Mahatma Education Society's

Pillai College of Arts, Commerce & Science (Autonomous)

Affiliated to University of Mumbai

New Panvel

Syllabus for F. Y. B. Sc. IT Semester II

Program: B. Sc. Information Technology

(Semester based Credit and Grading system for the academic year 2019-20)

Semester II

Course Code	Course Type	Course Title	Theory/ Practical	Marks	Credits	Lectures/ Week
PUSIT201	Core	Object oriented Programming	Theory	100	2	5
PUSIT202	Core	Microprocessor Architecture	Theory	100	2	5
PUSIT203	Core	Web programming	Theory	100	2	5
PUSIT204	Core	Numerical and statistical methods	Theory	100	2	5
PUSIT205	Core	Green Computing	Theory	50	2	5
PUSIT201P	Core	PRACTICAL (PUSIT201)	Practical	50	2	3
PUSIT202P	Core	PRACTICAL (PUSIT202)	Practical	50	2	3
PUSIT203P	Core	PRACTICAL (PUSIT203)	Practical	50	2	3
PUSIT204P		PRACTICAL (PUSIT204)	Practical	50	2	3
PUSIT205P		PRACTICAL (PUSIT205)	Practical	50	2	3
Total				700	20	

BOS	Information Technology
Class	F.Y. B.Sc. I.T.
Semester	II
Subject Name	Object Oriented Programming
Subject Code	PUSIT201
Level of the Subject	Medium

Objectives

1. To understand the concepts of Programming
2. For getting more information about how programs are written and its syntax

Unit No	Name of Unit	Topic No	Name of Topic	No. Of Lectures
1	Object Oriented Methodology, Principles, Classes and Objects	1.1	Introduction: Advantages and Disadvantages of Procedure Oriented Languages, What is Object Oriented Development? Benefits and Application of OOPS.	15L
		1.2	Basic concepts: Basic Concepts of OOPS: Objects, Classes, Data Abstraction and Data Encapsulation, Inheritance, Polymorphism, Dynamic Binding, Message Passing.	
		1.3	Classes and objects: Simple classes (Class specification, class members accessing), Defining member functions, passing object as an argument, Returning object from functions, friend classes, Pointer to object, Array of pointer to object.	
2	Constructors and Destructors, Polymorphism	2.1	Introduction, Default Constructor, Parameterized Constructor and examples, Destructors.	15L
		2.2	Concept of function overloading, overloaded operators, overloading unary and binary operators, overloading comparison operator, overloading arithmetic assignment operator,	
		2.3	Data Conversion between objects and basic types, String Handling Functions.	

3	Virtual Functions, Program development using Inheritance	3.1	Inheritance: Introduction, understanding inheritance, Advantages provided by inheritance, choosing the access specifier , Derived class declaration, derived class constructors, class hierarchies, multiple inheritance, multilevel inheritance, containership, hybrid inheritance.	15L
		3.2	Virtual Functions: Introduction and need, Pure Virtual Functions, Static Functions, abstract classes, virtual destructors.	
4	Exception Handling, Templates and Working with Files	4.1	Exception Handling: Introduction, Exception Handling Mechanism, Concept of throw & catch with example.	15L
		4.2	Templates**:** Introduction, Function Template and examples, Class Template and examples.	
		4.3	File system: Introduction, File Operations, Various File Modes, File Pointer and their Manipulation	
			Total No of Lectures	**60**

Expected Outcome

1. To understand programming concepts, basics through C++
2. Implementation of OO concepts through programming.

Reference Books

1. Object Oriented Analysis and Design- Timothy Budd TMH
2. Mastering C++ -K R Venugopal, Rajkumar Buyya,T Ravishankar
3. C++ for beginners- B. M. Hirwani
4. Effective Modern C++ -Scott Meyers
5. Object Oriented Programming with C++ -E. Balagurusamy

BOS	Information Technology
Class	F.Y. B.Sc. I.T.
Semester	II
Subject Name	Object Oriented Programming
Subject Code	PUSIT201P
Level of the Subject	Medium

Practical No.	Details
1.	**Classes and methods** a) Design an employee class for reading and displaying the employee information, the getInfo() and displayInfo() methods will be used respectively. Where getInfo() will be private method b) Design the class student containing getData() and displayData() as two of its methods which will be used for reading and displaying the student information respectively. Where getData() will be private method c) Design the class Demo which will contain the following methods: readNo(), factorial() for calculating the factorial of a number, reverseNo() will reverse the given number, is Palindrome() will check the given number is a palindrome, isArmstrong() which will calculate the given number is armStrong or not.Where readNo() will be private method. d) Write a program to demonstrate function definition outside class and accessing class members in function definition.
2.	**Using friend functions.** a) Write a friend function for adding the two complex numbers, using a single class b) Write a friend function for adding the two different distances and display its sum, using two classes. c) Write a friend function for adding the two matrix from two different classes and display its sum.
3.	**Constructors and method overloading.** a) Design a class Complex for adding the two complex numbers and also show the use of constructor. b) Design a class Geometry containing the methods area() and volume() and also overload the area() function

	a. Design a class Static Demo to show the implementation of static variable and static function. **Operator Overloading** a) Overload the operator unary(-) for demonstrating operator overloading. b) Overload the operator + for adding the timings of two clocks, And also pass objects as an argument. c) Overload the + for concatenating the two strings. For e.g "Py" + "thon" = Python
4.	**Inheritance** a) Design a class for single level inheritance using public and private type derivation. b) Design a class for multiple inheritance. **c)** Implement the hierarchical inheritance.
5.	**Virtual functions and abstract classes** a) Implement the concept of method overriding b) Show the use of virtual function **c)** Show the implementation of abstract class.
6.	**String Handling** a) String operations for string length , string concatenation b) String operations for string reverse, string comparison, c) Console formatting functions.
7.	**Exception handling** a) Show the implementation of exception handling b) Show the implementation for exception handling for strings

BOS	Information Technology
Class	F.Y. B.Sc. I.T.
Semester	II
Subject Name	Microprocessor Architecture
Subject Code	PUSIT202
Level of the Subject	Medium

Objectives:

1. To Understand the basic functions of Microprocessor Architecture
2. To Analyze the Instruction set with operation of Microprocessor.

Unit No	Name of Unit	Topic No.	Content	No. of Lectures
1	Introduction to Microprocessor	1.1	Microprocessors, microcomputers, and Assembly Language: Microprocessor, Microprocessor Instruction Set and Computer Languages, From Large Computers to Single-Chip Microcontrollers, Applications.	15L
		1.2	Microprocessor Architecture and Microcomputer System: Microprocessor Architecture and its operation's, Memory, I/O Devices, Microcomputer System, Logic Devices and Interfacing, Microprocessor-Based System Application.	
		1.3	8085 Microprocessor Architecture and Memory Interface: Introduction, 8085 Microprocessor unit, 8085-Based Microcomputer, Memory Interfacing, Interfacing the 8155 Memory Segment, Illustrative Example:	
		1.4	Designing Memory for the MCTS Project, Testing and Troubleshooting Memory Interfacing Circuit, 8085-Based Single-Board microcomputer	
2	Assembly Language	2.1	Interfacing of I/O Devices Basic Interfacing concepts, Interfacing Output Displays, Interfacing Input Devices, Memory Mapped I/O, Testing and Troubleshooting I/O Interfacing Circuits.	15L
		2.2	Introduction to 8085 Assembly Language Programming: The 8085 Programming Model, Instruction Classification, Instruction, Data and Storage, Writing assembling and Execution of a simple program, Overview of 8085 Instruction Set, Writing and Assembling Program.	

3	Basics of 8085	3.1	Introduction to 8085 Instructions: Data Transfer Operations, Arithmetic Operations, Logic Operation, Branch Operation, Writing Assembly Languages Programs, Debugging a Program.	20L
		3.2	Programming Techniques With Additional Instructions: Programming Techniques: Looping, Counting and Indexing, Additional Data Transfer and 16-Bit Arithmetic Instructions, Arithmetic Instruction Related to Memory, Logic Operations: Rotate, Logics Operations: Compare, Dynamic Debugging.	
		3.3	Counters and Time Delays: Counters and Time Delays, Illustrative Program: Hexadecimal Counter, Illustrative Program: zero-to-nine (Modulo Ten) Counter, Generating Pulse Waveforms, Debugging Counter and Time-Delay Programs.	
		3.4	Software Development System and Assemblers: Microprocessors-Based Software Development system, Operating System and Programming Tools, Assemblers and Cross-Assemblers, Writing Program Using Cross Assemblers.	
		3.5	Code Conversion, BCD Arithmetic, and 16-Bit Data Operations: BCD-to-Binary Conversion, Binary-to-BCD Conversion, BCD-toSeven-Segment-LED Code Conversion, Binary-to-ASCII and ASCIIto-Binary Code Conversion, BCD Addition, BCD Subtraction, Introduction To Advanced Instructions and Applications, Multiplication, Subtraction With Carry.	
		3.6	Stacks and Sub-Routines: Stack, Subroutine, Restart, Conditional Call, Return Instructions, Advanced Subroutine concepts. Interrupts: The 8085 Interrupt, 8085 Vectored Interrupts, Restart as S/W Instructions, Additional I/O Concepts and processes.	
4	8086 and Advance Microprocessor	4.1	Introduction to 8086: Architecture, Programming model, Pin Configuration	10l
		4.2	The Pentium and Pentium Pro microprocessors: Introduction, Special Pentium registers, Memory management, Pentium instructions, Pentium Pro microprocessor, Special Pentium Pro features. Core 2 and later Microprocessors: Introduction, Pentium II software changes, Pentium IV and Core 2	

		4.3	Intel i3, i5 and i7. SUN SPARC Microprocessor: Architecture, Register file, data types and instruction format	
			Total No. of Lectures	**60**

Expected Outcomes:

1. Learner get basic knowlwdge of the microprocessor
2. Learner understood basic instruction set & coding using microprocessor

References Books:

1. Microprocessors Architecture, Programming and Applications with the 8085. Ramesh Gaonkar PENRAM Fifth 2012
2. Computer System Architecture M. Morris Mano PHI 1998
3. Structured Computer Organization Andrew C. Tanenbaum PHI.
4. Introduction to 8086 Microprocessor : William stalling

BOS	Information Technology
Class	F.Y. B.Sc. I.T.
Semester	II
Subject Name	Microprocessor Architecture Practical
Subject Code	PUSIT202P
Level of the Subject	Medium

Practical No.	Details
1	Store the data byte 32H into memory location 4000H.
2	Exchange the contents of memory locations 2000H and 4000H
3	Subtract two 8-bit numbers.
4	Add the 16-bit number in memory locations 4000H and 4001H to the 16-bit number in memory locations 4002H and 4003H. The most significant eight bits of the two numbers to be added are in memory locations 4001H and 4003H. Store the result in memory locations 4004H and 4005H with the most significant byte in memory location 4005H.
5	Pack the two unpacked BCD numbers stored in memory locations 4200H and 4201H and store result in memory location 4300H. Assume the least significant digit is stored at 4200H.
6	Two digit BCD number is stored in memory location 4200H. Unpack the BCD number and store the two digits in memory locations 4300H and 4301H such that memory location 4300H will have lower BCD digit.
7	Write a program to shift an eight bit data four bits right. Assume that data is in register C.
8	Program to shift a 16-bit data 1 bit left. Assume data is in the HL register pair
9	Multiply two 8-bit numbers stored in memory locations 2200H and 2201H by repetitive addition and store the result in memory locations 2300H and 2301H.
10	Divide 16 bit number stored in memory locations 2200H and 2201H by the 8 bit

	number stored at memory location 2202H. Store the quotient in memory locations 2300H and 2301H and remainder in memory locations 2302H and 2303H.
11	Write a program to sort given 10 numbers from memory location 2200H in the ascending order.
12	Add two 4 digit BCD numbers in HL and DE register pairs and store result in memory locations, 2300H and 2301H. Ignore carry after 16 bit.
13	Subtract the 16-bit number in memory locations 4002H and 4003H from the 16-bit number in memory locations 4000H and 4001H. The most significant eight bits of the two numbers are in memory locations 4001H and 4003H. Store the result in memory locations 4004H and 4005H with the most significant byte in memory location 4005H.
14	Find the l's complement of the number stored at memory location 4400H and store the complemented number at memory location 4300H.
16	Calculate the sum of series of numbers. The length of the series is in memory location 4200H and the series begins from memory location 4201H. a. Consider the sum to be 8 bit number. So, ignore carries. Store the sum at memory location 4300H.
17	Find the largest number in a block of data. The length of the block is in memory location 2200H and the block itself starts from memory location 2201H. Store the maximum number in memory location 2300H. Assume that the numbers in the block are all 8 bit unsigned binary numbers.
18	Consider the sum to be a 16 bit number. Store the sum at memory locations 4300H and 4301H

BOS	Information Technology
Class	F.Y. B.Sc. I.T.
Semester	II
Subject Name	Web Programming
Subject Code	PUSIT203
Level of the Subject	Basic

Objectives:

1. To enable students to gain practical knowledge on Web Designing
2. To provide basic knowledge to develop their own website

Unit No	Name of Unit	Topic No	Content	No. of Lectures
1	Internet and the World Wide Web	1.1	What is Internet? Introduction to internet and its applications, E-mail, telnet, FTP, e-commerce, video conferencing, e-business.	15L
		1.2	Internet service providers, domain name server, internet address,	
		1.3	World Wide Web (WWW): World Wide Web and its evolution, uniform resource locator (URL).	
		1.4	Browsers – internet explorer, Netscape navigator, opera, Firefox, chrome, Mozilla. search engine, web saver – apache, IIS, proxy server, HTTP protocol	
2	HTML5	2.1	Introduction, Why HTML5? Formatting text by using tags, using lists and backgrounds, Creating hyperlinks and anchors. Style sheets, CSS formatting text using style sheets, formatting paragraphs using style sheets.	15L
		2.2	HTML5 Page layout and navigation: Creating navigational aids: planning site organization, creating text based navigation bar, creating graphics based navigation bar, creating graphical navigation bar, creating image map, redirecting to another URL	

		2.3	Creating division based layouts: HTML5 semantic tags, creating divisions, creating HTML5 semantic layout, positioning and formatting divisions. HTML5 Tables, Forms and Media: Creating tables: creating simple table, specifying the size of the table, specifying the width of the column, merging table cells, using tables for page layout, formatting tables: applying table borders, applying background and foreground fills, changing cell padding, spacing and alignment	
		2.4	Creating user forms: creating basic form, using check boxes and option buttons, creating lists, additional input types in HTML5, Incorporating sound and video: audio and video in HTML5, HTML multimedia basics, embedding video clips, incorporating audio on web page	
3	Java Script	3.1	Introduction, Client-Side JavaScript, Server-Side JavaScript, JavaScript Objects, JavaScript Security	15L
		3.2	Operators: Assignment Operators, Comparison Operators, Arithmetic Operators, % (Modulus), ++(Increment), --(Decrement), -(Unary Negation), Logical Operators, Short-Circuit Evaluation, String Operators, Special Operators, ?: (Conditional operator), , (Comma operator), delete, new, this, void	
		3.3	Statements: Break, comment, continue, delete, do...while, export, for, for...in, function, if...else, import, labelled, return, switch, var, while, with, 12 42 | Page Core JavaScript (Properties and Methods of Each) : Array, Boolean, Date, Function, Math, Number, Object, String, regExp Document and its associated objects: document, Link, Area, Anchor, Image, Applet, Layer	
		3.4	Events and Event Handlers : General Information about Events, Defining Event Handlers, event, onAbort, onBlur, onChange, onClick, onDblClick, onDragDrop, onError, onFocus, onKeyDown, onKeyPress, onKeyUp, onLoad, onMouseDown, onMouseMove, onMouseOut, onMouseOver, onMouseUp, onMove, onReset, onResize, onSelect, onSubmit, onUnload	
4	PHP and My SQL	4.1	Why PHP and MySQL? Server-side scripting, PHP syntax and variables, comments, types, control structures, branching, looping, termination	15L

		4.2	Functions, passing information with PHP, GET, POST, formatting form variables, superglobal arrays	
		4.3	Strings and string functions, regular expressions, arrays, number handling, basic PHP errors , PHP/MySQL Functions, Integrating web forms and databases	
		4.4	Displaying queries in tables, Building Forms from queries, String and Regular Expressions, Sessions, Cookies and HTTP, E-Mail, File Handling and data uploading using FTP	
			Total No. of Lectures	**60**

Expected Outcome:

1. On completion of the Subject students will be skilful in fundamental concepts of Web Programming
2. Students gain more knowledge in the field of Web Designing

Reference Books:

1. Web Design - The CompleteReference, Thomas Powell Tata McGraw Hill
2. HTML5 Step by Step Faithe Wempen - MicrosoftPress2011
3. PHP 5.1 for Beginners- Ivan Bayross,Sharanam Shah,SPD 2013
4. PHP Project for Beginners - SharanamShah,Vaishali Shah SPD 2015
5. PHP 6 and MySQL Bible Steve Suehring,Tim Converse,Joyce ParkWiley 2009
7. JavaScript 2.0: TheComplete Reference, ThomasPowell

BOS	Information Technology
Class	F.Y. B.Sc. I.T.
Semester	II
Subject Name	Web Programming Practical
Subject Code	PUSIT203P
Level of the Subject	Basic

Practical No.	Details
1.	Use of Basic Tags a) Design a web page using different text formatting tags. b) Design a web page with links to different pages and allow navigation between web pages.
2.	Image maps a) Design a web page with Imagemaps.
3.	Cascading Style Sheets Design a web page demonstrating all Style sheet types
4.	Semantics Design a web page demonstrating different semantics
5.	Tables, Forms and Media a) Design a web page with different tables. Design a webpages using table so that the content appears well placed. b) Design a web page with a form that uses all types of controls. c) Design a web page embedding with multimedia features.
6.	Java Script a) Using JavaScript design, a web page that prints factorial/Fibonacci series/any given series. b) Design a form and validate all the controls placed on the form using Java Script. c) Write a JavaScript program to display all the prime numbers between 1 and 100.
7.	Control and looping statements and Java Script references a) Write a JavaScript program to accept a number from the user and display the sum of its digits. b) Write a java script program to design simple calculator.
8.	Control and looping statements and Java Script references a) Design a web page demonstrating different conditional statements.

	b) Design a web page demonstrating different looping statements. c) Design a web page demonstrating different Core JavaScript references (Array, Boolean, Date, Function, Math, Number, Object, String, regExp).
9.	Basic PHP a) Write a PHP Program to accept a number from the user and print it factorial. b) Write a PHP code to find the greater of 2 numbers. Accept the no. from the user c) Write a PHP program to display the following Binary Pyramid: 1 0 1 1 0 1 0 1 0 1 d) Write a PHP program to create one dimensional array.
10.	PHP and Database a) Write a PHP code to create: Create a database College Create a table Department (Dname, Dno, Number_Of_faculty b) Write a PHP program to create a database named “College”. Create a table named “Student” with following fields (sno, sname, percentage). Insert 3 records of your choice. Display the names of the students whose percentage is between 35 to 75 in a tabular format.

BOS	Information Technology
Class	F.Y. B.Sc. I.T.
Semester	II
Subject Name	Numerical and Statistical Methods
Subject Code	PUSIT204
Level of the Subject	Basic

Objectives :

1. To develop an interest in solving numerical equations by using different methods.
2. To provide an understanding for the student on basic statistical concepts.

Unit No.	Name of Unit	Topic No.	Name of Topic	No. of lectures
1	Solutions of algebraic and transcendental equations	1.1	Bisection method, Newton Raphson method, Regula-falsi method, Gauss-Seidel method,Secant method	15L
		1.2	Numerical integration:- Trapezoidal rule, Simpson's $1/3^{rd}$ and $3/8^{th}$ rules.	
		1.3	Approximations:- Significant figures accuracy,precision, Errors:-round off error, truncation errors	
		1.4	Iterative methods :- Gauss Jordan, Gauss elimination & Gauss seidel methods	
2	Finite difference and Interpolation:	2.1	Finite difference:- Forward and backward difference	15L
		2.2	Newton's forward interpolation	
		2.3	Newton's backward interpolation	
		2.4	Lagrange's interpolation	
3	Numerical solutions of 1^{st} and 2^{nd} order differential equations	3.1	Taylor polynomial, Maclaurin series	15L
		3.2	Taylor series :- First and second order differential equations	
		3.3	Euler's method, Modified Euler's method	
		3.4	Runge –kutta method of second and fourth order	

4	Least square regression and LPP	4.1	Linear, polynomial, multiple linear, general linear & non-linear regression	15L
		4.2	Formulation of LPP, Graphical, basic and feasible solution of LPP	
		4.3	Expectation & variance:- Definition with relevant examples	
		4.4	Discrete , continuous and normal distributions (properties and their applications).	
			Total No. of lectures	60

Expected Outcome:

1. Students are able to solve the simultaneous equations.
2. Getting the knowledge to integrate the functions by iterative methods.

Reference Books:

1. Introductory Methods of Numerical Methods, S. S. Shastri, PHI, Vol 2
2. Numerical Analysis, Richard L. Burden, J. Douglas Faires, Cengage Learning, 9th vol
3. Fundamentals of Mathematical Statistics, S. C. Gupta, V. K. Kapoor
4. Elements of Applied Mathematics Volume 1 and 2, P.N.Wartikar and J.N.Wartikar, A. V. Griha, Pune
5. Fundamentals of Mathematical Statistics, Gupta, S.C. and Kapoor, V.K., S. Chand and Sons, New Delhi , 2002

BOS	Information Technology
Class	F.Y. B.Sc. I.T.
Semester	II
Subject Name	Numerical and Statistical Methods Practical
Subject Code	PUSIT204P
Level of the Subject	Basic

Practical No.	Details
1	Program for iterative calculation
2	Program to calculate the roots of a quadratic equation using the formula
3	Program to evaluate e^{x} using infinite series
4	Program to solve algebraic and transcendental equation by bisection method.
5	Program to solve algebraic and transcendental equation by false position method.
6	Program to solve algebraic and transcendental equation by Secant method.
7	Program to solve algebraic and transcendental equation by Newton Raphson method
8	Program for Newton's forward interpolation
9	Program for Newton's backward interpolation.
10	Program for Lagrange's interpolation
11	Program for solving linear system of equations using Gauss Jordan method.
12	Program for solving linear system of equations using Gauss Seidel method.
13	Program to obtain derivatives numerically
14	Program for numerical integration using Trapezoidal rule.
15	Program for numerical integration using Simpson's 1/3 rd rule.
16	Program for numerical integration using Simpson's 3/8 th rule.
17	Program to solve differential equation using Euler's method

18	Program to solve differential equation using modified Euler's method.
19	Program to solve differential equation using Runge-kutta 2nd order and 4th order method
20	Program for Linear regression.
21	Program for Polynomial Regression
22	Program for multiple linear regression
23	Program for non-linear regression

BOS	Information Technology
Class	F.Y. B.Sc. I.T.
Semester	II
Subject Name	Green Computing
Subject Code	PUSIT205
Level of the Subject	Medium

Objectives:

1. To familiarize with the concept of Green Computing and Green IT infrastructure for making computing and information system environment sustainable.
2. Encouraging optimized software and hardware designs for development of Green IT Storage, Communication and Services and highlight useful approaches to embrace green IT initiatives

Unit No.	Name of Unit	Topic No.	Content	No. of lectures
1	Overview of Green computing	1.1	Overview and Issues: Problems: Toxins, Power Consumption, Equipment Disposal, And Company's Carbon Footprint: Measuring, Details, reasons to bother, Plan for the Future, Cost Savings: Hardware, Power.	15L
		1.2	Initiatives and Standards: Global Initiatives: United Nations, Basel Action Network, Basel Convention, North America: The United States, Canada, Australia, Europe, WEEE Directive, RoHS, National Adoption, Asia: Japan, China, Korea.	
		1.3	Minimizing Power Usage: Power Problems, Monitoring Power Usage, Servers, and Low-Cost Options, Reducing Power Use, Data De duplication, and Bigger Drives, Involving the Utility Company, Low Power Computers, PCs, Linux, Servers, Computer Settings, Storage, Monitors, Power Supplies, Wireless Devices, and Software.	
2	Energy efficient technique	2.1	Cooling: Cooling Costs, Power Cost, Causes of Cost, Calculating Cooling Needs, Reducing Cooling Costs, Economizers, On-Demand	15L

			Cooling, HP's Solution, Optimizing Airflow, Hot Aisle/Cold Aisle, Raised Floors, Cable Management, Vapor Seal, Prevent Recirculation of Equipment Exhaust, Supply Air Directly to Heat Sources, Fans, Humidity, Adding Cooling, Fluid Considerations, System Design, Data Center Design, Centralized Control, Design for Your Needs, Put Everything Together.	
		2.2	Changing the Way of Work: Old Behaviors, starting at the Top, Process Reengineering with Green in Mind, Analyzing the Global Impact of Local Actions, Steps: Water, Recycling, Energy, Pollutants, Teleworkers and Outsourcing, Telecommuting, Outsourcing, how to Outsource.	
3	Environmental Concerns	3.1	Going Paperless: Paper Problems, The Environment, Costs: Paper and Office, Practicality, Storage, Destruction, Going Paperless, Organizational Realities, Changing Over, Paperless Billing, Handheld Computers vs. the Clipboard, Unified Communications, Intranets, What to Include, Building an Intranet, Microsoft Office SharePoint Server 2007, Electronic Data Interchange (EDI), Nuts and Bolts, Value Added Networks, Advantages, Obstacles.	
		3.2	Hardware Considerations: Certification Programs, EPEAT, RoHS, Energy Star, Computers, Monitors, Printers, Scanners, All-in-Ones, Thin Clients, Servers, Blade Servers, Consolidation, Products, Hardware Considerations, Planned Obsolescence, Packaging, Toxins, Other Factors, Remote Desktop, Using Remote Desktop, Establishing a Connection, In Practice	
4	Greening of IT	4.1	Greening Your Information Systems: Initial Improvement Calculations, Selecting Metrics, Tracking Progress, Change Business Processes, Customer Interaction, Paper Reduction, Green Supply Chain, Improve Technology Infrastructure, Reduce PCs and Servers, Shared Services, Hardware Costs, Cooling.	
		4.2	Staying Green: Organizational Check-ups, Chief Green Officer, Evolution, Sell the CEO, SMART Goals, Equipment Check-ups, and Gather Data, Tracking the data, Baseline Data, Benchmarking,	

			Analyze Data, Conduct Audits, Certifications, Benefits, Realities, and Helpful Organizations. **Virtualization:** server Virtualization, server virtualization solution.	
			Total No. of lectures	60

Expected Outcome:

1. Learn about green IT can be achieved in and by hardware, software, network communication and data center operations.
2. Understand the strategies, frameworks, processes and management of green IT

Reference Books:

1. Green IT by Toby Velte, Anthony Velte, Robert Elsenpeter,McGraw Hil
2. Green Data Center: Steps for the Journey by Alvin Galea, Michael Schaefer, Mike Ebbers, Shroff Publishers and Distributors
3. Green Computing and Green IT Best Practice by Jason Harris, Emereo
4. Green Computing Tools and Techniques for Saving Energy, Money and Resources by
5. Bud E. Smith, CRC Press
6. Harnessing Green IT- Principles and Practices by San Murugesan,G.R Gangadharan WILEY

BOS	Information Technology
Class	F.Y. B.Sc. I.T.
Semester	II
Subject Name	Green Computing Practical
Subject Code	PUSIT205P
Level of the Subject	Medium

Project & Viva Voce:

Practical No	Details
1	A project should be done based on the objectives of Green Computing. A report of minimum 50 pages should be prepared. The report should have a font size of 12, Times new roman and 1.5 line spacing. The headings should have font size 14. The report should be hard bound.
2	The project can be done individually or a group of two students.
3	The students will have to present the project during the examination.
4	A certified copy of the project report is essential to appear for the examination.