Study Scheme

&

Curriculum

Computer Engineering

Campus:
Puran Murti Campus
Kami Road, Sonepat (Delhi-NCR), Haryana - 131001, India
Contact no.:7438900900

Website: www.puranmurti.com
E-mail: info@puranmurti.com

FIFTH SEMESTER

FIFTH SEMESTER (COMPUTER ENGINEERING)

Sr. No.	SUBJECTS	STUDY SCHEME Hours/Week			MARKS IN EVALUATION SCHEME								Total Marks of Internal & External
					INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT					
		Th	Pr	Credit	Th	Pr	Tot	Th	Hrs	Pr	Hrs	Tot	
Industrial Training		-	-	5	-	100	100	-	-	100	-	100	200
5.1	Software Engineering	3	-	3	25	-	25	100	3	-	-	100	125
5.2	Computer Networks	3	3	4	25	25	50	100	3	50	3	150	200
5.3	Computer Programming Using Python	3	6	6	25	25	50	100	3	50	3	150	200
5.4	*Elective:	3	3	4	25	25	50	100	3	50	3	150	200
5.5	Web Development Using PHP	3	6	6	25	25	50	100	3	50	3	150	200
Soft Skills -III		-	2	-	-	25	25	-	-	-	-	-	25
	Total	15	20	28	125	225	350	500	-	300	-	800	1150

5.1 SOFTWARE ENGINEERING

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RATIONALE

The system analysis and design is the backbone of Application software development. After studying the subject the students will be able to develop and design the system according to given requirements. It involves various steps in analysis and design of the system. It includes the knowledge of preparing project systematically. It is important to know about various aspects of the system analysis and design so that the students will be able to understand the responsibilities while designing and implementing the project.

LEARNING OUTCOMES

- Understanding the problem and corresponding requirement for development of software.
- Describe the various phases of the system development life cycle.
- Identify the expected benefits and scope of the projects.
- Prepare and develop data flow diagrams and decision tables.
- Perform a feasibility study of the system.
- Write detailed design specifications for programmes and database.
- Select methods for evaluating the effectiveness and efficiency of a system.
- Apply different testing techniques on simple programme.

DETAILED CONTENTS

1. Introduction to Software Engineering (8 periods)

Concept of systems: Types of systems : open, closed, static and dynamic systems.
Introduction, Programmes v/s Software Products
Emergence of Software Engineering- Early Computer Programming, High-level Language Programming, Control flow based Design, Data Structure Oriented Design, Object Oriented Design

2. Software Life Cycle Models (10 periods)

Requirement of Life Cycle Model, Classic Waterfall Model, Prototyping Model, Evolutionary Model, Spiral Model, introduction to angle methodology. Comparison of different Life Cycle Models

3. Software Planning (8 periods)

Responsibilities of Software Project Manager
- Metrics for Project Size Estimation- LOC(Lines of Code), Function Point Metric
- Project estimation Techniques- Using COCOMO Model.

4. Requirement Analysis and Specification (6 periods)

Requirement gathering and Analysis, Software Requirement Specifications(SRS), Characteristics of good SRS

5. Software Design and Implementation (8 periods)

Characteristics and features of good Software Design Cohesion and Cupling, Software design Approaches- Function Oriented Design(Data flow diagrams, Data dictionary, Decision Trees and tables), Object Oriented Design, Structured Coding Techniques, Coding Styles, documentation

6. Software Testing (8 periods)

Concept of Testing, Verification v/s Validations, Unit Testing, Black Box Testing, White Box Testing, Integration testing, System testing, Configuration management.

MEANS OF ASSESSMENT

• Assignments and quiz/class tests, mid-term and end-term written tests
• Software installation, operation, development and viva-voce

RECOMMENDED BOOKS

1. Software Engineering by Rajib Mall, PHI Publishers, New Delhi
2. An Integrated Approach to Software Engineering by Pankaj Jalote, Narosa Publishing House Pvt Ltd, Darya Ganj, New Delhi 110002
3. Software Engineering, Sangeeta Sabharwal, New Age International, Delhi
4. Software Engineering by KK Aggarwal and Yogesh Singh
5. Software Engineering – A Practitioner's Approach by RS Pressman, Tata McGraw Hill Publishers, New Delhi
6 e-books/e-tools/relevant software to be used as recommended by AICTE/HSBTE/NITTTR.

Websites for Reference:

http://swayam.gov.in

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted	Marks Allotted
1	8	15
2	10	20
3	8	15
4	6	15
5	8	20
6	8	15
Total	**48**	**100**

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5.2 COMPUTER NETWORKS

RATIONALE

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The future of computer technology is in computer networks. Global connectivity can be achieved through computer networks. A diploma holder in computer engineering should therefore understand the function of networks. Knowledge about hardware and software requirements of networks is essential.

LEARNING OUTCOMES

After undergoing the subject, the students will be able to:

- setup computer networks
- setup basic wireless network
- diagnose & solve network problems
- diagnose & solve network problems remotely
- provide security to networks
- manage & handle WAN
- prevent external Network Attacks
- identify network troubleshooting methods.

DETAILED CONTENTS

1. Networks Basics (12 Periods)

- Concept of network
- Models of network computing
- Networking models
- Peer-to –peer Network
- Client-Server Network
- LAN, MAN and WAN
- Network Services
- Topologies
- Switching Techniques

2. Networking Models (08 Periods)

- OSI model: Definition, Layered Architecture
Functions of various layers
- TCP/IP Model: Definition, Functions of various layers
- Comparison between OSI and TCP/IP model

3. TCP/IP Addressing (08 Periods)

- Concept of physical and logical addressing
- IPV4 addresses – Address space, Notations
- Classful Addressing- Different IP address classes, Classes & Blocks, Net-id & Host-Id, Masks, Address depletion
- Classless Addressing – Address blocks, Masks
- Special IP Addresses
- Subnetting and Supernetting
- Loop back concept
- Network Address Translation
- IPV4 Header
- IPV6 Header
- Comparison between IPV4 and IPV6

4. Network Architecture (03 Periods)

Ethernet specification and standardization: 10 Mbps (Traditional Ethernet), 10 Mbps(Fast Ethernet) and 1000 Mbps (Gigabit Ethernet)

5. Network Connectivity (05 Periods)

- Network connectivity Devices
- NICs
- Hubs, Switches, Routers, Repeaters, Modem, Gateway
- Configuration of Routers & Switches

6 Network Administration (07 Periods)

- Network Security Principles, Cryptography, using secure protocols
- Trouble Shooting Tools: PING,IPCONFIG, IFCONFIG, NETSTAT, TRACEROOT,Wireshark, Nmap, TCPDUMP, ROUTEPRINT
- DHCP Server
- Workgroup/Domain Networking

7 Introduction to Wireless Networks. **(05 Periods)**

- Introduction to wireless LAN IEEE 802.11, WiMax ad Li-Fi
- Wireless Security
- Introduction to bluetooth - architecture, application
- Comparison between bluetooth and Wifi

LIST OF PRACTICALS

1. Recognize the physical topology and cabling (coaxial, OFC, UTP, STP) of a network.
2. Recognition and use of various types of connectors RJ-45, RJ-11,BNC and SCST
3. Making of cross cable and straight cable
4. Install and configure a network interface card in a workstation.
5. Identify the IP address of a workstation and the class of the address and configure the IP Address on a workstation
6. Managing user accounts in windows and LINUX
7. Sharing of Hardware resources in the network.
8. Use of Netstat and its options.
9. Connectivity troubleshooting using PING, IPCONFIG, IFCONFIG
10. Installation of Network Operating System(NOS)
11. Visit to nearby industry for latest networking techniques
12. Create a network of at least 6 computers.

Required Software

➢Windows Server/Linux Server

Required Tools and Supplies

1) Crimping tool, Cable tester,
2) RJ 45 connectors, RJ-11, BNC, SCST
3) Coaxial Cable, UTP, STP, OFC cable
4) Screw Driver Kit
5) Switch/Hub
6) Manageable Switch

INSTRUCTIONAL STRATEGY

Since the facilities are not available in the polytechnic, students need exposure to various security systems and software available in some organisations, universities and engineering colleges. For this, visits may be organized for students. The teachers should also be exposed in this area. Some practicals can be conducted in the laboratory.

MEANS OF ASSESSMENT

- Assignments and quiz/class tests, mid-term and end-term written tests
- Actual laboratory and practical work exercises and viva-voce
- Software installation, operation, development and viva-voce

RECOMMENDED BOOKS

1. Computer Networks by Tanenbaum, Prentice Hall of India, New Delhi
2. Data Communications and Networking by Forouzan, (Edition 2nd and 4th), Tata McGraw Hill Education Pvt Ltd , New Delhi
3. Data and Computer Communication by William Stallings, Pearson Education, New Delhi
4. Local Area Networks by Peter Hudson
5. Network+ Lab manual,- BPB Publications -by Tami Evanson
6. Networking Essentials – BPB Publications New Delhi
7. Computer Network and Communications By V.K. Jain and Narija Bajaj, Cyber Tech Publications, New

Delhi.
8. Cloud Computing Bible by Berrie Sarinby
9. e-books/e-tools/relevant software to be used as recommended by AICTE/HSBTE/NITTTR.

Websites for Reference:
http://swayam.gov.in
NPTEL.ac.in

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted	Marks Allotted (%)
1.	12	25
2.	08	15
3.	08	20
4.	03	05
5.	05	10
6.	07	15
7.	05	10
Total	**48**	**100**

5.3 COMPUTER PROGRAMMING USING PYTHON

RATIONALE

L T P
3 - 6

This course introduces to the students the Python language. Upon completion of this course, the student will be able to write non trivial Python programs dealing with a wide variety of subject matter domains.
Topics include language components, the IDLE/IDE environment, control flow constructs, strings, I/O, collections, classes, modules, and regular expressions

LEARNING OUTCOMES

a. Execute Python code in a variety of Environments

b. Use correct Python syntax in Python programs

c. Use the correct Python control flow construct

d. Write Python programs using various collection data types

e. Write home grown Python functions

f. Use many of the standard Python modules such as os, sys, math, and time

g. Trap various errors via the Python Exception Handling model

h. Use the IO model in Python to read and write disk files

i. Create their own classes and use existing Python classes. Understand and use the Object Oriented paradigm in Python programs

J. Use the Python Regular Expression capabilities for data verification

DETAILED CONTENTS

1. **Introduction** **(03 Periods)**

- Brief History of Python

- Python Versions
- Installing Python
- Environment Variables
- Executing Python from the Command Line
- IDLE
- Editing Python Files
- Python Documentation
- Getting Help
- Dynamic Types
- Python Reserved Words
- Naming Conventions

2. Basic Python Syntax **(03 Periods)**

- Basic Syntax
- Comments

String Values

- String Methods
- The format Method
- String Operators
- Numeric Data Types
- Conversion Functions
- Simple Output
- Simple Input

3. **▪ The print Function** **(04 Periods)**
Language Components

- Indenting Requirements
- The if Statement
- Relational and Logical Operators
- Bit Wise Operators
- The while Loop
- break and continue
- The for Loop

4. Collections **(09 Periods)**

- Introduction
- Lists
- Tuples
- Sets
- Dictionaries
- Sorting Dictionaries
- Copying Collections
- Summary

5. Functions **(06 Periods)**

Parameters

- Function Documentation
- Keyword and Optional Parameters
- Passing Collections to a Function
- Variable Number of Arguments
- Scope
- Functions - "First Class Citizens"
- Passing Functions to a Function
- map
- filter

- Mapping Functions in a Dictionary

6. Modules **(03 Periods)**

- Modules
- Standard Modules - sys
- Standard Modules - math
- Standard Modules - time
- The dir Function

7. Exceptions **(05 Periods)**

- Errors
- Runtime Errors
- The Exception Model
- Exception Hierarchy
- Handling Multiple Exceptions

8 Input and Output **(03 Periods)**

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- Introduction
- Data Streams
- Creating Your Own Data Streams
- Access Modes
- Writing Data to a File
- Reading Data From a File
- Additional File Methods
- Using Pipes as Data Streams
- Handling IO Exceptions

9. Classes in Python **(07 Periods)**

- Classes in Python
- Principles of Object Orientation
- Creating Classes
- Instance Methods
- File Organization
- Special Methods
- Class Variables
- Inheritance
- Polymorphism

10. Regular Expressions **(05 Periods)**

- Introduction
- Simple Character Matches
- Special Characters
- Character Classes
- Quantifiers
- The Dot Character
- Greedy Matches
- Grouping
- Matching at Beginning or End
- Match Objects
- Substituting
- Splitting a String
- Compiling

LIST OF PRACTICALS

1. Getting started with Python and IDLE in interactive and batch modes

2. What do the following string methods do?
- lower
- count
- replace

3. Write instructions to perform each of the steps below
(a) Create a string containing at least five words and store it in a variable. (b) Print out the string.
(c) Convert the string to a list of words using the string split method.
(d) Sort the list into reverse alphabetical order using some of the list methods (you might need to use dir(list) or help(list) to find appropriate methods).
(e) Print out the sorted, reversed list of words.

4. Write a program that determines whether the number is prime.
What is your favorite number? 24
24 is not prime
What is your favorite number? 31
31 is prime

5. Find all numbers which are multiple of 17, but not the multiple of 5, between 2000 and 2500?

6. Swap two integer numbers using a temporary variable. Repeat the exercise using the code format: a, b = b, a. Verify your results in both the cases.

7. Find the largest of n numbers, using a user defined function largest().

8. Write a function myReverse() which receives a string as an input and returns the reverse of the string.

10. Check if a given string is palindrome or not.

11. WAP to convert Celsius to Fahrenheit

12. Find the ASCII value of charades

13. WAP for simple calculator

INSTRUCTIONAL STRATEGY

Teachers should lay emphasis on practicals and experts from industries may be invited to deliver lectures and share experiences with the students.

MEANS OF ASSESSMENT

- Assignments and quiz/class tests, mid-term and end-term written tests
- Actual laboratory and practical work exercises and viva-voce
- Software installation, operation, development and viva-voce

RECOMMENDED BOOKS

1. Learning Python by Mark Lutz; Pratham Books, Bangalore
2. Foundations of Python Network Programming by John Goerzen and Brandeu Rhodes; Apress-eBook distributed by Springer Science and Business Media, New York
3. Dive Into Python by Mark Pilgrim; Pratham Books, Bangalore
4. Think Python by Allen B. Downey; O'Reily Media
5. Python Programming For Beginners: A Must Read Introduction to Python Programming by Robert Richards; Pratham Books, Bangalore
6. e-books/e-tools/relevant software to be used as recommended by AICTE/HSBTE/NITTTR.

SUGGESTED DISTRIBUTION OF MARKS

Topic no.	**Time Allotted (Periods)**	**Marks Allotted (%)**
1.	6	15
2.	6	15
3.	4	10
4.	8	15
5.	6	10
6.	6	10
7.	12	25
Total	**48**	**100**

ELECTIVE

5.4.2 BIG DATA

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RATIONALE

The importance of Big Data in various domain disciplines has increased tremendously in recent years. The subject provides an overview of the historical and modern context and operation of Big Data for beginners. The objective of the curriculum is that the students can begin to study/practice Big Data tools and techniques.

Note: Teachers should demonstrate and expose the students to various practical applications of Big Data through tutorials and exercises.

LEARNING OUTCOMES

After undergoing this subject, the students will be able to:

- Explain the challenges of Big Data
- Install and run Big Data tools
- Use tools to analyze big data and create statistical models.
- Solve problems using tools such as R and RStudio, and MapReduce/Hadoop
- Analyze data using different statistical techniques.
- Explain the utility of popular Big Data tools like: - Hadoop, Hive, Pig, Map Reduce, R Programming
- Deploy a structured life cycle approach to data science and big data analytics projects
- Use techniques and tools to analyze big data and create statistical models

DETAILED CONTENTS

1. INTRODUCTION TO BIG DATA (08 Periods)

Introduction – distributed file system, Big data: definition and taxonomy, Sources of Big Data, characteristics, Benefits of Big Data, Understanding Big Data with Examples. Big data applications, Top 10 industries using Big Data, Big data analytics, Challenges for processing big data.

2. INTRODUCTION TO HADOOP (12 Periods)

History of Hadoop, What is Hadoop & Hadoop vendors ,Big Data – Apache Hadoop & Hadoop EcoSystem. Hadoop Architecture, How Hadoop clusters work, Hadoop Storage: HDFS Introduction, 5 Dameons of Hadoop and their functionalities: NameNode, Secondary NameNode, DataNode, Job Tracker, and Task Tracker.

3 INTRODUCTION TO MAP REDUCE (12 Periods)

MapReduce Introduction, How MapReduce Works, Understanding the Map Reduce architecture - Writing Hadoop MapReduce Word-Count problem - Loading data into HDFS - Executing the Map phase - Shuffling and sorting - Reducing phase execution.

4. **Hadoop Eco Systems (08 Periods)**

Pig: What is Pig. Introduction to Pig Data Flow Engine . Pig and MapReduce. When Pig should be used, Hive: What is Hive, Architecture of Hive, how Hive Differs from Traditional RDBMS.

5. Introduction to R (08 Periods)

Reading and getting data into R – ordered and unordered factors – arrays and matrices – lists and data frames – reading data from files – probability distributions – statistical models in R.

LIST OF PRACTICALS

1. Installation of Hadoop.
2. Setting up a Hadoop cluster.
3. Practice of various Hadoop commands
4. MapReduce WordCount problem.
5. MapReduce TeraSort problem
6. Basics of R Programming/ Rstudio

INSTRUCTIONAL STRATEGY

The teachers should lay emphasis on demonstration and application of big data along with the theoretical inputs in the class. Experts may by invited to deliver lectures and share experiences.

MEANS OF ASSESSMENT

• Assignments and quiz/class tests, mid-term and end-term written tests
• Software installation, operation, development and viva-voce

RECOMMENDED BOOKS

1. Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, “Professional Hadoop Solutions”, Wiley, ISBN: 9788126551071, 2015.
2. Chris Eaton, Dirk deroos et al. , “Understanding Big data ”, McGraw Hill, 2012.
3. Tom White, “HADOOP: The definitive Guide” , O Reilly 2012.
4. Big Data and Analytics by Seema Acharya and Subhashini Chellappan; Wiley India
5. Vignesh Prajapati, “Big Data Analytics with R and Haoop”, Packet Publishing 2013.
6. Nina Zumel, John Mount, “Practical Data Science with R”, Manning Publications, 2014.
7. Jure Leskovec, Anand Rajaraman, Jeffrey D. Ullman, “Mining of Massive Datasets”, Cambridge University Press, 2014.
8. Mark Gardener, “Beginning R - The Statistical Pr ogramming Language”, John Wiley & Sons, Inc., 2012.
9. A Simple Introduction to DATA SCIENCE: BOOK ONE (New Street Data Science Basics 1) Kindle Edition ,by Lars Nielsen Noreen Burlingame .
10. A Simple Introduction to Data Science: BOOK TWO (New Street Data Science Basics 2) Kindle Edition by Lars Nielsen
11. The Big Data Revolution : Kindle Edition, by Jason Kolb (Author), Jeremy Kolb

12. Big Data:Principles and best practices of scalable realtime data systems (Englisch),von Nathan Marz James Warren
13. Data Mining Methods and Models: wileyindia ,by Daniel T Larose
14. Pro Apache Hadoop, 2ed by Sameer Wadkar, Madhu Siddalingaiah, Jason Venner; Wiley india,
15. e-books/e-tools/relevant software to be used as recommended by AICTE/HSBTE/NITTTR.

Websites for Reference:
http://swayam.gov.in

SUGGESTED DISTRIBUTION OF MARKS

Topic	Time Allotted (Periods)	Marks Allotted (%)
1	08	16
2	12	26
3	12	26
4	08	16
5	08	16
Total	**48**	**100**

5.5 WEB DEVELOPMENT USING PHP

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RATIONALE:
This course will enable the students to understand and develop competency amongst the students to design professional database backed dynamic and feature based web sites. The course covers the use of programming with PHP and the concepts of database with MySQL.

LEARNING OUTCOMES
After going through the subject, the student will be able to
• Compare and contrast the use of various markup languages.
• Perform various logical operations in PHP
• Create simple programmes to validate forms in PHP
• Perform database connectivity using PHP

DETAILED CONTENTS

1. DEVELOPING PORTALS USING HTML (14 periods)
Introduction to HTML 5 and CSS 3. Basic structure of HTML, designing a web page, inserting liks images, horizontal rules, comments. Formatting text, title, headings, colors, fonts, sizes, simple tables and forms. HTML tags, hyperlinks. Adding graphics and images, image maps, image files. Using tables, forms, style sheets and frames. Floating of web site/pages.

2. PHP (24 periods)
Introduction to PHP: How PHP Works , The php.ini File, Basic PHP Syntax, PHP variables, statements, operators, decision making, loops, arrays, strings, forms, get and post methods, functions.
Introduction to cookies, storage of cookies at client side, Using information of cookies. Creating single or multiple server side sessions. Timeout in sessions, Event management in PHP. Introduction to content management systems based on PHP.

3. PHP and MySQL (10 periods)
Introduction to MySQL, connecting to MySQL, database, creation, insertion, deletion and retrieval of

MySQL data using PHP.

LIST OF PRACTICALS

1. Design PHP based web pages using correct PHP, CSS, and XHTML syntax, structure.

2. Create Web forms and pages that properly use HTTP GET and POST protocol as appropriate.

3 Design SQL language within MySQL and PHP to access and manipulate databases.

4. Install and configure both PHP and MySQL.

5 Create PHP code that utilizes the commonly used API library functions built in to PHP.

6. Design and create a complete web site that demonstrates good PHP/MySQL client/serverdesign.

7. To store a cookie using PHP on client side.

8. To save the user session on server side.

9. Design website using wordpress or Joomla.

MEANS OF ASSESSMENT

• Assignments and quiz/class tests, mid-term and end-term written tests
• Actual laboratory and practical work, exercises and viva-voce
• Software installation, operation, development and viva-voce

RECOMMENDED BOOKS

1 Sams Teach Yourself PHP, MySQL, and Apache All in One" by Julie C. Meloni, Publisher: SAMS ,ISBN 0-672-32976-X
2. Web enabled development application by Ivan Byross: Commercial; TMH
3. HTML, CSS, JavaScript, Perl, Python and PHP by Schafer Textbooks; Wiley India
4. e-books/e-tools/relevant software to be used as recommended by AICTE/HSBTE/NITTTR.

Websites for Reference:

http://swayam.gov.in

SUGGESTED DISTRIBUTION OF MARKS

Topic	Time Allotted (Periods)	Marks Allotted (%)
1	14	30
2	24	50
3	10	20
Total	**48**	**100**

SOFT SKILLS – III

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RATIONALE

The present day world requires professionals who are not only well qualified and competent but also possess good communication skills. The diploma students not only need to possess subject related knowledge but also soft skills to get good jobs or to rise steadily at their work place. The objective of this subject is to prepare students for employability in job market.

LEARNING OUTCOMES

After undergoing this course, the students will be able to:
• Develop communication skills.
• Learn how to speak without fear and get rid of hesitation
• Use effective presentation techniques
• Understand entrepreneurial traits
• Exhibit attitudinal changes

DETAILED CONTENTS

• Communication Skills – Handling fear and phobia
• Resume Writing
• Applying for job through email/job portal
• Interview preparation : Mock Interview, Group Discussions and Extempore
• Presentation Techniques
• Developing attitude towards safety. Disaster management.

In addition, the students must participate in the following activities to be organized in the institute
• Sports
• NCC/NSS
• Camp – Entrepreneurial awareness
• Cultural Event

Note : Extension Lectures by experts may be organized. There will be no examination for this subject.