# **ADVANCE CTE EXCELLENCE IN ACTION AWARD**

**PROGRAM SUMMARY**

Advance CTE is pleased to announce a call for applications for the sixth annual Excellence in Action awards, through which we recognize and honor superior Career Technical Education (CTE) programs of study from across the nation.

**CRITERIA FOR JUDGING**

Selected programs will exemplify excellence in:

* Implementing Career Cluster®-based [programs of study](https://careertech.org/programs-study);
* Maintaining effective employer and business partnerships;
* Demonstrating alignment to rigorous and relevant college- and career-ready expectations;
* Demonstrating a clear progression of knowledge and skills and learner transitions across secondary and postsecondary systems;
* Integrating successful career guidance and advisement;
* Integrating high-quality work-based learning experiences;
* Highlighting alignment to workforce and employer needs in the community;
* Providing concrete data on the program of study’s impact on learner achievement, success at both the secondary and postsecondary levels and meeting the needs of underserved populations; and
* Delivering high-quality and effective instruction.

**ELIGIBILITY**

* This award is open to any public secondary or postsecondary schools or colleges in the United States. Your school or institution may submit one application per [Career Cluster](http://careertech.org/career-clusters);
* The program of study must have at least one full graduating class;
* Your program must be eligible to receive funding from the Carl D. Perkins Career and Technical Education Act;
* Applications that do not include data to demonstrate positive impact on learner achievement will not be eligible for consideration.
* If your program has received in an Excellence in Action award from Advance CTE in the past, you may not apply for that same Career Cluster. However, your school or institution may apply in a different Career Cluster.

**AWARD SUBMISSION REQUIREMENTS**

Complete applications will contain the following:

* A completed application including supplemental materials by the application deadline of **November 21, 2018 at 5 p.m. ET.**
* At least one letter of support from an employer or business partner supporting the program of study; and
* At least one additional letter of support from a partner (education, community or business) of your choosing.
* *Optional:* Supplemental materials including photos, videos, news articles, etc., are welcome but not required.

The application must be submitted using [this form](https://careertech.org/2019-excellence-action-application). The application must be submitted in a Microsoft Word format. Supplemental materials, including the letters of recommendation, must be combined and submitted as **one** PDF document.

*Please note:*

* Submissions should **not** include any personally identifiable learner data.
* The application does not have a page limit, however, many questions do have a word limit. Please do not submit responses that go beyond this limit. Also, submissions that do not contain all the required materials (a completed application, two letters of support and supplemental materials in the correct formats) will not be advanced for consideration.

**WINNERS WILL RECEIVE**

* A banner to hang in their school or institution;
* A digital banner to use in email and print materials as they so choose;
* Travel and one hotel room for one night in Washington, DC for a representative to be recognized at an awards ceremony to be held the week of April 8-10, 2019 at the Advance CTE Spring Meeting; and
* Discounted rate to the Advance CTE Spring Meeting

**WINNERS WILL ALSO BE FEATURED IN**

* A national press release, which will be distributed to national media.
* A winner-specific press release to distribute to local media;
* A standalone one-pager;
* A standalone blog on the [Learning that Works blog](http://blog.careertech.org/);
* Representation on the Advance CTE [website](http://www.careertech.org).
* Many past winners have been featured in national conferences, in briefs and reports, on webinars and in the media.

**HOW TO APPLY**

* Fill out the following application.
* Once you have finished, complete [this form](https://careertech.org/2019-excellence-action-application) and upload the following:
* Your full application saved as a Word document (.docx)
* All of your supplemental documents or evidence consolidated as one PDF document.

**BACKGROUND INFORMATION**

1. Program of study name**: Computer & Electronic Engineering**
2. Point of Contact
 **Name: Leslie Weckesser**

**Email Address: lweckesser@sersd.org**

**Phone Number: 508-230-1217
Address: 250 Foundry Street, South Easton, MA 02375**

1. Applicant’s School/College: **Southeastern Regional Vocational Technical High School**
2. State: **Massachusetts**
3. Type of institution (click the box to check)

 X Area technical center

☐ Career academy

 ☐ Comprehensive high school

 ☐ Community college

 ☐ Technical college

Other (please specify)

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1. Career Cluster in which your program of study should be considered (Follow this link for a further explanation of each Career Cluster [careertech.org/career-clusters](http://careertech.org/career-clusters)) **(Select only ONE):**

 ☐ Agriculture, Food & Natural Resources Career Cluster

 ☐ Architecture & Construction Career Cluster

 ☐ Arts, A/V Technology & Communications Career Cluster

 ☐ Business Management & Administration Career Cluster

 ☐ Education & Training Career Cluster

 ☐ Finance Career Cluster

 ☐ Government & Public Administration Career Cluster

 ☐ Health Sciences Career Cluster

 ☐ Hospitality & Tourism Career Cluster

 ☐ Human Services Career Cluster

 ☐ Information Technology Career Cluster

 ☐ Law, Public Safety, Corrections & Security Career Cluster

 ☐ Manufacturing Career Cluster

 ☐ Marketing Career Cluster

 X Science, Technology, Engineering & Mathematics Career Cluster

 ☐ Transportation, Distribution & Logistics Career Cluster

1. In three sentences or less, describe your program of study, including the secondary and postsecondary components and how long the program of study has been in place.

**Computer & Electronic Engineering follows the Project Lead the Way pathway. As part of the curriculum, students take Introduction to Engineering Design, Computer Science Basics, Principles of Engineering, Electronic Essentials, Computer Science Principles, AP Computer Science, and Engineering Design and Development. In addition to AP credit, students are also eligible for articulated college credit at Massasoit Community College, Wentworth and Worcester Poly Tech.**

1. Please check the geographical and demographic setting for your program of study and describe the geographic and economic conditions of the region served by the school.

 X Urban

 ☐ Suburban

 ☐ Rural

 ☐ Other

1. Please describe how your program of study was developed and how it ensures learners are academically and technically prepared for both postsecondary education and careers. Please also address the following:
	1. How were employers involved in the development and continue to be involved in the maintenance of your program of study? **As an annual practice, members of business, industry, colleges, parents, and students are unified as an Advisory Board. They meet twice to discuss curriculum, program alignment, and to review data on the program. Through this, program adjustments are made to improve student outcomes.**
	2. How does this program of study meet the economic needs of your community? **As part of the Advisory Board, business and industry make recommendations on equipment purchases, suggested teacher professional development, industry recognized credentials that are offered and student certifications that are needed for employment. These recommendations are then included in both long and short term budget planning and program implementation. In addition, alignment to post-secondary education is always the topic of discussion to make sure that students are prepared for the rigor at the college level.**
	3. How does this program prepare learners for postsecondary education? (if applicable) **Because of our strong program alignment to Project Lead the Way and are articulation agreements with colleges, students who obtain high scores, graduate from high school with 4 college classes under their belt. In addition, the program maintains a 95% positive placement rate annually in both 2 and 4 year colleges.**
	4. How were both secondary and postsecondary educators involved in the development and/or maintenance of the program of study? (500 word limit)

**Southeastern’s Engineering program’s planning process involves an ongoing collaboration and commitment from administrators, teachers, students, parents, colleges and community partners. Career technical educators and career guidance staff support the curriculum through a rigorous course of study, professional development, the use of end-of-course assessments to gain articulated college credit. In December, each of the teachers reviews the mid-year assessments to determine optional and required curriculum standards that tailor a learning plan for each student. This information is used to inform district-level decisions about curriculum updates as well as professional development. The academic and vocational curriculum directors continue to perform their roles as key strategists, who guide scheduling, seek opportunities to expand access to engineering, and encourage collaboration among teachers. In addition, the vocational curriculum director monitors students to ensure that engineering students have positive placement rates in two- or four-year colleges or industry after graduation. All three CTE Instructors have taken advanced professional development courses to certify them to teach the content. All three of them have had extensive training in PLTW course work, one of which is a Master PLTW instructor. While collaborating with Southeastern’s Guidance Department and local colleges, our program continues to follow and track the PLTW progress of our students. We continue to seek professional development, attend college and career fairs, work with local colleges on course alignment and dual enrollment opportunities and ways that our staff and students can compete in competitions and take advantage of annual meetings, and other offerings so that we can continue to keep current with the Project Lead the Way Engineering Standards as well as alignment to postsecondary pathways in engineering. Because the engineering field is driven by additional concentration at a four-year college, our school has put emphasis on a dual enrollment, advanced course work program of studies. This rigorous, heavily academic embedded career and technical curriculum, gives our high school students a real life scenario of learning that better prepares them for college. Our students deeply focus on math, English and science standards both during the school day and beyond.**

# **LEARNER POPULATION & DATA**

1. Please describe your program of study’s demographic and outcome data for the most recent academic year(s). It is our strong preference to have data from both secondary and postsecondary levels. If this is not available, please provide an explanation as to why the data from the other learner level is not available. Applications that do not include data to support positive impact on learner achievement will not be eligible for consideration. (100 word limit)

**Our students are socially, culturally, and economically diverse. A snapshot of our student population reveals that more than 60% of our students come from Brockton, with the remainder residing in the towns of Easton, East Bridgewater, Foxborough, Mansfield, Norton, Sharon, Stoughton, and West Bridgewater.  More than half of our combined high school population identify as African-American, Asian, Hispanic, or Multi-Race, and nearly a quarter of the students speak English as a second language. For the current school year, 40% of our high school students are identified as economically disadvantaged, and 15.1% require special education services.**

**NOTE**: Please specify if and when you are using a percentage with a different denominator (e.g., seniors) than the one listed.

**When completing the data section, please only use percentages and include data that is from your program of study. Additionally, only include data where learners are eligible to participate (e.g., only seniors in high school will be eligible for the section asking for percent of seniors who graduated high school, so only seniors should be included in that data; if your work-based learning only occurs within a specific grade level, only include them in your data for that category.)**

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| SCHOOL YEAR | 2015-16 | 2016-17 | 2017-18 |
| **SECONDARY-LEVEL DATA** |
| **What is the total number of learners served by your school/institution?**  | 1348 | 1404 | 1413 |
| What is the total number of minority learners served by your school/institution? | 630 | 693 | 741 |
| What is the total number of low-income learners served by your school/institution? | 791 | 808 | 780 |
| What is the total number of learners with disabilities served by your school/institution?  | 308 | 271 | 217 |
| What is the total number of English language learners served by your school/institution?  | 12 | 23 | 15 |
| **What is the total number of learners served by your program of study?** | 79 | 77 | 75 |
| % male learners in program of study  | 86% | 90% | 95% |
| % female learners in program of study  | 14% | 10% | 5% |
| % minority learners program of study  | 43% | 45% | 44% |
| % low-income learners program of study  | 47% | 44% | 41% |
| % learners with disabilities program of study  | 16% | 13% | 16% |
| % English language learners program of study  | 0% | 0% | 0% |
| Other relevant *demographic* data from your **program of study** |  |  |  |
| % of learners in program of study who earned postsecondary credit (dual enrollment, AP, etc.)  | 14% | 32% | 47% |
| % of learners in program of study who earned an industry-recognized credential  | 75% | 70% | 69% |
| % of learners in program of study who participated in work-based learning  | 8% | 8% | 5% |
| % of seniors in program of study who graduated high school (who were eligible/seniors) | 100% | 100% | 100% |
| % of graduates in program of study who enrolled in postsecondary education (who were eligible/seniors)  | 75% | 90% | 100% |
| % of graduates in program of study who entered the workplace and/or military (who were eligible/seniors)  | 20% | 10% | 0% |
| **POSTSECONDARY-LEVEL DATA** |
| **What is the total number of learners served by your school/institution?**  | N/A | N/A | N/A |
| What is the total number of minority learners served by your school/institution? | N/A | N/A | N/A |
| What is the total number of low-income learners served by your school/institution? | N/A | N/A | N/A |
| What is the total number of learners with disabilities served by your school/institution?  | N/A | N/A | N/A |
| What is the total number of English language learners served by your school/institution?  | N/A | N/A | N/A |
| **Total number of learners served by your program of study**  | N/A | N/A | N/A |
| % male learners in program of study  | % | % | % |
| % female learners in program of study  | % | % | % |
| % minority learners in program of study  | % | % | % |
| % low-income learners in program of study  | % | % | % |
| % learners with disabilities in program of study  | % | % | % |
| % English language learners in program of study  | % | % | % |
| **Other relevant *demographic* data from your program of study**  |  |  |  |
| % of learners in program of study who completed postsecondary/earned a degree or certificate (who were eligible)  | % | % | % |
| % of learners in program of study who earned an industry-recognized credential (who were eligible)  | % | % | % |
| % of graduates in program of study who entered the workplace and/or military (who were eligible)  | % | % | % |
| % of graduates in program of study who transitioned to further postsecondary education (who were eligible) | N/A | N/A | N/A |

1. Provide links to the source of the above data. If the links are not publicly accessible, please explain the source of the data. If you are missing any data, please explain why and how you measure success. **We track all student achievement and demographic data through our Student Information System (Schoolbrains). This information is also reported to and verified through the Massachusetts Department of Elementary and Secondary Education’s Student Information Management System (SIMS) reports. In addition, all high school graduates are required to complete a survey as part of the Massachusetts Department of Elementary and Secondary Education 2 year follow up study.**
2. How does your school or institution ensure equitable access for learners with diverse backgrounds? (150 word limit) **All freshmen are given a mathematical and reading literacy test to use as benchmark data on placement in academic classes. All students are tested in all core subjects using beginning of the year, middle of year and end of year benchmark testing. This data then allows every core content area to customize the standards based learning for each student. Based upon their performance, all students are eligible to attend our afterschool support sessions Monday through Thursday to allow for extra assistance. Transportation home is provided for every student. In addition, students have additional supports built into the normal school day as needed. Student benchmark testing allows for students to move up to honors and AP courses at the next school year. In addition, all AP test fees are paid for by the district which allows students of disadvantaged households to be afforded the same opportunity to receive college credit.**
3. How do you ensure learner success, especially of those who from diverse backgrounds? Please provide examples of what supports you offer learners. (150 word limit**) In addition to our supports mentioned above, every classroom teacher provides extra help late nights. Parents are called by every classroom teacher numerous times a year by individual classroom instructors to arrange for extra help sessions. Standards based reports are also shared with parents and students to monitor student progress in each core content area. We utilize the assistance of translators to communicate these opportunities to non-English speaking parents. We provide transportation to students that have no means of transportation to stay afterschool. In addition, we hold parent teacher conferences throughout the year that highlight opportunities for advanced course work. In every career and technical education program, we have a para professional that works with students to ensure they are taking advantage of extra teacher assistance when needed.**
4. Is your program of study associated with a Career Technical Student Organization (CTSO)? If so, which one(s) and in what way(s)? (Check the [approved list](http://www.ctsos.org/ctsos/) of CTSOs) (50 word limit) **Southeastern is a 100% SkillsUSA Chapter. We pay membership fees for all students, provide transportation, lodging, materials, and uniforms for the State and National Competitions, Each December, we hold local competitions in which our Advisory Board comes in to judge the performance competition. We are the host site for the District Competition.**
5. Describe how career guidance/advisement is integrated into your program of study to support learners’ completion of the program of study and entry into additional education/training and/or a successful career. Describe how you recruit students into CTE programs. Where applicable, describe the tools (individual career and academic plans, career exploration websites, etc.) that are provided to learners and how they are used. (200 word limit) **Freshmen complete a one-day experience in every CTE program. Based upon that experience, students select programs they want to explore further. Once that timeframe concludes, students select three choices. Our district prides itself in placing 85% of students in their first or second choices. Students that do not get their top selection are placed on a waiting list by score (grades, attendance, and behavior) which are the same identifiers to who gets their choice. If a space becomes available, the student first on the waiting list gets the option to enter the program. Throughout the students four years of high school, guidance counselors in collaboration with CTE teachers, work with them on college and career planning, host numerous college and career field trips and bring in guest speakers. All of our students are monitored on their post-secondary plans to ensure that placement in college or a career has been established before graduation. In addition, we also keep a close eye on positive placement using the State’s two year follow up study. If a program falls below 90% positive placement for a graduated class, discussions take place amongst teachers, guidance counsellors administrators, and Advisory Committees to make adjustments to our programming.**
6. Which technical, academic and/or employability standards does your program of study incorporate at the secondary and/or postsecondary level and how? (Please list the standards you use and be specific regarding how your program uses industry, national, state and/or locally-developed standards) (250 word limit)

**Our program meets the demands of modern technical education. Each facet adheres to the Massachusetts frameworks for Engineering Technology. Highlighted are several initiatives that incorporate the English, Mathematics and Science embedded academic crosswalks in addition to the Engineering Technology framework.**

**Starting in their freshman year, students in the Engineering program learn to combine the knowledge needed in our three disciplines by creating an Infinity Mirror. Design is completed using 3D modeling software and then created on a 3D printer. Students construct the product using mirrors and an Arduino microcontroller. Electronics are implemented to provide power to a string of LED lights. Finally, coding of the LED lighting is used to create varying patterns of each student’s own design. Digital Electronics is part of our curriculum in grades 10 and 11. Students create a power supply by creating the enclosure using various hand tools. They utilize their knowledge of electronics to then create and assemble the circuitry needed for a fully functional product. Computer Science Principles is part of our curriculum in grades 10 and 11. Students are assessed in grade 11 for the Advanced Placement Explore Performance Task. This assessment requires the submission of writing associated with technical research describing a computing innovation. Students begin to prepare in grade 10 and continue through grade 11 by researching technical topics, creating computational artifacts that illustrate the innovation and writing about the benefits and detriments to society.**

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| **Standard Types**  | **Please list the standards your program of study uses and how it uses them below:**  |
| Academic Standards |

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| 2.A.01 – 2.A.022B.01 – 2.B.102.C.01-2.C.20 |  WHST. Grades 6-12.10 | Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences  |
|   2.A.02.012.A.02.02 |   RST. grades 9-10.1 |  Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions   |
|   2.B.01.022.B.01.03 |   SL. Grades 8-.1a-dSL. Grades 9 -10.1a-dSL. Grades 11-12.1a-d |  8. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 8 topics, texts, and issues, building on others’ ideas and expressing their own clearly. a. Come to discussions prepared, having read or researched material under study; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion. b. Follow rules for collegial discussions and decision-making, track progress toward specific goals and deadlines, and define individual roles as needed. c. Pose questions that connect the ideas of several speakers and respond to others’ questions and comments with relevant evidence, observations, and ideas. d. Acknowledge new information expressed by others, and, when warranted, qualify or justify their own views in light of the evidence presented 9-10Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9–10 topics, texts, and issues, building on others’ ideas and expressing their own clearly and persuasively. a. Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas. b. Work with peers to set rules for collegial discussions and decision-making (e.g.,, informal consensus, taking votes on key issues, presentation of alternate views), clear goals and deadlines, and individual roles as needed. c. Propel conversations by posing and responding to questions that relate the current discussion to broader themes or larger ideas; actively incorporate others into the discussion; and clarify, verify, or challenge ideas and conclusions. d. Respond thoughtfully to diverse perspectives, summarize points of agreement and disagreement, and, when warranted, qualify or justify their own views and understanding and make new connections in light of the evidence and reasoning presented 11-12Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 11–12 topics, texts, and issues, building on others’ ideas and expressing their own clearly and persuasively. a. Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas. b. Work with peers to promote civil, democratic discussions and decision-making, set clear goals and deadlines, and establish individual roles as needed. c. Propel conversations by posing and responding to questions that probe reasoning and evidence; ensure a hearing for a full range of positions on a topic or issue; clarify, verify, or challenge ideas and conclusions; and promote divergent and creative perspectives. d. Respond thoughtfully to diverse perspectives; synthesize comments, claims, and evidence made on all sides of an issue; resolve contradictions when possible; and determine what additional information or research is required to deepen the investigation or complete the task.  |
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|   2.b.01-2.B.102.C.01-2.C.20 |   RST. grades 9-10.3RST. Grades 11-12.3 |   9-10Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text 11-12Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.  |
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|   2.B.01-2.B.102.C.01-2.C.20 |   L. grades 9 – 12.6 |  Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression   |
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|   2.B.03.022.B.01.102.B.07.052.B.09.022.C.05.132.C.05.172.C.07.012.C.07.232.C.07.302.C07.342.C.07.362.C.11.08 |   SL. Grades 8.4SL. Grades 9 – 10.4SL. Grades 11-12.4 |   8.Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound valid reasoning, and well-chosen details; use appropriate eye contact, adequate volume, and clear pronunciation 9-10Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task. 11-12Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range of formal and informal tasks.  |
|  2.C.02.142.C.02.192.C.05.182.C.06.012.C.11.042C.12.032.C.13.03  |  RST. Grades 6-12.4RST.6-10.9  |   Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–12 texts and topics 6-8Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic. 9-10Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts  |

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|  2.B.01.052.B.01.062.B.10.012.B.03.022.B.03.052.C.04.032.C.05.172C.05.222C.07.362C.08.032.C.08.032.C.09.022.C.12.032.C.13.022.C.16.032.C.17.012.C.17.022.C.19.012.C.20.03 |  W. grades 9-12.7W. grades 9-10.8RST. Grades 9-10.10RST. Grades 11-12.10 |  7Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. 8Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation Grades 9-10.10By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently. Grades 11-12.10By the end of grade 12, read and comprehend science/technical texts in the grades 11–CCR text complexity band independently and proficiently |
|   2.B.01.032.B.03.032.B.04.012.C.01.032.C.02.152.C.02.202,C.02.212.C.02.232.C.03.062.C.05.062.C.06.022.C.06.032.C.06.052.C.05.162.C.06.102.C.13.15 |  WHST. Grades 6-12.4 RST. Grades 6-12.4 |   Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–12 texts and topics.  |
|  2.B.01.05  |   SL.6-12.6 |   Adapt speech to a variety of contexts and tasks, demonstrating a command of formal English when indicated or appropriate.  |

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| **CVTE Learning Standard Number** | **Math Content Conceptual Category and Domain CodeLearning Standard Number** | **Text of Mathematics Learning Standard** |
|   2.B.01 |   \* Modeling |  See the asterisks in the Math Framework document for more detail information on the used standards assigned as these will be project dependant.  |
|  2.C.02.042.C.02.05 2.C.02.082.C.02.092.C.02.152.C.02.162.C.02.222.C.02.232.C.02.242.C.02.27 |   A-CEDF-IFF-LEF-TF |  Create equations that describe numbers or relationships. 1. Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions. 2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.4. Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.Analyze functions using different representations.7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.Construct and compare linear, quadratic, and exponential models and solve problems. 4. For exponential models, express as a logarithm the solution to abct = d where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology.Model periodic phenomena with trigonometric functions. 5. Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline. |
|  2.D.01.042.D.01.082.D.01.092.D.01.132.D.01.18 |  G-MGF-TFF-LE |  Apply geometric concepts in modeling situations.1. Use geometric shapes, their measures, and their properties to describe objects (e.g.,, modeling a tree trunk or a human torso as a cylinder).2. Apply concepts of density based on area and volume in modeling situations (e.g.,, persons per square mile, BTUs per cubic foot).3. Apply geometric methods to solve design problems (e.g.,, designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).MA.4. Use dimensional analysis for unit conversions to confirm that expressions and equations make sense.Prove and apply trigonometric identities.8. Prove the Pythagorean identity sin2(θ) + cos2(θ) = 1 and use it to find sin(θ), cos(θ), or tan(θ) given sin(θ), cos(θ), or tan(θ) and the quadrant. 9. (+) Prove the addition and subtraction formulas for sine, cosine, and tangent and use them to solve problems.Construct and compare linear, quadratic, and exponential models and solve problems. 1. Distinguish between situations that can be modeled with linear functions and with exponential functions. a. Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another. 2. Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table). 3. Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.  |
|  2.D.02.012.D.02.042.D.02.052.D.02.182.D.02.192.D.02.20 |   A-CED5.MD7.EE |  Create equations that describe numbers or relationships. 1. Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions. 4. Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. Geometric measurement: Understand concepts of volume and relate volume to multiplication and to addition.3. Recognize volume as an attribute of solid figures and understand concepts of volume measurement.a. A cube with side length 1 unit, called a “unit cube,” is said to have “one cubic unit” of volume, and can be used to measure volume.b. A solid figure which can be packed without gaps or overlaps using n unit cubes is said to have a volume of n cubic units.4. Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.5. Relate volume to the operations of multiplication and addition and solve real-world and mathematical problems involving volume.a. Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g.,, to represent the associative property of multiplication.b. Apply the formulas V = l × w × h and V = b × h for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real-world and mathematical problems. c. Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real-world problems.Solve real-life and mathematical problems using numerical and algebraic expressions and equations.3. Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. 4. Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. |
|  2.F.01.042.F.01.092.F.01.102.F.01.112.F.01.122.F.01.132.F.01.142.F.01.152.F.01.16 |   G-MGF-TFF-LE |  Apply geometric concepts in modeling situations.1. Use geometric shapes, their measures, and their properties to describe objects (e.g.,, modeling a tree trunk or a human torso as a cylinder).2. Apply concepts of density based on area and volume in modeling situations (e.g.,, persons per square mile, BTUs per cubic foot).3. Apply geometric methods to solve design problems (e.g.,, designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).MA.4. Use dimensional analysis for unit conversions to confirm that expressions and equations make sense.Prove and apply trigonometric identities.8. Prove the Pythagorean identity sin2(θ) + cos2(θ) = 1 and use it to find sin(θ), cos(θ), or tan(θ) given sin(θ), cos(θ), or tan(θ) and the quadrant. Construct and compare linear, quadratic, and exponential models and solve problems. 1. Distinguish between situations that can be modeled with linear functions and with exponential functions. a. Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.2. Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table). 3. Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.  |
|  2.F.02.042.F.02.052.F.02.062.F.02.072.F.02.082.F.02.102.F.02.112.F.02.12 |  G-MGF-TF F-LE |  Apply geometric concepts in modeling situations.1. Use geometric shapes, their measures, and their properties to describe objects (e.g.,, modeling a tree trunk or a human torso as a cylinder).2. Apply concepts of density based on area and volume in modeling situations (e.g.,, persons per square mile, BTUs per cubic foot).3. Apply geometric methods to solve design problems (e.g.,, designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).MA.4. Use dimensional analysis for unit conversions to confirm that expressions and equations make sense.Prove and apply trigonometric identities.8. Prove the Pythagorean identity sin2(θ) + cos2(θ) = 1 and use it to find sin(θ), cos(θ), or tan(θ) given sin(θ), cos(θ), or tan(θ) and the quadrant. Construct and compare linear, quadratic, and exponential models and solve problems. 1. Distinguish between situations that can be modeled with linear functions and with exponential functions. a. Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another. 2. Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table). 3. Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.  |

[Embedded Science and Technology/Engineering](#TableofContents)*[Earth and Space Science](#TableofContents)*

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| **CVTE Learning Standard Number** | **Subject Area,Topic Heading andLearning Standard Number** | **Text of Earth and Space Science Learning Standard** |
|  2.C.06.182.C.14.122.C.14.13 |  1. Matter and Energy in the Earth System |  1.3 Explain how the transfer of energy through radiation, conduction, and convection contributes to global atmospheric processes, such as storms, winds, and currents.  |
|  2.C.14 |  3. Earth Processes and Cycles |  3.4 Explain how water flows into and through a watershed. Explain the roles of aquifers, wells, porosity, permeability, water table, and runoff. 3.5 Describe the processes of the hydrologic cycle, including evaporation, condensation, precipitation, surface runoff and groundwater percolation, infiltration, and transpiration. |
| 2.C.06.182.C.14.122.C.14.13 |  1. Matter and Energy in the Earth System |  1.3 Explain how the transfer of energy through radiation, conduction, and convection contributes to global atmospheric processes, such as storms, winds, and currents.  |
|  2.C.14.132.C.13.07 |  2. Energy Resources in the Earth System |  2.1 Recognize, describe, and compare renewable energy resources (e.g.,, solar, wind, water, biomass) and nonrenewable energy resources (e.g.,, fossil fuels, nuclear energy).2.2 Describe the effects on the environment and on the carbon cycle of using both renewable and nonrenewable sources of energy. |

[*Physical Science (Chemistry)*](#TableofContents)

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| **CVTE Learning Standard Number** | **Subject Area,Topic Heading andLearning Standard Number** | **Text of Chemistry Learning Standard** |
|  2.C.02.01 | 2. Atomic Structure and Nuclear Chemistry |  2.1 Recognize discoveries from Dalton (atomic theory), Thomson (the electron), Rutherford (the nucleus), and Bohr (planetary model of atom), and understand how each discovery leads to modern theory. |

[*Physical Science (Physics)*](#TableofContents)

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| **CVTE Learning Standard Number** | **Subject Area,Topic Heading andLearning Standard Number** | **Text of Physics Learning Standard** |
|  2.C.05.05 |  Properties of Matter | Differentiate between weight and mass, recognizing that weight is the amount of gravitational pull on an object.3. Recognize that the measurement of volume and mass requires understanding of the sensitivity of measurement tools (e.g.,, rulers, graduated cylinders, balances) and knowledge and appropriate use of significant digits. |
|  2.C.14.12 |  Heat Energy |  14. Recognize that heat is a form of energy and that temperature change results from adding or taking away heat from a system.16. Give examples of how heat moves in predictable ways, moving from warmer objects to cooler ones until they reach equilibrium. |
|  2.C.13.16 |  1. Motion and Forces | 1.1 Compare and contrast vector quantities (e.g.,, displacement, velocity, acceleration force, linear momentum) and scalar quantities (e.g.,, distance, speed, energy, mass, work).1.2 Distinguish between displacement, distance, velocity, speed, and acceleration. Solve problems involving displacement, distance, velocity, speed, and constant acceleration. 1.5 Use a free-body force diagram to show forces acting on a system consisting of a pair of interacting objects. For a diagram with only co-linear forces, determine the net force acting on a system and between the objects. |
|  2.C.02 |  5. Electromagnetism |  5.2 Develop qualitative and quantitative understandings of current, voltage, resistance, and the connections among them (Ohm’s law).5.3 Analyze simple arrangements of electrical components in both series and parallel circuits. Recognize symbols and understand the functions of common circuit elements (battery, connecting wire, switch, fuse, resistance) in a schematic diagram. |
|  2.C.06.18 |  3. Heat and Heat Transfer |  3.1 Explain how heat energy is transferred by convection, conduction, and radiation.3.2 Explain how heat energy will move from a higher temperature to a lower temperature until equilibrium is reached. |
| 2.C.06.16 2.C.06.17 |  2. Conservation of Energy and Momentum |  2.2 Interpret and provide examples of how energy can be converted from gravitational potential energy to kinetic energy and vice versa.2.3 Describe both qualitatively and quantitatively how work can be expressed as a change in mechanical energy.  |
| 2.C.06.16 2.C.06.17 |  1. Motion and Forces |  1.6 Distinguish qualitatively between static and kinetic friction, and describe their effects on the motion of objects. |
|  2.C.02.02 |    5. Electromagnetism |  5.1 Recognize that an electric charge tends to be static on insulators and can move on and in conductors. Explain that energy can produce a separation of charges. |

[*Technology/Engineering*](#TableofContents)

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| **CVTE Learning Standard Number** | **Subject Area,Topic Heading andLearning Standard Number** | **Text of Technology/Engineering Learning Standard** |
|  2.A.2 |  1. Materials, Tools, and Machines |  1.3 Identify and explain the safe and proper use of measuring tools, hand tools, and machines (e.g.,, band saw, drill press, sander, hammer, screwdriver, pliers, tape measure, screws, nails, and other mechanical fasteners) needed to construct a prototype of an engineering design. |
|  2.B.01 |  2. Engineering Design |  2.1 Identify and explain the steps of the engineering design process, i.e., identify the need or problem, research the problem, develop possible solutions, select the best possible solution(s), construct a prototype, test and evaluate, communicate the solution(s), and redesign. 2.2 Demonstrate methods of representing solutions to a design problem, e.g.,, sketches, orthographic projections, multiview drawings.2.4 Identify appropriate materials, tools, and machines needed to construct a prototype of a given engineering design. 2.5 Explain how such design features as size, shape, weight, function, and cost limitations would affect the construction of a given prototype. |
|  2.C.05 |  1. Materials, Tools, and Machines |  1.1 Given a design task, identify appropriate materials (e.g.,, wood, paper, plastic, aggregates, ceramics, metals, solvents, adhesives) based on specific properties and characteristics (e.g.,, strength, hardness, and flexibility).1.2 Identify and explain appropriate measuring tools, hand tools, and power tools used to hold, lift, carry, fasten, and separate, and explain their safe and proper use. |
|  2.C.052.C.07 |  2. Engineering Design |  2.4 Identify appropriate materials, tools, and machines needed to construct a prototype of a given engineering design.  |
|  2.C.13 |  5. Construction Technologies | Describe and explain parts of a structure, e.g.,, foundation, flooring, decking, wall, roofing systems.5.3 Explain how the forces of tension, compression, torsion, bending, and shear affect the performance of bridges.5.4 Describe and explain the effects of loads and structural shapes on bridges. |
|  2.B.08 |  2. Engineering Design |  2.6 Identify the five elements of a universal systems model: goal, inputs, processes, outputs, and feedback. |
|  2.A.02 2.C.08 2.C.12 |  2. Construction Technologies |  2.5 Identify and demonstrate the safe and proper use of common hand tools, power tools, and measurement devices used in construction. |
|  2.B.01 2.C.06 |  1. Engineering Design |  1.1 Identify and explain the steps of the engineering design process: identify the problem, research the problem, develop possible solutions, select the best possible solution(s), construct prototypes and/or models, test and evaluate, communicate the solutions, and redesign.1.2 Understand that the engineering design process is used in the solution of problems and the advancement of society. Identify examples of technologies, objects, and processes that have been modified to advance society, and explain why and how they were modified.1.3 Produce and analyze multi-view drawings (orthographic projections) and pictorial drawings (isometric, oblique, perspective), using various techniques. |
|  2.B.01 2.C.06 2.C.13 |  | 1.4 Interpret and apply scale and proportion to orthographic projections and pictorial drawings (e.g.,, ¼" = 1'0", 1 cm = 1 m).1.5 Interpret plans, diagrams, and working drawings in the construction of prototypes or models. |
|  2.B.06 2.C.05 | 7. Manufacturing Technologies |  7.1 Describe the manufacturing processes of casting and molding, forming, separating, conditioning, assembling, and finishing.7.2 Identify the criteria necessary to select safe tools and procedures for a manufacturing process (e.g.,, properties of materials, required tolerances, end-uses). |
|  2.C.01 | 5. Energy and Power Technologies—Electrical Systems |  5.1 Explain how to measure and calculate voltage, current, resistance, and power consumption in a series circuit and in a parallel circuit. Identify the instruments used to measure voltage, current, power consumption, and resistance. |
|  2.C.02 2.C.03 |  5. Energy and Power Technologies—Electrical Systems |  5.1 Explain how to measure and calculate voltage, current, resistance, and power consumption in a series circuit and in a parallel circuit. Identify the instruments used to measure voltage, current, power consumption, and resistance.5.2 Identify and explain the components of a circuit, including sources, conductors, circuit breakers, fuses, controllers, and loads. Examples of some controllers are switches, relays, diodes, and variable resistors.5.3 Explain the relationships among voltage, current, and resistance in a simple circuit, using Ohm’s law.5.5 Compare and contrast alternating current (AC) and direct current (DC), and give examples of each. |
|  2.C.05 | 2. Construction Technologies  |  2.1 Identify and explain the engineering properties of materials used in structures (e.g.,, elasticity, plasticity, R value, density, strength). |
|  2.C.05 2.C.14.06 | 2. Construction Technologies  | 2.6 Recognize the purposes of zoning laws and building codes in the design and use of structures. |
| 2.C.06 | 3. Energy and Power Technologies—Fluid Systems |  3.3 Calculate and describe the ability of a hydraulic system to multiply distance, multiply force, and effect directional change.3.4 Recognize that the velocity of a liquid moving in a pipe varies inversely with changes in the cross-sectional area of the pipe.3.5 Identify and explain sources of resistance (e.g.,, 45º elbow, 90º elbow, changes in diameter) for water moving through a pipe. |
|  2.C.06 2.C.13 2.C.14 |  4. Energy and Power Technologies—Thermal Systems |  4.1 Differentiate among conduction, convection, and radiation in a thermal system (e.g.,, heating and cooling a house, cooking).4.2 Give examples of how conduction, convection, and radiation are considered in the selection of materials for buildings and in the design of a heating system.4.3 Explain how environmental conditions such as wind, solar angle, and temperature influence the design of buildings. |
| 2.C.062.C.13 |  2. Construction Technologies |  2.2 Distinguish among tension, compression, shear, and torsion, and explain how they relate to the selection of materials in structures.2.4 Calculate the resultant force(s) for a combination of live loads and dead loads. |
|  2.C.09 |  7. Manufacturing Technologies |  7.3 Describe the advantages of using robotics in the automation of manufacturing processes (e.g.,, increased production, improved quality, safety). |
|  2.C.09 |  6. Communication Technologies |  6.3 Explain how the various components (source, encoder, transmitter, receiver, decoder, destination, storage, and retrieval) and processes of a communication system function. |

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| Career Cluster or Technical Standards | 1. Engineering – Introductory Knowledge and Skills
	1. Demonstrate and apply the design process.
		1. Brainstorm ideas; develop and evaluate solutions; create documentation; build and test prototype; and present design.
		2. Create new designs by working in teams using brainstorming techniques.
		3. Maintain an engineering journal to document design solutions.
		4. Fabricate a prototype using hand tools, manual machine tools, CNC devices, joining processes, measuring and cutting techniques.
		5. Produce final drawing documentation, develop presentation, present results; patent, market, and sell idea.
	2. Demonstrate skills in problem solving, diagnostics, and troubleshooting.
		1. Use appropriate testing equipment and tools for diagnosing the problem.
	3. Document and communicate engineering concepts.
		1. Write a technical design report.
		2. Maintain engineering logs/notebooks/journals and portfolios for projects.
	4. Develop project or product objectives and criteria.
		1. Define requirements for a project or product.
		2. Establish milestones for a project or product.
		3. Develop a time line for a project or product.
		4. Identify critical path components.
		5. Implement a schedule for a project or product.
	5. Develop methods and plan of production.
		1. Make custom parts (those not readily available that meet specifications).
		2. Assemble a product.
	6. Explain, demonstrate and apply manufacturing process management techniques according to current industry and OSHA standards.
		1. Identify resources needed (supplies, personnel, equipment).
	7. Explain introductory engineering concepts.
		1. Define and use engineering notations and prefixes: tera, giga, mega, kilo, milli, micro, nano, pico.
		2. Use both metric and English systems of measurements.
2. Electrical Engineering Demonstration, Design, and Implementation
	1. Demonstrate introductory electrical engineering knowledge and skills.

2.C.01.01 Identify appropriate test devices for specific tasks (e.g., oscilloscope or multimeter).2.C.01.03 Read and interpret schematics.* 1. Explain and apply electrical engineering principles, and techniques and use design tools and materials according to current industry and OSHA standards..
		1. Identify resistors using color code.
		2. Measure resistance using multimeters.
		3. Identify basic circuit components (source, load, control, and conductors).
		4. Describe different types and functions of switches.
		5. Identify different types of capacitors, their values, and their voltage polarity requirements.
		6. Differentiate between direct and alternating currents.
		7. Demonstrate the operation of diodes and describe their function.
	2. Build and implement electrical engineering circuits.
		1. Simulate a circuit.
		2. Construct a circuit.
		3. Troubleshoot problems with a circuit.
1. Mechanical Engineering Demonstration, Design, and Implementation
	1. Demonstrate introductory mechanical engineering knowledge and skills.
		1. Identify and use devices and gauges (i.e. rulers, scales, timers, calipers, radius gauges, protractors) to accurately measure units of mass, length, angles, and time and their extensions.
		2. Interpret detail and assembly drawings, technical processes, procedures, and instructions.
	2. Explain and apply mechanical engineering principles and techniques, and use design tools and materials according to current industry and OSHA standards.
		1. Define geometric shapes, line types, tools, and describe constraints used in sketching.
		2. Prepare clear and accurate hand sketches using orthographic and perspective views.
		3. Prepare clear and accurate hand sketches using annotative labels including materials, processes, functions and dimensions.
		4. Apply scale, dimensioning, and tolerance standards to drawings.
		5. Create and edit a solid model using a 3-D modeling program, based upon design sketches. Utilize appropriate materials, measurements, fits, appearances, processes and functions.
		6. Combine model parts into working assembly, manipulate and animate assembly using a 3-D modeling program.
		7. Analyze parts and assemblies with respect to safety, handling, end user, production, cost, packaging, and environmental impact.
		8. Create detail and assembly drawings based upon 3-D models.
		9. Annotate detail drawings with dimensions, materials, processes and appropriate views.
		10. Create section, detail, broken-out, break, and auxiliary views.
		11. Create an assembly drawing with: balloons, a parts list containing items, quantities, descriptions and part numbers, appropriate assembly notes; and a titleblock based upon 3-D models.
	3. Build and implement mechanical engineering designs.
		1. Use industry-wide prototyping methods including rapid-prototyping.
		2. Build a prototype model from a drawing database
2. Automated Systems Engineering Demonstration, Design, and Implementation
	1. Demonstrate automated systems engineering introductory knowledge and skills.
		1. Design and create a program to evaluate data and make decisions using external digital and analog sensors.
 |
| Employability Standards  | 1. **Career Exploration and Navigation**
	1. Develop a career plan and portfolio.
		1. Develop and revise career plan annually based on workplace awareness and skill attainment.
		2. Assess personal strengths and interest areas to determine potential careers, career pathways and career ladders.
		3. Examine potential career field(s)/discipline(s) and identify criteria to select, secure and keep employment in chosen field(s).
		4. Research and evaluate a variety of careers utilizing multiple sources of information and resources to determine potential career(s) and alternatives.
		5. Identify training and education requirements that lead to employment in chosen field(s) and demonstrate skills related to evaluating employment opportunities.
		6. Explore and evaluate postsecondary educational opportunities including degrees and certifications available, traditional and nontraditional postsecondary pathways, technical school and apprenticeships, cost of education, financing methods including scholarships and loans and the cost of loan repayment.
		7. Create a portfolio showcasing academic and career growth including a career plan, safety credential, resume and a competency profile demonstrating the acquisition of the knowledge and skills associated with at least two years of full-time study in the Chapter 74 program.
	2. Demonstrate job search skills.
		1. Conduct a job search and complete written and electronic job applications, resumes, cover letters and related correspondence for a chosen career path.
		2. Explore and evaluate postsecondary job opportunities and career pathways specific to career technical areas.
		3. Identify role and use of social media and networking for staying current with career and employment trends as well as networking, job seeking and career development opportunities.
		4. Demonstrate ability to use social media and networking to develop useful occupational contacts, job seeking and career development opportunities.

* 1. Demonstrate all phases of the job interview process.
		1. Gather relevant information about potential employer(s) from multiple print and digital sources, assessing the credibility and accuracy of each source.
		2. Identify employment eligibility criteria, such as drug/alcohol free status, clean driving record, etc.
		3. Practice effective interviewing skills: appearance, inquiry and dialogue with interviewer, positive attitude and evidence of work ethic and skills.
		4. Explore and evaluate employment benefit packages including wages, vacation, health care, union dues, cafeteria plans, tuition reimbursement, retirement and 401K.
1. Communication in the Workplace
	1. Demonstrate appropriate oral and written communication skills in the workplace.
		1. Communicate effectively using the language and vocabulary appropriate to a variety of audiences within the workplace including coworkers, supervisors and customers.
		2. Read technical and work-related documents and demonstrate understanding in oral discussion and written exercise.
		3. Demonstrate professional writing skills in work-related materials and communications (e.g., letters, memoranda, instructions and directions, reports, summaries, notes and/or outlines).
		4. Use a variety of writing/publishing/presentation applications to create and present information in the workplace.
		5. Identify, locate, evaluate and use print and electronic resources to resolve issues or problems in the workplace.
		6. Use a variety of financial and data analysis tools to analyze and interpret information in the workplace.
		7. Orally present technical and work-related information to a variety of audiences.
		8. Identify and demonstrate professional non-verbal communication.
	2. Demonstrate active listening skills.
		1. Listen attentively and respectfully to others.
		2. Focus attentively, make eye contact or other affirming gestures, confirm understanding and follow directions.
		3. Show initiative in improving communication skills by asking follow-up questions of speaker in order to confirm understanding.
2. **Work Ethic and Professionalism**
	1. Demonstrate attendance and punctuality.
		1. Identify and practice professional time-management and attendance behaviors including punctuality, reliability, planning and flexibility.
	2. Demonstrate proper workplace appearance.
		1. Identify and practice professional appearance specific to the workplace.
		2. Identify and practice personal hygiene appropriate for duties specific to the workplace.
		3. Identify and wear required safety gear specific to the workplace.
	3. Accepts direction and constructive criticism.
		1. Demonstrate ability (both verbally and non-verbally) to accept direction and constructive criticism and to implement solutions to change behaviors.
		2. Ask appropriate questions to clarify understanding of feedback.
		3. Analyze own learning style and seek instructions in a preferred format that works best for their understanding (such as oral, written or visual instruction).
	4. Demonstrate motivation and initiative.
		1. Evaluate assigned tasks for time to completion and prioritization.
		2. Demonstrate motivation through enthusiasm, engagement, accurate completion of tasks and activities.
		3. Demonstrate initiative by requesting new assignments and challenges.
		4. Explain proposed solutions to challenges observed in the workplace.
		5. Demonstrate the ability to evaluate multiple solutions to problems and challenges using critical reasoning and workplace/industry knowledge and select the best solution to the problem.
		6. Implement solution(s) to challenges and/or problem(s) observed in the workplace.
		7. See projects through completion and check work for quality and accuracy.
	5. Demonstrate awareness of workplace culture and policy.
		1. Display ethical behavior in use of time, resources, computers and information.
		2. Identify the mission of the organization and/or department.
		3. Explain the benefits of a diverse workplace.
		4. Demonstrate a respect for diversity and its benefit to the workplace.
	6. Interact appropriately with coworkers.
		1. Work productively with individuals and in teams.
		2. Develop positive mentoring and collaborative relationships within work environment.
		3. Show respect and collegiality, both formally and informally.
		4. Explain and follow workplace policy on the use of cell phones and other forms of social media.
		5. Maintain focus on tasks and avoid negative topics or excessive personal conversations in the workplace.
		6. Negotiate solutions to interpersonal and workplace conflicts.
 |

# **SEQUENCE OF COURSES & CREDIT TRANSFER**

1. Please fill out the chart below, and describe your program of study’s course sequence by grade level, including the relevant or required academic and technical courses, as well as other required activities.

**Make sure to highlight the course sequence that bridges secondary and postsecondary education.** Explain how your program of study ensures learners gain the broader Career Cluster-level knowledge/skills and, over time, gain the more specific occupation-level knowledge/skills as they progress through the program of study. You can also include graphics or [plans of study](https://cte.careertech.org/sites/default/files/PlanPathways-CareerCluster-AG-AgribusinessSystem.pdf) of the course sequence in lieu of filling out the chart below.

|  |  |  |  |  |  |  |
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| Grade/Year | English/Language Arts | Math | Science | Social Studies/ Sciences | Other Required Courses/Other Electives/Learner Activities  | CTE Courses and/or Degree Major Courses |
| **9** | English 9, or  Honors English 9 | Algebra I, Honors Algebra, or Honors Algebra II | Biology or Introductory Physics  | Honors World or History 1800 – 2001, or World History 1800 - 2001 | Spanish I or Spanish & Latin American Literature or Computer Science Essentials or Phys. Ed/Health/Wellness or Virtual High School or Honors/AP Colloquium (1 cr.) or Music | Exploratory and Introduction to ElectronicsIntroduction to Engineering DesignComputer Science Basics  |
| **10** | English 10 or Honors English 10 | Geometry or Honors Geometry AND Honors Algebra II or Honors Geometry | Earth and Space Science or Biology or Chemistry or Introductory  Physics or Honors Biology, Honors Chemistry, or Honors Physics | U.S. History 1763 - 1877 or Honors U.S. History 1763 - 1877  | Spanish II or Spanish & Latin Am.  Lit. or Computer Science Essentials or Phys. Ed/Health/Wellness or Virtual High School or Honors/AP Colloquium (1 cr.) or Music or Aircraft Systems and Operations | Electronic Essentials;PTLW Engineering and Design; Computer Science Principles  |
| **11** | American Literature or British Literature or AP Language and Composition  | Algebra II, Honors Algebra II or Honors Pre- Calculus  | Earth and Space Science or Biology or Chemistry or Introductory  Physics or Honors Biology, or Honors Chemistry or Honors Physics | U.S. History 1877 - 2001 or Honors U.S. History or 1877 – 2001   | Spanish I or Spanish & Latin American Literature or Computer Science Essentials or Phys. Ed/Health/Wellness or Virtual High School or Honors/AP Colloquium (1 cr.) or Music or Principles of Aviation or Public Speaking | PLTW Digital Electronics; Principles of Engineering; AP Computer Science Principles |
| **12** | American Literature or British Literature or AP Literature and Composition or Honors American Studies  | AP Calculus or AP Statistics or Calculus or Trigonometry with Advanced Algebra II or Honors Pre- Calculus  | Earth and Space Science or Biology or Chemistry or AP Biology or AP Chemistry or Introductory  Physics  | AP United States or Government and Politics + Honors American Studies or Facing History: World History or Facing History: U.S. History | Spanish II or Spanish & Latin American Literature or Computer Science Essentials or Phys. Ed/Health/Wellness Virtual High School or Honors/AP Colloquium (1 cr.) or Music or Aircraft Systems and Operations or Public Speaking | PLTW Engineering Design and Development; PLTW Principles of Engineering;Computer Science A  |
| **13** | N/A | N/A | N/A | N/A | N/A | N/A |
| **14** | N/A | N/A | N/A | N/A | N/A | N/A |
| **15** | N/A | N/A | N/A | N/A | N/A | N/A |
| **16** | N/A | N/A | N/A | N/A | N/A | N/A |

1. How do you ensure that CTE instruction and coursework is integrated with core academics? Please provide one, specific example. **Both the Vocational and Academic Curriculum Directors monitor lesson plans, instructional practices, and end of course assessments to ensure alignment each week.**
2. List the opportunities for learners to earn articulate and/or transcript dual enrollment credit across K-12 and postsecondary, such as AP/IB, dual and concurrent enrollment, capstone experiences and/or transcripted credit articulation agreements. (250 word limit)

**There are multiple ways that Southeastern students receive college credit. Through the Commonwealth Dual Enrollment Partnership (CDEP), our students can take college courses and earn credit toward high school completion. This agreement is with partners such as Massasoit Community College, Bridgewater State University, and Bristol Community College. We also take part in 100 Males to College. This was created to increase college access, enrollment, retention, and success for low-income males and males of color and low-income Latino and African American men. We also take advantage of articulated credit through state wide agreements with the Massachusetts Association of Community Colleges Agreements. In addition to this agreement, the following regional Project Lead the Way (PTLW) partners offer college credits for students who successfully complete select PTLW courses. Worcester Polytechnic Institute course equivalents have already been identified for Introduction to Engineering Design (IED), Principles of Engineering (POE), and Digital Electronics (DE); Wentworth Institute of Technology offers college credit for Computer Science A, Introduction to Engineering Design and Principles of Engineering; The University of New Haven offers college credit for Introduction to Engineering Design, Digital Electronics, and Principles of Engineering; New England Institute of Technology  offers college credit for Computer Science Essentials which is an elective course offering at Southeastern and  Intro to Engineering Design and Computer Science Principles. The College Board recognizes PLTW and AP courses such as AP Computer Science A. PLTW has connected its standards for the course to those of the College Board for AP distinction.**

1. Please provide information on **at least three partnerships** with *education institutions and groups* your program of study has, and describe how these partnerships have been built, maintained and sustained over time. Use this space to specifically address the secondary and postsecondary partners that contribute to and maintain this program of study.

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| --- | --- | --- |
| **Education Partnership Name** | **What role does this partner have in directly supporting your program of study?** | **How many years has this partnership been active, and how was this partnership developed?** |
| Bristol CommunityCollege - BCC | We have partnered with BCC through  VEX robotics (they have paid our registration fees), the statewide engineering articulation agreement (they have helped our students achieve an associate degree while preparing them for a four-year college). | Since 2010, we have worked with BCC providing engineering challenges and college presentations at Southeastern to our Engineering students. Our contact is now the Associate Dean of their New Bedford campus. The relationship strengthened when BCC became the Southeastern Massachusetts  VEX Competition Host |
| Quinsigamond Community College - QCC  | We have worked with QCC through  the VEX Robotics program and they have paid our registration fees for their competitions.. | Starting in 2010 while at MAVA conference we met the now, Dean of the School of Business, Engineering and Technology at QCC and through VEX robotics it has remained active and on-going. |
| Worcester Polytechnic Institute - WPI | WPI has directly supported our program by providing college credit and advanced placement for our engineering students. | We began the process of becoming a PLTW certified school in 2010 and achieving that goal in 2012. Since then we have worked together to continually  provide our students with a rigorous engineering program. |
| Keene State College  | Keene State educates our instructors so they can become OSHA outreach trainers. | Through an ongoing relationship since 2003, Keene State and our instructors have trained over 200 of our engineering students providing them with their OSHA 10 - General Industry card. We continue to provide this much needed safety training to our newly enrolled students. |
| Bridgewater State College  | Bridgewater State College mentors a group of male students through the 100 Males to College Initiative. In addition to the mentoring relationship, students also take a dual enrollment course on the Bridgewater Campus.  | This program was created to increase college access, enrollment, retention, and success for low-income males and males of color and particularly young, low-income Latino and African American men.  |

# **ALIGNMENT WITH INDUSTRY AND BUSINESS NEEDS**

1. Describe how your program of study is aligned with the needs of the workforce and industry in your community. Make sure to include information on how the program of study helps meet workforce demand identified by business and industry. What labor market data does your program of study use to align to workforce needs? (250-word limit)

**Through the Engineering Advisory Committee, members of industry assist and support our school personnel to improve planning, operation and the evaluation of the program. The committee consists of representatives of local business and industry members, post-secondary institutions, parents and guardians, students and representatives. Every effort is made to include racial and linguistic minorities, persons with disabilities and individuals in non- traditional occupations for their gender. This committee reviews curriculum to make sure the curriculum aligns to labor market data. They advise staff on labor market trends in the industry including current and future trends; advise methods of instruction, make suggestions of on the job training that occurs in business and industry; assists in the development of articulation agreements with local colleges, provide internships at their local businesses; and inform the school of opportunities to place students in cooperative education. In addition, our school monitors through our local workforce investment board (Mass Hire) industry trends and employment forecasting. In our region, there is a 10% increase in Computer and Information System Managers occupations; 17% increase in Computer Systems Analysists; a 1% increase in the need of Electrical Engineers; 3% Increase in Industrial Engineers; and a 4% increase in Engineering software developers and applicators. Southeastern continues to pull labor market data and trends and uses this information to build in content and alignment to its programs of study.**

1. Are ALL learners in the program of study required to participate in a work-based learning opportunity? Please describe the work-based learning opportunities available to learners who participate in this program of study. (250-word limit) **All of our vocational programs have the opportunity to participate in co-operative education after two years of study. Co-operative education means that students can go to work to expand their skills every other week instead of coming to school. Southeastern students all qualify for co-operative education during the second half of their junior year. Some students take advantage of this opportunity while others do not. However, the Engineering Department works with our school’s technology department on projects throughout the year so that students can apply the relevance of their learning. In addition, Southeastern offers additional opportunities for students to complete paid internships after school and over the summer. Engineering students assist with setting up new computer labs, updating software, designing new school maps, and other applicable tasks that allow them to transfer their learning to new situations. The Engineering Department is working with members of their program advisory board to build in a job shadowing opportunity at local engineering firms. This opportunity would expose our sophomores to shadow different industry representatives and will expose them to options before they select their postsecondary pathway.**

1. Please list the industry-recognized credentials/certifications/licenses offered/required. If your program of study does not include industry-based credentials/certifications, please explain why. (200-word limit) **Because of the heavy emphasis on post-secondary education and advanced course credit, Southeastern’s engineering program focuses more on course work than certifications. Industry recognized credentials such as OSHA General Industry is directly aligned to the Curriculum Frameworks. All Southeastern students graduate with this credential. However, through our program advisory board, if industry credentials become necessary for entry level employment, and are aligned to embedded academic and college pathways, the district will explore avenues to incorporate as part of the curriculum.**

|  |  |
| --- | --- |
| **Offered** | **Required**  |
| **OSHA General Industry**  | **OSHA General Industry**  |

1. Please provide information **at least three** *business, industry and/or labor* partnerships your program of study has, and describe how these partnerships have been built, maintained and sustained over time.

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| --- | --- | --- |
| **Business/Industry Name** | **What role does this partner have in directly supporting your program of study?** | **How many years has this partnership been active, and how was this partnership developed?** |
| Krohn-Hite Corp, 5 Jonathan Dr # 4, Brockton, MA 02301 | Co-Op PlacementsServes on the Advisory Board  | Since 1999 cold call from instructor as they provide information on up and coming trends in industry. |
| CM Tech Support, 75 1st St #7, Bridgewater, MA 02324 | Co-Op Placements; Serves on the Advisory Board | Since 2013 contacted School about shortage of workers in industry and hires students.  |
| Blueport Wireless, 2 Annette Rd #2, Foxborough, MA 02035 | Co-Op Placements; Serves on the Advisory Board | Since 2015Contacted School about hiring co-operative education students.  |
| Symantec, 2 Canal Park #5, Cambridge, MA 02141 | Co-Op PlacementsServes on the Advisory Board | Since 2015Contacted School about about hiring co-operative education students. |
| Wellington Management, 100 Campus Dr #3, Marlborough, MA 01752 | Guest speaker and serves on the Advisory Board | Since 2013 invited as was a former Co-Worker still working in industry |

1. Please feel free to use the space below to share any other information or evidence of success of your program of study and the learners who participate. (Optional)
2. If applicable, please provide more detail on any partnerships your program of study has that have not been mentioned already. This includes community groups, non-profits, volunteer organizations, etc. Describe how these partnerships have been built, maintained and sustained over time. (Optional)

|  |  |  |
| --- | --- | --- |
| **Additional Partnerships** | **What role does this partner have in directly supporting your program of study?** | **How many years has this partnership been active, and how was this partnership developed?** |
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# **SUBMIT YOUR APPLICATION**

**SUBMIT YOUR APPLICATION**

* Fill out this application.
* Once you have finished, complete [this form](https://careertech.org/2019-excellence-action-application) and upload the following:
* Your full application saved as a Word document (.docx)
* All of your supplemental documents or evidence consolidated as one PDF document.

**THANK YOU!**

Thank you for completing this application! You will know the status of your application by January 22, 2019. The programs of study will be evaluated based on their effective leveraging of partnerships, alignment to rigorous and relevant college- and career-ready expectations, clear progression of knowledge and skills across secondary and postsecondary systems, integration of successful career guidance/advisement, and key indicators of learner success.

Don’t forget to use the Excellence in Action award submission checklist to make sure you’ve completed your application in its entirety.

We look forward to learning more about your program!

For questions, concerns please contact awards@careertech.org.