** Indicate how the training will be delivered (e.g., classroom-based, computer-based, other).
 If in-person, identify the location(s) (e.g., city, campus, etc.) where the training will be available.
 If computer-based, identify the targeted location(s) (e.g. city, county, statewide) where the training will be available.

Please see Attachment 1 - Narrative

- E.** Indicate the number of anticipated annual enrolled students and completers in the proposed program.

Please see Attachment 1 - Narrative

- F.** Indicate the length of program (e.g., quarters, semesters, weeks, etc.), including anticipated beginning and ending dates.

Begin Date: ^{Attach 1} _____

End Date: ^{Attach 1} _____

Please see Attachment 1 - Narrative & Attachment 3 - Addendum to 2F

- G.** Describe the plan to support the sustainability of the program after grant completion.

Please see Attachment 1 - Narrative

- H.** Identify any certifications, degrees, etc. that will result from the completion of the program. Please include the Classification of Instructional Programs (CIP) code and the percent of completer in each code, corresponding with Section E.

Please see Attachment 1 - Narrative

- I.** Does this project have a local match amount?

Yes No

If yes, please describe the entity providing the match and the amount (Do not include in-kind).

Please see Attachment 1 - Narrative

J. Provide any additional information or attachments to be considered for the proposal.

Additional attachments include: 1) Narrative 2) Budget Narrative; 3) Addendum to #2F (multiple charts); 4) Signature Authority; 5) Industry Partner Letters of Commitment (6) Signature Page.

3. Program Budget

(If additional space is needed, attach a word document with your entire answer.)

Estimated Costs and Sources of Funding: Include all applicable workforce training costs and other funding sources available to support the proposal.

1.) Total Amount Requested	\$ 2,851,730	
Florida Job Growth Grant Fund	<hr/>	
2.) Other Workforce Training Project Funding Sources:		
City/County	\$ 0	
Private Sources	\$ 0	
Other (grants, etc.)	\$ 6,574,930	Please Specify: <u>See Attach 1</u>
Total Other Funding	\$ 6,574,930	
3.) Workforce Training Project Costs:		
Equipment	\$ 1,478,211	
Personnel	\$ 211,583	
Facilities	\$ 7,579,824	
Tuition	\$ 0	
Training Materials	\$ 10,000	
Other	\$ 147,042	Please Specify: <u>See Attach 1</u>
Total Project Costs	\$ 9,426,660	

Note: The total amount of the project should equal the total amount requested plus the total other funding.

- 4.) Provide a detailed budget narrative, including the timing and steps necessary to obtain the funding, how equipment purchases will be associated with the training program, if applicable, and any other pertinent budget-related information.

Please see Attachment 2 - Budget Narrative

4. Approvals and Authority

(If additional space is needed, attach a word document with your entire answer.)

- A. If entity is awarded grant funds based on this proposal, what approvals must be obtained before it can execute a grant agreement with the Florida Department of Economic Opportunity (e.g., approval of a board, commission or council)?

Please see Attachment 1 - Narrative

- B. If approval of a board, commission, council or other group is needed prior to execution of an agreement between the entity and the Florida Department of Economic Opportunity:

- i. Provide the schedule of upcoming meetings for the group for a period of at least six months.
- ii. State whether entity is willing and able to hold special meetings, and if so, upon how many days' notice.

Please see Attachment 1 - Narrative

- C. Attach evidence that the undersigned has all necessary authority to execute this proposal on behalf of the entity. This evidence may take a variety of forms, including but not limited to: a delegation of authority, citation to relevant laws or codes, policy documents, etc.

See Attachment 4 - Letter of Evidence of Authority

I, the undersigned, do hereby certify that I have express authority to sign this proposal on behalf of the above-described entity and to the best of my knowledge, that all data and information submitted in proposal is truthful and accurate and no material fact has been omitted.

Name of Entity: Santa Fe College

Name and Title of Authorized Representative: Jackson N. Sasser; President, Santa Fe College

Representative Signature: See Attachment 6 - Signature Page

Signature Date: _____

September 23, 2019

Mr. Ken Lawson
Executive Director
Department of Economic Opportunity
107 East Madison Street
Caldwell Building
Tallahassee, FL 32399-4120

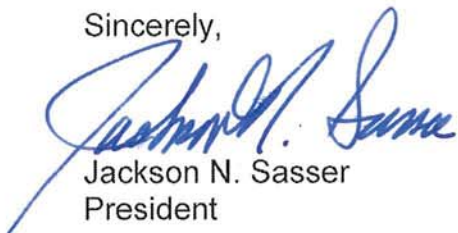
Dear Mr. Lawson,

Please see the attached application from Santa Fe College for our Florida Job Growth Grant Fund – Institute of Technology and Manufacturing (ITM) – Workforce Training grant.

Santa Fe College is committed to providing our citizens with educational opportunities that fuel Florida's economy and job growth. We appreciate the opportunity to apply for these funds to develop the Institute of Technology and Manufacturing.

Should you have any questions, please contact Ms. Kathryn Lehman, Director for Sponsored Projects at (352)395-5496; or Mr. Liam McClay, Senior Advisor to the President / Acting Associate Vice President, Facilities Services at (352)395-5199.

Sincerely,



Jackson N. Sasser
President

Attachments

Attachment 1 - Narrative

1. PROGRAM REQUIREMENTS

Each proposal must include the following information describing how the program satisfies the eligibility requirements listed on page 1.

A. Provide the title and a detailed description of the proposed workforce training.

Title: Institute of Technology and Manufacturing (ITM)

Florida's future depends on training and maintaining a highly qualified workforce to meet the changing needs of industry across the state. Manufacturing industries and the jobs they create are a cornerstone of Florida's economic future. Forecasts indicate that more than 93,610 manufacturing jobs will be created over the next eight years, and the current labor force is not adequate to fill these positions. Santa Fe College's proposal will rapidly develop a new advanced manufacturing program and double the size of its current successful welding programs. With the support of the Florida Job Growth Grant Fund, these programs will be focused on educating highly skilled workers who will provide the needed workforce to attract new businesses to Florida, create jobs and promote economic growth. Statewide industry demand will be served by Santa Fe's Institute of Technology and Manufacturing including the ports of Jacksonville and Tampa. Growth sector companies from aerospace, health services, and transportation across the State of Florida will be served by highly skilled workers graduating from these programs.

Alachua and Bradford counties are in the heart of Florida's Tech Corridor. This region is home to significant assets that will be supported and utilized by Santa Fe College's Institute of Technology and Manufacturing (ITM) programs. These assets include several emerging industry clusters, including a strong cluster of bioscience firms that produce medical devices, regenerative medicine, gene therapies, pharmaceuticals, and more, powered by the tremendous research capabilities of the University of Florida's Colleges of Medicine, Engineering, and Liberal Arts and Sciences, as well as the Institute of Food and Agricultural Sciences (IFAS). Each year, the area benefits from the creation of more than ten new companies with the intent of commercially developing UF-owned innovations in medicine, life sciences, biotechnology, medical devices, logistics, and manufacturing. Other expanding industry clusters in the region include aerospace, software, web development, and information technology. These are among the fastest-growing segments with numerous startups launching annually. Santa Fe College has supported this economic growth with active programs in rapid response job training, SF's Gainesville Technology Entrepreneurship Center (GTEC), and its Center for Innovation and Economic Development (CIED). The CIED has provided incubation space for these companies as well as for other young startups.

Physical infrastructure in the region is well established and expanding, including Interstate 75, other US highways, a regional airport with frequent service to Atlanta, Charlotte, Miami, and Dallas and growth in housing and business in general. A significant economic development project and collaborative effort by the entire community is the build-out and expansion of Innovation Square in Gainesville. The

CIED, with an extensive expansion underway, is located within a few blocks of this development. This downtown innovation zone includes office space, residential space, retail, and entertainment in a "live-work-play" setting. Santa Fe College and the CIED are significant contributors to this economic and business development, in that they provide not only a pipeline of startups into the CIED and other local incubators but also provide incubator graduate companies with needs for the trained workforce that ITM will provide.

A critical component of building and expanding advanced manufacturing industries is the opportunity to provide training for manufacturing-related jobs. According to the Gainesville Chamber of Commerce, North Central Florida encompasses more than 200 manufacturers that employ more than 4,000 people. The Chamber's five-year economic development strategy, *Transforming Greater Gainesville*, lists Advanced Manufacturing as an emerging industry sector, but "one of the greatest challenges the Greater Gainesville region experiences is the low number of trained engineering technology employees."

To meet this growing statewide demand, Santa Fe College will establish a new Associate of Science (AS) degree program in Engineering Technology (ET) with a specialization tract in Advanced Manufacturing housed by the Institute of Technology and Manufacturing (ITM). This program offers a sequence of courses that provide coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge as well as skills needed to prepare for further education and careers in the Advanced Manufacturing Career Cluster. A breakdown of these jobs by category is discussed in section # 1.G of this proposal.

Santa Fe College (SF) has leveraged strategies to increase student success while offering programs that provide high levels of degree credential attainment, earnings outcomes, and equitable results for students. SF is well qualified to be a driving force in this critical workforce component of Florida's economic engine. These technical jobs are essential to give veterans and other non-traditional students high-wage stable careers.

For the past three years, SF has been a leader in degree attainment amongst its peers within the Florida College System. These strengths have led to SF being recognized as a national model. Santa Fe's track record in providing effective training in partnership with CareerSource North Central Florida and local business and industry make the proposed ET program offered by the ITM a natural addition to Florida's economic development and resiliency.

When fully established, Santa Fe anticipates that a minimum of 75 students will successfully complete and graduate from the Engineering Technology AS program with a specialization in Advanced Manufacturing and Welding each year. These graduates will be well prepared to enter the manufacturing workforce, contributing to the local community and growing the state economy.

The general focus of the Engineering Technology and Welding programs is broad, transferable skills, and stresses the understanding and demonstration of the following elements of Engineering Technology and Industrial Applications: production materials

and processes; quality control; computer-aided drafting; electronics; mechanics; instrumentation; and safety.

These careers are well-suited for veterans returning to the workforce. Santa Fe is a leader in providing education for veterans. *Military Times* ranked SF as a “Best for Vets” college for 2019. Santa Fe College is also an official U.S. Department of Veterans Affairs Vet Success On-Campus site.

The **common core** of the Engineering Technology (ET) programs consists of 18 credit hours of technical courses. These directly align with the nationally recognized Manufacturing Skills Standards Council’s (MSSC) skills standards that define the knowledge, skills, and performance that current frontline manufacturing workers need. The Council also recommends all students complete the core first. After completing the core, students will progress to the **Advanced Manufacturing specialization courses**. The entire program of 60 credit hours will be completed by students over four semesters.

The SF Welding Technology Certificate program prepares students to enter the workforce with a wide variety of welding skills and certifications. Students are trained on the industry’s latest equipment and are taught by experienced instructors. The program, accredited by the American Welding Society, offers 20 different welding certification tests to students and industry workers, enabling graduates of the program to receive higher wages when entering the workforce.

The programs will engage local industry partners as Advisory Committee members to ensure continuous dialog and collaboration on how the program is addressing industry needs for trained technicians. The Program Director and staff will create and maintain a database to track participant progress and outcomes up to and including job placement. Staff will collaborate with CareerSource North Central Florida on job placement for graduates.

The timeline following the grant award process will immediately begin upon funding:

- Welding program continues in current location until construction of the facility is completed
- Facility construction will be completed
- Purchase, installation, and training for Advanced Manufacturing equipment will be fast-tracked by the vendor
- The full 60 credit hour, 4-semester ET program will begin
- The total grant period will be two years. The program will be fully institutionalized, and it will be sustained on an ongoing basis

The ET program provides technical skill proficiency and includes competency-based applied learning that contributes to the academic knowledge, higher-order reasoning and problem-solving skills, work attitudes, general employability skills, occupation-specific skills, and knowledge of all aspects of the manufacturing career cluster. ET content also includes communication skills; leadership skills; human relations; safe and efficient work practices; and a combination of theory and laboratory activities to gain the

necessary cognitive and manipulative skills to perform preventive and corrective maintenance and support for engineering design, processes, production, testing, and/or maintaining product quality.

The Engineering Technology A.S. with specialization in Advanced Manufacturing courses prepare students for employment with occupational titles: Manufacturing Engineering Technician or Advanced Manufacturing or Production Technician; or the courses provide supplemental training for previous or current employees in these occupations.

According to the *Florida Department of Education Curriculum Framework 2019-2020* (pg. 4–8), after successfully completing the Engineering Technology AS degree, students will be able to demonstrate:

- An understanding of industrial processes and material properties
- An ability to generate and interpret computer-aided drawings
- A fundamental knowledge of electricity and electronics
- An understanding of industrial safety, health, and environmental requirements
- Proficiency in the use of quality assurance methods and quality control concepts
- Proficiency in using tools, instruments and testing devices
- Basic troubleshooting skills
- Appropriate communication skills
- Appropriate math skills
- An understanding of modern business practices and strategies
- Employability skills

After completing the **specialization courses** in *Advanced Manufacturing*, students will be able to:

- Understand, operate, troubleshoot, and maintain pneumatic, hydraulic, and electromechanical components and/or systems
- Identify lean and six sigma concepts in manufacturing environments
- Operate industrial automation systems
- Apply the principles of robotics to automated systems
- Use human-machine interfaces proficiently to operate automated systems
- Identify, implement and/or interpret supply chain and operations management concepts and techniques

B. Describe how this proposal supports programs at state colleges or state technical centers.

This proposal supports programs at all state colleges and technical centers because it is aligned with the design of the *Florida statewide model* for an articulating, industry-validated, transferable and stackable credential-based degree. The Florida Department of Education and the Florida Advanced Technological Education Center (FLATE) partnered with industry and colleges to produce the statewide Engineering Technology A.S. Degree Program. The core program aligns with the nationally recognized Manufacturing Skills Standards Council Certified Production Technician (MSSC-CPT) certification, and the degree articulates directly to Florida Bachelor of Science in Engineering Technology (B.S.E.T.) degrees. In addition, coursework from the following

postsecondary vocational College Credit Certificate (CCC) programs may be applied to the Engineering Technology AS with Advanced Manufacturing specialization:

- Automation (CCC 0615040601)
- Lean Manufacturing (CCC – 0615061302)
- Mechatronics (CCC – 0615000013)
- Pneumatics, Hydraulics, and Motors for Manufacturing (CCC – 0615061303)
- Welding PSAV & Certificates

The proposed new Engineering Technology AS degree program also complements the existing Career and Technical Education (CTE) programs at Santa Fe College. These include: Automotive Service Technology Certificate; Automotive Service Management Technology Associate in Applied Science (AAS); Air Conditioning Refrigeration and Heating Service Certificate; Welding Technology; Building Construction Technology AS; and Plumbing Technology.

C. Describe how this proposal provides participants transferable, sustainable workforce skills applicable to more than a single employer.

The ET program provides students with transferable, sustainable workforce skills applicable to more than one employer in two keyways.

First, the program **common core** is a sequence of 18 credit hours of instruction that is common to all eight specialization tracts, one of which is Advanced Manufacturing. The courses are from the areas of: instrumentation and measurement; manufacturing processes and materials; quality; computer-aided drafting; electronics; and safety. This technical common core was designed to align with the nationally recognized Manufacturing Skills Standards Council's (MSSC) skills standards that define the knowledge, skills, and performance needed by contemporary manufacturing workers *across all these specializations*. The nationally recognized MSSC Production Technician Certification is a part of the *state articulated* Engineering Technology A.S. program of study that is recognized as having proven transfer and job placement rates applicable to more than a single employer.

Also, the program staff will be in continuous dialogue with partners across various manufacturing industries through the Advisory Committee. One of the primary purposes for creating and fostering these relationships with industry is to ensure that the program is successfully supporting their various needs for trained employees.

D. Describe how this proposal supports a program(s) that is offered to the public?

Santa Fe College, as part of the Florida College System, has a general open-admission policy provided applicants meet the minimum standards as stated in Florida law. In compliance with the statute, the College is committed to providing equitable educational opportunities to all citizens pursuing admission, regardless of background.

E. Describe how this proposal is based on criteria established by the state colleges and state technical centers.

All offerings in the proposed Engineering Technology AS degree and the Welding program are based on the State of Florida Department of Education Curriculum

Frameworks, course numbers, and course descriptions, including prerequisite courses. Thus, any enhancement of the equipment available for training students in these programs directly supports the learning outcomes articulated by the state. In addition to following state program criteria, all Santa Fe College degree and certificate programs are recognized by external third-party accreditors and are offered in response to the current manufacturing needs of the community.

F. Does this proposal support a program(s) that will not exclude unemployed or underemployed individuals?

Yes.

G. Describe how this proposal will promote economic opportunity by enhancing workforce training. Please include the number of program completers anticipated to be created from the proposed training. Further, please include the economic impact on the community, region, or state and the associated metrics used to measure the success of the proposed training.

The program anticipates 375 completers per five-year period. A conservative ROI estimate is 338 high-wage earning completers after five years of operation.

Manufacturing represents 4.2% of the industries in Florida (Source: U.S. Department of Labor, Bureau of Labor Statistics, Current Employment Statistics Program, released July 19, 2019). According to the DEO Current Employment Statistics (CES) data online, there are 384,300 manufacturing production worker jobs in Florida in June 2019. This number represents an 11,500 job (or 3.08%) increase in one year since June 2018.

The following chart shows the 2018-2026 employment projections for Florida for the targeted occupations with which this proposal aligns. The openings for these occupational titles represent a total of 93,610 jobs.

Employment Projections 2018-2026		Total Job Openings 2018- 2026	Percent of Growth 2018 - 2026
SOC Code	Occupational Title	Florida	Florida
11-3051	Industrial Production Managers	3,293	7.1%
17-2141	Mechanical Engineers	5,116	11.8%
17-3023	Electrical and Electronics Engineering Technicians	4,438	7.0%
17-3027	Mechanical Engineering Technicians	698	12.3%
49-1011	First-Line Supervisor of Mechanics, Installers, and Repairers	25,304	10.2%
49-9041	Industrial Machinery Mechanics*	10,997	9.5%
51-1011	First-Line Supervisor of Production and Operating Workers*	22,283	7.5%
51-4041	Machinists	8,752	7.7%
51-4121	Welders, Cutters, Solderers, and Brazers*	14,493	11.2%

Source: Florida Department of Economic Opportunity, Employment Projections Data, 2018-2026

As manufacturers across the State of Florida have begun using Computer Numerical Control (CNC), Programmable Logic Controller (PLC), and additive manufacturing processes, the demand for technicians has steadily increased. New manufacturers in biotechnology, medical devices, and related industries are locating in the North Central Florida region. All of these employ advanced manufacturing equipment and processes that require skilled engineering technicians to set up, maintain, troubleshoot, and repair. Graduates of the ET and Welding programs will provide approximately 75 technicians to address the critical needs of manufacturing partners for trained employees. The Bureau of Labor Statistics lists the 2018 mean wage for a Mechanical Engineering Technician (SOC 17-3027) in Florida at \$24.21 per hour or \$50,360 annually, compared to the mean wage for Florida all occupations at \$22.12 per hour or \$46,060 annually. (Source: BLS May 2018 State Occupational Employment and Wage Estimates Florida https://www.bls.gov/oes/current/oes_fl.htm, accessed 08/01/19).

The **metrics** that will be used to measure the associated program impact to the community will consist of quantitative data on enrollment, completion/graduation, and job placement of students in the ET with specialization in Advanced Manufacturing. Through collaboration with the instructors, students, and Advisory Committee members, the Project Director will create and distribute surveys to students (pre- and post-course) and partners (annually), and aggregate and analyze the survey feedback to provide qualitative data to inform program success. ET will use all data, including the survey feedback, to determine and make needed changes for program improvement.

Most importantly, the Project Director will ensure a responsive, collaborative relationship with industry partners by maintaining an open, ongoing dialogue with Advisory Committee members.

2. ADDITIONAL INFORMATION

A. Is this an expansion of an existing training program?

Yes, this project is an expansion of SF's high-demand Welding program. It also includes the development of a critically needed Advanced Manufacturing program.

If yes, please provide an explanation for how the funds from this grant will be used to enhance the existing program.

ITM is a synergistic expansion of successful existing programs that are much in need of new facilities and establishment of the high-demand Engineering Technology AS degree. Currently, the Welding program is housed on the Northwest Campus in Building H. This facility was built in 1974 and has not been updated since its original construction. Significant structural problems are limiting enrollment and accelerating the need to demolish and replace significant portions of the current structure. In addition, considerable improvements are needed in order to increase student access to these highly sought-after technical programs as well as to modernize the teaching space in order to conform to industry standards.

With the industry demand for the new Engineering Technology degree and expanded Welding program, this new building and the required specialized equipment sought in this proposal have become imperative.

In June 2017, the SF District Board of Trustees dedicated \$6,000,000 for the construction of Phase I of the Institute, which will include the relocation and expansion of the Welding program and the new Engineering Technology degree. The project is currently listed at #15 on the Division of Florida Colleges Fixed Capital Outlay priority list for 2020-21 and is the College's second-highest facilities priority.

B. Does the proposal align with Florida's Targeted Industries?

Yes, the proposal aligns with Florida's Targeted Industries.

If yes, please indicate the targeted industries with which the proposal aligns.

The Florida Targeted Industries with which the proposal aligns are Engineering, Computer Systems, Simulation and Training, Electronics, Maintenance Repair, and Machine Tooling.

C. Does the proposal align with an occupation(s) on the Statewide Demand Occupations List and/or the Regional Demand Occupations List?

Yes.

If yes, please indicate the specific occupation(s) with which the proposal aligns.

The proposal aligns with occupations on the Statewide Demand Occupations List and the Regional Demand Occupations List, which include:

- Industrial Machinery Mechanics
- Industrial Production Managers
- Mechanical Engineering Technicians
- Electrical and Electronics Engineering Technicians
- Machinists; Welders, Cutters, Solderers, and Brazers
- Front Line Supervisors of Production and Operating Workers
- Front-Line Supervisors of Mechanics, Installers, and Repairers

D. Indicate how the training will be delivered (e.g., classroom-based, computer-based, other).

If in-person, identify the location(s) (e.g., city, campus, etc.) where the training will be available. If computer-based, identify the targeted locations (e.g., city, county, statewide) where the training will be available.

The new Engineering Technology AS degree and the Welding program training will be delivered in both classroom and lab-based format at the NW Campus of Santa Fe College in Gainesville, Florida.

E. Indicate the number of anticipated annual enrolled students and completers in the proposed program.

Santa Fe College anticipates both these programs will serve 75 students per year when fully implemented. Recruitment will be strengthened by a pipeline created with the Alachua County Schools' middle and high school robotics courses which will be articulated with the degree requirements at Santa Fe College through an inter-institutional articulation agreement. This pipeline will ensure a minimum enrollment of 75 students annually. During each five-year period, 375 students will be served. An 90% completion rate is anticipated. A conservative ROI estimate is 338 high-wage earning graduates after five years of operation.

F. Indicate the length of program (e.g., quarters, semesters, weeks, etc.), including anticipated beginning and ending dates.

Begin Date: See explanation below. **End Date:** See explanation below.

Building Construction Begin Date: Fall 2020

SF's Welding program is currently active and will be ongoing in another facility on campus during construction. The program's expansion will coincide with the completion of the project. Program length will remain 18 months.

The first cohort for advanced manufacturing will begin in Spring 2022 upon completion of the new facility. Following the award notice, the project will require: facility planning and site development; the appointment of a program advisory committee; hiring the project director (faculty) and lab manager; facility construction; equipment purchase and installation; and faculty and staff training. The entire project will be completed by Spring 2022. The ET program will be fully institutionalized and *ongoing* by the end of the project period. The 60 credit-hour Advanced Manufacturing program will take students four semesters to complete. A full description is listed under **Project Timeline chart** provided in #3.4 of this narrative. The **attachment 3: "Addendum to #2.F" details the ET completion timeline for students and the ET Course Descriptions.**

G. Describe the plan to support the sustainability of the program after grant completion.

Santa Fe College has a strong historical record of long-term commitment to sustaining technical degree programs, due in part to the support of numerous local and regional affiliates of the manufacturing industry. Industry affiliates include the CareerSource North Central Florida workforce board and members of the Greater Gainesville Chamber of Commerce Advanced Manufacturing Council: Exactech Inc., Endoscopy Replacement Parts Inc., Invivo, Milliken-Sivance, Fabco-Air, Nanotherapeutics, and Sandvik. The **ET** Advisory Committee will be comprised of these and other local business representatives from the manufacturing community.

In addition to continuous engagement with industry partners, Santa Fe College will incorporate replacement costs for program equipment upgrades into its annual college-wide planning process. The college will also continue to provide salary support for the project director and lab manager. The Santa Fe College Construction and Technical Program administration and faculty will also continue to work closely with local manufacturing industries, private businesses, and the Florida Technological Education Center (FLATE) and staff to ensure the achievement of Student Learning Outcomes.

Santa Fe College will have fully institutionalized the sustainment of the ITM by the end of the project period.

H. Identify any certifications, degrees, etc. that will result from the completion of the program. Please include the Classification of Instructional Programs (CIP) code and the percent of completers in each code, corresponding with Section E.

The Welding program results in completion for the following CIP codes:

- Welding Technology CIP 0648050805
- Advanced Welding Technology CIP 0648050806
- According to SF Institutional Research, 90% of completers in Welding attain employment. Data per individual CIP code is not available.

Completion of the new program will result in an ***Engineering Technology Associate of Science Degree (A.S.) with a Specialization tract in Advanced Manufacturing (CIP Number 1615000001)***. Completer data is not available for this new program. It is anticipated that completion rates will be high.

The following **industry certifications** will also be available to students (depending on their contact hours) using the listed Mindsight Bluegrass equipment and software tools:

- KUKA Robotics Programming One
- Siemens Mechatronics Systems Certification Program (SMSCP) Level 1-2
- Siemens CNC Sinumerik Certification
- Manufacturing Skills Standards Council (MSSC) Certified Production Technician (CPT)
- MSSC Certified Logistics Technician (CLT)
- National Institute for Metalworking Skills (NIMS) Duty: 1,2,3,4 and most of 5,6, and 7, including credentials in Machining Level I and Industrial Technology Maintenance in the areas of Maintenance Operations, Basic Mechanical Systems, Basic Hydraulic Systems, Basic Pneumatic Systems, Electrical Systems, Process Controls Systems, Maintenance Welding and Maintenance Piping
- Festo FICP most of Level One Fundamentals
- The Association for Packaging and Processing Technologies (PMMI) Mechatronics Certification Level 1 and 2
- International Fluid Power Society (IFPS)- Certified Fluid Power Specialist
- American Welding Society (AWS)
- OSHA 10 General Industry

I. Does this project have a local match amount?

Yes, Santa Fe College has committed \$6 million to the construction of this much-needed facility. SF will also provide operational resources to sustain the ITM.

If yes, please describe the entity providing the match and the amount. (Do not include in-kind.)

Santa Fe College was established by the state legislature in 1965 as a "community

college" to offer wide access to quality higher education for the citizens of Alachua and Bradford counties. The demand for qualified technicians and employees in manufacturing in the community influences the offerings and associated allocated resources at Santa Fe College.

Each year the College identifies and dedicates human, current, and capital resources to programs after a needs-assessment process. The College meets any unexpected interim needs through the assignment of adjunct instructors and speedy repair or replacement of equipment. Santa Fe will continue to dedicate appropriate portions of its budget to support the enhancement of the Engineering Technology AS program to sustain the high level of instruction for which the College is known.

Santa Fe College is providing a match of **\$6,574,930**. The match is comprised of: 1) \$6,000,000 committed for construction of the Institute of Technology and Manufacturing 2) welding equipment currently in use and additional equipment for which funds have already been allocated (estimated at \$233,805); 3) Personnel salary and benefits for one full-time project director and one full-time lab manager who will be hired for the proposed Engineering Technology AS degree program. Also included is one full-time welding instructor and one part-time welding instructor (\$211,583); 4) Training materials (\$10,000), and 5) Indirect costs related to the program funding equals (\$119,542).

J. Provide any additional information or attachments to be considered for the proposal.

Additional attachments include: 2) Budget Narrative; 3) Addendum to #2F (multiple charts); 4) Signature Authority; 5) Industry Partner Letters of Commitment 6) Signature Page.

3. PROGRAM BUDGET

Estimated Costs and Sources of Funding: Include all applicable workforce training costs and other funding sources available to support the proposal.

- 1.) Total Amount Requested \$2,851,730.
Florida Job Growth Grant Fund

- 2.) Other Workforce Training Project Funding Sources

City/County	\$0
Private Sources	\$0
Other (grants, etc.)	\$6,574,930.
Total other funding	\$6,574,930.

Please Specify: **See Attach 1**

- 3.) Workforce Training Project Costs:

Equipment	\$1,478,211.
Personnel	\$211,583.
Facilities	\$7,579,824.
Tuition	\$0
Training Materials	\$10,000.
Other	\$147,042.

Total Project Costs	\$9,426,660.	Please Specify: <u>See Attach 1</u>
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Note: The total amount of the project should equal the total amount requested plus the total other funding.

4.) Provide a detailed budget narrative, including the timing and steps necessary to obtain the funding, how equipment purchases will be associated with the training program, if applicable, and any other pertinent budget-related information.

This proposal requests funding for the completion of a new facility as well as required software and equipment to support essential technical training and experience for students in the new ET degree program. **The Project Timeline outlines the work done during the grant period** after the grant award announcement. This includes: Building Completion; Project Director and Lab Manager hiring; equipment purchase and installation; and faculty and staff training in the Mindsight integrated equipment and software system.

Project Timeline: Fall 2019 – Fall 2023				
Strategy	Key Staff	Process	Outcome	Time
1. Welding Program	Welding Faculty, Director	Cohorts continue through the existing program	Graduates continue with strong job placements	Ongoing
2. Select and hire Architect / Engineering Firm	Facilities Department Director	Planning & development of ITM facility	New state-of-the-art building design	Months 1-4
3. Design new facility, project bidding, and permits	Facilities Department Director	Planning & development of ITM facility	New state-of-the-art building design	Months 5-12
4. Recruit and appoint ET Advisory Committee (AC)	Department Director, Board Members	Formalize AC scope and roles, meetings held	Advisory Board provides input to develop the program	Month 6 - ongoing
5. Construction of the new facility	Facilities, Department Director	Complete site development & building construction	Building for new program and expansion of Welding	Months 13-24
6. Hire new ET Project Director and Lab Manager	Department Director & HR dept.	Follow standard HR process	Qualified staff ensures continued operations	Hired as appropriate to schedule

7. Finalize equipment order (ET curriculum included)	Department Director, AC, Project Director & Lab Manager	Scheduled meetings	State-of-the-art equipment	Month 16
8. Furnish new facility	Facilities, Department Director	Planning & development of ITM facility	Building equipment and furnishings	Months 25-26
9. Welding Program	Welding faculty, Director	Expansion of the Welding Program fully implemented	Recruitment of expanded Welding cohort	Spring 2022
10. ET four-semester program begins	Department Director, AC, Project Director & Lab Manager	ET programs fully implemented	Recruitment of 1 st ET Cohort	Spring 2022
11. Welding program expansion (18-month program)	Welding faculty, Director	Expansion of the Welding Program fully implemented	Completion of 1 st Welding Cohort	Spring 2023
12. ET four-semester program	Department Director, AC, Project Director & Lab Manager	ET programs fully implemented	Completion of 1 st ET Cohort	Fall 2023

The **Budget Narrative (see attachment 2)** outlines all other timelines for expenditures under their respective areas. All college and state purchasing procedures, including bid process and approvals, will be followed prior to the purchase of equipment.

The **Addendum to #2.F (see attachment 3)** details the **timeline of the 4 semester degree program and the description of the courses**.

4. APPROVALS AND AUTHORITY

A. If entity is awarded grant funds based on this proposal, what approvals must be obtained before it can execute a grant agreement with the Florida Department of Economic Opportunity (e.g., approval of a board, commission or council)?

The proposal must be approved by the Santa Fe College Board of Trustees. This proposal will be submitted to the Board of Trustees for approval at the October 15, 2019 Board meeting. A copy of this approval will be available to the Florida Department of Economic Opportunity.

B. If approval of a board, commission, council or other group is needed prior to execution of an agreement between the entity and the Florida Department of Economic Opportunity:

i. Provide the schedule of upcoming meetings for the group for a period of at least six months.

SF Board of Trustees meetings are scheduled for the following dates: October 15, 2019; November 19, 2019; January 21, 2020; February 18, 2020; and April 21, 2020.

ii. State whether entity is willing and able to hold special meetings, and if so, upon how many days' notice.

Special meetings of the Board can be called at any time by the Chairperson, or by the President of Santa Fe College, or by a majority of the Board. Except in the case of emergency meetings, seven days' notice is required (see section 120.525, Florida Statutes).

C. Attach evidence that the undersigned has all necessary authority to execute this proposal on behalf of the entity. This evidence may take a variety of forms, including but not limited to: a delegation of authority, citation to relevant laws or codes, policy documents, etc.

See attachment 4 - Signature Authority

BUDGET NARRATIVE

Santa Fe College (SF) is requesting funds to support the following budget items, which will facilitate the implementation of a new *Institute of Technology and Manufacturing (ITM)*. All college and state purchasing procedures, including bid process and approvals, will be followed.

Institute of Technology and Manufacturing (ITM)

Grant Period: Fall 2019 through Summer 2023

Budget

**Grant
Funds**

WORKFORCE TRAINING PROJECT COSTS

EQUIPMENT - \$5,000+ per unit cost

The **MindSight** system by Bluegrass Educational Technologies, LLC integrates all the necessary tools to focus on essential skills: efficiently building and delivering engaging lessons while monitoring student progress to ensure success. Tracking and management are key to providing an effective and successful learning environment. The MindSight Learning Content Management System (LMS) is a seamless integration of course delivery and classroom management. Instructors use MindSight to manage enrollment, schedule learning activities, customize courseware and track individual achievement as students work through modules. We propose the purchase of five (5) site licenses priced at approximately \$1,180 each or a total \$5,900. In addition, we propose to purchase one (1) complete eSeries Library at an estimated cost of \$26,200. The Complete eSeries Library contains all available eSeries courses, including the Industrial Training Zone (ITZ) and Weld Academy courses. ($\$5,900 + \$26,200 = \$32,100$)

\$ 32,100

Equipment requested for Electricity and Electronics to provide training to students that will focus on the fundamental electricity and electronic skill development. It includes topics and components relevant in today's industry. AC/DC training systems (5), Preparatory Electricity and Electronics Trainers (PEET) (5), FACET Computer Interface Base Unit (2), DC Fundamentals (2) AC 1 Fundamentals (2), Dual Trace Oscilloscope (2), and Digital Multimeter/ Function Generator (2) Curriculum included.

\$ 46,909

The Mechanical Training Systems cover the installation; use, maintenance, and troubleshooting of mechanical drive components. The systems are divided into five levels, and each level is further divided into specific topics, which deal with the components encountered in the industry. The learning is based on practical, hands-on tasks. The total cost proposed includes shipping. Curriculum included.

\$ 99,546

Budget	Grant Funds
<p>The pneumatics training program is divided into the following subsystems: Pneumatics Fundamentals, Electrical Control of Pneumatic Systems, Pneumatics Applications – PLC (programmable logic controller), Troubleshooting Pneumatic Circuits, Servo Control of Pneumatic Systems and Sensors. Equipment to support student training is proposed using two Pneumatic Fundamental Trainers at \$9,280 each or total \$18,560. Four additional option levels covering electrical control of pneumatic systems, troubleshooting, Servo Control and PLC (Allen Bradley) totaling \$41,518. The hydraulics training program is divided into the following subsystems: Hydraulics Fundamentals, Electrical Control of Hydraulic Systems, Hydraulics Applications – PLC (programmable logic controller), Troubleshooting Hydraulic Circuits, Servo Control of Hydraulic Systems and Sensors. Two Hydraulics Fundamental Training systems with software for 20 students at \$41,700. Four option levels for electrical control, troubleshooting, Servo control, PLC (Siemens) and Sensors with software for both total \$88,601. Curriculum included.</p> <p>(\$18,560 + \$41,518 + \$41,700 + \$88,601 = \$190,379)</p>	<p>\$ 190,379</p>
<p>The Programmable Logic Controller (AB MicroLogix 1200 with Case) is specially designed to help students develop skills in operating, programming, and troubleshooting modern PLC-controlled systems. Driven by an Allen-Bradley® MicroLogix™ 1200 controller, the training module is fully supported by instructional material and is compatible with several didactic applications. Five PLC trainers are proposed at \$3,140 each or \$15,700 total. PLC Software and Analog I/O Expansion Kit totals \$4,410. There is an advanced PLC training system proposed for \$13,535 (2) or \$27,070. The PLC Software Studio 5000 Logix Designer Lite Edition and FactoryTalk View Studio ME support and enhances the systems \$4,806. Two Traffic Light Training Systems are proposed at \$2,294 and two Electro-Pneumatic Training Systems for \$6,084. Curriculum included.</p> <p>(\$15,700 + \$4,410 + \$27,070 + \$4,806 + \$2,294 + \$6,084 = \$60,364)</p>	<p>\$ 60,364</p>
<p>The Industrial Controls Training Systems are designed to teach the theory and techniques of electric motor controllers. They allow students to select and mount control devices to form typical control circuits, and to troubleshoot them once a fault is inserted. The systems offer unique controls training possibilities are modular and include insertable faults. The Industrial Controls Training Systems comprise four basic systems, each covering a particular topic that deals with various aspects of industrial controls equipment operation. The following systems are available: (2) Basic Controls, Model 8036-1, provides students with a complete basic training in motor controls for \$16,391 each or \$32,782 total; (2) Programmable Logic Controller, Model 8036-2, introduces students to PLCs for motor operation control for \$4,221 each or \$8,442 total; (2) Motor Drives, Model 8036-3, introduces students to DC and AC drives at \$ 3,186 each or \$6,372; (2) Sensors, Model 8036-4, introduces students to photoelectric and proximity switches at \$14,881 each or \$29,762 total. Curriculum included (\$32,782 + \$8,442 + \$6,372 + \$29,762 = \$77,358)</p>	<p>\$ 77,358</p>
<p>This equipment level is created based on the basic design of the MPS robot station and the two robot handling and robot assembly modules as an introduction to industrial robots. Getting to know these areas of application is an essential part of an introduction to robotics. User guide, student manuals, Instructor Guides and equipment. Curriculum included.</p>	<p>\$ 18,806</p>

Budget	Grant Funds
Consists of KUKA/FUNUC or equivalent Robotics Educational package, exercise equipment package, curriculum package, cart for material handling, (25) seat server license, 5-day instructor training and certification. Curriculum included.	\$ 55,841
Process Controls training encompasses several theoretical and technical areas including PLC Level-Process Training; Pressure, Flow and Level Process Control Training; Temperature Process Control and Heat Exchange and Industrial Flow and Pressures. Two training units for each area is proposed for an estimated cost of \$52,782 each. Curriculum included. (\$52,782 x 2 units = \$105,564)	\$ 105,564
Concept Mill 55 PC-controlled 3-axis milling machine for universal CNC training with 8-station tool turret, base machine, install and training, tool holder package, cutting tools, machine stands, automation, machine and software manuals and courseware. Curriculum included.	\$ 39,590
Concept Turn 60 PC-controlled slant-bed lathe for universal CNC Training, Base Machine, Install and Training, Tool Holder Package, Cutting Tools, Machine Stands, Automation, Machine and Software Manuals and Courseware. Curriculum included.	\$ 34,535
CNC Simulation Classroom 11 - Seats with USB Controllers, Base Machine, Install and Training, Tool Holder Package, Cutting Tools, Machine Stands, Automation, Machine and Software Manuals and Courseware. Curriculum included.	\$ 50,785
Automated systems are found in virtually every industry today. With the Festo Meclab students can gain insight into the use of automated technology in a production environment. The three Meclab stations represent simplified models of typical production process found in most automated factories. The Conveyor Station- Transports and Sorts the parts. Stack Magazine Station- Store, feeds and presses the parts. Handling Station- Uses a pneumatic gripper to pick up the part and deposit each at a pre-defined point. Meclab/Siemens Mechatronics Training Package \$26,525 CompactLogix 5370 Suitcase PLC Trainer with Simulators \$25,354. Curriculum included. (\$26,525 + \$ 25,354 = \$51,879)	\$ 51,879
MPS Station, MPS EdTrainer, Robot Station, Mobile Robotics, Accessories, Software Service and Training. Specifications available upon request. Curriculum included.	\$ 365,750
Equipment Installation, Setup and Commissioning	\$ 7,500
Instructor Training	\$ 7,500
Welding Equipment currently in use and additional equipment which funds have already been allocated.	\$ 233,805
TOTAL EQUIPMENT	\$ 1,478,211
PERSONNEL	
Project Director - Full-time instructional faculty with the minimum instructional load required of a full-time instructor during the academic/contract year (30 semester hours of credit class instruction, usually on the basis of 15 credit hours in the Fall semester and 15 credit hours in the Spring semester).	\$ 50,093
Lab Manager - Full-time Lab Manager to manage lab activities. Will have demonstrated knowledge and experience in a laboratory setting and be familiar with a variety of laboratory techniques using electrical/electronic equipment as well as hydraulics, pneumatics robotics, mechanical, process and industrial controls.	\$ 46,481

Budget	Grant Funds
Welding Instructor - Full-time instructional faculty with the minimum instructional load required of a full-time instructor during the academic/contract year (30 semester hours of credit class instruction, usually on the basis of 15 credit hours in the Fall semester and 15 credit hours in the Spring semester).	\$ 43,336
Adjunct Welding Instructor - Part-time	\$ 24,587
Fringe Benefits	
Project Director	\$ 16,255
Lab Manager	\$ 15,413
Welding Instructor - FT	\$ 15,061
Adjunct Welding Instructor - PT	\$ 357
TOTAL PERSONNEL & FRINGE BENEFITS	\$ 211,583
FACILITIES	
SF has committed \$6 million of the \$7,579,824 in construction costs to the Institute of Technology and Manufacturing. Projected building costs for the two-story building complex are based on State of Florida approved funding formulas and an initial review by the architect.	\$ 7,579,824
TOTAL FACILITIES	\$ 7,579,824
TRAINING MATERIALS: Training Materials, student exam fees, consumable supplies	\$ 10,000
TOTAL TUITION & TRAINING COSTS	\$ 10,000
OTHER	
Outreach/Marketing	\$ 27,500
Indirect Costs - 50% of Modified Total Direct Costs, which excludes equipment, facilities and participant support costs (\$239,083 x 50% = \$119,542) Indirect Costs are reflected as cost share and are not charged to grant.	\$ 119,542
TOTAL OTHER COSTS	\$ 147,042
TOTAL PROJECT COSTS	\$ 9,426,660
OTHER WORKFORCE TRAINING PROJECT FUNDING SOURCES	
CITY/COUNTY	
PRIVATE SOURCES	
SF has committed \$6 million to the Institute of Technology and Manufacturing. Projected building costs for the two-story building complex are based on State of Florida approved formulas and an initial review by the architect.	\$ 6,000,000
Santa Fe College will provide welding equipment currently in use and additional equipment for which funds have already been allocated as a cost share incentive.	\$ 233,805
Santa Fe College will cover the salary costs for the Project Manager, Lab Manager and Welding Instructors for this new program as a cost share incentive.	\$ 211,583
Santa Fe College will cover the training material costs as a cost share incentive.	\$ 10,000
Indirect Costs - 50% of Modified Total Direct Costs which excludes equipment, facilities and participant support costs (\$239,083 x 50% = \$119,542) Indirect Costs not charged to the grant but contributed as cost share by SF	\$ 119,542
TOTAL OTHER FUNDING SOURCES	\$ 6,574,930
A. TOTAL WORKFORCE TRAINING PROGRAM COSTS	\$ 9,426,660
B. TOTAL OTHER WORKFORCE TRAINING PROJECT FUNDING SOURCES	\$ 6,574,930
TOTAL AMOUNT REQUESTED	\$ 2,851,730

Addendum to Question # 2.F

TIMELINE: Engineering Technology A.S. with Specialization in Advanced Manufacturing

ENGINEERING TECHNOLOGY DEGREE A.S. WITH SPECIALIZATION IN ADVANCED MANUFACTURING (CIP-161500001)					
Bluegrass Ed Aligned	YEAR 1 - FIRST SEMESTER	Credit Hours	Mindsight/Bluegrass Educational Alignment		
			Software	Equipment	Equipment
ENC 1101	English Composition I (General Education)	3	Not Applicable		
MAC 1105	College Algebra (General Education)	3	Not Applicable		
PHY 2004	Applied Physics (General Education)	3	Not Applicable		
ETM 1010C	Mechanical Measurement & Instrumentation	3	Mindsight MSSC	Mechanical 46101	
ETI 1701	Industrial Safety	3	Mindsight MSSC-ITZ	Multiple Listed Trainers	
YEAR 1 - SECOND SEMESTER					
Various	Humanities Elective (General Education)	3	Not Applicable		
Various	Social Science Elective (General Education)	3	Not Applicable		
ETI 1810C	Intro to Electricity and Electronics	3	Mindsight MSSC	FACET/PEET 2.0	AC-DC 3351
Various	Engineering Technology Elective	3	TBD		
ETS 2527	Electromechanical Components & Mechanisms	3	Mindsight eSeries-ITZ	Mechanical 46101	MecLab
YEAR 2 - FIRST SEMESTER					
ETI 1843	Motors and Controls	3	Mindsight Sim Software 3161	Ind Controls 8036	MecLab
ETS 1542	Introduction to PLCs	3	Mindsight ITZ/Festo CIROS	Festo Prolog V4	PLC 3240 & HMI 3355
ETI 1110	Introduction to Quality	3	Mindsight MSSC	Festo Prolog V4	
ETM 2315 C	Hydraulics and Pneumatics	3	Mindsight eSeries-ITZ/LVSIM	HYD 6080	PNEU 6081/MecLab
Various	Engineering Technology Elective	3	TBD		
YEAR 2 - SECOND SEMESTER					
ETD 1320C	Computer-Aided Drafting for Engineering	3	Mindsight STEM (Partial)		
Various	Engineering Technology Elective	3	TBD		
ETI 1420	Manufacturing Processes & Materials	3	Mindsight MSSC/MES	Festo Prolog V4	
ETI 1622	Concepts of Lean & Six Sigma	3	Mindsight STEM/MES	Festo Prolog V4	
ETS 2604	Robotics Applications	3	Festo CIROS	Festo Prolog V4	Kuka Robotics
AS DEGREE TOTAL CREDITS		60			
RECOMMENDED ELECTIVES					
Recommended Electives to Additionally Earn Both an Automation CCC and a Lean CCC					
ETS 1535	Automated Process Control	3	Mindsight eSeries	Process Control 8075-6	Process Control 6090
ETI 1644	Production and Inventory Control	3	Mindsight STEM/MES	Festo Prolog V4	
ETI 1931	Special Topics in Modern Manufacturing	3	Mindsight STEM/MES	Festo Prolog V4	
ETI 1949	Manufacturing Internship	3	Mindsight STEM (Partial)		
ENC 2210	Technical Writing	3	Not Applicable		
Recommended Electives to Additionally Earn Both a CNC and CCC					
ETD 2364C	Intro to 3D CAD	3	Mindsight STEM (Partial)		
PMT 1250C	Computer Numerical Control (CNC) I	3	FANUC & Siemens/SIM LAB	EMCO CNC Mill & Turn	
PMT 2254C	Computer Numerical Control (CNC) II	3	FANUC & Siemens/SIM LAB	EMCO CNC Mill & Turn	

Articulated with MSSC CPT Cert

Industry Certifications Available Using the Listed Equipment Depending on Contact Hours
Festo Industry Certification Program (FICP) - All of Level 1 Fundamentals, except for the I4.0 Credential (We have a trainer for this).
NIMS Industrial Maintenance Technician (IMT) - Duty Areas 1 (partial but we have a trainer for this), 2, 3, 4, 5, 6, 7, but not #8 Welding (We supplement using Welding Simulator & Mindsight Weld Academy but requires hands on welding), or #9 Piping (We have a trainer for this).
Kuka Official Robot Education (KORE) - Level 1 Robotics Programming.
PMMI Mechatronics Certification - All of Level 1 and Level 2.
Siemens CNC Sinumerik Certification - Level 1. (Level 2 and 3 require 4th and 5th axis equipment)
Manufacturing Skill Standards Council (MSSC) - Certified Production Technician (CPT) using the Mindsight Content based on Polk State College MTDI Program.
Siemens Mechatronics Systems Certification Program (SMSCP) - Level 1 and Level 2
International Fluid Power Society (IFPS) - Certified Fluid Power Specialist - Hydraulic, Pneumatic, and Electronic Controls http://www.ifps.org/docs/certification/certifications_of_fered/fluid_power_specialist/default.aspx
American Welding Society (AWS) - We use Mindsight ITZ Weld Academy http://www.aws.org/certification

Course Descriptions (Per Semester)		
Engineering Technology A.S. with Specialization in Advanced Manufacturing		
YEAR 1 - FIRST SEMESTER		
ENC 1101	English Composition I	
This course embodies the fundamentals of effective expression with emphasis on the various forms of expository writing, logical and imaginative thinking, and reading for understanding. The course provides instruction in sentence structure, diction, organization of short essays, correct usage of standard American English documentation skills, and writing with sources.		
MAC 1105	College Algebra	
This course meets Area II requirements for both the A.A. General Education Requirements and A.S. General Education Requirements. This is a rigorous introduction to the math concepts necessary for successful study of MAC 2233 or MAC 1140. This course is primarily a conceptual study of functions and graphs, their applications and of systems of equations and inequalities. Linear, quadratic, rational, absolute value, radical, exponential and logarithmic functions will be investigated. The use of a graphing calculator is integrated throughout the course.		
PHY 2004	Applied Physics (General Education)	
PHY2053 is the first course in a two semester sequence outlining mechanics, properties of matter, heat and sound. Algebra, trigonometry, geometry and vector methods will be used in the quantitative description of these topics. PHY2054 is the second course in a two semester sequence. The topics covered in PHY2054 include: electricity, magnetism and optics. Algebra, trigonometry, geometry and vector methods will be used in the quantitative description of these topics.		
ETM 1010C	Mechanical Measurement & Instrumentation	Articulated with MSSC CPT Cert
This course provides the basic foundation for both mechanical and electronic measurement techniques used in manufacturing environments. The course will integrate the concepts, principles, and techniques of mechanical measurement with the use of various types of instruments including micrometers, verniers, calipers, gages, and other types of measuring equipment. The course will also introduce the student to the basic measurement techniques employing electronic test equipment including the operation and usage of digital multimeters, function generators, and oscilloscopes.		
ETI 1701	Industrial Safety	Articulated with MSSC CPT Cert
Covers practical and operational health and safety procedures and practices as defined by OSHA regulations that are applicable to advanced manufacturing facilities. Handling and disposal of hazardous materials will also be emphasized.		
YEAR 1 - SECOND SEMESTER		
Various	Humanities Elective	
Humanities electives are from the departments of Classics, English, History, Philosophy or Theology.		
Various	Social Science Elective	
Some Social Science Electives are anthropology, archaeology, economics, linguistics, political science, psychology, sociology, etc.		
ETI 1810C	Intro to Electricity and Electronics	Articulated with MSSC CPT Cert
This course covers basic safety practices for electrical systems and knowledge of voltage, current and power in AC and DC circuits, circuit analysis of series and parallel loads, and basic understanding of resistors, capacitors, inductors, and transformers. This basic knowledge of industrial electricity would be expected of an entry level electrician working in facilities maintenance or assisting in the assembly, test, startup, troubleshooting, maintenance, repair or upgrade of electrical and electronic equipment.		
Various	Engineering Technology Elective	
ETS 2527	Electromechanical Comp. & Mechanisms	
This course covers gears and gearboxes, belts and pulleys, chains and sprockets, alignments and measures found in the industrial environment.		
YEAR 2 - FIRST SEMESTER		
ETI 1843	Motors & Controls	
This course explores the theory and application of AC and DC motors. It covers how different types of motors operate and how electronic motor control systems are designed and can be used to improve efficiency in a wide range of applications.		
ETS 1542	Intro to PLCs	
Provides basic operational concepts common to programmable controllers, focusing on PLC principles, programming, and the fundamentals needed for simple process control.		
ETI 1110	Intro to Quality	Articulated with MSSC CPT Cert
This course defines the role of quality in an industrial environment. Topics include the use of quality management techniques and quality philosophies, process development, techniques used in evaluation, approaches used on continuous operations, methods used to control quality, and the ISO series of standards. The responsibility of quality assurance during the engineering, manufacturing, and marketing of a product is also covered.		
ETM 2315 C	Hydraulics & Pneumatics	
Introduces the student to the basic hydraulic and pneumatic systems and devices commonly found in advanced manufacturing facilities. The underlying scientific principles will be covered and their practical applications.		
Various	Engineering Technology Elective	
YEAR 2 - SECOND SEMESTER		

ETD 1320C	Computer-Aided Drafting for Engineering	
<p>This course is about using the major features of AutoCAD to make graphic displays including basic geometric figures, orthographic views of three-dimensional objects, architectural and construction drawings, and pictorial drawings of three-dimensional objects.</p> <p>The major topics include the AutoCAD drawing, utility, file handling, text, editing, dimensioning, and plotting features.</p>		
Various	Engineering Technology Elective	
ETI 1420	Manufacturing Processes & Materials	Articulated with MSSC CPT Cert
<p>This course is an introduction to modern manufacturing materials, processes, and systems. Materials, processes and systems are the basic building blocks of modern manufacturing and are best taught together. The student will learn to identify and distinguish appropriate materials and processing selections given general performance needs and production rates. Material physical and mechanical properties are covered along with the equipment and processing methods used in modern manufacturing.</p>		
ETI 1622	Concepts of Lean & Six Sigma	
<p>This course provides a comprehensive overview of the Lean and Six Sigma methodologies including the Define, Measure, Analyze, Improve, and Control (DMAIC) process improvement paradigm, techniques, tools and metrics that are critical for process improvement success.</p> <p>The course will include demonstration and use of Lean and Six Sigma tools.</p>		
ETS 2604	Robotics Applications	
<p>This course is designed to introduce students to the basic principles of robots, including classification, operation, maintenance, troubleshooting and applications in the robotics industry. Students use hands-on practices to become familiar with sections of a robotic system.</p>		
RECOMMENDED ELECTIVES		
Recommended Electives to Additionally Earn Both an Automation CCC and a Lean CCC		
ETS 1535	Automated Process Control	
<p>Introduces modern control theory and the use of sensors, actuators, and controllers. The student will be introduced to state of the art control systems used in industry and the elements that comprise a closed-loop network.</p>		
ETI 1644	Production and Inventory Control	
<p>A survey style course in production planning and inventory control including the topics of production planning and control, scheduling, MRP, capacity planning, among others.</p>		
ETI 1931	Special Topics in Modern Manufacturing	
<p>This course is designed to allow flexibility for presenting a variety of topics related to high-performance manufacturing principles and applications. Some special topics may require laboratory assignments or field work.</p>		
ETI 1949	Manufacturing Internship	
<p>This course is a structured and supervised internship for students in the Engineering Technology program of study. On the job experience will be integrated with bi-weekly class meetings to review and compare work experiences with respect to workplace skills and technical expectations.</p>		
ENC 2210	Technical Writing	
<p>A composition course focusing on writing for business, science, and technology. Assignments include letters, memos, resumes, reports, proposals, an oral presentation, and the use of graphics. Students use a variety of research and investigative techniques to produce documented papers on science, business or technological subjects.</p>		
Recommended Electives to Additionally Earn Both a CNC & CCC		
ETD 2364C	Intro to 3D CAD	
<p>This course is an introduction to new designing techniques and capabilities of solid modeling using 3D computer aided design software. Topics include the integration of advanced parametric solid modeling drawing tools.</p>		
PMT 1250C	Computer Numerical Control (CNC) I	
<p>The history and development of CNC (computer numerical control). Programming methods are reviewed with the emphasis of skills placed on programming, milling, drilling and turning with M and G code preparation. Manual and computer assisted programming are also reviewed. Students will program, set up and operate CNC machines.</p>		
PMT 2254C	Computer Numerical Control (CNC) II	
<p>This course expands on the CNC Programming I course, providing further study in computer-aided numerical control programming of CNC Lathes. It concentrates on the lathe series of machines and includes set-up, centering, turning, facing, filing, polishing, burning, thread cutting and other processes common to the lathe series.</p>		

Select Year:

The 2018 Florida Statutes

[Title XLVIII](#)
K-20 EDUCATION CODE

[Chapter 1001](#)
K-20 GOVERNANCE

[View Entire Chapter](#)

1001.65 Florida College System institution presidents; powers and duties.—The president is the chief executive officer of the Florida College System institution, shall be corporate secretary of the Florida College System institution board of trustees, and is responsible for the operation and administration of the Florida College System institution. Each Florida College System institution president shall:

- (1) Recommend the adoption of rules, as appropriate, to the Florida College System institution board of trustees to implement provisions of law governing the operation and administration of the Florida College System institution, which shall include the specific powers and duties enumerated in this section. Such rules shall be consistent with law, the mission of the Florida College System institution, and the rules and policies of the State Board of Education.
- (2) Prepare a budget request and an operating budget pursuant to s. [1011.30](#) for approval by the Florida College System institution board of trustees at such time and in such format as the State Board of Education may prescribe.
- (3) Establish and implement policies and procedures to recruit, appoint, transfer, promote, compensate, evaluate, reward, demote, discipline, and remove personnel, within law and rules of the State Board of Education and in accordance with rules or policies approved by the Florida College System institution board of trustees.
- (4) Govern admissions, subject to law and rules or policies of the Florida College System institution board of trustees and the State Board of Education.
- (5) Approve, execute, and administer contracts for and on behalf of the Florida College System institution board of trustees for licenses; the acquisition or provision of commodities, goods, equipment, and services; leases of real and personal property; and planning and construction to be rendered to or by the Florida College System institution, provided such contracts are within law and guidelines of the State Board of Education and in conformance with policies of the Florida College System institution board of trustees, and are for the implementation of approved programs of the Florida College System institution.
- (6) Act for the Florida College System institution board of trustees as custodian of all Florida College System institution property and financial resources. The authority vested in the Florida College System institution president under this subsection includes the authority to prioritize the use of Florida College System institution space, property, equipment, and resources and the authority to impose charges for the use of those items.
- (7) Establish the internal academic calendar of the Florida College System institution within general guidelines of the State Board of Education.
- (8) Administer the Florida College System institution's program of intercollegiate athletics.
- (9) Recommend to the board of trustees the establishment and termination of programs within the approved role and scope of the Florida College System institution.
- (10) Award degrees.
- (11) Recommend to the board of trustees a schedule of tuition and fees to be charged by the Florida College System institution, within law and rules of the State Board of Education.
- (12) Organize the Florida College System institution to efficiently and effectively achieve the goals of the Florida College System institution.

(13) Review periodically the operations of the Florida College System institution in order to determine how effectively and efficiently the Florida College System institution is being administered and whether it is meeting the goals of its strategic plan adopted by the State Board of Education.

(14) Enter into agreements for student exchange programs that involve students at the Florida College System institution and students in other institutions of higher learning.

(15) Approve the internal procedures of student government organizations and provide purchasing, contracting, and budgetary review processes for these organizations.

(16) Ensure compliance with federal and state laws, rules, regulations, and other requirements that are applicable to the Florida College System institution.

(17) Maintain all data and information pertaining to the operation of the Florida College System institution, and report on the attainment by the Florida College System institution of institutional and statewide performance accountability goals.

(18) Certify to the department a project's compliance with the requirements for expenditure of PECO funds prior to release of funds pursuant to the provisions of chapter 1013.

(19) Provide to the law enforcement agency and fire department that has jurisdiction over the Florida College System institution a copy of the floor plans and other relevant documents for each educational facility as defined in s. 1013.01(6). After the initial submission of the floor plans and other relevant documents, the Florida College System institution president shall submit, by October 1 of each year, revised floor plans and other relevant documents for each educational facility that was modified during the preceding year.

(20) Develop and implement jointly with school superintendents a comprehensive dual enrollment articulation agreement for the students enrolled in their respective school districts and service areas pursuant to s. 1007.271(21).

(21) Have authority, after notice to the student of the charges and after a hearing thereon, to expel, suspend, or otherwise discipline any student who is found to have violated any law, ordinance, or rule or regulation of the State Board of Education or of the board of trustees of the Florida College System institution pursuant to the provisions of s. 1006.62.

(22) Submit an annual employment accountability plan to the Department of Education pursuant to the provisions of s. 1012.86.

(23) Annually evaluate, or have a designee annually evaluate, each department chairperson, dean, provost, and vice president in achieving the annual and long-term goals and objectives of the Florida College System institution's employment accountability plan.

(24) Have vested with the president or the president's designee the authority that is vested with the Florida College System institution.

History.—s. 81, ch. 2002-387; s. 22, ch. 2011-5; s. 3, ch. 2012-191; s. 91, ch. 2016-10.

August 20, 2019

Dr. Jackson Sasser
President, Santa Fe College
3000 NW 83rd Street, Gainesville, Florida 32606

Re: Support of Florida Job Growth Fund Application

Dear Dr. Sasser:

On behalf of CareerSource North Central Florida, we are proud to support Santa Fe College in its pursuit of a Florida Job Growth Fund application to secure equipment to start an Engineering Technology A.S. degree with a Specialization in Advanced Manufacturing.

As the business-led public workforce board serving Alachua and Bradford counties in North Central Florida, we know how crucial it is to develop unique opportunities in high-demand occupations like advanced manufacturing. Proposals like the one referenced clearly support, "Workforce training projects will provide Floridians with transferable, sustainable workforce skills applicable to many employers," and we will do what we can to ensure the investment is well spent.

To remain competitive in the increasingly global marketplace, well-trained workers in this field are essential for our future. Our local area is uniquely positioned to capitalize on these opportunities through our organization and our partners in the Gainesville Area Chamber of Commerce's Advanced Manufacturing Council.

Santa Fe College has served as one of our leading and most utilized partners for referring future members of the workforce to receive training. We wholeheartedly believe in their team and capacity to deliver an exceptional program that meets the needs of employers and prepares young individuals to capture STEM job opportunities.

And as always, CareerSource North Central Florida will be available to provide any assistance we can for those who need support from our array of services including:

- Job matching and career counseling services
- Tuition assistance
- Access to paid and unpaid work experience, particularly with available advanced manufacturing occupations
- Occupational skill training in preparation for manufacturing
- Leadership development opportunities
- Support services

Likewise, through our collaboration with the Gainesville Area Chamber of Commerce and as part of the statewide CareerSource Florida network, we will ensure the use of this program and equipment through services such as employed worker training, incumbent worker training, and job matching services to ensure trainees retain self-sufficient employment.

Finally, we would be proud to participate as a member on the Santa Fe College Advisory Board for Engineering Technology A.S. degree program with a Specialization in Advanced Manufacturing. We will provide guidance and resources to ensure the project is meeting the demands of business.





careersourcencfl.com

We urge the reviewing parties to approve this request and look forward to bringing this to our community.

Sincerely,

A handwritten signature in black ink, appearing to read "Frank Avery". The signature is fluid and cursive, with a large initial "F" and "A".

Frank Avery
Executive Director





Eric L. Godet

President and CEO

300 East University Ave. Suite 100

Gainesville, FL 32601

egodet@gainesvillechamber.com

Tel: 352.334.7100

September 17, 2019

Dr. Jackson N. Sasser, President
Santa Fe College
3000 NW 83 St.
Gainesville, FL 32606

Dear Dr. Sasser,

The Gainesville Area Chamber of Commerce fully supports Santa Fe College in its efforts to develop well-trained engineering technicians in the Engineering Technology A.S. degree program with a Specialization in Advanced Manufacturing. This program will help to meet the employment demand in this industry. Santa Fe College's request for a building and advanced manufacturing equipment will give them the opportunity to provide students with hands-on training and the development of problem-solving skills needed to be successful in the advanced manufacturing sector.

Santa Fe College will train students transitioning from secondary to postsecondary education and students looking to utilize their transitional skills to a new career. Santa Fe College will help our local employers to train a growing need for engineering technology employees in Greater Gainesville. With the help of the Florida Job Growth Fund grant, Santa Fe College will be able to meet both student and industry needs for a skilled technical workforce.

Nationally, according to a U.S. Department of Commerce report, STEM jobs grew at three times the rate of non-STEM jobs within the past decade. It is determined that a STEM degree is a conventional path to a STEM job, which is evidenced by the fact that more than two-thirds of the 4.7 million STEM workers with a college degree have an undergraduate STEM degree.

Greater Gainesville's advanced manufacturing sector represents the future of the industry in Florida. Greater Gainesville's manufacturing sector, comprised of about 200 companies employing 4,000 people, has evolved into a go-to source for in-demand consumer goods. According to the Chamber's five-year economic development strategy, Transforming Greater Gainesville, Advanced Manufacturing is listed as an emerging industry sector. One of the challenges the Greater Gainesville region experiences is the low number of engineering technology employees. The Chamber and its members will work with Santa Fe College to engage our partners in our Technology and Manufacturer industry sectors in the development and implementation of engineering technicians in the Engineering Technology A.S. degree program with a Specialization in Advanced Manufacturing.

Please do not hesitate to contact Eric via phone at 352.334.7100 or email at egodet@gainesvillechamber.com if you have any questions or require further information.

Sincerely,

A handwritten signature in blue ink that reads 'E. L. Godet'.

Eric L. Godet
President and CEO
Greater Gainesville Chamber of Commerce



September 20, 2019

Dr. Jackson N. Sasser, President
Santa Fe College
3000 NW 83 St,
Gainesville, FL 32606

Dear Dr. Sasser,

As past chair and current board member of Gainesville's Advanced Manufacturing Council and a team member at one of the world's leading providers of bone and joint restoration products headquartered right here in Gainesville, FL, we are in support of Santa Fe's initiatives to pursue the Florida Growth Job Fund grant.

We expect impressive growth in the advanced manufacturing sector in our community which provides strong middle class jobs with high value skill sets. It is these types of opportunities that improve the potential of those who will build a better future. As we continue to grow, we will need the right talent to help us achieve our purpose. Many of our current team members are valuable contributors with training from our local education institutions such as yours.

Please let us know if there is anything we can do to help support Santa Fe on this journey. Also, as always, you and anyone on your team is always welcome on a tour of Exactech to see first-hand the impact these advanced manufacturing enterprises have on our world.

Sincerely,



Ryan Loftus
Director of Manufacturing
Exactech, Inc.

Dr. Jackson N. Sasser, President
Santa Fe College
3000 NW 83rd St
Gainesville, FL 32606

Dear Dr. Sasser,

As a new member of the second largest pneumatic manufacturing company in the world, Festo Corp., Fabco-Air, Inc. is projected to grow very rapidly. As a result, the need to fill highly skilled machinists, designers, and quality job positions is more present than ever.

With over 200 manufacturing companies in and around Gainesville, the need for better training is growing every day. Many jobs in this area are going unfilled because of the lack of qualified applicants available.

It would be wonderful for us, as a company and for the community, to have a new vocational sector to draw from. Our pool of eligible applicants is progressively shrinking, and many current employees are getting older and heading towards retirement. Santa Fe College could be a great help to this community in this crucial time of need.

These days, many young people are looking for career paths and not short-term jobs. As young workers grow and learn new skills, we can offer quick advancement and opportunities within our company. We are committed to helping the next generation to learn, grow, and exceed in life. Please let us know how we can help.

Sincerely,



Christopher Schmidt
Director of Finance and Human Resources | CFO

FABCO-AIR
A member of Festo Group

Name: Christopher Schmidt
Job Title: Director of
Finance and Human
Resources | CFO
Date: September 19, 2019

FABCO-AIR, INC.
3716 N.E. 49th Ave.
Gainesville, FL
32609-1699



Peter H. Khoury, Ph.D., MBA
President & CEO

September 18, 2019

To: Santa Fe College
Attn: Jackson Sasser, President
From: Peter H. Khoury, Ph.D., MBA

Dear Dr. Sasser,

We at Ology Bioservices, Inc. fully support Santa Fe College's effort to pursue a grant from the Governor's Job Growth Fund. Ology Bio is a biologics contract development and manufacturing organization (CDMO) that operates a U.S.-based 183,000 square foot, state of the art facility in Alachua, FL. And employs approximately 200 people. We offer clients extensive capabilities including a pilot facility for performing optimization of upstream, downstream and formulation functions, bulk cGMP manufacturing, and analytical development for proteins, antibodies, viral vaccines and gene therapy drug products. With four (4) independent production suites which use single-use, disposable manufacturing technology and functioning at BSL 1-3 levels, we provide expertise from preclinical through FDA licensure in a variety of production platforms, including microbial and mammalian cell culture. We are proud to be the Advanced Development and Manufacturing (ADM) partner for the US Department of Defense.

As a rapidly growing company, we are always looking for qualified technicians to support our growing biologics production business. With multiple companies in the "Florida Biotech Corridor" going through major expansions, we find ourselves competing for the limited local talent, or going outside the State to hire. By utilizing this Job Growth Fund grant to support an advanced manufacturing associate in science degree, local employers in-turn, may offer summer internships, to further support the advanced manufacturing skills utilized in our facilities.

Please feel free to contact me with any questions or with additional ways I can assist your efforts.

Sincerely,



Peter H. Khoury, Ph.D., MBA
President & CEO
Ology Bioservices

September 18, 2019

Dr. Jackson N. Sasser, President
Santa Fe College
3000 NW 83 St,
Gainesville, FL 32606

RE: Welding Facility Improvements

Dear Dr. Sasser,

As the Supervisor of the Welding and Fabrication Department for a large, local company, I am in a position to know that our ever-expanding market requires more welders with higher levels of training. This is true for new welders as well as current professionals in need of additional or refresher training. The possibilities that a new/larger space could provide are very exciting. I would like to offer my full support to building a new, modern facility for the Welding program that will keep it current and allow for future growth.

The Welding Program at Santa Fe has produced many highly skilled welders over the years. The quality of the training and staff is exceptional, and a larger, modern facility will complement the existing program. The new building will also provide equipment and training space required needed to accommodate both a growing student population, as well as new opportunities for Welder Continuing Education Programs.

With a reinvigorated emphasis on vocational education and a shortage of skilled welders in the market, I believe a new welding facility will ensure, the program's long-term success. I am always available to support the Santa Fe Welding program as it moves into the future. Please give me a call if there is anything I can do to assist. I can be reached at 352.262.3263 or via email at rdownin@cromcorp.com.

Sincerely,

CROM, LLC



Robert Downin
Welding & Fabrication Supervisor

I, the undersigned, do hereby certify that I have express authority to sign this proposal on behalf of the above-described entity and to the best of my knowledge, that all data and information submitted in proposal is truthful and accurate and no material fact has been omitted.

Name of Entity: Santa Fe College

Name and Title of Authorized Representative: Jackson N. Sasser; President, Santa Fe College

Representative Signature: 

Signature Date: 9-23-19