



IT Networking – Information Systems
and Technology
Applied Baccalaureate Degree Program

Statement of Need

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Cover Sheet
STATEMENT OF NEED

Program Information

Institution Name: Tacoma Community College

Degree Name: IT Networking - Information Systems and Technology CIP Code: 11.0103

Name(s) of existing technical associate degree(s) that will serve as the foundation for this program:

Degree: AAS Networking and Cyber Security CIP Code: 11.0901 Year Began: 1985

Degree: _____ CIP Code: _____ Year Began: _____

Proposed Start Implementation Date (i.e. Fall 2014): Fall 2019

Projected Enrollment (FTE) in Year One: 20 at Full Enrollment by Year: **2023**

Funding Source: State FTE: Self-Support: Other:

Mode of Delivery

Single Campus Delivery: Tacoma Community College

Off-site: _____

Distance Learning: Hybrid

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Introduction

Tacoma Community College (TCC) is proposing a Bachelor of Applied Science (BAS) Degree in IT Networking (ITN) with a specific focus on Information Systems and Technology (IST). This new offering will create a pathway for graduates from TCC's Networking and Cyber Security Associate of Applied Science Degree. The proposed degree will provide holistic education that will enable graduates to meet the needs of a broad scope of technical skills in high demand that area employers desperately need. The program will focus on security, networking, and databases with emphasis on highly desirable industry certifications, ethical behavior, diversity and equity, and soft skills. This Information Technology (IT) Bachelor Degree aspires to increase access and mitigate or remove the significant barriers faced by current graduates of applied associate degree programs when trying to pursue further education.

The widespread adoption of technology into every aspect of daily life has fueled the rapid and continued growth of a wide range of Information Technology careers. Many of these new positions require bachelor's degrees. Additionally, many current IT professionals require additional training to further their career and can accomplish this through the pursuit of a BAS Information Technology Networking – Information Systems and Technology (ITN-IST) from Tacoma Community College. Tacoma community College currently has a robust Networking and Cyber Security (NCS) Associate's degree program on which to build a successful BAS ITN-IST.

TCC's BAS ITN-IST program outcomes include student's ability to:

1. Evaluate and implement effective communication across all levels of the organization and to diverse audiences using language, tools, concepts and ethical technology principles necessary to achieve desired outcomes.
2. Apply an understanding of the value of diversity and community as it relates to technology fields with attention to the dynamics of power and privilege.
3. Design policies that support data integrity, confidentiality, availability, and security within the organizational structure.
4. Demonstrate innovation and critical thinking, teamwork, and technical proficiency commensurate with duties of an information technology professional.
5. Analyze, evaluate, and implement decision-making strategies applying analytical tools, information systems and emerging technologies.
6. Adapt emerging technologies to improve business process and eliminate security vulnerabilities.
7. Develop realistic and comprehensive project plans, identify risk areas, monitor the plans, and deal with problems through appropriate use of project management techniques.
8. Classify access levels and fair use policies, recommend acceptable resolutions of ethical issues and dilemmas to improve organizational outcomes.
9. Analyze data to solve problems, explain performance, make decisions, and identify opportunities.
10. Investigate and mitigate threats to network infrastructure and data and provide adequate countermeasures.

As of the date of this proposal the Bureau of Labor Statistics has designated information technology fields as a high growth area. Their data projects a 13 percent growth from 2016 to 2026 higher than the average for all occupations nationally. The Puget Sound region serves as one of the primary hubs for technology fields in the world and as seen by the State Economic and Revenue Forecast Council, "Demand is expected to continue as these jobs become more and more ubiquitous across all sectors".

Criteria One: Institutional Role and Mission

The proposed BAS ITN-IST supports the role and mission of Tacoma Community College and reflects its program priorities as demonstrated by the TCC mission and key priorities in the TCC 2014-2018 Strategic Plan.

Tacoma Community College (TCC) is a public, two-year institution of higher education authorized by the State of Washington under the Community College Act of 1967. The college offers comprehensive educational and service programs to meet the needs of the students and communities in our service area. In addition to providing associate degrees in a number of areas for students with 4-year university transfer intent, TCC is committed to creating high-quality workforce education opportunities for Tacoma and the surrounding area. Currently TCC offers certificates and Associate in Applied Science degrees in 12 programs and most recently has added BAS degrees in Health Information Management (Fall, 2016) and Community Health (Fall, 2018).

TCC is one of nineteen Washington colleges participating in Achieving the Dream (ATD), a national, foundation-funded student success initiative focused on students of color and low-income students. This initiative has increased the college's institutional research capacity, fostered evidence-based decision making across the college, and facilitated the development and implementation of interventions to increase student success, particularly that of historically underrepresented populations.

Tacoma Community College's mission is to create meaningful and relevant learning, inspire greater equity, and celebrate success in our lives and our communities. The college meets its mission through the Strategic Plan 2014-2018 which focuses broadly on learning, equity, community, and discovery. Within the strategic plan, TCC has identified several priorities which align with the development of an applied baccalaureate in IT Networking - Information Systems and Technology. These include:

- **Theme One: Create Learning.** Ensuring College curricula meet current and emerging workforce competencies, transfer requirements, and the educational goals and priorities of our students.
- **Theme Two: Achieve Equity.** Increasing completion rates for diverse populations in all academic programs, with emphasis on those that lead to higher wage employment.
- **Theme Three: Engage Community.** Developing strong relationships and partnerships with local employers, including active program advisory committees, in order to meet their employment needs.
- **Theme Four: Embrace Discovery.** Continuously exploring and evaluating new and emerging fields of business so that Tacoma and Pierce County can benefit from these opportunities by providing graduates with the necessary knowledge and skill sets.

The proposed BAS ITN-IST degree has been discussed on the TCC campus soliciting input from faculty, staff and students. The vetting process at TCC has included widespread sharing and discussion of the proposed Statement of Need with administration through formalized meetings with all of the Instructional Deans, as well as meetings with the Student and Administrative Services Group (which includes all Instructional Administrators as well as Executive Staff). In addition, the Statement of Need has been presented at multiple faculty groups, to include Faculty Forum, and Instructional Council. The

proposed degree has also been discussed and endorsed by our professional technical program advisory committees. Finally, this degree has been discussed with student groups and we have performed a formal survey of the target student populations.

Criteria Two: Support of Statewide Strategic Plan

The development of a BAS ITN-IST supports both the WSAC and SBCTC missions, goals, and strategies as outlined in their organizational documents.

The 2013 WSAC Roadmap speaks to demographic and economic imperatives for both increased postsecondary attainment and alignment between credentials and degrees with employees' skill needs and employment opportunities. The Roadmap identifies three strategies to meet these imperatives: ensure access by making education more affordable; enhance learning through use of technology to improve student outcomes; and prepare for the future challenges by responding to student, employer and community needs. The BAS ITN-IST at Tacoma Community College addresses all three of these strategies by providing a cost effective alternative in the Tacoma/Pierce County area, leveraging the successful online education already in place at TCC, and preparing the workforce in the Tacoma area through education to meet current and future demand of employers. Finally, the Roadmap's emphasis on adult learners is met by an intentional expansion of adult-centered learning principles currently designed into the all professional technical programs as Tacoma Community College develops the applied baccalaureate content.

The follow up WSAC 2015 Roadmap Report reported a number of issues, three of which the BAS ITN-IST in addresses.

1. The least educated were hit hardest by the last economic downturn.
The BAS ITN-IST addresses this issue by providing a new and different pathway to a bachelor's degree thereby making the graduates more resilient in economic downturns.
2. Employers are finding it harder to find qualified employees.
The BAS ITN-IST addresses this issue by creating a made-in-Washington skilled workforce ready and able to fill openings for current Tacoma-area employers and more attractive to future employers.
3. Persons of color are the largest growing demographic in WA State but have been traditionally underserved by postsecondary education.
In Academic Year 2016-17, 40% of the graduates from the NCS AAS degree were students of color compared to 31% of graduates college-wide. A BAS ITN-IST degree would give those graduates, who are largely students of color, a pathway to seamlessly advance to a bachelor degree program and all the economic potential it holds.

The SBCTC Mission Study (2010) focused on economic demand, increased educational attainment particularly for underserved populations, and instructional innovation in framing its recommendations. Specifically, the study suggests that "Washington...needs more people with baccalaureate and graduate degrees. Community and technical colleges must expand their contribution to help meet this need."

The mission study also outlines ten action items that are met by Tacoma Community Colleges' applied baccalaureate in ITN-IST. These include:

- Serving more students, particularly the underserved;
- Closing skills gaps between what technically trained workers can do and what industries in Washington need;
- Contributing to the production of baccalaureate degrees that meet regional needs and are oriented towards competitiveness for employment;
- Creating seamless pathways in P-20 with stackable credentials from the AAS in Business, AAS in Accounting, AAS in Paralegal, and others to the BAS in ITN-IST;
- Using technology to invest in a 21st century learning infrastructure including eLearning and online student services. Tacoma Community College has years of experience in offering quality online and blended learning and continually seeks out new technologies to enhance education clearly demonstrating our commitment.

Finally our proposal to create a BAS ITN-IST at Tacoma Community College helps fulfill the SBCTC's goals "increase educational pathways for professional and technical associate graduates who have been limited in their ability to apply credits toward a bachelor degree"; "meet state goals for increasing the overall number of baccalaureate degrees" and "expand the workforce mission of community and technical colleges to serve the needs of local and state employers".

Criteria Three: Employer and Community Demand

Tacoma-Pierce County Business Environment

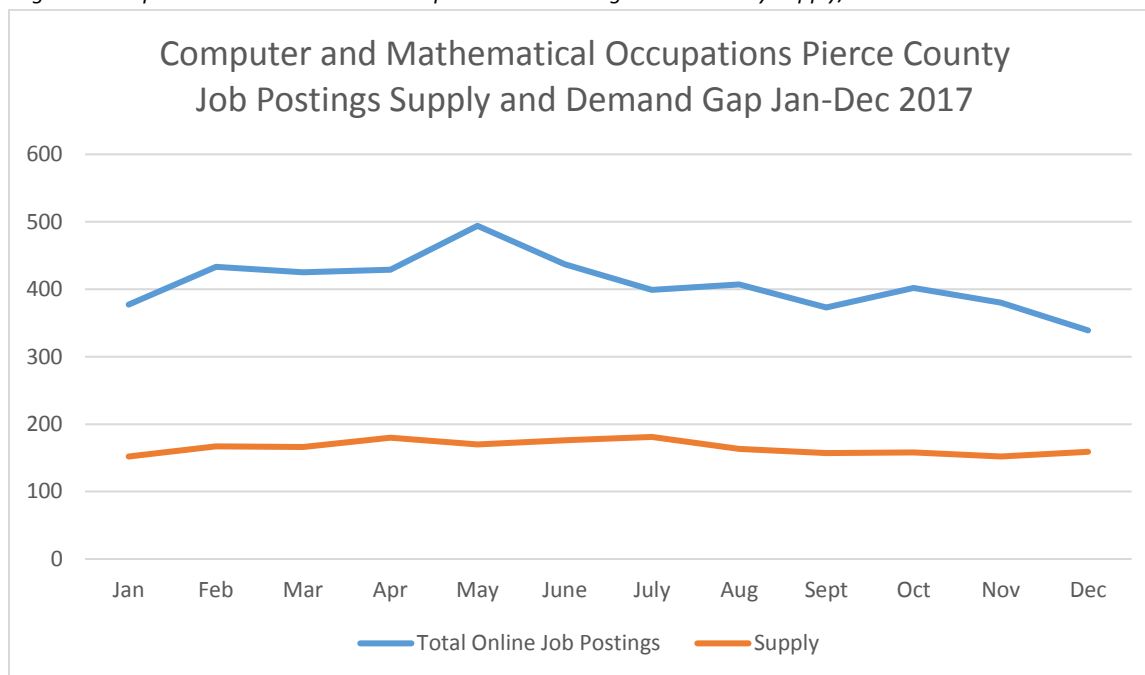
Tacoma Community College is located in Tacoma, Washington in Pierce County. Pierce County is the second largest county in the state of Washington and Tacoma is the third largest city. According to the U.S. Department of Commerce, the estimated population size of Pierce County in 2017 was 861,312, 62.9% of which are between the ages of 18-64; 25.4% of person's age 25+ have a bachelor's degree or higher. (2017). The city of Tacoma is home to an estimated 211,277 persons, 66% of whom are between the ages of 18-64; 26.7% of whom have a Bachelor's degree or higher. (U.S. Department of Commerce, 2017). The total number of employer establishments in Pierce County for 2015 was 17,012. (U.S. Department of Commerce, 2017) .

Labor Market Demand

Washington State as a whole is experiencing a large gap in supply in Computer Systems. According to the Labor Market Supply/Demand Annual report (which takes into account the number of graduates from colleges and universities entering the workforce as well as the number of unemployed insurance (UI) claimants) - there is a gap of 46,149 in Computer Systems fields in Washington State. (2017).

Tacoma-Pierce County's IT businesses continue to grow as does the need for qualified bachelor level business employees. According to Washington State's Employment Security Department (ESD), for the period of January-December 2017, Pierce County saw a demand of 4,895 postings for Computer and Mathematical Occupations with a supply of qualified prospective employees of 1,981 leaving a gap of 2,914 (see figure 1). (2017).

Figure 1 Computer and Mathematical Occupations Job Postings Pierce County Supply/Demand Jan-Dec 2017



The Employment Security Department’s long-term projections for the general category of SOC 15-1100, Computer Occupations, shows an estimated employment in Pierce County 2015 of 5,337 with an estimated employment of 7,634 by 2020, which is an average annual growth rate of 7.42% with further estimated employment of 8,911 projected by 2025 – which is an average annual growth rate of 3.14%. (Washington State Employment Security Department, 2017).

Table 1 Long Term Occupational Projections for Computer Occupations Washington State Employment Security Department

SOC	Occupational Title	Est Employment 2015	Est Empl 2020	Est Empl 2025	Average Annual Growth rate 2015-20	Average Annual Growth Rate 2020-25	Average Annual Opening due to growth 2015-20	Average Annual Opening due to growth 2020-25	Average annual total openings 2015-20	Average annual total openings 2020-25
15-0000	Computer and Mathematical Occupations	5,758	8,118	9,462	7.11%	3.11%	471	269	2,341	2,615
15-1100	Computer Occupations	5,337	7,634	8,911	7.42%	3.14%	458	255	2,246	2,507

While professionals with information technology degrees could work in any number of fields, TCC’s attention is focused on occupational classifications that most closely reflect natural pathways for graduates of our NCS AAS degree. TCC was careful not to include classifications that require a degree in Computer Science, but instead focus on the networking aspects of Information Technology. The following occupations all require a bachelor’s degree for entry level (as specified by the Employment Security Department website), have sizeable demand, and are high wage earning (see table 2). Labor

data illustrates that the five occupational categories targeted by TCC indicate a significant gap in supply of 1,197 qualified professionals for the time period of January through December 2017. (2017).

Table 2 ESD Occupations In Demand List

Occupation	SOC Code	Est Employment (2015)	Avg Annual Openings (2015-2025)	Avg Annual Growth Rate (2015-2025)	Avg Annual Wage (2017 Q1)	ESD Supply/Demand Gap Jan-Dec 2017
Computer Systems Analysts	15-1121	544	213	3.9%	\$84,978	499
Information Security Analysts	15-1122	254	98	4.1%	\$97,997	196
Database Administrators	15-1141	89	38	4.9%	\$77,951	46
Network and Computer Systems Administrators	15-1142	561	195	2.4%	\$76,120	453
Computer Network Architects	15-1143	103	28	1.4%	\$83,968	3

According to a June 2017 snapshot provided by Burning Glass through the SBCTC, there is an unmet demand for bachelor level computer and IT positions in Pierce County. Burning Glass notes, “On average, there are 1,112 unique job postings in this career area and region each year, and 241 graduates” (Burning Glass, 2017).

The supply gap in Pierce County is very large. TCC understands the great need and while we realize that the addition of this program will not fill this gap, it is movement in the right direction. Our main focus is that graduates from the ITN-IST degree will be qualified to get jobs in the county they live in when they are done. Adding in our ITN-IST degree will not solve the problem facing the shortage in our area, but we can provide more opportunity to Pierce County residents to get fulfilling, well-paying jobs and provide Pierce County with a more educated workforce to attract from.

TCC has received enthusiastic endorsement of this proposed degrees by members of our Associate of Applied Science Networking and Cyber Security degree advisory board members. The advisory committee includes employers from the IT industry, including Western State Hospital, Networking Computing Architects, Hewlett Packard Company, InsynQ Inc., 2Bridges Tech, City of Tacoma, Internet Identify, Amazon, and Columbia Bank.

Supply

Pierce County includes five four-year universities and colleges and four community and technical colleges (see table 3). Three of the five universities are regional universities, University of Washington-Tacoma, The Evergreen State College-Tacoma, and Central Washington University-Pierce. University of Puget Sound and Pacific Lutheran University are private universities.

Table 3. Pierce County Institutions of Higher Education

Four-Year Universities and Colleges	Community and Technical Colleges
University of Washington Tacoma	Tacoma Community College
Pacific Lutheran University	Pierce College
University of Puget Sound	Bates Technical College
The Evergreen State College Tacoma	Clover Park Technical College
Central Washington University - Pierce	

Three of the universities in Pierce County offer a bachelor degree in computer science. The University of Washington-Tacoma (UW-T) offers a Bachelor of Art and a Bachelor of Science in Computer Science and Systems and a Master of Science in Computer Science and Systems. Pacific Lutheran University offers a Bachelor of Science and a Bachelor of Arts in Computer Science, and the University of Puget Sound offers a Bachelor of Science in Computer Science. Computer Science Degrees differ greatly from IT Networking Degrees. Computer Science degrees focus on coding and building software, whereas the IT Networking degrees maintain the networks used to run that software. These are very different skill sets. The University of Washington-Tacoma does offer a Bachelor of Science in IT

Using IPEDS data on completions for the 2016-2017 academic year, there were 299 bachelor prepared graduates in computer science and 121 master’s prepared graduates (see table 4). We did not include Central Washington University’s (CWU) Information Technology and Administrative Management (ITAM) degree in the IPEDs data below as they are not a computer science degree, but instead adds the business components to someone who already has a technology degree, although CWU reported 95 bachelor level graduates and 33 Master’s level graduates in Computer and Information Sciences and Support Services for their college as a whole (not specific to Pierce County).

Table 4 Computer and Information Sciences and Support Service Graduates 2016-2017 IPEDS

College/University	Bachelor Degrees	Master’s Degrees	Total
Pacific Lutheran University	28		28
University of Puget Sound	25	0	25
University of Washington – Tacoma	246	121	369
TOTAL	299	121	420

Criteria Four: Building on existing Professional and Technical Degree Programs

The target population for this degree will be graduates from TCC's NCS Associate of Applied Science Degree.

TCC has graduated over 174 students in this degree over the past five years (see table 5).

Table 5 Graduates NCS five years 12-13 through 16-17

AY12/13	QY13/14	AY14/15	AY15/16	AY16/17	Total
36	27	44	30	37	174

In addition to the graduates listed above, this degree may eventually allow a pathway to baccalaureate level education for graduates from other networking and Cyber Security degree programs from other community and technical colleges.

Degree Specifics

Associate of Applied Science in Networking and Cyber Security

The Networking and Cyber Security program initially began as the Computer Information Management Systems AAS degree in 1985. This degree has changed, both in name and curriculum, over the past thirty three years to keep up with advancing technology as well as to meet the needs of our local employers. Today, this 93 credit program prepares students for a career in database administration, network administration, and technical support with a focus on cyber security.

Issues of Equity

According to the SBCTC’s conclusion in their 2014 Progress Report on Student Access and Success, “Professional technical education is the predominant entry way for state population groups identified as under-represented in post-secondary attainment” and that “the results by race and ethnicity highlight the challenges for increasing college attainment for Hispanics, Black/African American, and American Indian/Alaskan Native and Hawaiian/Pacific Islander students. “ (p. 6).

Review of the student population of the NCS degree shows that, as suggested in the SBCTC Progress Report, this program is serving a significant population of under-represented groups. Using data from our Civitas, Illume Students Database, we can see that there are current 115 students who are coded as in program for the NCS degree and are enrolled in courses for Spring quarter 2018. These 115 currently enrolled students show a racial makeup of 50% who self-identified as white or Caucasian, 29% who self-identified as persons of color, and 21% who did not identify their race (see table 6).

Table 6 Race of NCS Applied Science Students Spring quarter 2018

Race	White or Caucasian	Black or African American	Asian	American Indian/Alaskan Native	Pacific Islander	Two or More	Unknown	Total
NCS students	57	17	6	1	2	6	26	115

Using our Civitas Data for students enrolled Spring 2018, 19% of students self-identified as female, 70% identified as male and 10% chose not to identify (see table 7).

Table 7 Gender of Networking and Cyber Security Applied Science Degree Students Spring quarter 2018

Gender	Male	Female	Not Specified	Total
NCS Students	81	22	12	115

Finally, graduates from these programs will likely face barriers to continuing their education, such as being older, having family obligations, and working while completing school. Using data from our Civitas, Illume Students Database, out of the 115 students currently enrolled in these programs during

Spring 2018, 43% of the currently enrolled students were over the age of 35 with 15% being over the age of 50 (see table 8).

Table 8 Age of Networking and Cyber Security Applied Science Associate Degree Students Spring Quarter 2018

Age	<18	18-19	20-21	22-24	25-29	30-34	35-39	40-48	50-64	65+	Total
NCS Students	1	3	8	12	20	22	16	16	16	1	115

Criteria Five: Student Demand

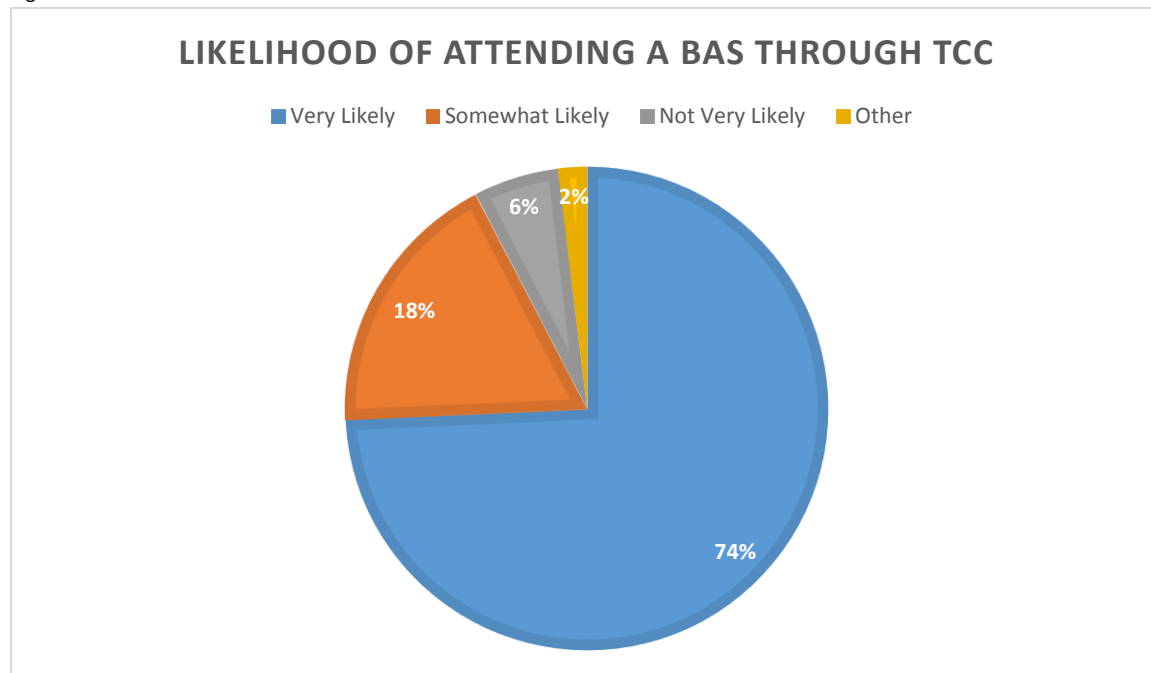
During the Winter and Spring quarters of 2018, TCC surveyed current students of our NCS AAS degree. We received 105 responses. Of particular note:

- 97 respondents indicated that they had considered pursuing a bachelor degree
- 74 respondents were either unsure of or felt that they did not have sufficient pathways to pursuing a bachelor degree

When asked, “If Tacoma Community College offered an Applied Bachelor of Science degree in Networking, how likely you would be to enroll,” 92.3% of respondents were either somewhat or very likely to attend (see figure 2).

- 78 students indicated they were very likely,
- 19 indicated somewhat likely
- 6 answered not very likely
- 2 said it would depend on when we offered it

Figure 2



Cohort Size

TCC plans to allow students to attend full time or part time. TCC will phase in one 20 student cohort at a time over three years until we are at full capacity of three full cohorts, or 60 students. TCC projects the following enrollments for the first five years (see table 9).

Table 9 Five Year Proposed Cohort Size

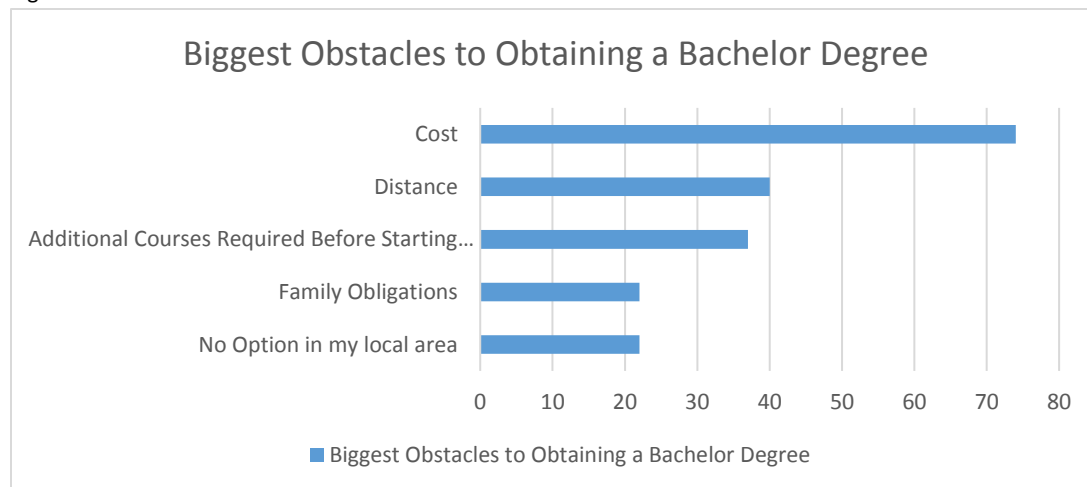
Student Type	FY19-20	FY20-21	FY21-22	FY22-23	FY23-24	TOTAL
New Students (10 credits or more upper division)	20	40	60	60	60	240
New Part time (5 credits upper division)	2	2	2	2	2	10
TOTAL	22	42	62	62	62	250
Continued 10 credits or more upper division	0	22	38	58	58	176
Continued 5 credits upper division		2	2	2	2	8
Headcount	22	66	102	122	122	434

Criteria Six: Service Place-Bound Students

Place Bound Students

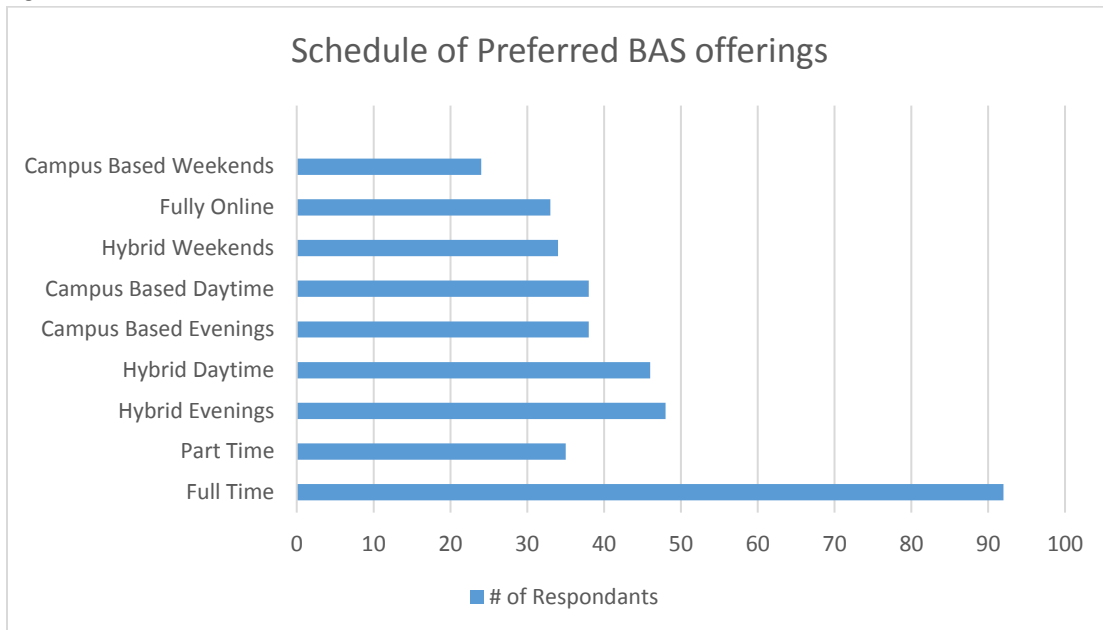
In the survey to our potential student pool 97 of our 105 respondents answered that they had considering pursuing a bachelor degree. When we asked them why they had not done so yet, the top answers were cost, distance, money, having to do an additional year of schooling before they could apply, and family obligations (see figure 3).

Figure 3



The majority of students who decide to pursue TCC's BAS ITN-IST are likely already working. Many of them will be full time employees. With this in mind, we asked potential students what kind of scheduling would allow them to pursue a bachelor degree. It is clear that students need both full and part time options. The overwhelming majority requested online or hybrid options (see figure 4).

Figure 4



Students clearly need full and part time options as well as a variety of modalities of delivery. The majority of students indicated they preferred a hybrid option with a pretty even split on daytime versus evening options. Keeping in mind not only the cost of the education itself, but that entailed in moving to access education, TCC will work to offer options for working, place bound professionals to include full and part time options, as well as daytime, evening, and weekend hybrid options to maximize access to those currently without.

Surveyed students were also offered the chance to comment on the possibility of a BAS ITN-IST at TCC. The comments showed support for this idea. A sampling of comments include:

- “TCC is a wonderful school. It would be terrific if students in IT could complete an accredited 4 year degree at TCC.”
- “A bachelors program would be a great idea. The biggest advantage would be saving credits so as to be a junior already.
- “I would absolutely love a bachelor’s program for TCC, please! Transfer options are slim pickings and I enjoy the instructors at TCC.”

Similar Programs in the Area

As stated previously, there are three schools in Pierce County with bachelor level or above education in a computer related field. In addition, Clover Park Technical College has indicated an interest in a BAS in Cyber Security. Central Washington University has a BAS in Information Technology and Administrative Management, which is not a technology degree but instead an IT management focused degree (see table 10).

Table 10 Business, Management, Marketing, and Related Support Service Graduates

College/University	Bachelor Degree
Clover Park Technical College	Bachelor of Applied Science in Cyber Security.
Pacific Lutheran University	Bachelor of Science in Computer Science Bachelor of Arts in Computer Science
University of Puget Sound	Bachelor of Science in Computer Science
University of Washington - Tacoma	Bachelor of Science in Computer Science and Systems Bachelor of Arts in Computer Science and Systems Bachelor of Science Information Technology
Central Washington University – Pierce College	BAS Information Technology and Administrative Management Bachelor of Science Information Technology and Administrative Management

Computer Science Degrees differ greatly from IT Networking Degrees. Computer Science degrees focus on coding and building software, whereas the IT Networking degrees maintain the networks used to run that software. These are very different skill sets.

The University of Washington-Tacoma (UW-T) offers a Bachelor of Art and a Bachelor of Science in Computer Science and Systems. The degree offered at UW-T focuses on software design, development, and maintenance, whereas the degree at TCC is focusing on security, networking, and databases. Admission to this major at UW-T is capacity-constrained. To apply to this competitive entry program, students must have completed Calculus I, Calculus 2, a lab based science, such as physics or chemistry, and Introduction to Programming course and an Object-oriented Programming course. Graduates from TCC’s CSN Applied Science degree are required to take BUS 110 which is equivalent to Introductory Algebra. These CSN graduates would need to take 6-7 math classes to meet the application requirements (which would include MATH 90 (Elementary Algebra), MATH 95 (Intermediate Algebra), MATH 140 (Introduction to Precalculus), MATH& 141 (Precalculus I), MATH& 142 (Precalculus II), MATH& 151 (Calculus 1), MATH& 152 (Calculus II). In addition, CSN graduates are not required to take a lab based science or programming course, so those courses would also need to be completed prior to making application to this competitive program. It would therefore take students 6-7 quarters (two years) to make application to this UW-T program.

The University of Washington-Tacoma also offer a Bachelor of Science in IT. The curriculum and job focus of the UW-T IT degree shares many similarities with TCC’s proposed ITN-IST degree. Our differences are most pronounced in areas of focus on industry certifications and admission requirements. Firstly, the ITN-IST degree at TCC will focus on teaching to industry certifications, requiring completion of said certifications as part of some course requirements. Secondly, the admission requirements are significantly different between the two programs. To apply to this competitive entry program, students must have completed Precalculus I & II and Introduction to Programming. As stated above, graduates from TCC’s CSN Applied Science degree are required to take BUS 110 which is equivalent to Introductory Algebra. These CSN graduates would need to take 4-5 math classes to meet the application requirements (which would include MATH 90 (Elementary Algebra), MATH 95 (Intermediate Algebra), MATH 140 (Introduction to Precalculus), MATH& 141 (Precalculus I), MATH& 142 (Precalculus II). In addition, they would need to take the programming course, which has precalculus as a prerequisite. It would therefore take students 5-6 quarters to be ready to make

application to the UW-T IT program. The TCC admission requirements include statistics, with an option to do the statway pathway, which would require one additional quarter of math prior to beginning the ITN-IST BAS. As already shown, the supply gap specific to the career fields for graduates from IT Networking focused degrees is significant, with a supply gap of 1,197 for our five job areas of focus (see table 2).

Central Washington University (CWU) has a branch campus on the Pierce College campus that offers a Bachelor of Science and a Bachelor of Applied Science in Information Technology and Administrative Management (ITAM). The ITAM degree offered by CWU is intended to add the business components to a student with technical knowledge. The ITAM degree through CWU focuses on areas of project management, customer relationship management, leaders/management, and business communications. TCC’s IST-BAS degree will focus on the technical aspects involved in security, networking, and databases.

Pacific Lutheran University offers a Bachelor of Science and a Bachelor of Arts in Computer Science, and the University of Puget Sound offers a Bachelor of Science in Computer Science, both of which prepares students to work as software developers. Again, TCC’s proposed degree will focus on security, networking, and databases.

Clover Park Technical College has indicated an interest in exploring a Bachelor of Applied Science in Cyber Security. With such a substantial unmet need for information systems graduates in Pierce County, Tacoma Community College and Clover Park Technical College are committed to collaboration around information systems and technology options to meet the diverse needs of the students, employers, and the Pierce County community. TCC and Clover Park will support the needs of our county and differing populations by coordinating information technology options, to include the modality of offerings, specializations, and shared courses.

From 2011 to 2016, there have been eighteen students that have transferred from TCC’s NCS program to one of our university partners (see table 11).

Table 11. TCC Graduates with cip code 110901 between 2011-2016

College	11-12	12-13	13-14	14-15	15-16	Total
Central Washington University	5	0	0	6	0	11
The Evergreen State College	0	1	0	0	0	1
University of Washington – Tacoma	2	2	2	0	0	6
Total	7	3	2	0	0	18

Collaborations

TCC has made contact with several local community and technical colleges to begin conversations about collaborations and articulations.

- TCC has been in contact with Bates Technical College and will work to convene a meeting to work on student pathways.

- June 8, 2018 TCC had preliminary discussion with Pierce College on pathways for students in their Computer Network Engineering Associate (CNE) degree. In attendance at this meeting from Pierce College was Ron May, Dean of Health and Technology, Donna Moran, Program Coordinator for CIS/CNE/HIT, Sam Scott, CIS Instructor, Ciaran Bloomer, Computer Network Engineering Instructor, and Sharon Huitsing, Assistant Professor. In attendance from TCC was Sergio Hernandez, Program Chair for the Networking and Cyber Security AAS, and Jeremy Sims, Faculty in the Networking and Cyber Security AAS. Ciaran Bloomer indicated a willingness to work with TCC on partnerships and review curriculum to allow for smooth transition for students for whom the TCC degree would be appropriate.
- Clover Park Technical College has indicated an interest in exploring a BAS in Cyber Security for their student population. TCC and Clover Park met and both are committed to a collaboration around information technology options to meet the diverse needs of the students, employers, and the Pierce County community. TCC and Clover Park will support the needs of our county and differing populations by coordinating information technology options, to include the modality of offerings, specializations, and shared courses.

Conclusion

Labor market data shows an unmet need for computer and IT related professionals in the Tacoma-Pierce County area. The SBCTC's own studies show that under-represented groups participate at a higher rate in professional technical areas. By adding a BAS in IT Networking - Information Systems and Technology at TCC we hope to fill the gap in our workforce, as well as provide pathways to bachelor education to students who traditionally felt they had no option to go beyond their associate degree. This proposed BAS will allow students to stay in their current industry while providing them with the skills they need to improve their career.

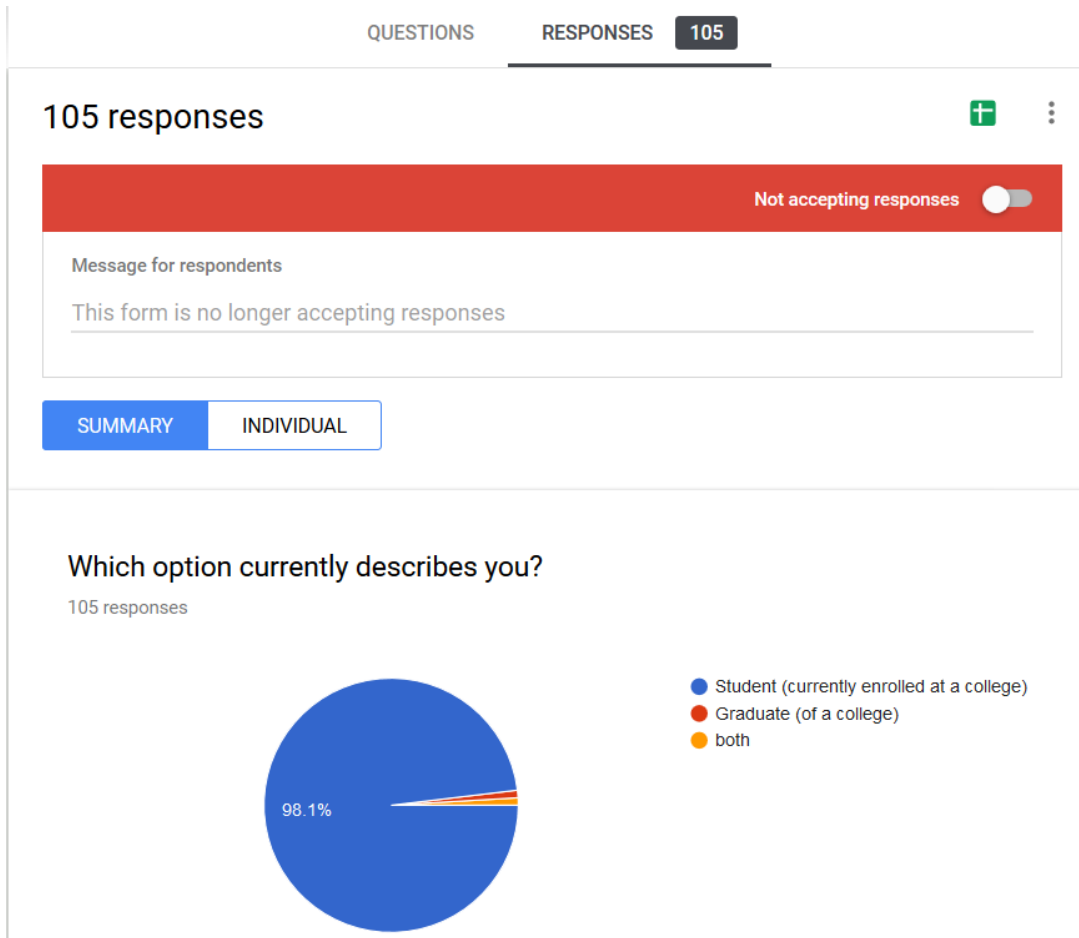
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Appendix B Student Survey Results

Access live results at:

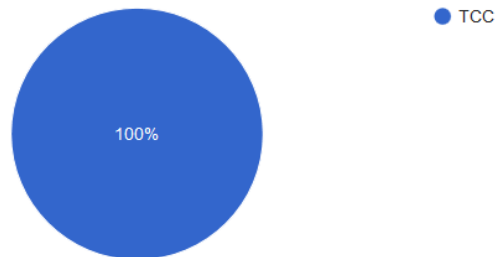
<https://docs.google.com/forms/d/1NiS9Pvs0WL78n6vLo6LT3leSTWK2XoUeTNYNMuns1GU/vi/ewanalytics>



Student

Where are you a student?

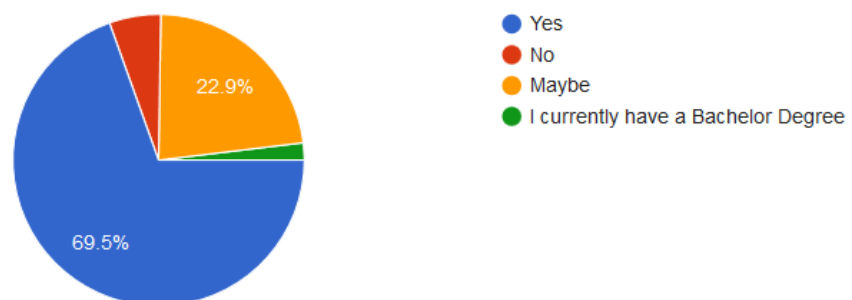
103 responses



Continued Education?

Do you plan to pursue a bachelor degree?

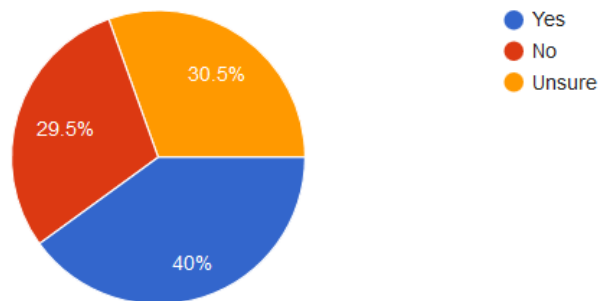
105 responses



Bachelor Degree Options?

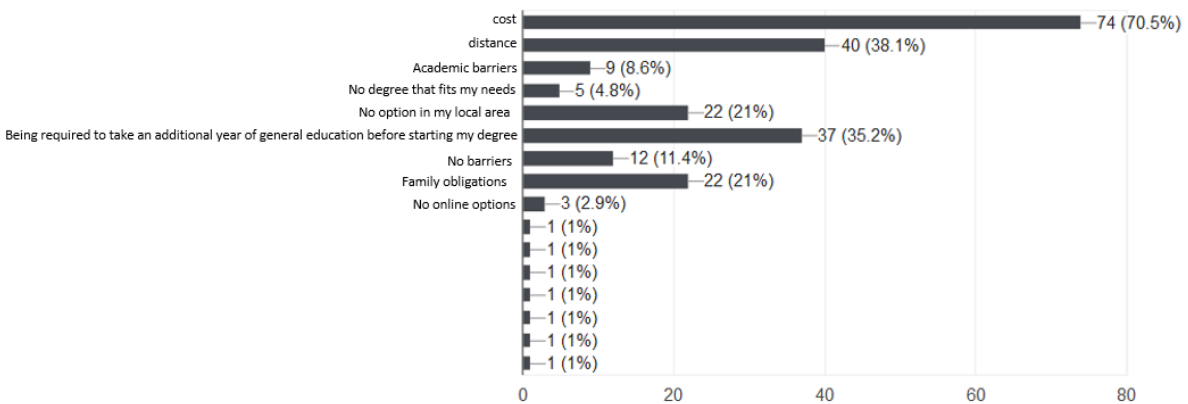
Do you feel that you currently have sufficient ways (or options) to earn a Bachelor Degree?

105 responses



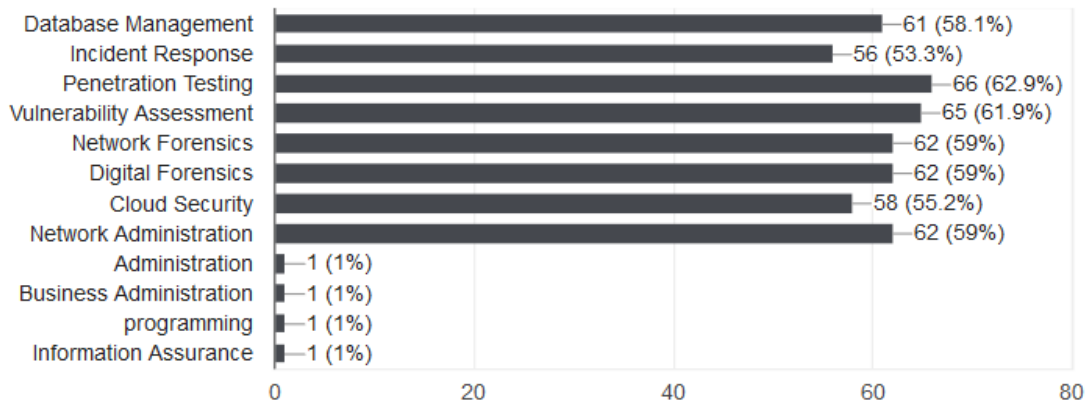
What are your biggest obstacles to attaining a bachelor degree?
(choose all that apply)

105 responses



If you were to pursue a Networking bachelor degree, what content areas would you be interested in? (check all that apply)

105 responses



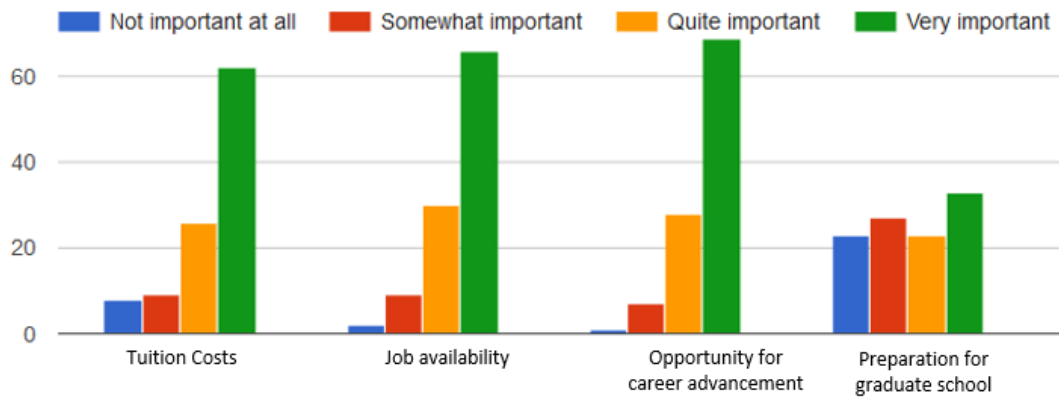
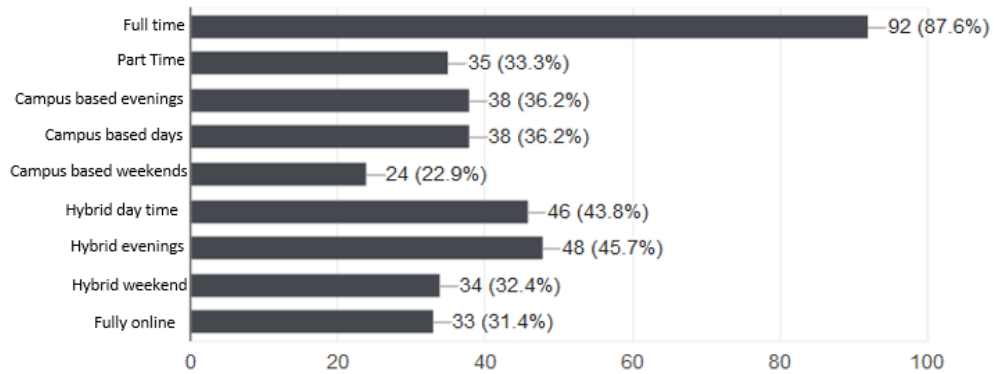
If Tacoma Community College offered a bachelor degree in IT Networking with a focus in Information Systems and Technology , how likely would you be to enroll?

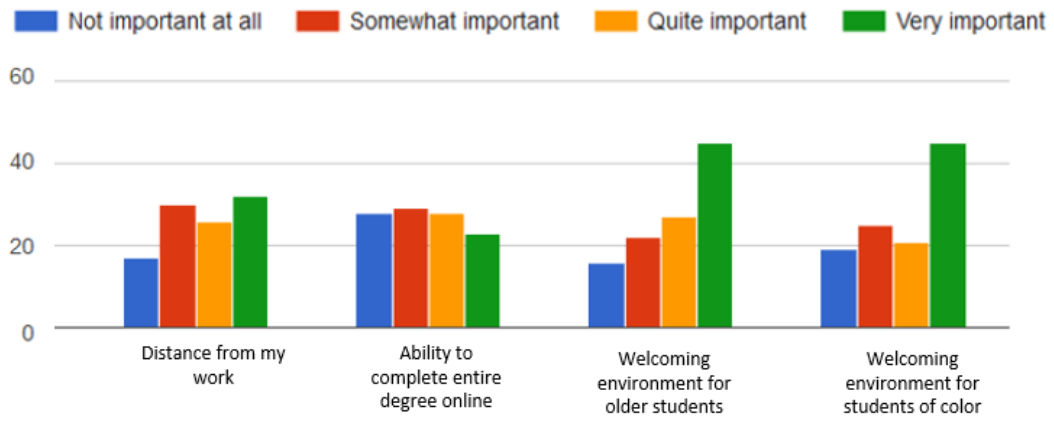
105 responses



If you were to pursue a bachelor degree option through Tacoma Community College, which scheduling options would be most preferable? (check all that apply)

105 responses

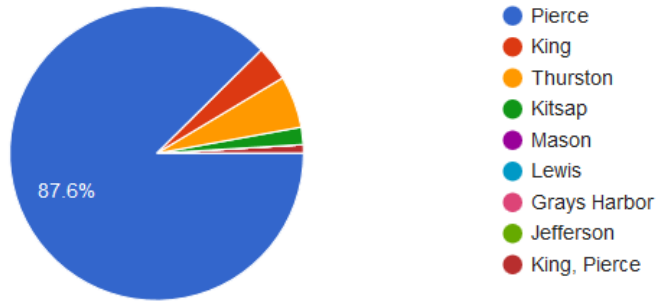




Demographics

In which county do you live?

105 responses



Please feel free to leave comments

20 responses

I would only attend for a B.S. if the curriculum content was updated.

This would be awesome!

I would be interested in pursuing a bachelors degree but I have no idea what field I would want to pursue. I know I want to be in the IT industry, but I am still figuring out where I will fit into it.

I am very interested

Thank You! JR. Caragan

If this program was put in place by next year I could continue my education with TCC, otherwise I would have to go to WGU

Thank you!

TCC is a wonderful school. It would be terrific if students in IT could complete an accredited 4 year degree at TCC.

it would be so much easier if TCC offered a bachelor degree so that I wouldnt have to tranfer after finishing my 2 yr degree at TCC.

Thanks!

Please set this up so we can do one or two classes at a time instead of a block for those of us who have no financial aid. This program is a spectacular idea!

is a BA in networking and cybersecurity came to TCC it would be helpful

If it doesn't take that long I would go for my bachelor's here at TCC.

A bachelors program would be a great idea. The biggest advantage would be saving credits so as to be a junior already.

This was very informative and encouraging for all future prospects students.

Love this program, and the entire community on campus.



Thank you sims and hernandez and Simpson

I would absolutely love a bachelor's program for TCC, please! Transfer options are slim pickings and I enjoy the instructors at TCC.

I plan on transferring to UW-T. If a four-year opened I would be very interested in finishing at TCC.