

ICT Employer Feedback - Software Development Curriculum

1. Primary Research from Regional Director, ICT:

Knowledge, Skills, Abilities for Success by Subsector

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

2. Advancing San Diego- Preferred Providers Requirements (Partial):

Programming Languages	
Required:	Python -or- JavaScript -or- Java -or- C# -or- C++
Preferred:	SQL
Development Environments	
Required:	Operating Systems (e.g. Linux, Microsoft or MacOS)
Preferred:	Virtual Machines Software Containers (e.g. Docker or Kubernetes)
Software Tools	
Required:	Version Control System (e.g. Git) APIs (e.g. REST)
Preferred:	Cloud Computing Platform (e.g. AWS) Cross-Platform Framework (e.g. Angular)

Technical Skills & Abilities	
Required:	Debugging
Preferred:	Agile Software Development (esp. Scrum framework) Build Automation Scalability Machine Learning Scripting
Employability Skills:	
Required:	Problem Solving Critical Thinking Collaboration
Preferred:	Communication
Databases	
Required:	None
Preferred:	Relational Databases (SQL)

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Key Employment Drivers by Subsector- Computer Science/Software Development

- 35-54% increase in total job openings⁽¹⁾
- Baseline Knowledge (required for entry):
 - Javascript (ECMA Script)
 - Python
 - Debugging skills
- Additional competencies (required for advancement)⁽²⁾ :
 - Java
 - C/C++/C#
 - Frameworks (AngularJS/ReactJS for web or pandas for python)
- Connections to relational (RDBMS) and NoSQL databases are also critical.
 - SQL knowledge for RDBMS and ECMA Script (AJAX connection to data sources) play key roles in managing information flows⁽³⁾
 - Database storage of structured data is also precursor to data science/analytics and machine learning
- HTML5/CSS skills are helpful for web development, scraping but are largely abstracted in MVC⁽⁴⁾ framework (relegating this skillset to digital media)
 - Specialization largely depends on employer size – firms with ≥250 emp can justify dedicated web developers (design, layout); smaller firms consolidate roles
- Additional languages are industry/project dependent:
 - Java, Kotlin (Android mobile devices)
 - Swift (Apple devices – e.g. iPhone)
 - Javascript/ECMA Script (mainly web/mobile apps)
 - C (embedded, gaming, high performance apps)
 - C++, C#/Visual Basic (Window apps)
 - Web Development courses should be augmented to include modules on frameworks: React.js or Angular.js
 - Node.js courses should be created with focus on API, and include frameworks such as Express and NoSQL Database integration (e.g. MEAN/MERN stack)
- Work-based learning opportunities including networking events, career and internship fairs, local company tours, guest speakers, and more
- Annual briefings with local employers on demand for software talent and other critical jobs.

Sources: 1) 35% from Burning Glass, “New Foundational Skills” (2012-2017), 54% projected hires by 2022 from SD Regional EDC, “Advancing San Diego”, 2019; 2) Burning Glass, KD Nuggets; 3) SD Regional EDC, “Advancing San Diego”, 2019; 4) “Model-View-Controller” - Architectural pattern that separates display design from logic