

UNIVERSITY OF MUMBAI



Syllabus for F.Y.B.Sc.

Programme: B.Sc.

Course: Information Technology

with effect from the academic year

2016 – 2017

| Semester – 1 | | | |
|----------------------|--|----------------------------------|----------------|
| Course Code | Course Type | Course Title | Credits |
| USIT101 | Core Subject | Imperative Programming | 2 |
| USIT102 | Core Subject | Digital Electronics | 2 |
| USIT103 | Core Subject | Operating Systems | 2 |
| USIT104 | Core Subject | Discrete Mathematics | 2 |
| USIT105 | Ability Enhancement Skill Course | Communication Skills | 2 |
| USIT1P1 | Core Subject Practical | Imperative Programming Practical | 2 |
| USIT1P2 | Core Subject Practical | Digital Electronics Practical | 2 |
| USIT1P3 | Core Subject Practical | Operating Systems Practical | 2 |
| USIT1P4 | Core Subject Practical | Discrete Mathematics Practical | 2 |
| USIT1P5 | Ability Enhancement Skill Course Practical | Communication Skills Practical | 2 |
| Total Credits | | | 20 |

| Semester – 2 | | | |
|----------------------|--|---|----------------|
| Course Code | Course Type | Course Title | Credits |
| USIT201 | Core Subject | Object oriented Programming | 2 |
| USIT202 | Core Subject | Microprocessor Architecture | 2 |
| USIT203 | Core Subject | Web Programming | 2 |
| USIT204 | Core Subject | Numerical and Statistical Methods | 2 |
| USIT205 | Ability Enhancement Skill Course | Green Computing | 2 |
| USIT2P1 | Core Subject Practical | Object Oriented Programming Practical | 2 |
| USIT2P2 | Core Subject Practical | Microprocessor Architecture Practical | 2 |
| USIT2P3 | Core Subject Practical | Web Programming Practical | 2 |
| USIT2P4 | Core Subject Practical | Numerical and Statistical Methods Practical | 2 |
| USIT2P5 | Ability Enhancement Skill Course Practical | Green Computing Practical | 2 |
| Total Credits | | | 20 |

Preamble

The B.Sc. Information Technology programme was started in 2001 with an aim to make the students employable and impart industry oriented training. The main objectives of the course are:

- to think analytically, creatively and critically in developing robust, extensible and highly maintainable technological solutions to simple and complex problems.
- to apply their knowledge and skills to be employed and excel in IT professional careers and/or to continue their education in IT and/or related post graduate programmes.
- to be capable of managing complex IT projects with consideration of the human, financial and environmental factors.
- to work effectively as a part of a team to achieve a common stated goal.
- to adhere to the highest standards of ethics, including relevant industry and organizational codes of conduct.
- to communicate effectively with a range of audiences both technical and non-technical.
- to develop an aptitude to engage in continuing professional development.

The new syllabus is aimed to achieve the objectives. The syllabus spanning three years covers the industry relevant courses. The students will be ready for the jobs available in different fields like:

- Software Development (Programming)
- Website Development
- Mobile app development
- Embedded Systems Programming
- Embedded Systems Development
- Software Testing
- Networking
- Database Administration
- System Administration
- Cyber Law Consultant
- GIS (Geographic Information Systems)
- IT Service Desk
- Security

And many others

The students will also be trained in communication skills and green computing.

SEMESTER II

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|--|---------------------------|-----------------------------|--------------|
| B. Sc. (Information Technology) | | Semester – II | |
| Course Name: Object Oriented Programming | | Course Code: USIT201 | |
| Periods per week (1 Period is 50 minutes) | | 5 | |
| Credits | | 2 | |
| | | Hours | Marks |
| Evaluation System | Theory Examination | 2½ | 75 |
| | Internal | -- | 25 |

| Unit | Details | Lectures |
|-------------|--|-----------------|
| I | Object Oriented Methodology: Introduction, Advantages and Disadvantages of Procedure Oriented Languages, what is Object Oriented? What is Object Oriented Development? Object Oriented Themes, Benefits and Application of OOPS. Principles of OOPS: OOPS Paradigm, Basic Concepts of OOPS: Objects, Classes, Data Abstraction and Data Encapsulation, Inheritance, Polymorphism, Dynamic Binding, Message Passing | 12 |
| II | 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. Constructors and Destructors: Introduction, Default Constructor, Parameterized Constructor and examples, Destructors | 12 |
| III | Polymorphism: Concept of function overloading, overloaded operators, overloading unary and binary operators, overloading comparison operator, overloading arithmetic assignment operator, Data Conversion between objects and basic types, Virtual Functions: Introduction and need, Pure Virtual Functions, Static Functions, this Pointer, abstract classes, virtual destructors. | 12 |
| IV | Program development using 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. Exception Handling: Introduction, Exception Handling Mechanism, Concept of throw & catch with example | 12 |
| V | Templates: Introduction, Function Template and examples, Class Template and examples. Working with Files: Introduction, File Operations, Various File Modes, File Pointer and their Manipulation | 12 |

| Books and References: | | | | | |
|------------------------------|-------------------------------------|--|------------------|-------------------------|-------------|
| Sr. No. | Title | Author/s | Publisher | Edition | Year |
| 1. | Object Oriented Analysis and Design | Timothy Budd | TMH | 3 rd | 2012 |
| 2. | Mastering C++ | K R Venugopal, Rajkumar Buyya, T Ravishankar | Tata McGraw Hill | 2 nd Edition | 2011 |

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|----|--------------------------------------|-----------------|------------------|-----------------|------|
| 3. | C++ for beginners | B. M. Hirwani | SPD | | 2013 |
| 4. | Effective Modern C++ | Scott Meyers | SPD | | |
| 5. | Object Oriented Programming with C++ | E. Balagurusamy | Tata McGraw Hill | 4 th | |
| 6. | Learning Python | Mark Lutz | O' Reilly | 5 th | 2013 |
| 7. | Mastering Object Oriented Python | Steven F. Lott | Pact Publishing | | 2014 |

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|---|------------------------------|-----------------------------|--------------|
| B. Sc. (Information Technology) | | Semester – II | |
| Course Name: Object Oriented Programming Practical | | Course Code: USIT2P1 | |
| Periods per week (1 Period is 50 minutes) | | 3 | |
| Credits | | 2 | |
| | | Hours | Marks |
| Evaluation System | Practical Examination | 2½ | 50 |
| | Internal | -- | -- |

| List of Practical: To be implemented using object oriented language | |
|--|---|
| 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, isPalindrome() will check the given number is 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 . |
| c. | Design a class StaticDemo to show the implementation of static variable and static function. |
| 4. | 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 |
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| 5. | 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. |

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| 6. | 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. |
| | |
| 7. | String handling |
| a. | String operations for string length , string concatenation |
| b. | String operations for string reverse, string comparison, |
| c. | Console formatting functions. |
| | |
| 8. | Exception handling |
| a. | Show the implementation of exception handling |
| b. | Show the implementation for exception handling for strings |
| c. | Show the implementation of exception handling for using the pointers. |
| | |
| 9. | File handling |
| a. | Design a class FileDemo open a file in read mode and display the total number of words and lines in the file. |
| b. | Design a class to handle multiple files and file operations |
| c. | Design a editor for appending and editing the files |
| | |
| 10. | Templates |
| a. | Show the implementation for the following |
| b. | Show the implementation of template class library for swap function. |
| c. | Design the template class library for sorting ascending to descending and vice-versa |

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|--|---------------------------|-----------------------------|--------------|
| B. Sc. (Information Technology) | | Semester – II | |
| Course Name: Microprocessor Architecture | | Course Code: USIT202 | |
| Periods per week (1 Period is 50 minutes) | | 5 | |
| Credits | | 2 | |
| | | Hours | Marks |
| Evaluation System | Theory Examination | 2½ | 75 |
| | Internal | -- | 25 |

| Unit | Details | Lectures |
|-------------|---|-----------------|
| I | <p>Microprocessor, microcomputers, and Assembly Language: Microprocessor, Microprocessor Instruction Set and Computer Languages, From Large Computers to Single-Chip Microcontrollers, Applications.</p> <p>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.</p> <p>8085 Microprocessor Architecture and Memory Interface: Introduction, 8085 Microprocessor unit, 8085-Based Microcomputer, Memory Interfacing, Interfacing the 8155 Memory Segment, Illustrative Example: Designing Memory for the MCTS Project, Testing and Troubleshooting Memory Interfacing Circuit, 8085-Based Single-Board microcomputer.</p> | 12 |
| II | <p>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.</p> <p>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.</p> <p>Introduction to 8085 Instructions: Data Transfer Operations, Arithmetic Operations, Logic Operation, Branch Operation, Writing Assembly Languages Programs, Debugging a Program.</p> | 12 |
| III | <p>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.</p> <p>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.</p> <p>Stacks and Sub-Routines: Stack, Subroutine, Restart, Conditional Call, Return Instructions, Advanced Subroutine concepts.</p> | 12 |

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| IV | <p>Code Conversion, BCD Arithmetic, and 16-Bit Data Operations: BCD-to-Binary Conversion, Binary-to-BCD Conversion, BCD-to-Seven-Segment-LED Code Conversion, Binary-to-ASCII and ASCII-to-Binary Code Conversion, BCD Addition, BCD Subtraction, Introduction To Advanced Instructions and Applications, Multiplication, Subtraction With Carry.</p> <p>Software Development System and Assemblers: Microprocessors-Based Software Development system, Operating System and Programming Tools, Assemblers and Cross-Assemblers, Writing Program Using Cross Assemblers.</p> <p>Interrupts: The 8085 Interrupt, 8085 Vectored Interrupts, Restart as S/W Instructions, Additional I/O Concepts and processes.</p> | 12 |
| V | <p>The Pentium and Pentium Pro microprocessors: Introduction, Special Pentium registers, Memory management, Pentium instructions, Pentium Pro microprocessor, Special Pentium Pro features.</p> <p>Core 2 and later Microprocessors: Introduction, Pentium II software changes, Pentium IV and Core 2, i3, i5 and i7.</p> <p>SUN SPARC Microprocessor: Architecture, Register file, data types and instruction format</p> | 12 |

| Books and References: | | | | | |
|------------------------------|---|---------------------|-----------|---------|------|
| Sr. No. | Title | Author/s | Publisher | Edition | Year |
| 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 | | |

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| B. Sc. (Information Technology) | | Semester – II | |
| Course Name: Microprocessor Architecture Practical | | Course Code: USIT2P2 | |
| Periods per week (1 Period is 50 minutes) | | 3 | |
| Credits | | 2 | |
| | | Hours | Marks |
| Evaluation System | Practical Examination | 2½ | 50 |
| | Internal | -- | -- |

| List of Practical | |
|--------------------------|---|
| 1. | Perform the following Operations related to memory locations. |
| a. | Store the data byte 32H into memory location 4000H. |
| b. | Exchange the contents of memory locations 2000H and 4000H |
| | |
| 2. | Simple assembly language programs. |
| a. | Subtract the contents of memory location 4001H from the memory location 2000H and place the result in memory location 4002H. |
| b. | Subtract two 8-bit numbers. |
| c. | 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. |
| d. | Add the contents of memory locations 40001H and 4001H and place the result in the memory locations 4002H and 4003H. |
| e. | 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. |
| f. | Find the 1's complement of the number stored at memory location 4400H and store the complemented number at memory location 4300H. |
| g. | Find the 2's complement of the number stored at memory location 4200H and store the complemented number at memory location 4300H. |
| | |
| 3. | Packing and unpacking operations. |
| a. | 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. |
| b. | 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. |
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| 4. | Register Operations. |
| a. | Write a program to shift an eight bit data four bits right. Assume that data is in register C. |
| b. | Program to shift a 16-bit data 1 bit left. Assume data is in the HL register pair |
| c. | Write a set of instructions to alter the contents of flag register in 8085. |
| d. | Write a program to count number of 1's in the contents of D register and store the count in the B register. |

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| 5. | Multiple memory locations. |
| a. | 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. b. Consider the sum to be 16 bit number. Store the sum at memory locations 4300H and 4301H |
| b. | 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. |
| c. | 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. |
| d. | Find the number of negative elements (most significant bit 1) in a block of data. The length of the block is in memory location 2200H and the block itself begins in memory location 2201H. Store the number of negative elements in memory location 2300H |
| e. | 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. |
| | |
| 6. | Calculations with respect to memory locations. |
| a. | Write a program to sort given 10 numbers from memory location 2200H in the ascending order. |
| b. | Calculate the sum of series of even numbers from the list of numbers. The length of the list is in memory location 2200H and the series itself begins from memory location 2201H. Assume the sum to be 8 bit number so you can ignore carries and store the sum at memory location 2300H. Sample problem: |
| c. | Calculate the sum of series of odd numbers from the list of numbers. The length of the list is in memory location 2200H and the series itself begins from memory location 2201H. Assume the sum to be 16-bit. Store the sum at memory locations 2300H and 2301H. |
| d. | Find the square of the given numbers from memory location 6100H and store the result from memory location 7000H |
| e. | Search the given byte in the list of 50 numbers stored in the consecutive memory locations and store the address of memory location in the memory locations 2200H and 2201H. Assume byte is in the C register and starting address of the list is 2000H. If byte is not found store 00 at 2200H and 2201H |
| f. | Two decimal numbers six digits each, are stored in BCD package form. Each number occupies a sequence of byte in the memory. The starting address of first number is 6000H Write an assembly language program that adds these two numbers and stores the sum in the same format starting from memory location 6200H |
| g. | Add 2 arrays having ten 8-bit numbers each and generate a third array of result. It is necessary to add the first element of array 1 with the first element of array-2 and so on. The starting addresses of array 1, array2 and array3 are 2200H, 2300H and 2400H, respectively |
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| 7. | Assembly programs on memory locations. |
| a. | Write an assembly language program to separate even numbers from the given list of 50 numbers and store them in the another list starting from 2300H. Assume starting address of 50 number list is 2200H |
| b. | Write assembly language program with proper comments for the following: A block of data consisting of 256 bytes is stored in memory starting at 3000H. This block is to be shifted (relocated) in memory from 3050H onwards. Do not shift the block or part of the block anywhere else in the memory. |
| c. | Add even parity to a string of 7-bit ASCII characters. The length of the string is in memory location 2040H and the string itself begins in memory location 2041H. Place even parity in the most significant bit of each character. |
| d. | A list of 50 numbers is stored in memory, starting at 6000H. Find number of negative, zero and positive numbers from this list and store these results in memory locations 7000H, 7001H, and 7002H respectively |
| e. | Write an assembly language program to generate fibonacci number. |
| f. | Program to calculate the factorial of a number between 0 to 8. |
| | |
| 8. | String operations in assembly programs. |
| a. | Write an 8085 assembly language program to insert a string of four characters from the tenth location in the given array of 50 characters |
| b. | Write an 8085 assembly language program to delete a string of 4 characters from the tenth location in the given array of 50 characters. |
| c. | Multiply the 8-bit unsigned number in memory location 2200H by the 8-bit unsigned number in memory location 2201H. Store the 8 least significant bits of the result in memory location 2300H and the 8 most significant bits in memory location 2301H. |
| d. | Divide the 16-bit unsigned number in memory locations 2200H and 2201H (most significant bits in 2201H) by the B-bit unsigned number in memory location 2300H store the quotient in memory location 2400H and remainder in 2401H |
| e. | DAA instruction is not present. Write a sub routine which will perform the same task as DAA. |
| | |
| 9. | Calculations on memory locations. |
| a. | To test RAM by writing '1' and reading it back and later writing '0' (zero) and reading it back. RAM addresses to be checked are 40FFH to 40FFH. In case of any error, it is indicated by writing 01H at port 10 |
| b. | Arrange an array of 8 bit unsigned no in descending order |
| c. | Transfer ten bytes of data from one memory to another memory block. Source memory block starts from memory location 2200H where as destination memory block starts from memory location 2300H |
| d. | Write a program to find the Square Root of an 8 bit binary number. The binary number is stored in memory location 4200H and store the square root in 4201H. |
| e. | Write a simple program to Split a HEX data into two nibbles and store it in memory |
| | |
| 10. | Operations on BCD numbers. |
| a. | 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. |
| b. | Subtract the BCD number stored in E register from the number stored in the D register |
| c. | Write an assembly language program to multiply 2 BCD numbers |

Books and References:

| Sr. No. | Title | Author/s | Publisher | Edition | Year |
|----------------|---|--------------------|------------------|----------------|-------------|
| 1. | Microprocessors Architecture, Programming and Applications with the 8085. | Ramesh Gaonkar | PENRAM | Fifth | 2012 |
| 2. | 8080A/8085 Assembly Language Programming | Lance A. Leventhel | Osborne | | 1978 |

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|--|---------------------------|-----------------------------|--------------|
| B. Sc (Information Technology) | | Semester – II | |
| Course Name: Web Programming | | Course Code: USIT203 | |
| Periods per week (1 Period is 50 minutes) | | 5 | |
| Credits | | 2 | |
| | | Hours | Marks |
| Evaluation System | Theory Examination | 2½ | 75 |
| | Internal | -- | 25 |

| Unit | Details | Lectures |
|-------------|---|-----------------|
| I | <p>Internet and the World Wide Web: What is Internet? Introduction to internet and its applications, E-mail, telnet, FTP, e-commerce, video conferencing, e-business. Internet service providers, domain name server, internet address, World Wide Web (WWW): World Wide Web and its evolution, uniform resource locator (URL), browsers – internet explorer, Netscape navigator, opera, Firefox, chrome, Mozilla. search engine, web saver – apache, IIS, proxy server, HTTP protocol</p> <p>HTML5: 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.</p> | 12 |
| II | <p>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, creating division based layouts: HTML5 semantic tags, creating divisions, creating HTML5 semantic layout, positioning and formatting divisions.</p> <p>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, 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.</p> | 12 |
| III | <p>Java Script: Introduction, Client-Side JavaScript, Server-Side JavaScript, JavaScript Objects, JavaScript Security,</p> <p>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</p> <p>Statements: Break, comment, continue, delete, do...while, export, for, for...in, function, if...else, import, labelled, return, switch, var, while, with,</p> | 12 |

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|-----------|---|-----------|
| | <p>Core JavaScript (Properties and Methods of Each) : Array, Boolean, Date, Function, Math, Number, Object, String, RegExp</p> <p>Document and its associated objects: document, Link, Area, Anchor, Image, Applet, Layer</p> <p>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</p> | |
| IV | <p>PHP: Why PHP and MySQL? Server-side scripting, PHP syntax and variables, comments, types, control structures, branching, looping, termination, functions, passing information with PHP, GET, POST, formatting form variables, superglobal arrays, strings and string functions, regular expressions, arrays, number handling, basic PHP errors/problems</p> | 12 |
| V | <p>Advanced PHP and MySQL : PHP/MySQL Functions, Integrating web forms and databases, Displaying queries in tables, Building Forms from queries, String and Regular Expressions, Sessions, Cookies and HTTP, E-Mail</p> | 12 |

| Books and References: | | | | | |
|------------------------------|--|--|------------------|-----------------|-------------|
| Sr. No. | Title | Author/s | Publisher | Edition | Year |
| 1. | Web Design The Complete Reference | Thomas Powell | Tata McGraw Hill | | - |
| 2. | HTML5 Step by Step | Faithe Wempen | Microsoft Press | | 2011 |
| 3. | PHP 5.1 for Beginners | Ivan Bayross Sharanam Shah, | SPD | | 2013 |
| 4. | PHP Project for Beginners | SharanamShah, Vaishali Shah | SPD | | 2015 |
| 5. | | | | | |
| 6. | PHP 6 and MySQL Bible | Steve Suehring, Tim Converse, Joyce Park | Wiley | | 2009 |
| 7. | Head First HTML 5 programming | Eric Freeman | O'Reilly | | 2013 |
| 8. | JavaScript 2.0: The Complete Reference | Thomas Powell and Fritz Schneider | Tata McGraw Hill | 2 nd | |

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|--|------------------------------|-----------------------------|--------------|
| B. Sc. (Information Technology) | | Semester – II | |
| Course Name: Web Programming Practical | | Course Code: USIT2P3 | |
| Periods per week (1 Period is 50 minutes) | | 3 | |
| Credits | | 2 | |
| | | Hours | Marks |
| Evaluation System | Practical Examination | 2½ | 50 |
| | Internal | -- | -- |

| List of Practical | |
|--------------------------|--|
| 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. |
| c. | Design a web page demonstrating all Style sheet types |
| | |
| 2. | Image maps, Tables, Forms and Media |
| a. | Design a web page with Imagemaps. |
| b. | Design a web page demonstrating different semantics |
| c. | Design a web page with different tables. Design a webpages using table so that the content appears well placed. |
| d. | Design a web page with a form that uses all types of controls. |
| e. | Design a web page embedding with multimedia features. |
| | |
| 3. | 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. |
| a. | Write a JavaScript program to accept a number from the user and display the sum of its digits. |
| d. | Write a program in JavaScript to accept a sentence from the user and display the number of words in it. (Do not use split () function). |
| e. | Write a java script program to design simple calculator. |
| | |
| 4. | 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). |
| | |
| 5. | Basic PHP I |
| a. | Write a PHP Program to accept a number from the user and print it factorial. |
| b. | Write a PHP program to accept a number from the user and print whether it is prime or not. |
| | |
| 6. | Basic PHP II |
| a. | Write a PHP code to find the greater of 2 numbers. Accept the no. from the user. |

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|---------------------------------------|---|
| b. | Write a PHP program to display the following Binary Pyramid: <pre> 1 0 1 1 0 1 0 1 0 1 </pre> |
| 7. String Functions and arrays | |
| a. | Write a PHP program to demonstrate different string functions. |
| b. | Write a PHP program to create one dimensional array. |
| 8. PHP and Database | |
| a. | Write a PHP code to create: <ul style="list-style-type: none"> • 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. |
| c. | Design a PHP page for authenticating a user. |
| 9. Email | |
| a. | Write a program to send email with attachment. |
| 10. Sessions and Cookies | |
| a. | Write a program to demonstrate use of sessions and cookies. |

| Books and References: | | | | | |
|------------------------------|--|--|------------------|-----------------|-------------|
| Sr. No. | Title | Author/s | Publisher | Edition | Year |
| 1. | HTML5 Step by Step | Faithe Wempen | Microsoft Press | | 2011 |
| 2. | JavaScript 2.0: The Complete Reference | Thomas Powell and Fritz Schneider | Tata McGraw Hill | 2 nd | |
| 3. | PHP 6 and MySQL Bible | Steve Suehring, Tim Converse, Joyce Park | Wiley | | 2009 |
| 4. | PHP 5.1 for Beginners | Ivan Bayross Sharanam Shah, | SPD | | 2013 |
| 5. | PHP Project for Beginners | SharanamShah, Vaishali Shah | SPD | | 2015 |
| 6. | Murach’s PHP and MySQL | Joel Murach Ray Harris | SPD | | 2011 |

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|---|---------------------------|-----------------------------|--------------|
| B. Sc. (Information Technology) | | Semester – II | |
| Course Name: Numerical and Statistical Methods | | Course Code: USIT204 | |
| Periods per week (1 Period is 50 minutes) | | 5 | |
| Credits | | 2 | |
| | | Hours | Marks |
| Evaluation System | Theory Examination | 2½ | 75 |
| | Internal | -- | 25 |

| Unit | Details | Lectures |
|-------------|--|-----------------|
| I | <p>Mathematical Modeling and Engineering Problem Solving: A Simple Mathematical Model, Conservation Laws and Engineering Problems</p> <p>Approximations and Round-Off Errors: Significant Figures, Accuracy and Precision, Error Definitions, Round-Off Errors</p> <p>Truncation Errors and the Taylor Series: The Taylor Series, Error Propagation, Total Numerical Errors, Formulation Errors and Data Uncertainty</p> | 12 |
| II | <p>Solutions of Algebraic and Transcendental Equations: The Bisection Method, The Newton-Raphson Method, The Regula-falsi method, The Secant Method.</p> <p>Interpolation: Forward Difference, Backward Difference, Newton's Forward Difference Interpolation, Newton's Backward Difference Interpolation, Lagrange's Interpolation.</p> | 12 |
| III | <p>Solution of simultaneous algebraic equations (linear) using iterative methods: Gauss-Jordan Method, Gauss-Seidel Method.</p> <p>Numerical differentiation and Integration: Numerical differentiation, Numerical integration using Trapezoidal Rule, Simpson's 1/3rd and 3/8th rules.</p> <p>Numerical solution of 1st and 2nd order differential equations: Taylor series, Euler's Method, Modified Euler's Method, Runge-Kutta Method for 1st and 2nd Order Differential Equations.</p> | 12 |
| IV | <p>Least-Squares Regression: Linear Regression, Polynomial Regression, Multiple Linear Regression, General Linear Least Squares, Nonlinear Regression</p> <p>Linear Programming: Linear optimization problem, Formulation and Graphical solution, Basic solution and Feasible solution.</p> | 12 |
| V | <p>Random variables: Discrete and Continuous random variables, Probability density function, Probability distribution of random variables, Expected value, Variance.</p> <p>Distributions: Discrete distributions: Uniform, Binomial, Poisson, Bernoulli, Continuous distributions: uniform distributions, exponential, (derivation of mean and variance only and state other properties and discuss their applications) Normal distribution state all the properties and its applications.</p> | 12 |

| Books and References: | | | | | |
|------------------------------|---|--|-------------------------|-------------------|-------------|
| Sr. No. | Title | Author/s | Publisher | Edition | Year |
| 1. | Introductory Methods of Numerical Methods | S. S. Shastri | PHI | Vol – 2 | |
| 2. | Numerical Methods for Engineers | Steven C. Chapra, Raymond P. Canale | Tata Mc Graw Hill | 6 th | 2010 |
| 3. | Numerical Analysis | Richard L. Burden, J. Douglas Faires | Cengage Learning | 9 th | 2011 |
| 4. | Fundamentals of Mathematical Statistics | S. C. Gupta, V. K. Kapoor | | | |
| 5. | Elements of Applied Mathematics | P.N.Wartikar and J.N.Wartikar | A. V. Griha, Pune | Volume 1 and 2 | |

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| B. Sc. (Information Technology) | | Semester – II | |
| Course Name: Numerical and Statistical Methods Practical | | Course Code: USIT2P4 | |
| Periods per week (1 Period is 50 minutes) | | 3 | |
| Credits | | 2 | |
| | | Hours | Marks |
| Evaluation System | Practical Examination | 2½ | 50 |
| | Internal | -- | -- |

| List of Practical | |
|--------------------------|---|
| 1. | Iterative Calculation |
| a. | Program for iterative calculation. |
| b. | Program to calculate the roots of a quadratic equation using the formula. |
| c. | Program to evaluate e^x using infinite series. |
| 2. | Solution of algebraic and transcendental equations: |
| a. | Program to solve algebraic and transcendental equation by bisection method. |
| b. | Program to solve algebraic and transcendental equation by false position method. |
| c. | Program to solve algebraic and transcendental equation by Secant method. |
| d. | Program to solve algebraic and transcendental equation by Newton Raphson method. |
| 3. | Interpolation |
| a. | Program for Newton's forward interpolation. |
| b. | Program for Newton's backward interpolation. |
| c. | Program for Lagrange's interpolation. |
| 4. | Solving linear system of equations by iterative methods |
| a. | Program for solving linear system of equations using Gauss Jordan method. |
| b. | Program for solving linear system of equations using Gauss Seidel method. |
| 5. | Numerical Differentiation |
| a. | Programing to obtain derivatives numerically. |
| 6. | Numerical Integration |
| a. | Program for numerical integration using Trapezoidal rule. |
| b. | Program for numerical integration using Simpson's 1/3 rd rule. |
| c. | Program for numerical integration using Simpson's 3/8 th rule. |
| 7. | Solution of differential equations |
| a. | Program to solve differential equation using Euler's method |
| b. | Program to solve differential equation using modified Euler's method. |
| c. | Program to solve differential equation using Runge-kutta 2 nd order and 4 th order methods. |
| 8. | Regression |
| a. | Program for Linear regression. |
| b. | Program for Polynomial Regression. |

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| c. | Program for multiple linear regression. |
| d. | Program for non-linear regression. |
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| 9. | Random variables and distributions |
| a. | Program to generate random variables. |
| b. | Program to fit binomial distribution. |
| c. | Program to fit Poisson distribution. |
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| 10. | Distributions |
| a. | Program for Uniform distribution. |
| b. | Program for Bernoulli distribution |
| c. | Program for Negative binomial distribution. |

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| B. Sc. (Information Technology) | | Semester – II | |
| Course Name: Green Computing | | Course Code: USIT205 | |
| Periods per week (1 Period is 50 minutes) | | 5 | |
| Credits | | 2 | |
| | | Hours | Marks |
| Evaluation System | Theory Examination | 2½ | 75 |
| | Internal | -- | 25 |

| Unit | Details | Lectures |
|-------------|---|-----------------|
| I | <p>Overview and Issues: Problems: Toxins, Power Consumption, Equipment Disposal, Company's Carbon Footprint: Measuring, Details, reasons to bother, Plan for the Future, Cost Savings: Hardware, Power.</p> <p>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.</p> | 12 |
| II | <p>Minimizing Power Usage: Power Problems, Monitoring Power Usage, Servers, Low-Cost Options, Reducing Power Use, Data De-Duplication, Virtualization, Management, Bigger Drives, Involving the Utility Company, Low-Power Computers, PCs, Linux, Components, Servers, Computer Settings, Storage, Monitors, Power Supplies, Wireless Devices, Software.</p> <p>Cooling: Cooling Costs, Power Cost, Causes of Cost, Calculating Cooling Needs, Reducing Cooling Costs, Economizers, On-Demand Cooling, HP's Solution, Optimizing Airflow, Hot Aisle/Cold Aisle, Raised Floors, Cable Management, Vapour Seal, Prevent Recirculation of Equipment Exhaust, Supply Air Directly to Heat Sources, Fans, Humidity, Adding Cooling, Fluid Considerations, System Design, Datacentre Design, Centralized Control, Design for Your Needs, Put Everything Together.</p> | 12 |
| III | <p>Changing the Way of Work: Old Behaviours, starting at the Top, Process Reengineering with Green in Mind, Analysing the Global Impact of Local Actions, Steps: Water, Recycling, Energy, Pollutants, Teleworkers and Outsourcing, Telecommuting, Outsourcing, how to Outsource.</p> <p>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.</p> | 12 |

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| IV | <p>Recycling: Problems, China, Africa, Materials, Means of Disposal, Recycling, Refurbishing, Make the Decision, Life Cycle, from beginning to end, Life, Cost, Green Design, Recycling Companies, Finding the Best One, Checklist, Certifications, Hard Drive Recycling, Consequences, cleaning a Hard Drive, Pros and cons of each method, CDs and DVDs, good and bad about CD and DVDs disposal, Change the mind-set, David vs. America Online</p> <p>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</p> | 12 |
| V | <p>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.</p> <p>Staying Green: Organizational Check-ups, Chief Green Officer, Evolution, Sell the CEO, SMART Goals, Equipment Check-ups, Gather Data, Tracking the data, Baseline Data, Benchmarking, Analyse Data, Conduct Audits, Certifications, Benefits, Realities, Helpful Organizations.</p> | 12 |

| Books and References: | | | | | |
|------------------------------|---|--|---|----------------|-------------|
| Sr. No. | Title | Author/s | Publisher | Edition | Year |
| 1. | Green IT | Toby Velte, Anthony Velte, Robert Elsenpeter | McGraw Hill | | 2008 |
| 2. | Green Data Center: Steps for the Journey | Alvin Galea, Michael Schaefer, Mike Ebbers | Shroff Publishers and Distributers | | 2011 |
| 3. | Green Computing and Green IT Best Practice | Jason Harris | Emereo | | |
| 4. | Green Computing Tools and Techniques for Saving Energy, Money and Resources | Bud E. Smith | CRC Press | | 2014 |

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| B. Sc. (Information Technology) | | Semester – II | |
| Course Name: Green Computing Practical | | Course Code: USIT2P5 | |
| Periods per week (1 Period is 50 minutes) | | 3 | |
| Credits | | 2 | |
| | | Hours | Marks |
| Evaluation System | Practical Examination | 2½ | 50 |
| | Internal | -- | -- |

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| Project and Viva Voce | |
| 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. |

Evaluation Scheme:**1. Internal Evaluation (25 Marks).****i. Test: 1 Class test of 20 marks. (Can be taken online)**

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| Q | Attempt <i>any four</i> of the following: | 20 |
| a. | | |
| b. | | |
| c. | | |
| d. | | |
| e. | | |
| f. | | |

ii. 5 marks: Active participation in the class, overall conduct, attendance.**2. External Examination: (75 marks)**

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| | All questions are compulsory | |
| Q1 | (Based on Unit 1) Attempt <i>any three</i> of the following: | 15 |
| a. | | |
| b. | | |
| c. | | |
| d. | | |
| e. | | |
| f. | | |
| Q2 | (Based on Unit 2) Attempt <i>any three</i> of the following: | 15 |
| Q3 | (Based on Unit 3) Attempt <i>any three</i> of the following: | 15 |
| Q4 | (Based on Unit 4) Attempt <i>any three</i> of the following: | 15 |
| Q5 | (Based on Unit 5) Attempt <i>any three</i> of the following: | 15 |

3. Practical Exam: 50 marks

A Certified copy journal is essential to appear for the practical examination.

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| 1. | Practical Question 1 | 20 |
| 2. | Practical Question 2 | 20 |
| 3. | Journal | 5 |
| 4. | Viva Voce | 5 |

OR

| | | |
|-----------|---------------------------|-----------|
| 1. | Practical Question | 40 |
| 2. | Journal | 5 |
| 3. | Viva Voce | 5 |