RELEASED 5.13.20

AMENDED 5.14.20

AMENDED 5.26.20

DATE: May 13, 2020

TO: Chief Instructional Officers, Career Education Deans
San Diego and Imperial Counties Community Colleges

CC: CEOs, CSSOs

FROM: San Diego-Imperial Regional Consortium

Regional Strong Workforce Program (SWP) Request for Applications (RFA)
Information and Communication Technologies (ICT):
Software Development Curriculum Alignment Project

Please respond to the prompts below with details about your ICT training program(s) and scale-up plan. This will be used as a scope of work for the contract with your college. This is also the information needed to submit a Strong Workforce Plan in the statewide system NOVA.

If you have questions about the scope of this RFA, feel free to contact Mollie Smith at mollie.smith@gcccd.edu or Sally Cox at sally.cox@gcccd.edu. If you have questions about the RFA process and details, please contact Sue Fisher at Sue.fisher@gcccd.edu.

Regional SWP Request for Applications
ICT – Software Development Curriculum Alignment Project

Context and Purpose of the RFA

Today's labor market requires stronger alignment between education and the skills needed to be successful in a dynamic and increasingly digital labor market. The alignment must take the needs of local and regional employers into account; be specific with addressing the knowledge, skills, and abilities (KSAs) of individuals within clearly articulated pathways; and lead to outcomes that improve students and communities.

One of the fastest growing industry sectors that requires a strong alignment between education and employers is information and communication technologies (ICT). With more than 115,622 people employed in 2019 and approximately 7,880 businesses, ICT is priority sector in the San Diego-Imperial region[1]. Nationally, it took companies almost 70 days to fill tech roles in 2019, according to a report from iCIMS.[2] Developing and growing the workforce with the knowledge, skills, and abilities needed to succeed in the ICT sector is crucial to prevent individuals from being locked out of a dynamic labor market and industry sector. It is also important for the growth and expansion of businesses and the vitality of local communities.

ICT Overview – In-Demand Jobs and Skills

Given that technology is ubiquitous in all industry sectors and nearly every company needs to leverage some form of technology to be successful, ICT can be seen as a broad industry sector. According to the Center of Excellence for Labor Market Research, "ICT encompasses all rapidly emerging, evolving, and converging computer, software, networking, telecommunications, Internet, programming, information systems and digital media technologies. It is an umbrella or superset term that includes many different competing subset terminologies."[3]

To better understand the diverse needs of ICT companies in the region, economic and workforce agencies partnered to implement the initiative, "Advancing San Diego." Advancing San Diego is a collaborative grant program with the San Diego Regional Economic Development Corporation, City of San Diego, San Diego Workforce Partnership, United Way of San Diego, and San Diego & Imperial Counties Community College Association. The goals of the partnership are to: 1) Engage employers in a structured process to better communicate talent demand; 2) Identify education programs that are preparing individuals for high-demand, quality jobs; 3) Increase pool of diverse, skilled talent in San Diego; and 4) Expand access to skilled talent for small companies. The collaborative seeks to achieve the following objectives:

[1] ICT and Digital Media Sector Profile, Centers of Excellence for Labor Market Research, 01/03/19
[2] https://www.cnbc.com/2019/11/06/how-switching-careers-to-tech-could-solve-the-us-talent-shortage.html
[3] 2014 Environmental Scan, Information and Communication Technologies, Centers of Excellence for Labor Market Research, 07/10/14

- Convene nine Employer Working Groups to communicate demand for critical jobs;
- Launch the Advancing San Diego competition and identify "preferred providers" that meet employer demand; and
- Deploy $1.3m to subsidize internships for small businesses and support services for students enrolled in preferred provider programs.

Decisions made should be grounded in regional labor market data to address the needs of the region. The Software Working Group of the collaborative, which consists of 17 San Diego employers representing multiple industries, highlights the need to take action. They collectively employ more than 53,000 people and are projected to hire more than 7,000 software professionals by 2022. Employers provided individual job growth projections and hiring requirements for software engineers given that it has the strongest demand in the next few years. The data below highlights demand for software talent in San Diego and the urgency for institutions to take meaningful actions as part of this RFA.

For example, Table 1 from the Advancing Cities data shows the projected demand for critical software positions. In fact, software engineers account for 54% of total projections for all software positions, with 1,734 projected openings for entry-level software engineers and 1,125 for senior-level positions[4].

Table 1- Top Jobs in ICT in San Diego

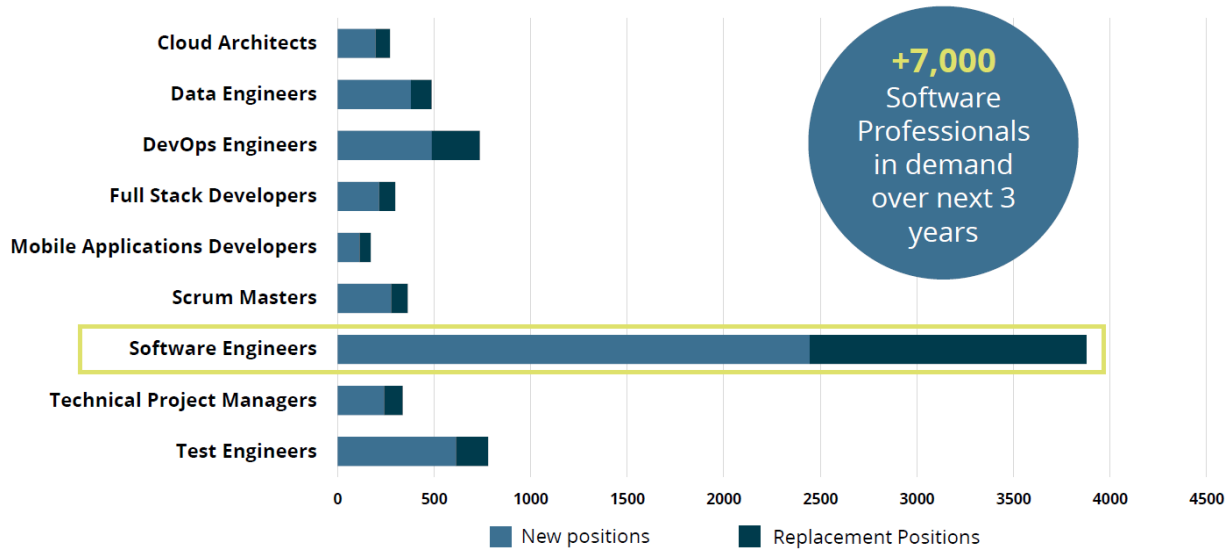


Table 2 displays the technical skills that were preferred by the companies. Those skills included programming language, software tools, frameworks, databases, operating systems and other. As shown in Table 2, a little over 80% of the companies ranked Python as a high technical skill and over 50% ranked JavaScript, C++, SQL, and Java as a high technical skill. Companies indicated

[4] https://sd-regional-edc.maps.arcgis.com/apps/Cascade/index.html?appid=36ef8f3e9881417f87edfeaeeb537e66

the importance of the ability to learn a new technical language as critical, even if it is not one of the high-priority languages.

Table 2 – Top Programming Languages for Entry-Level Software Professionals

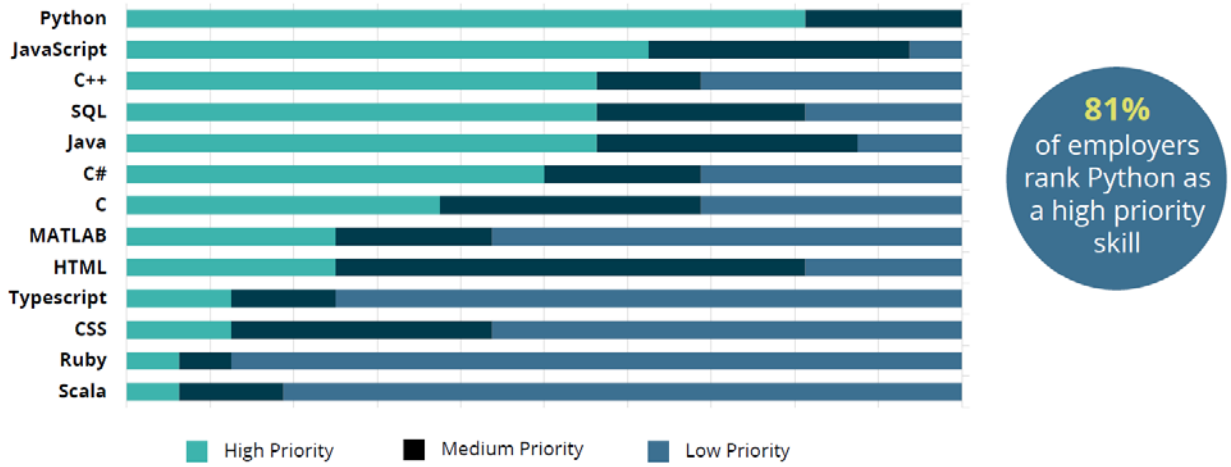
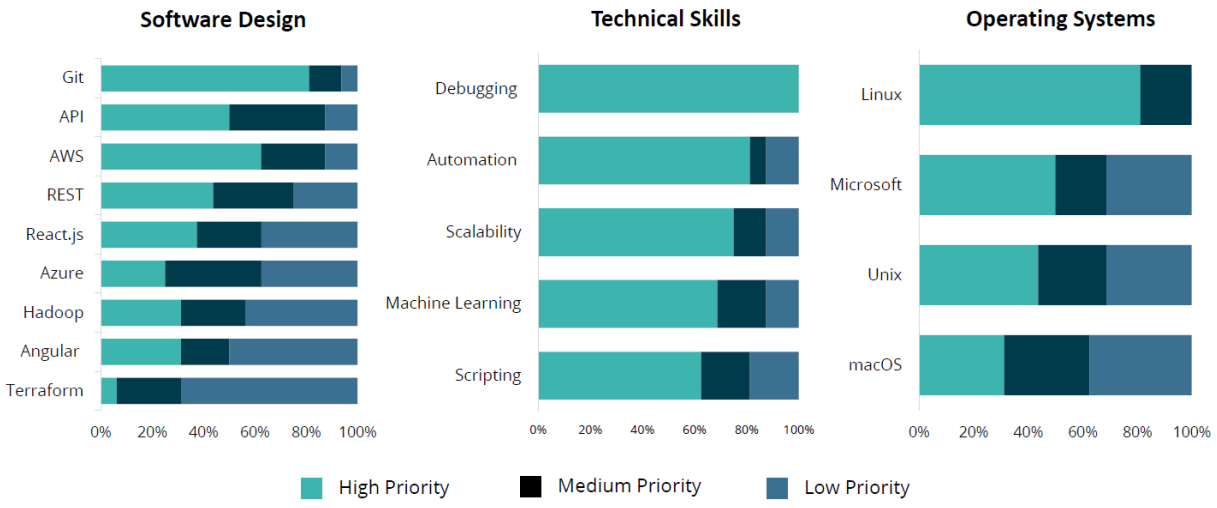


Table 3 highlights the software design, technical skills, and operating systems that were seen as high priorities by companies. Over 80% of employers placed a high priority on understanding Git software design and Linux operating systems. 100% of employers placed a high priority on debugging skills.

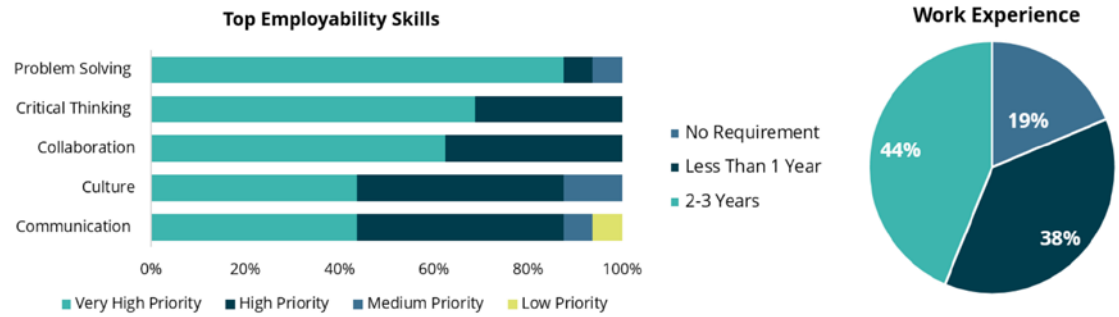
Table 3 – Priority Skills for Entry-Level Software Professionals



Even though employers placed a strong emphasis on prospective employees' various technical abilities, employability skills were also a point of emphasis. Technical skills should be complemented with strong employability skills. As shown below in Table 4, over 50% of employers believed collaboration and critical thinking were "very high" priority skills and about

90% believed the same for problem solving skills. It is no surprise that most employers required some work experience. Less than 20% of employers indicated no work experience was required, while 82% required some work experience. Further, all employers either required or preferred a bachelor's degree[5].

Table 4 – Employability Skills and Required Work Experience for Entry-Level Software Professionals



Key Employment Drivers by Subsector- Computer Science/Software Development

Research conducted by the San Diego ICT Regional Director supports the data collected through the Advancing San Diego initiative. As highlighted in the following table, the knowledge, skills and abilities outlined under the Computer Science/Software Development column further validate the Advancing San Diego findings and as well as the national criteria for high-demand, high-wage, and high skills.

Table 5 – ICT Subsectors

Business Software Applications	IT Networking/Cybersecurity	Computer Science / Software Development	Digital Media / Entertainment
Business Communications & Computer Literacy	A+ (or comparable hardware) (esp. retail)	CS-ADT	Graphic Design (Adobe - Photoshop, Illustrator, InDesign, Animate)
MS Office (Word, Powerpoint, Excel, Outlook)	Help desk / troubleshooting	C++, python, Java, Javascript + node.js	Video/Audio Production
Excel (pivot tables) or Google Docs	CISCO (or comparable) certification	Linux, Windows Server (certification valued but not without degree)	Photography
Quickbooks	Security+, CySA+, CISA, CISSP certifications	RDBMS (MySQL, MS SQL Server, Oracle) NoSQL (mongo, couchdb); graph db (e.g. Neo4j) for GIS	Writing / storytelling / journalism
Business math	Linux & Open source security tools (e.g. Kali)	Scripting (bash or Powershell)	[Web] Publishing
Salesforce (CRM)	Scripting (bash)	Debugging; Frameworks – AngularJS, React	Social media

[5] https://sd-regional-edc.maps.arcgis.com/apps/Cascade/index.html?appid=36ef8f3e9881417f87edfeaeeb537e66

Defining the Problem to be Addressed through this RFA

Within the context of the research and information outlined above, there are two broad categories of needs within the area of ICT that need to be addressed to ensure students develop the knowledge, skills, and abilities necessary to succeed: (1) institutional alignment and (2) student success. Institutional alignment deals with the structures, systems, and processes of institutions to respond to employer needs and labor market demands. Student success deals directly with the strategies and support activities that ensure students acquire the knowledge, skills, and abilities needed to be successful in high-demand, high-growth career pathways in ICT. Below are key challenges that are often present within these two categories.

ICT Institutional Alignment Challenges

- Need for strategies to assess and respond to labor market demands, particularly in constantly changing ICT industries
- Lack of consistent and sustainable processes to receive employer feedback or act on employer recommendations
- Need for curriculum that is aligned to current employer needs
- Unclear articulation of pathways (i.e., need for organized sequences of courses and stackable credentials with multiple entry and exit points that lead to specific careers)
- Need for clearly identified, accessible, and scalable certificates of value that can be attained as part of degree in pathways
- Limited high-quality, high-impact work-based learning opportunities for students
- Limited ability to track the attainment of certifications by third-party credential providers
- Inequities of ethnicity, gender and first-generation college students across pathways
- Poor alignment of ICT courses and programs between community college institutions and resulting confusion among students that have to transfer between colleges

ICT Student Success Challenges

- Lack of systemic opportunities for access to a continuum of work-based learning opportunities where students develop skills and gain valuable experiences
- Limited student knowledge of the wide range of ICT subsectors and areas (i.e., gaming and simulations/networking/software development/information support and services)
- Poorly defined or inaccessible on and off ramps for older students
- Limited exposure to the demands of ICT occupations and careers
- Lack of opportunities for students to earn certificates of value and obtain high-wage employment
- High enrollments and low retention in ICT courses and programs
- Limited opportunities for students to develop employability skills

Information and Communications Technologies – Software Development Curriculum Alignment Project

The San Diego-Imperial Regional Consortium is providing funding to the region's colleges to support improvement, alignment, and success of their respective software development offerings. The purpose is to address the challenges of students enrolled in software development programs through aligned, clear, and robust institutional ICT structures. The goals of the investment are to:

- Align curriculum to address the employer needs for Software Development workforce
- Improve retention, completion, and success of students in Software Development pathways
- Scale institutional practices that improve equity in Software Development pathways

The investment in software development will be delivered in three phases. The following is the first phase and the final deliverable for this phase will be due by May 28, 2021.

This curriculum alignment project will provide our ICT students with the knowledge, skills, and abilities they need to successfully compete for software development jobs in the San Diego and Imperial Counties. Additionally, it will allow the colleges to apply for preferred provider status within the Advancing Cities project. The students who are enrolled at colleges who are designated as preferred providers will have access to paid internships. MiraCosta College and San Diego Mesa College were designated as partial preferred providers in the initial application. Alignment with the competencies outlined in Addendum I and Addendum II will allow colleges to apply for designation as a partial or a full preferred provider. Designation as a preferred provider will allow students attending those colleges to be eligible for paid internships.

PHASE I Objectives – This RFA – Final deliverable due May 28, 2021.

As part of the investment, colleges will:

1. Create an inventory of all the computer science/software development courses taught at the college. The inventory should delineate certificate and degree programs, courses, articulation agreements, and careers.
2. Realign programs to industry needs.
    a. Identify redundancies and streamline curriculum.
    b. Update curriculum to align with industry knowledge, skills and abilities (KSAs) presented in this RFA.
    c. Intentionally embed the 21st Century Employability Skills specified as important by employers to this occupation.
    d. Clarify stackability or design stackable credentials for software development. Create a career pathway diagram to include courses, certificates, degree, occupations and certifications. A template will be provided by the region.

3. Mitigate disproportionate impact across diverse student populations.
    a. Conduct an assessment/analysis of the enrollment, retention, completion, employment, and earnings of these courses/programs (see Addendum III for template).
    b. Use disaggregated data to analyze disproportionate impact in Software Development classes based on college service area demographics and student performance. Analyze enrollment, course retention and success, program completion, employment and wage gain.
    c. Embed strategies into the instructional delivery model of Software Development courses to improve retention, success and completion.
4. Integrate work-based learning.
    a. In collaboration with Work-based Learning Coordinators, integrate a continuum of work-based learning into the instructional delivery model of all courses in the computer science/ software development program(s).
5. OPTIONAL: Implement strategies for improving course retention and success in classes with below average retention and success rates by embedding tutoring into the instructional delivery model.

Faculty Participation

1. Faculty who currently (within the past two semesters) teach any of the courses within the software development program, will be eligible to participate in the project.
2. One faculty will be designated as the lead faculty from each college and will facilitate the work of the group to achieve the goals.
3. Participating faculty must collaborate as a team to achieve the goals of this project.
4. Individual college teams will work with the other college teams participating in this project and with the Regional Faculty Coordinator. A separate RFA will be released for the Regional Faculty Coordinator position.

Funding Model

Faculty will be compensated as follows:

1. The college will receive $5,000 to collaborate with colleagues as a team and to meet the objectives of this curriculum alignment project.
2. The college lead will receive $2,000 to facilitate the college team.
3. Each college will receive $10,000 in additional funding for logistics coordination.

Funding will be paid out in three increments. See milestones below for project deliverables tied to funding.

Project Outcomes

The outcomes of this investment will be:

- Curriculum aligned with the KSAs presented in this RFA
- Improved retention, completion, and success of students in Software Development pathways
- Scaled institutional practices that improve equity in Software Development pathways

Deliverables

1. Submit draft course outlines of record (COR) submitted for review by employer panel. Include either Addendum I or Addendum II, depending on whether you plan to apply as an Advancing San Diego **partial** or **full** preferred provider designation (see pages 14 and 15) and Addendum III (see page 16).
    a. Due: September 4, 2020

2. Updated or new CORs and updated certificates (credit or noncredit) or associate degrees submitted to the local curriculum committee.
    a. Due: October 30, 2020
    b. Payment: $6,000

3. Career pathway diagrams for software development courses will be reviewed by an employer panel from the Advancing Cities collaborative. Approval by the employer panel is required to provide payment for steps 3 and 4.
    a. Due: December 11, 2020
    b. Payment: $6,000

4. Verification of COR and updated certificates or associate degrees approvals by local curriculum committees.
    a. Due: Friday, May 28, 2021
    b. Payment: $5,000

Timeline

Date(s)	Activity/Milestone
Week of May 11, 2020	• Release Phase I RFA
May 22, 2020	• Informational meeting*
July 15, 2020	• RFA responses due
September 4, 2020	• Draft COR(s) submitted for review
October 30, 2020	• Updated or new COR(s) and updated certificates or associate degrees submitted to the local curriculum committee
December 11, 2020	• Career pathway diagrams for computer science and software development programs
May 28, 2021	• Verification of COR and updated certificates or associate degrees approvals by local curriculum committees
Fall 2020	• Release Phase II RFA
Spring 2021	• Release Phase III RFA

*Colleges who plan to apply for this RFA will need to have a representative present at the informational meeting.

RFA Response Form (Project Plan) - Phase I

PLEASE COMPLETE THE SECTIONS BELOW

Description of need:

How does the curriculum in your software development program compare to the KSAs and courses outlined in this RFA? Please describe your analysis and who was involved in the evaluation of the curriculum.

Description of proposed project needs:

What courses and programs will need to be changed or created to align your curriculum with the proposed curriculum from the employers involved in the sector analysis?

Faculty Lead:

Who will be the faculty lead for your college?

Implementation and Sustainability:

How will you ensure ongoing updates to your curriculum beyond the period of performance of this funding given this new engagement with employers?

Industry Sector: Information Communications Technology – Software Development

Phase I Budget:

This RFA is for $17,000 to update curriculum for software development. $2,000 is for a college faculty lead to coordinate the project with other college faculty. The additional funding is coordinate logistics and ensure faculty involvement based on college policies. Please provide a detailed budget. Funding can only be used up to May 31, 2021.

Year 1 Budget:

Object	Classification	Itemized List of Budgeted Expenses	Total
1000	Instructional Salaries		
2000	Non-instructional Salaries		
3000	Employee Benefits		
4000	Supplies and materials		
5000	Other operating expenses and services		
Total Program Costs			

Indirect is not permitted on this project.

Once the curriculum alignment has been completed RFAs for Phases II & III will be released. Phase I will need to be satisfied to be eligible for Phases II & III.

PHASE II – Next RFA estimated release Fall 2020

1. Partner with high school teachers and/or noncredit faculty and align or develop pathways for high school and noncredit programs.
2. Work with high school teachers to make courses eligible for dual enrollment.
3. Design, publish and disseminate career pathway diagrams.
4. Develop a college internship model for facilitating student engagement in internships.
5. Develop a marketing strategy for the computer software program.
6. Identify equipment required as evidenced in the COR, that will allow students to use the latest technology.
7. Develop relationships with employers that will provide students with the opportunity to engage in internships as a capstone to their program of study.

PHASE III – Final RFA estimated release Spring 2021

1. Encourage and support student extra-curricular activities as evidenced by the course syllabus, to further support student engagement and leaning.
2. Develop career exploration engagement activities and engage students in local middle schools and high schools.
3. Build faculty industry expertise by developing faculty externships.
4. Develop a system for tracking industry required (third party) certification attainments.

Signature Page

Faculty Lead

Signature	Date
Title	Institution (College) Name

CE Dean

Signature	Date
Title	Institution (College) Name

CIO

Signature	Date
Title	Institution (College) Name

College President

Signature	Date
Title	Institution (College) Name

Addendum I: Advancing San Diego Preferred Provider Partial Designation

Advancing San Diego

Sponsored by

JPMORGAN CHASE & CO.

Application for: Preferred Provider of Software Engineering Talent (partial) – Continued

In section 3, describe how particular courses teach, including to what level of proficiency, required competencies in each area, and preferred categories where applicable.

Section 3: Competencies			
	Competencies:	**Course name**	**Description of Learning Activities**
	Programming Languages		(500 characters max per course)
Required:	Python **-or-**		
	JavaScript **-or-**		
	Java **-or-**		
	C# **-or-**		
	C++		
Preferred:	SQL		
	Development Environments		
Required:	Operating Systems (e.g. Linux, Microsoft,MacOS)		
Preferred:	Virtual Machines		
	Software Containers (e.g. Docker, Kubernetes)		
	Software Tools		
Required:	Version Control System (e.g. Git)		
Preferred:	APIs (e.g. REST)		
	Cloud Computing Platform (e.g. AWS)		
	Cross-Platform Framework (e.g. Angular)		
	Technical Skills & Abilities		
Required:	Debugging		
Preferred:	Agile Software Development (esp. Scrum)		
	Build Automation		
	Scalability		
	Machine Learning		
	Scripting		
	Employability Skills:		
Required	Problem Solving		
	Critical Thinking		
	Collaboration		
Preferred:	Communication		
	Databases		
Required:	None		
Preferred:	Relational Databases (SQL)		

Addendum II: Advancing San Diego Preferred Provider Full Designation

Advancing San Diego

Sponsored by

JPMorgan Chase & Co.

Application for: Preferred Provider of Software Engineering Talent (full) – Continued

In section 3, describe how particular courses teach, including to what level of proficiency, required competencies in each area, and preferred categories where applicable.

Section 3: Competencies			
	Competencies:	**Course name**	**Description of Learning Activities**
	Programming Languages		(500 characters max per course description)
Required:	Python -or-		
	JavaScript -or-		
	Java -or-		
	C# -or-		
	C++		
Required:	SQL		
	Development Environments		
Required:	Operating Systems (e.g. Linux, Microsoft, MacOS)		
	Virtual Machines		
Preferred:	Software Containers (e.g. Docker or Kubernetes)		
	Software Tools		
Required:	Version Control System (e.g. Git)		
	APIs (e.g. REST)		
	Cloud Computing Platform (e.g. AWS)		
Preferred:	Cross-Platform Framework (e.g. Angular)		
	Technical Skills & Abilities		
Required:	Debugging		
	Agile Software Development (esp. Scrum)		
	Build Automation		
	Scalability		
Preferred:	Machine Learning		
	Scripting		
	Employability Skills:		
Required	Problem Solving		
	Critical Thinking		
	Collaboration		
Preferred:	Communication		
	Databases		
Required:	Relational Databases (SQL)		
	Non-Relational Databases (NoSQL)		

Addendum III: Assessment/Analysis of Enrollment, Retention, Completion, Employment and Earnings of Students from ICT Programs (Template)

Instructions:

1. For each metric (enrollment, retention, completion, employment, and earnings), use your college's definition and provide an assessment/analysis of your courses and department using the following template.
2. This template is for "enrollment" rates. Replace the grey-shaded font with the appropriate metric name when replicating this template for other metrics.

[ENROLLMENT] RATES BY DEMOGRAPHIC

1. What are the enrollment rates for the community college overall, department, and course for each demographic below (i.e., race/ethnicity, gender, age group)?

Race/Ethnicity	Community College Overall %		% of Students Enrolled in Course		Department %
African American	%		%		%
American Indian/Alaska Native	%		%		%
Asian	%		%		%
Filipino/a	%		%		%
Hispanic	%		%		%
Pacific Islander	%		%		%
Two or More Races	%		%		%
White	%		%		%
Other, unreported or N/A	%		%		%

Gender	Community College Overall %		% of Students Enrolled in Course		Department %
Male	%		%		%
Female	%		%		%
Other, unreported, or N/A	%		%		%

Age Group	Community College Overall %		% of Students Enrolled in Course		Department %
19 or younger	%		%		%
20-24	%		%		%
25-29	%		%		%
30-34	%		%		%
35-39	%		%		%
40 and older	%		%		%
Other, unreported or N/A	%		%		%

Instructions:

1. Looking at the demographic breakdown of students, please answer the following open-ended questions.

   a. What trends do you see among the different demographics? Do certain demographics have higher rates in your courses or department than the college overall, depending on the metric? Why do you think these trends exist?

   a. Do you have any demographics with a high retention rate, but low success rate? Conversely, do you have any demographics with a low retention rate, but high success rate? If so, why do you think these trends exist?

   b. Are you interested in increasing the enrollment, retention, success, etc. rates of a specific demographic? If so, what would be your next steps?