

ITT Technical Institute
SD3120
Programming in Open Source with
LAMP
Onsite and Online Course

SYLLABUS

Credit hours: 4.5

Contact/Instructional hours: 56 (34 Theory Hours, 22 Lab Hours)

Prerequisite(s) and/or Corequisite(s):

Prerequisites: SD1340 Creating Websites Using HTML5, CSS3 and JavaScript or equivalent

Course Description:

This course introduces skills to develop software applications in the open source environment using Linux, Apache, MySQL and PHP (LAMP) technologies

COURSE SUMMARY

COURSE DESCRIPTION

This course introduces skills to develop software applications in the open source environment using Linux, Apache, MySQL and PHP (LAMP) technologies.

MAJOR INSTRUCTIONAL AREAS

1. Use of LAMP platform and an open source IDE to create Web applications
2. Fundamental tasks required to configure a computer running Linux as a development platform
3. Basic Apache Web server configuration techniques
4. Database creation using MySQL
5. Introduction to Web application development using PHP
6. Introduction to Perl and Python

COURSE LEARNING OBJECTIVES

By the end of this course, you should be able to:

1. Describe fundamental Web technologies and the HTML markup language.
2. Operate and develop effectively within a Linux environment.
3. Configure Apache Web server to host a Web site.
4. Enhance Web applications through server-side scripting.
5. Create a Web application using PHP.
6. Apply object-oriented programming techniques using PHP.
7. Create a Web application that accesses a MySQL database.
8. Handle errors and exceptions in PHP.
9. Manage Web session state in PHP.
10. Describe the best practices for securing a server.

COURSE OUTLINE

MODULE 1: INTRODUCING THE WEB AND HTML

COURSE LEARNING OBJECTIVES COVERED

- Describe fundamental Web technologies and the HTML markup language.
- Operate and develop effectively within a Linux environment.

TOPICS COVERED

- Internet Protocol and the Client-Server Model
- Hypertext Transfer Protocol (HTTP) and Web Servers
- Hypertext Markup Language (HTML) Syntax, Elements, and Documents
- HTML Documents, Tables, Forms, and Form Control Elements
- Fundamentals of Perl and Perl Common Gateway Interface (CGI) Programming

MODULE LEARNING ACTIVITIES	GRADE D	OUT-OF- CLASS TIME
Reading: Connolly, R., & Hoar, R., Chapter 1, pp. 2-29 and pp. 40-48, Chapter 2, pp. 53-80, and Chapter 4, pp. 149-173	No	6.5 hr
Reading: ITT Tech Virtual Library> Basic Search> Browse> Browse by Format> Books> Books24x7> <i>Perl and Apache: Your Visual Blueprint for Developing Dynamic Web Content</i> > Chapter 6, Sections 6.1-6.5 and Chapter 8, Sections 8.1-8.5	No	1.5 hr
Lesson: Study the lesson for this module.	No	1 hr
Discussion: Participate in the discussion titled “Exploring Different Servers.”	Yes	N/A
Lab: Complete the lab titled “Setting Up the Eclipse.”	Yes	N/A
Project: Read and begin the project.	No	0.5 hr

Total Out-Of-Class Activities: 9.5 Hours

MODULE 2: ADMINISTERING APACHE IN THE LINUX ENVIRONMENT

COURSE LEARNING OBJECTIVES COVERED

- Operate and develop effectively within a Linux environment.
- Configure Apache Web server to host a Web site.

TOPICS COVERED

- Web Server–Hosting Options and Domain and Name Server Administration
- Linux and Apache Configuration
- Apache Request and Response Management
- Web Monitoring and Analytics
- Installation, Use, and Administration of Linux
- Installation of Perl and Apache on Linux

MODULE LEARNING ACTIVITIES	GRADE D	OUT-OF- CLASS TIME
Reading: Connolly, R., & Hoar, R., Chapter 19, pp. 839-875	No	4 hr
Reading: ITT Tech Virtual Library> Basic Search> Browse> Browse by Format> Books> Books24x7> <ul style="list-style-type: none"> • <i>Setting Up LAMP: Getting Linux, Apache, MySQL, and PHP Working Together> Chapter 2, Sections 2.1-2.6, Chapter 3, Section 3.3, and Chapter 4, Sections 4.2-4.3</i> • <i>Perl and Apache: Your Visual Blueprint for Developing Dynamic Web Content> Chapter 3 and Chapter 5</i> 	No	9 hr
Lesson: Study the lesson for this module.	No	2 hr
Quiz: Prepare for Quiz 1.	No	1.5 hr
Discussion: Participate in the discussion titled “Apache Open Source Web Server.”	Yes	N/A
Lab 1: Complete the lab titled “Explore the Fedora Operating System.”	Yes	N/A
Lab 2: Complete the lab titled “Manage Content on Apache.”	Yes	N/A
Quiz: Take Quiz 1.	Yes	N/A
Project: Continue work on Project Part 1.	No	1 hr

Total Out-Of-Class Activities: 17.5 Hours

MODULE 3: USING PHP FOR WEB DEVELOPMENT

COURSE LEARNING OBJECTIVES COVERED

- Enhance Web applications through server-side scripting.
- Create a Web application using PHP.
- Apply object-oriented programming techniques using PHP.

TOPICS COVERED

- Server-Side Development
- Responsibility of a Web Server
- Introduction to PHP, Installation, and Configuration
- Program Control
- PHP Functions, Arrays, and Superglobals
- Classes and Objects in PHP

MODULE LEARNING ACTIVITIES	GRADE D	OUT-OF- CLASS TIME
Reading: Connolly, R., & Hoar, R., Chapter 8, pp. 323-358, Chapter 9, pp. 365-391, and Chapter 10, pp. 403-432	No	10 hr
Reading: ITT Tech Virtual Library> Basic Search> Browse> Browse by Format> Books> Books24x7> <i>Setting Up LAMP: Getting Linux, Apache, MySQL, and PHP Working Together</i> > Chapter 10, Sections 10.1-10.4	No	2 hr
Lesson: Study the lesson for this module.	No	2 hr
Quiz: Prepare for Quiz 2.	No	1.5 hr
Discussion: Participate in the discussion titled “Server-Side Scripting.”	Yes	N/A
Lab 1: Complete the lab titled “Write a PHP Script to Process a Form.”	Yes	N/A
Lab 2: Complete the lab titled “Implement a Contest-Checking Site.”	Yes	N/A
Quiz: Take Quiz 2.	Yes	N/A
Project: Continue work on Project Part 1.	No	2 hr

Total Out-Of-Class Activities: 17.5 Hours

MODULE 4: WORKING WITH THE DATABASE

COURSE LEARNING OBJECTIVES COVERED

- Enhance Web applications through server-side scripting.
- Create a Web application using PHP.
- Apply object-oriented programming techniques using PHP.
- Create a Web application that accesses a MySQL database.

TOPICS COVERED

- Database and Web Development
- SQL
- Database APIs
- MySQL Database Management
- PHP Programming in MySQL
- MySQL Installation and Administration
- Simple Database Techniques

MODULE LEARNING ACTIVITIES	GRADE D	OUT-OF- CLASS TIME
Reading: Connolly, R., & Hoar, R., Chapter 11, pp. 437-495	No	6.5 hr
Reading: ITT Tech Virtual Library> Basic Search> Browse> Browse by Format> Books> Books24x7> <i>Setting Up LAMP: Getting Linux, Apache, MySQL, and PHP Working Together</i> > Chapter 9, Sections 9.1-9.6	No	4 hr
Lesson: Study the lesson for this module.	No	2 hr
Quiz: Prepare for Quiz 3.	No	1.5 hr
Discussion: Participate in the discussion titled “Common Security Flaws.”	Yes	N/A
Lab: Complete the lab titled “Create and Access a Database.”	Yes	N/A
Quiz: Take Quiz 3.	Yes	N/A
Project: Submit Project Part 1.	Yes	3 hr

Total Out-Of-Class Activities: 17 Hours

MODULE 5: HANDLING ERRORS, EXCEPTIONS, AND MANAGING STATES

COURSE LEARNING OBJECTIVES COVERED

- Enhance Web applications through server-side scripting.
- Create a Web application using PHP.
- Apply object-oriented programming techniques using PHP.
- Create a Web application that accesses a MySQL database.
- Handle errors and exceptions in PHP.
- Manage Web session state in PHP.

TOPICS COVERED

- Errors and Exceptions
- PHP Error, Error Reporting, and Exception Handling
- Regular Expressions
- User Input Validation
- State in Web Applications
- Cookies, Serialization, and Session State
- HTML5 Web Storage and Caching

MODULE LEARNING ACTIVITIES	GRADE D	OUT-OF- CLASS TIME
Reading: Connolly, R., & Hoar, R., Chapter 12, pp. 504-536, and Chapter 13, pp. 542-567	No	6.5 hr
Lesson: Study the lesson for this module.	No	1.5 hr
Discussion: Participate in the discussion titled “Reducing Validation Errors.”	Yes	1.5 hr
Quiz: Prepare for Quiz 4.	No	1.5 hr
Lab 1: Complete the lab titled “Create a Number-Guessing Application.”	Yes	N/A
Lab 2: Complete the lab titled “Create a Paging Application.”	Yes	N/A
Quiz: Take Quiz 4.	Yes	N/A
Project: Continue work on Project Part 2.	No	3 hr
Final Exam: Prepare for the final exam.	No	5 hr

Total Out-Of-Class Activities: 19 Hours

MODULE 6: SECURING THE SERVER

COURSE LEARNING OBJECTIVES COVERED

- Create a Web application using PHP.
- Apply object-oriented programming techniques using PHP.
- Create a Web application that accesses a MySQL database.

- Describe the best practices for securing a server.

TOPICS COVERED

- Server Security and Authentication
- Cryptography
- Hypertext Transfer Protocol Secure (HTTPS)
- Security Best Practices
- Common Threat Vectors
- Introduction to Python
- Penetration Testing with Python

MODULE LEARNING ACTIVITIES	GRADE D	OUT-OF-CLASS TIME
Reading: <i>Connolly, R., & Hoar, R., Chapter 16, pp. 666-712</i>	No	4 hr
Reading: ITT Tech Virtual Library> Basic Search> Browse> Browse by Format> Books> Books24X7> <i>Violent Python: A Cookbook For Hackers, Forensic Analysts, Penetration Testers And Security Engineers> Chapter 1, Sections 1.1-1.6, and Chapter 2, Sections 2.1-2.3</i>	No	1.5 hr
Lesson: Study the lesson for this module.	No	1 hr
Project: Submit Project Part 2.	Yes	2 hr
Final Exam: Take the final exam.	Yes	N/A

Total Out-Of-Class Activities: 8.5 Hours

EVALUATION AND GRADING

EVALUATION CRITERIA

The graded assignments will be evaluated using the following weighted categories:

CATEGORY	WEIGHT
Lab	25%

CATEGORY	WEIGHT
Discussion	15%
Quiz	10%
Project	30%
Final Exam	20%
TOTAL	100%

GRADE CONVERSION

The final grades will be calculated from the percentages earned in the course, as follows:

GRADE	PERCENTAGE
A (4.0)	90–100%
B+ (3.5)	85–89%
B (3.0)	80–84%
C+ (2.5)	75–79%
C (2.0)	70–74%
D+ (1.5)	65–69%
D (1.0)	60–64%
F (0.0)	<60%

LEARNING MATERIALS AND REFERENCES

REQUIRED RESOURCES

COMPLETE TEXTBOOK PACKAGE

- Connolly, R., & Hoar, R. (2015). *Fundamentals of web development (1st ed.)*. Upper Saddle River, NJ: Pearson.

OTHER ITEMS

- Windows XP (or later)
- VMWare Player 5.2 (or later)
- Fedora 20 Virtual Machine
- Apache 2.0
- Eclipse IDE for Java EE Developers
- Eclipse PHP Development Tools (PDT)

Note: You can download Windows XP and VMware Player, from the DreamSpark website. Refer to the [DreamSpark Installation Guide](#) for download instructions.

RECOMMENDED RESOURCES

- [ITT Tech Virtual Library](https://studentportal.itt-tech.edu) (accessed via Student Portal | <https://studentportal.itt-tech.edu>)
 - Basic Search> Browse> Browse by Format> Books> Books24X7>
 - Boronczyk, T. (2009). *Beginning PHP6, Apache, MySQL Web Development*. Indianapolis, IN: John Wiley.
 - Harris, A.B. (2009). *PHP 6/MySQL Programming for the Absolute Beginner*. Boston, MA: Cengage Learning.
 - Mathew, N., & Stones, R. (2008). *Beginning Linux Programming (4th ed.)*. Indianapolis, IN: John Wiley.
 - McDaniel, A. (2010). *Perl and Apache: Your Visual Blueprint for Developing Dynamic Web Content*. Indianapolis, IN: John Wiley.
 - O'Connor, T.J. (2013). *Violent Python: A Cookbook for Hackers, Forensic Analysts, Penetration Testers and Security Engineers*. Waltham, MA: Syngress Publishing.
 - Rosebrock, E., & Filson, E. (2004). *Setting Up LAMP: Getting Linux, Apache, MySQL, and PHP Working Together*. Alameda, CA: Sybex.
 - Soyinka, W. (2009). *Linux Administration: A Beginner's Guide (5th ed.)*. McGraw-Hill/Osborne.

- Valade, J. (2010). *PHP & MySQL For Dummies (4th ed.)*. Indianapolis, IN: John Wiley.
- Vaswani, V. (2007). *PHP Programming Solutions*. McGraw-Hill/Osborne.

INSTRUCTIONAL METHODS AND TEACHING STRATEGIES

The curriculum employs a variety of instructional methods that support the course objectives while fostering higher cognitive skills. These methods are designed to encourage and engage you in the learning process in order to maximize learning opportunities. The instructional methods include but are not limited to lectures, collaborative learning options, use of technology, and hands-on activities.

To implement the above-mentioned instructional methods, this course uses several teaching strategies, such as hands-on labs and lessons. Your progress will be regularly assessed through a variety of assessment tools including discussions, labs, project, quizzes, and a final exam.

OUT-OF-CLASS WORK

For purposes of defining an academic credit hour for Title IV funding purposes, ITT Technical Institute considers a quarter credit hour to be the equivalent of: (a) at least 10 clock hours of classroom activities and at least 20 clock hours of outside preparation; (b) at least 20 clock hours of laboratory activities; or (c) at least 30 clock hours of externship, practicum or clinical activities. ITT Technical Institute utilizes a “time-based option” for establishing out-of-class activities which would equate to two hours of out-of-class activities for every one hour of classroom time. The procedure for determining credit hours for Title IV funding purposes is to divide the total number of classroom, laboratory, externship, practicum and clinical hours by the conversion ratios specified above. A clock hour is 50 minutes.

A credit hour is an artificial measurement of the amount of learning that can occur in a program course based on a specified amount of time spent on class activities and student preparation during the program course. In conformity with commonly accepted practice in higher education, ITT Technical Institute has institutionally established and determined that credit hours awarded for coursework in this program course (including out-of-class assignments and learning activities described in the “Course Outline” section of this syllabus) are in accordance with the time-based option for awarding academic credit described in the immediately preceding paragraph.

ACADEMIC INTEGRITY

All students must comply with the policies that regulate all forms of academic dishonesty or academic misconduct. For more information on the academic honesty policies, refer to the Student Handbook and the School Catalog.

INSTRUCTOR DETAILS

Instructor Name	
Office Hours	
Contact Details	

(End of Syllabus)