PIPEDLINE Program

Competency Model for Information Technology Programming, Development and Engineering Career Cluster Pathway

Employer-Specific Requirements

Occupation-Specific Competencies*

- Build/Maintain Software/Websites/Apps
- Recognize Functional Problems
- Documentation of Development/Revisions
- Upgrade/Maintain Systems As Required
- Team/Client Communication
- Troubleshooting

*Other on-the-job training associated with a specific occupation

Cross-Occupational Technical Competencies*

Systems Analysis
- Programming Languages

Software Development Life-Cycle
- Interoperability of Systems
- Performance Engineering

Web Design, Development & Management
- Mobile Applications, Development & Management

Industry-Wide Technical Competencies

Principles of Information Technology
- Databases and Applications

Networks, Telecom, Wireless & Mobility
- Software Development and Management

User and Customer Support
- Digital Media and Visualization

Risk Mgmt., Security and Information Assurance

IT Pillars: Infrastructure | Development | Security | Data

Workplace Competencies

Business Fundamentals
- Teamwork

Innovative Thinking
- Planning and Organizing

Problem Solving and Decision Making
- Working With Tools and Technology

Academic Competencies

Reading | Writing | Mathematics | Science | Communication | Critical and Analytic Thinking | Fundamental IT User Skills

Personal Effectiveness Competencies

Interpersonal Skills and Teamwork | Integrity | Professionalism | Initiative | Dependability and Reliability | Adaptability and Flexibility | Lifelong Learning

Based on: Information Technology Competency Model Employment and Training Administration, U.S Dept. of Labor, September 2012.

*The PIPEDLINE Program recommends the Industry-Sector Technical Competencies as formal training opportunities (provided through related instruction) and the Occupation-Specific Competencies as on-the-job training opportunities.
Competency Model for Programming, Development and Engineering Career Cluster Pathway Occupations

Possible Programming, Development and Engineering Career Cluster Pathway Occupations

- .Net: Application Developer/Programmer/Web Developer
- Active Directory Engineer
- Android: Developer/Engineer
- Applications: Analyst/Architect/Developer/Project Manager/Engineer/Programmer/Specialist
- ASP .Net Developer
- Back End: Developer/Engineer
- Big Data Developer
- Business: Analyst/Consultant
- Business Intelligence: Architect/Developer/Engineer
- Business Systems Analyst
- C#: .Net Developer/Developer
- C++ Developer/Software Engineer
- Cisco Engineer
- Cloud Engineer
- Computer: Programmer/Systems Analyst
- Configuration Analyst
- Content Producer
- CRM Developer
- Customer Experience Specialist
- Data Analyst
- Developer
- Devops Engineer
- E-Commerce Developer
- Engineer
- Enterprise Architect
- ETL Developer
- Field Implementation Specialist
- Financial Systems Analyst
- Front End: Developer/Engineer/Web Developer
- Full Stack Developer
- Graphic Designer
- Guest Experience Specialist
- HTML Developer
- Implementation: Consultant/Specialist
- Information Systems: Analyst/Specialist
- Information Technology: Analyst/Consultant/Specialist/Systems Analyst/Developer
- Infrastructure Project Manager
- IOS: Developer/Engineer
- Java: Application Developer/Architect/Engineer/Programmer/Technical Lead/JavaScript: Developer/Engineer
- Lead: Developer/Systems Analyst
- Linux Engineer
- Magento Developer
- Mainframe Developer
- Microsoft Expert
- Microstrategy Developer
- Mobile App Developer
- Multimedia Designer
- Network Engineer
- Oracle Developer
- Peoplesoft Developer
- Performance Engineer
- Perl Developer
- PHP Developer
- Principal Software Engineer
- Process Engineer
- Programmer/Analyst
- Python Developer
- User Experience (UX): Architect/Designer/Developer
- User Interface (UI): Designer/Developer
- VB .NET Developer
- Web: Analyst/Applications Developer/Architect/Content Specialist/Designer/Developer/Engineer/Manager/Producer/Programmer/UI Developer
- Website Designer
- Windows Engineer
- Wordpress Developer

This list is intended to be a guide of potential occupations available within the Programming, Development, and Engineering Career Cluster Pathway. Other position titles may be used based on an employer’s organizational structure.
Possible Programming, Development and Engineering Career Cluster Pathway Certifications

- MCSD App builder
- CSSLP: Certified Secure Software Lifecycle Professional
- C and C++ Certifications
- PCP: Puppet Certified Professional
- SSCE: SaltStack Certified Engineer
- PMP-ACP: PMP Agile Certified Practitioner
- Oracle APEX: Application Express Developer Certified Expert
- AWS Certified Developer
- IEEE CS Software Professional Developer

Industry-Wide and Cross-Occupational Technical Competencies

- **Principles of Information Technology** – Ability to understand the basics of how computers and telecommunications store, retrieve and send information.
- **Databases and Applications** – Ability to utilize a computer program whose primary purpose is entering and retrieving information from a larger computerized database.
- **Networks, Telecom, Wireless and Mobility** – Understanding the differences between localized computer networks that interact exclusively within a given set of parameters in comparison to hard wired telecommunications systems that transfers data through Internet provider companies. Mobile communication indicates voice interaction through phone. Wireless involves data transfer via telecommunications that typically do not include voice communication.
- **Software Development and Management** – Ability to create software and oversee its production to ensure that it is user friendly and succeeds in efficiently addressing the product’s intended and desired behavior or outcome.
- **User and Customer Support** – Ability to assist via communication and with technical assistance the end user of the software product as they have questions, concerns or problems with the software product.
- **Digital Media and Visualization** – Demonstrate how an interface and/or the software accessed through the interface is created in a manner that is easily seen and able to be understood.
- **Compliance** – Ability to understand and adhere to data practices that follow federal, state and local laws related to online data systems.
- **Systems Analysis** – the ability to study a procedure or business in order to identify its goals and purposes and create systems and procedures that will achieve them in an efficient way.
- **Programming Languages** – proficiency with a formal language that specifies a set of instructions that can be used to produce various kinds of output; generally consisting of instructions for a computer. Programming languages can be used to create programs that implement specific algorithms.
- **Software Development Life-Cycle** – Knowledge of the process of dividing software development work into distinct phases to improve design, product management, and project management.
- **Interoperability of Systems** – Understanding of the characteristics of a product or system, whose intended interfaces are completely understood, to work with other products or systems, at present or future, in either implementation of access, without any restrictions.
- **Performance Engineering** – Demonstrated understanding of the techniques applied during a systems development life cycle to ensure the non-functional requirements for performance will be met.
- **Web Design, Development and Management** – Demonstrated skillset to produce and maintain websites, including web graphic design, interface design, authoring, including standardized code and proprietary software, user experience design, and search engine optimization.
- **Mobile Applications, Development and Management** – Demonstrated skillset to develop software for mobile devices, such as personal digital assistants, enterprise digital assistants or mobile phones.
Occupation-Specific Competencies, typically addressed in on-the-job training

- **Build/Maintain Software/Websites/Applications** – the construction of a website; the process of converting source code files into standalone software that can be run on a computer
- **Recognize Functional Problems** – the ability to identify and problem solve problems with functionality in computer systems
- **Documentation of Development/Revisions** – the discipline of recording steps and changes in computer program development and maintenance
- **Upgrade/Maintain Systems as Required** – the act of rolling out improvements to computer systems, which are required for integration with other systems and programs
- **Team/Client Communication** – the act of speaking, writing, and listening to share ideas, thoughts and information effectively with team members and end users
- **Troubleshooting** – the act of trying different possible solutions to a problem with the end goal of solving the issue

### IT Programming, Development and Engineering Career Cluster Pathway Training Plan

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<th>Related Instruction Competencies</th>
<th>List Course/Training Name and Title</th>
<th>Description of Courses and/or Training Program</th>
<th>List Responsible Provider: Company, College, Trainer, or other</th>
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