

# POSTGRADUATE INSTITUTE OF SCIENCE UNIVERSITY OF PERADENIYA



## CERTIFICATE COURSE IN WEB DEVELOPMENT

### 1. INTRODUCTION

Technology is becoming an essential tool in each and every organization. Among many, Information Technology (IT) is playing a vital and significant role in education, business, engineering, medicine and so forth. As such literacy in IT is of paramount importance for efficient and accurate functionality of any organization.

The programme covers the essential areas of web development useful for those who are looking for IT related employments and those who want to use the various services provided by the Internet.

### 2. OBJECTIVES OF THE PROGRAMME

The objective of this programme is to provide thorough understanding of the information systems and technologies applicable to web based application development. At the completion of this course, candidates will be able to effectively use IT in designing and implementing web applications.

### 3. PROGRAMME ELIGIBILITY

Applicants should pass either three subjects in G.C.E. A/L examination or 6 subjects in G.C.E. O/L examination including English and Mathematics. Eligibility of candidates is determined according to the performance at an aptitude test and an interview.

### 4. PROGRAMME FEE

	Programme Fee
Local candidates	Rs. 30,000/-
SAARC countries	US \$ 1000/-
Other countries	US \$ 1500/-

Programme fees shall be paid at registration according to the procedure stipulated by the PGIS.

### 5. THE PROGRAMME STRUCTURE AND DURATION

The Certificate Course in Web Development programme will be conducted on a course unit basis. Course work will be conducted over a period of two months (*during weekdays*). Satisfactory completion of a minimum of 12 credit units of course work is required to qualify for the Certificate.

## Programme Summary

<i>Course Code</i>	<i>Course Title</i>	<i>Lecture hrs.</i>	<i>Practical hrs.</i>	<i>No. of Credits</i>
SC 580	Introduction to Mathematics	15	0	1
SC 581	Introduction to Computers	15	0	1
SC 582	Introduction to Programming	20	20	2
SC 583	Introduction to Database Systems	15	0	1
SC 584	Communication Networks	30	-	2
SC585	Implementation of Database Applications		30	1
SC 586	Document Markup Languages	20	20	2
SC 587	Web Page Construction	20	20	2
SC 588	Programming Web Applications	20	20	2
SC589	Multimedia programming		30	1

### 6. PROGRAMME CONTENT

#### SC580 - Introduction to Mathematics

Sets, Set operations, Relations and Functions, Graphs, Recurrence relation, Greatest common divisor, Fibonacci numbers, Counting rules, Pascal's triangle, Binomial theorem, Probability, Boolean algebra.

#### SC581 - Introduction to Computers

Evolution of computers, Personal computers: basic components, their functionality and assembling a PC, Computer networks: introduction and advantages over PCs, Internet: email, MSM messenger and web browsing.

#### SC582 - Introduction to Programming

Basic Concepts: The structure & definition of a HLL such as C, the concept of Data types and operation on data types. Structured Programme Development: Problem definition and specification, top-down design and development, Coding guidelines & standards in developing commercial application systems.

Writing a complete program: Sequential, alternation, and repetition control structure: formatted and unformatted basic input output, Modular structure programme modules in C, functions.

Pointers: Pointers concept, operations on pointers and usage of pointers. Array processing Character and string processing. Simple sorting and searching algorithms Bubble sort, sequential and binary search.

File processing: File Definition; processing logic for sequential and random files. Classification of Data types and Data Structure, scalar and structured data types, static and dynamic structures. Testing of programme via both black box and white box testing techniques and system integration via bottom-up or top-down approach.

#### References:

1. 2. How to Programme (2<sup>nd</sup> Ed.)- Deitel / Deitel, C (Prentice Hall, 1994)
3. Problem solving and Programming- Barclay, ANSI C (Prentice Hall, 1990)
4. The C Programming Language (2<sup>nd</sup> Ed.)- Kernighan / Ritchie (Prentice Hall, 1988)
5. Programming in ANSI C- E Balagurusamy

### **SC 583 - Introduction to Databases**

Basic Database Concept; Communication with Database System; Introduction to Database Management System, Relational Database Model; Structured Query Language; Relational Database Design and Normalization.

#### **References:**

1. A First Course in Database Systems- Ullman, J.D. & Widom, J. (1997) (Prentice-Hall)
2. Database System Concepts - Korth, H.F & Silberschatz, A (1991) (McGraw -Hill, 2<sup>nd</sup> ed)

### **SC 584 - Communication Networks**

Network: Definition of network, Importance and types of network, OSI Model of Networking. LAN, MAN, WAN: Definition and Their Features, Topologies (Star, Bus & Ring), Transmission Media & Communication Channels, Communication Techniques. Server, Workstation, File Server, Application Server, Connectors & Cabling Systems, HUB, Switch, Router, Modem, Network Interface Card. Network Operating System, Different Types of Protocol-TCP/IP, IPX/SPX, NetBEUI.

Internet: Introduction and Origin of Internet, Internet Architecture, Client Server Basics, Bridge, Gateway, IP Protocol & IP Address, Internet Control Protocols, Domain Name System (DNS) & Name Servers, TCP/IP, Electronic Mail, Telnet, FTP, Archie, Gopher, Jughead, Veronica, WAIS, WWW, Search Engine, HTTP, HTML, URLs, VSAT Web Page, Browsing.

#### **References:**

1. Computer Network- Andrew S. Tanenbaum
2. Data & Computer Communication- William Stallings

### **SC 585 - Implementation of Database Application**

RDBMS Programming with ACCESS and MySQL: Introduction to SQL, Benefit of SQL, Running SQL commands, Creating Database and Tables, Adding Data, Deleting Data, Updating Data, Altering Tables, Select Statements, Relational Operators and Constraint, Inner Joins and Outer Joins, Aliases and Synonyms, Built-in Functions, Creating Views, Database Sequences, Clauses, Index, Creating and Altering Table Space, Creating and Altering User, Granting and Revoking System Privileges and roles, Lock Table, Format Model.

Forms: Developer 2000, File Format, Object Navigator, Properties Window and Property Class, Master-Detail Relationship, Event Triggers and PL/SQL Blocks, Description and use of different Forms Items, Alters, Editors and Windows, Record Groups and LOVS, Menus and Transaction Processing, Images, Parameters and Controls, Database Triggers and Libraries. Report: Reports Style, The Reports Wizards, Modifying a Report, Report Templates and Storage, Queries and Groups in the Reports Data Model, Creating Columns in the Report Data Model, The Layout Model.

#### **References:**

1. SQL, PL/SQL- The Programming Language of ORACLE -Ivan Bayross ( 2<sup>nd</sup> Revised Edition 2001)
2. Developer 2000- The Programming Language of Oracle —Ivan Bayross ( 2<sup>nd</sup> Revised Edition 2001)

### **SC 586 - Document Markup Languages**

Introduction to XML, Creation of XML Documents, DTDs, Namespaces and XML Schemas, Simple API for XML (SAX), Document Object Model (DOM), XLinks, Xpointers, Transformation of XML Documents – XSLT, Resource Description Framework – RDF, XML Applications.

**References:**

1. (IXML) Required/Optional: Inside XML Steven Holzner. New Riders 2001. ISBN: 0-7357-1020-1
2. (JXML) Optional: Java and XML, solutions to real-world problems, Brett Mc Laughlin O'Reilly 2001. ISBN: 0-596-00197-5

**SC 587 - Web Page Construction**

Introduction to Internet Programming., Client/Server model, Browsers-Graphical and Hypertext Access to the Internet, HTTP – Hyper Text Transfer Protocol, Creating Internet World Wide Web pages, HTML – Hyper Text Markup Language, headers, body, html tags, tables, Text, graphics, sounds, video clips, multi-media, Client side image mapping, web page counters, HTML resources - html converters and tools, HTML forms programming, Building a form, Text fields and value, size, maxlength, html buttons, radio, checkboxes, prechecked, Selection lists, Introduction to CGI scripting, Action and Method - GET and POST, html form interface with cgi scripts, Automating processing such as info forms and email, Programming cgi interfacing via forms, Creating Interactive Executable Content, Advanced Java Programming, Graphic User Interface with AWT, AWT calls, Windows, dialog boxes, pop-up menus, Graphics, Using a Layout manager, Manipulating Images, Image animation, Threads - Process Management, Socket programming - client-server processing, URL Connections, Java Beans.

**References:**

1. Larry Wall and Randall Scharz. "Programming Perl", O'Reilly and Associates Publishing, Sebastopol, CA, 1994.
2. Gary Cornell, Cay Horstmann. "Core Java", SUN Soft Press Publishing, Mountain View, 1996.
3. S. Gundavaram. "CGI Programming on the World Wide Web", O'Reilly and Associates Publishing, Sebastopol, CA, 1996.

**SC 588 - Programming Web Applications**

Explores the use of scripting languages, such as Java Script, PHP, and Java Applets in web site development. Examines the use of relational databases to create dynamic web sites. Extensive exposure in lecture and lab to web based application development tools. Students will develop a full-featured web based interactive educational application.

**References:**

1. Benoit Marchal (1999/2001). XML by Example (1st or 2nd Edition). Que Publishers
2. Java 2 with Swing: Deitel and Deitel
3. Internet & World Wide Web How to Programme Second Edition 2002

**SC 589 – Multimedia programming**

Introduction to multimedia packages, sound editing, video editing, 2D and 3D animation design

**Recommended Text:**

- Introduction to Multimedia Systems (Communications, Networking and Multimedia), by Sugata Mitra and Gaurav Bhatnagar

## 7. PROGRAMME EVALUATION

At the end of each course student performance will be evaluated by means of written examinations, practical examinations, assignments, etc. The minimum grade a student should achieve to pass a course is C. A student who fails a course shall repeat that course. The maximum grade obtainable at a repeat attempt is a C. 'Make Up' examinations will be given to students who fail to sit a particular examination due to medical or other valid reasons acceptable to the PGIS. At the beginning of a given course, the students shall be informed of the guidelines for course evaluation.

**A student who achieves a GPA of 2.0 or above is eligible for the award of the Certificate in Web Development. A student whose GPA is between 3.00 and 3.49 will be awarded a merit pass and above 3.50 will be awarded a distinction pass.**

## 8. TEACHING PANEL

- Dr. S. R. Kodituwakku, *Dept. Statistics and Computer Science, University of Peradeniya*  
*B.Sc.(UPDN), M.Sc.(AIT), Ph.D.(RMIT)*
- Dr. A. A. I. Perera, *Dept. Mathematics, Faculty of Science, Univ. Peradeniya*  
*B.Sc. (UPDN), M. Sc. (Oslo), Ph.D. (Melb.)*
- Dr. J. Wijekulasooriya, *Dept. Electrical and Electronic Engineering, Faculty of Engineering, Univ. Peradeniya*  
*B.Sc. (UPDN), Ph.D. (Northumbria, UK).*
- Dr. U. A. J. Pinidiyaarachchi, *Dept. Statistics and Computer Science, University of Peradeniya*  
*B.Sc.(UPDN), Ph.D.(Upsala)*
- Dr. R. D. Yapa, *Dept. Statistics and Computer Science, University of Peradeniya*  
*B.Sc.(UPSJP), Ph.D.(Hiroshima)*
- L. S. K. Perera, *Information Technology Center, University of Peradeniya*  
*B.Sc.(UPDN), M.Sc. (UPDN)*

## 9. PROGRAMME COORDINATOR

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