



PROFESSIONAL CERTIFICATE IN **Software Analysis & Development**

Certificate Description

This certificate provides high school graduates, professionals with limited experience or out-of-field students and professionals the opportunity to understand the significance of software analysis and development in today's business environment.

Introduction to Computer and Network Hardware—ITCO 103 (required)—This course provides the student with the knowledge about microcomputers and basic network hardware. Topics may include desktop and portable systems, printers, input devices, and fundamental networking components and concepts.

Outcomes:

- Describe various computing infrastructure components
- Configure computer and network resources
- Explain the operation of computers
- Discuss installation, maintenance, and configuration of computer and network hardware
- Explain the operation of key network hardware
- Explain the structure and function of the OSI model

Network Infrastructure Basics—ITCO 251 (required)—This course provides students with a conceptual overview of network infrastructure. Topics may include network configurations, network operations, segmentation through subnetting, and wireless developments.

Outcomes:

- Explain structure of the principal network architecture models and their corresponding communication protocols.
- Explain networking concepts and principles
- Describe the different IP addressing techniques
- Describe subnetting concepts and techniques
- Describe wireless developments in networking



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Information Technology Security—ITCO 361 (required)—This survey course covers information security concepts and mechanisms. Information security concepts reviewed may include data protection techniques, software security, information assurance process, enterprise network security, and attack types/countermeasures.

Outcomes:

- Explain the fundamental concepts of information assurance and security.
- Discuss how operational issues such as software security and access management are addressed.
- Describe mechanisms for enterprise and Internet security.
- Discuss security management processes.
- Explain selected common security threats, vulnerabilities, and their countermeasures.

Object Oriented Application Development—ITSD 322—This course introduces the application development methodology using contemporary, industry-grade development environments. Students will learn to use programming techniques such as Try Catch blocks, If blocks, looping and arrays, etc. Furthermore students will learn about debugging, printing, message Boxes etc.

Outcomes:

- Explain the various components of an integrated development environment
- Create a simple application that will respond to user input
- Understand objects in the real world and in software
- Discuss the roles of encapsulation, inheritance, and polymorphism
- Set up a project in an integrated development environment

Software Requirement—ITSD 323—In this course, students will learn principles tools and techniques for requirements elicitation, analysis, and specification. Students will explore and become familiar with the role of requirements in the development process, goals of the requirements phase, and the essential difficulties inherent in specifying requirements for real-world systems.

Outcomes:

- Understand the principles of requirements specification and the use of mathematical models in assessing the quality of a requirements specification
- Be able to evaluate and choose appropriate requirements specifications methods and tools for a specific software development
- Demonstrate the ability to write formal software requirements specification
- Understand the context of requirements in the overall development process



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Software Quality Control and Testing—ITSD 324—In this course, students will examine a variety of programming techniques and technologies to ensure software quality, such as Quality Tools in Software Development, Software Testing Metrics and Models, and Software Test Document.

Outcomes:

- Examine quality issues such as product operation, revision, and transition factors
- Demonstrate graphic user interface testing, verification, and validation
- Apply white-box and black-box testing
- Demonstrate the use of test integration and debugging

Application of Scripting Language—ITSD 327—The course covers current scripting languages and their use in writing web applications with emphasis on software installation, deployment, and system administration and maintenance.

Outcomes:

- Demonstrate understanding for characteristics of interpreted languages
- Use and utilize scripts to administer and maintain system files and environment
- Create utilities aimed to install and deploy applications
- Apply various scripting techniques

System Analysis and Design—ITSD 422—This course focuses on software development life cycle, and covers methodologies and tools used in software planning, analysis, and design.

Outcomes:

- Create system requirements
- Describe the phases of system development life cycle
- Demonstrate understanding for use of tools in each phase of software development life cycle
- Explain major cross-functional Systems Analyst's tools, including: CASE tools, Financial Analysis tools, Project-Management tools, and Internet Resource tools
- Demonstrate an in-depth understanding of how information technology supports operational and business requirements in today's extremely competitive market