APPENDIX K: CYBERSECURITY EDUCATION PROGRAMS SURVEY

Part II: Program Information

Q5. Does your college currently offer *programs* (majors, concentrations, or certificates) or *coursework/training* related to the following topics? (Note: these categories are from the NICE Cybersecurity Workforce Framework)

	Yes (program currently exists)	**No** (program does not exist; no plans to develop)	**No** (but we are considering adding/ developing)
Securely Provision (includes: Risk Management; Software Development; Systems Architecture; Technology R&D; Systems Requirements Planning; Test and Evaluation; Systems Development)			
Operate and Maintain (includes: Data Administration; Knowledge Management; Customer Service and Technical Support; Network Services; Systems Administration; Systems Analyst)			
Oversee and Govern (includes: Legal Advice and Advocacy; Training, Education and Awareness; Cybersecurity Management; Strategic Planning and Policy; Executive Cyber Leadership; Program/Project Management and Acquisition)			
Protect and Defend (includes: Cyber Defense Analysis; Cyber Defense Infrastructure Support; Incident Response; Vulnerability Assessment and Management)			
Analyze (includes: Threat Analysis; Exploitation Analysis; All-Source Analysis; Targets; Language Analysis)			
Collect and Operate (includes: Collection Operations; Cyber Operational Planning; Cyber Operations)			
Investigate (includes: Cyber Investigation; Digital Forensics)			

Q6. What challenges are you facing as you consider adding/developing a new program or coursework/training?

Q7. Do your cybersecurity programs or coursework/training prepare students for any of the following specific industry certifications? (Mark all that apply)

- ❑ Certified Information Systems Security Professional (CISSP)
- ❑ CISCO Certificated Network Associate Security (CCNA-S)
- ❑ CISCO Certified Network Professional Security (CCNP-S)
- ❑ Microsoft Certified System Administrator (MCSA)
- ❑ Security +
- ❑ Department of Defense Directive 8140 (Security Clearance)
- ❑ SANS/GIAC Certification
- ❑ Certified Information Systems Auditor (CISA)
- ❑ Certified Information Security Manager (CISM)
- ❑ Certified in Risk and Information Systems Control (CRISC)
- ❑ CompTIA Security +
- ❑ CompTIA Cybersecurity Analyst (CySA+)
- ❑ CompTIA PenTest+
- ❑ CompTIA Advanced Security Practitioner (CASP)
- ❑ Cisco CCNA Cyber Ops
- [❑ Certified Ethical Hacker (CEH)

- ❑ EC-Council Certified Security Analyst (ECSA)
- ❑ GIAC Penetration Tester (GPEN)
- ❑ Offensive Security Certified Professional (OSCP)
- ❑ Palo Alto Networks Firewall
- ❑ Palo Alto Networks Endpoint
- ❑ Jupiter Networks Certification Program (JNCP) Junos Security Certification
- ❑ Other, please specify: _____
- ❑ None of the above

Q8. Which soft skills are covered the most thoroughly in your cybersecurity coursework/training? (Mark all that apply)

- ❑ Communication skills
- ❑ Writing
- ❑ Troubleshooting
- ❑ Teamwork/collaboration
- ❑ Ethics
- ❑ Planning
- ❑ Problem solving
- ❑ Building effective relationships
- ❑ Quality assurance and control
- ❑ Self-starter
- ❑ Enthusiasm
- ❑ Quick learner
- ❑ Other, please specify: _____

Q9. How have employers been involved in your program in the past year? (Mark all that apply)

❑ Employers participate on my advisory board(s). If so, please indicate how many employers:

_____

❑ Employers provide internships for my students. If so, please indicate how many employers participate:

_____

❑ Employers donate equipment to my program. If so please indicate how many employers:

_____

❑ Employers act as guest lecturers. If so please indicate how many employers:

_____

❑ Employers provide information about the industry and jobs. If so please indicate how many employers:

_____

❑ Employers offer facilities tours. If so please indicate how many employers:

_____

❑ Other:

_____

❑ None of the above

APPENDIX K: CYBERSECURITY EDUCATION PROGRAMS SURVEY

Q10. How much of a challenge do the following issues present to the success of your program?

	Not a challenge	Somewhat/ Moderate challenge	Extreme challenge
Facilities—adequate, workable space for this type of program			
Staffing—finding instructors with practical experience/technical expertise			
Faculty development—providing access to professional development opportunities			
Curriculum—keeping curriculum up-to-date with constantly evolving technologies			
Equipment—finding resources for new training equipment or soliciting donations for equipment			
Employer engagement—connecting employers to the program for advisory group functions			
Employer engagement—student internships			
Employer engagement—student/graduate employment			
Maintaining Software Licenses			
Other, please specify: _____			

Q11. Does your program have dedicated computer labs for cybersecurity coursework/trainings?

- ❑ Yes
- ❑ No

Q12. Does your program have dedicated virtual computer labs for cybersecurity coursework/trainings?

- ❑ Yes
- ❑ No

Thank you very much for your important feedback!

APPENDIX L: REFERENCES CITED

"2018 Global Investor Survey: Anxious Optimism in a Complex World." PwC International Limited, 2018, p. 11 and p. 22. https://www.pwc.com/gx/en/ceo-survey/2018/deep-dives/pwc-global-investor-survey-2018.pdf.

Burgess, Matt. "That Yahoo data breach actually hit three billion accounts." Wired Magazine, October 4, 2017. http://www.wired.co.uk/article/hacks-data-breaches-2017.

California Cyberhub, 2016. https://ca-cyberhub.org/.

"The Changing State of Ransomware." F-Secure, May 2015. https://fsecurepressglobal.files.wordpress.com/2018/05/ransomware_report.pdf.

Chickowski, Erica. "Automation exacerbates cybersecurity skills gap." Dark Reading, May 2, 2018, accessed May 18, 2018. https://www.darkreading.com/careers-and-people/automation-exacerbates-cybersecurity-skills-gap/d/d-id/1331697.

Cowley, Stacy. "Zelle, the Banks' Answer to Venmo, Proves Vulnerable to Fraud." The New York Times, April 22, 2018. https://www.nytimes.com/2018/04/22/business/zelle-banks-fraud.html?rref=collection%2Ftimestopic%2FComputer%20Security%20(Cybersecurity)&action=click&contentCollection=timestopics&region=stream&module=stream_unit&version=latest&contentPlacement=5&pgtype=collection.

Cuthbertson, Anthony. "Ransomware attacks reach 250 percent in 2017, hitting U.S. hardest." Newsweek, May 23, 2017. http://www.newsweek.com/ransomware-attacks-rise-250-2017-us-wannacry-614034.

"Cyber Security in San Diego: An Economic and Industry Assessment." San Diego Economic Development Corporation, March 2014.

"Cybersecurity Jobs Report 2018-2021," Cybersecurity Ventures and Herjavec Group, May 2017, https://cybersecurityventures.com/jobs/.

Cybersecurity Tech Accord. "Signing pledge to fight cyberattacks, 34 leading companies promise equal protection for customers worldwide." press release, April 17, 2018, accessed May 17, 2018. https://cybertechaccord.org/.

"Department of Defense Instruction: Number 8500.01," Department of Defense Chief Information Officer, March 14, 2014, http://www.esd.whs.mil/Portals/54/Documents/DD/issuances/dodi/850001_2014.pdf.

"Department of Defense Directive: Number 8140.01," Department of Defense Chief Information Officer, updated July 21, 2017, http://www.esd.whs.mil/Portals/54/Documents/DD/issuances/dodd/814001_2015_dodd.pdf.

"Exabeam 2018 Cyber Security Professionals salary and Job Report: Compensation, Job Satisfaction, Education, and Technology Outlook." Exabeam, May 2018. https://www.exabeam.com/wp-content/uploads/2018/05/EXA_Salary-Survey-Report_L1R7.pdf.

Gartenberg, Chaim. "Twitter advising all 330 million users to change passwords after bug exposed them in plain text." The Verge, May 3, 2018, accessed May 17, 2018. https://www.theverge.com/2018/5/3/17316684/twitter-password-bug-security-flaw-exposed-change-now.

Giles, Martin. "At Least Three Billion Computer Chips Have the Spectre Security Hole." MIT Technology Review, January 5, 2018. https://www.technologyreview.com/s/609891/at-least-3-billion-computer-chips-have-the-spectre-security-hole/.

Goel, Vindu and Rachel Abrams. "Card Data Stolen From 5 Million Saks and Lord & Taylor Customers." The New York Times, April 1, 2018. https://www.nytimes.com/2018/04/01/technology/saks-lord-taylor-credit-cards.html?rref=collection%2Ftimestopic%2FComputer%20Security%20(Cybersecurity)&action=click&contentCollection=timestopics&region=stream&module=stream_unit&version=latest&contentPlacement=6&pgtype=collection.

Hackett, Robert. "LinkedIn Lost 167 Million Account Credentials in Data Breach." Fortune Magazine, May 18, 2016. http://fortune.com/2016/05/18/linkedin-data-breach-email-password/.

APPENDIX L: REFERENCES CITED

"Hacking the Skills Shortage: A Study of the International Shortage in Cybersecurity Skills." McAfee and the Center for Strategic and International Studies, 2016. https://www.mcafee.com/uk/resources/reports/rp-hacking-skills-shortage.pdf.

"Hack the Gap: Close the cybersecurity talent gap with interactive tools and data." CyberSeek, accessed May 18, 2018. https://www.cyberseek.org/index.html#about.

"IBM X-Force Report: Fewer Records Breached in 2017." Security Magazine, April 4, 2018, accessed May 18, 2018. https://www.securitymagazine.com/articles/88893-ibm-x-force-report-fewer-records-breached-in-2017.

"Job Market Intelligence: Cybersecurity Jobs, 2015." Burning Glass, PowerPoint presentation, accessed May 18, 2018. https://www.burning-glass.com/wp-content/uploads/Cybersecurity_Jobs_Report_2015.pdf.

Morris, Chris. "14 million businesses are at risk of a hacker threat." CNBC, July 25, 2017, accessed May 18, 2018. https://www.cnbc.com/2017/07/25/14-million-us-businesses-are-at-risk-of-a-hacker-threat.html.

"National Centers of Academic Excellence in Cyber Education," National Security Agency, Central Security Service, October 31, 2016, accessed June 11, 2018, https://www.nsa.gov/resources/educators/centers-academic-excellence/cyber-operations/.

"Nearly Half of All Cyberattacks Result in Damages over $500,000," Security Magazine, April 1, 2018, accessed May 18, 2018. https://www.securitymagazine.com/articles/88834-nearly-half-of-all-cyberattacks-result-in-damages-over-500000.

Newhouse, William, Stephanie Keith, Benjamin Scribner, and Greg Witte. "National Initiative for Cybersecurity Education (NICE) Cybersecurity Workforce Framework." National Institute of Standards and Technology, U.S. Department of Commerce, August 2017.

NICE Cybersecurity Workforce Framework, December 12, 2017. https://niccs.us-cert.gov/workforce-development/cyber-security-workforce-framework.

"Professionalizing the Nation's Cybersecurity Workforce? Criteria for Decision Making." Committee on Professionalizing the Nation's Cybersecurity Workforce: Criteria for Future Decision-Making, National Research Council of the National Academies, (Washington, DC: The National Academies Press), 2013.

Rio Hondo College. "Rio Hondo College to train cybersecurity technicians, professionals to meet rapidly growing industry need," press release, November 14, 2017. https://www.riohondo.edu/marketing/rio-hondo-college-to-train-cybersecurity-technicians-professionals-to-meet-rapidly-growing-industry-need/

"Security Budgets Increasing, But Qualified Cybertalent Remains Hard to Find." Security Magazine, April 23, 2018, accessed May 18, 2017. https://www.securitymagazine.com/articles/88940-security-budgets-increasing-but-qualified-cybertalent-remains-hard-to-find.

Stein, Daniel, Benjamin Scribner, Noel Kyle, William Newhouse, Clarence Williams, and Baris Yakim. "National Initiative for Cybersecurity Education (NICE) Work Role Capability Indicators." National Institute of Standards and Technology, U.S. Department of Commerce, November 2017.

Vickers, Jenny. "Cybersecurity takes center stage." Business Facilities, April 16, 2018. https://businessfacilities.com/2018/04/cybersecurity-takes-center-stage/.

Weise, Elizabeth. "Equifax breach: Is it the biggest data breach?" USA Today, September 7, 2017. https://www.usatoday.com/story/tech/2017/09/07/nations-biggest-hacks-and-data-breaches-millions/644311001/.

Williams, Jamie. "The Worst Law in Technology Strikes Again: 2017 in Review." Electronic Frontier Foundation, December 29, 2017, accessed May 23, 2018. https://www.eff.org/deeplinks/2017/12/worst-law-technology-strikes-again-2017-review.

Whittaker, Zack. "Atlanta projected to spend at least $2.6 million on ransomware recovery." ZDNet, April 23, 2018, accessed May 17, 2018. https://www.zdnet.com/article/atlanta-spent-at-least-two-million-on-ransomware-attack-recovery/.

MORE ABOUT THE CENTERS OF EXCELLENCE

The Centers of Excellence (COE) for Labor Market Research deliver regional workforce research and technical expertise to California Community Colleges for program decision making and resource development. This information has proven valuable to colleges in beginning, revising, or updating economic development and Career Education (CE) programs, strengthening grant applications, assisting in the accreditation process, and in supporting strategic planning efforts.

The Centers of Excellence Initiative is funded in part by the Chancellor's Office, California Community Colleges, Economic and Workforce Development Program. The Centers aspire to be the leading source of regional workforce information and insight for California Community Colleges. More information about the Centers of Excellence is available at **www.coeccc.net**.

For more information on this study, contact:

John Carrese,
Director, Center of Excellence
for Labor Market Research
San Francisco Bay Region
Hosted at City College of San Francisco
(415)452-5529
jcarrese@ccsf.edu

Important Disclaimer

All representations included in this report have been produced from primary research and/or secondary review of publicly and/or privately available data and/or research reports. Efforts have been made to qualify and validate the accuracy of the data and the reported findings; however, neither the Centers of Excellence, COE host District, nor California Community Colleges Chancellor's Office are responsible for applications or decisions made by recipient community colleges or their representatives based upon components or recommendations contained in this study.

Please consider the environment before printing.
This document is designed for double-sided printing.

C·O·E
CENTERS OF EXCELLENCE
Inform Connect Advance