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 I

B. Sc (Information Technology)		Semester – I	
Course Name: Imperative Programming		**Course Code: USIT101**	
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	**Introduction:** Types of Programming languages, History, features and application. Simple program logic, program development cycle, pseudocode statements and flowchart symbols, sentinel value to end a program, programming and user environments, evolution of programming models., desirable program characteristics. **Fundamentals:** Structure of a program. Compilation and Execution of a Program, Character Set, identifiers and keywords, data types, constants, variables and arrays, declarations, expressions, statements, Variable definition, symbolic constants.	**12**
II	**Operators and Expressions:** Arithmetic operators, unary operators, relational and logical operators, assignment operators, assignment operators, the conditional operator, library functions. **Data Input and output:** Single character input and output, entering input data, scanf function, printf function, gets and puts functions, interactive programming.	**12**
III	**Conditional Statements and Loops:** Decision Making Within A Program, Conditions, Relational Operators, Logical Connectives, If Statement, If-Else Statement, Loops: While Loop, Do While, For Loop. Nested Loops, Infinite Loops, Switch Statement **Functions:** Overview, defining a function, accessing a function, passing arguments to a function, specifying argument data types, function prototypes, recursion, modular programming and functions, standard library of c functions, prototype of a function: foo1lal parameter list, return type, function call, block structure, passing arguments to a function: call by reference, call by value.	**12**
IV	**Program structure:** Storage classes, automatic variables, external variables, static variables, multifile programs, more library functions, **Preprocessor:** Features, #define and #include, Directives and Macros **Arrays:** Definition, processing, passing arrays to functions, multidimensional arrays, arrays and strings.	**12**
V	**Pointers:** Fundamentals, declarations, Pointers Address Operators, Pointer Type Declaration, Pointer Assignment, Pointer Initialization, Pointer Arithmetic, Functions and Pointers, Arrays And Pointers, Pointer Arrays, passing functions to other functions	**12**

B. Sc (Information Technology)		Semester – I	
Course Name: Imperative Programming		**Course Code: USIT101**	
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	**Introduction:** Types of Programming languages, History, features and application. Simple program logic, program development cycle, pseudocode statements and flowchart symbols, sentinel value to end a program, programming and user environments, evolution of programming models., desirable program characteristics. **Fundamentals:** Structure of a program. Compilation and Execution of a Program, Character Set, identifiers and keywords, data types, constants, variables and arrays, declarations, expressions, statements, Variable definition, symbolic constants.	**12**
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	Structures and Unions:
	Structure Variables, Initialization, Structure Assignment, Nested Structure, Structures and Functions, Structures and Arrays: Arrays of Structures, Structures Containing Arrays, Unions, Structures and pointers.

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Programming with C	Byron Gottfried	Tata McGRAW-Hill	2nd	1996
2.	Programming Logic and Design	Joyce Farell	Cengage Learning	8th	2014
3.	"C" Programming"	Brian W. Kernighan and Denis M. Ritchie.	PHI	2nd	
4.	Let us C	Yashwant P. Kanetkar,	BPB publication		
5.	C for beginners	Madhusudan Mothe	X-Team Series	1st	2008
6.	21st Century C	Ben Klemens	OReilly	1st	2012

B. Sc (Information Technology)		Semester – I	
Course Name: Imperative Programming Practical		**Course Code: USIT1P2**	
Periods per week (1 Period is 50 minutes)		**3**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	2½	50
	Internal	--	--

	List of Practical: (Can be done in any imperative language)
1.	**Basic Programs:**
a.	Write a program to display the message HELLO WORLD.
b.	Write a program to declare some variables of type int, float and double. Assign some values to these variables and display these values.
c.	Write a program to find the addition, subtraction, multiplication and division of two numbers.
2.	**Programs on variables:**
a.	Write a program to swap two numbers without using third variable.
b.	Write a program to find the area of rectangle, square and circle.
c.	Write a program to find the volume of a cube, sphere, and cylinder.
3.	**Conditional statements and loops(basic)**
a.	Write a program to enter a number from the user and display the month name. If number >13 then display invalid input using switch case.
b.	Write a program to check whether the number is even or odd.
c.	Write a program to check whether the number is positive, negative or zero.
d.	Write a program to find the factorial of a number.
e.	Write a program to check whether the entered number is prime or not.
f.	Write a program to find the largest of three numbers.
4.	**Conditional statements and loops(advanced)**
a.	Write a program to find the sum of squares of digits of a number.
b.	Write a program to reverse the digits of an integer.
c.	Write a program to find the sum of numbers from 1 to 100.
d.	Write a programs to print the Fibonacci series.
e.	Write a program to find the reverse of a number.
f.	Write a program to find whether a given number is palindrome or not.
g.	Write a program that solve the quadratic equation $$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$
h.	Write a program to check whether the entered number is Armstrong or not.
i.	Write a program to count the digit in a number
5.	**Programs on patterns:**
a.	Programs on different patterns.

6.	Functions:
a.	Programs on Functions.
7.	Recursive functions
a.	Write a program to find the factorial of a number using recursive function.
b.	Write a program to find the sum of natural number using recursive function.
8.	Arrays
a.	Write a program to find the largest value that is stored in the array.
b.	Write a program using pointers to compute the sum of all elements stored in an array.
c.	Write a program to arrange the 'n' numbers stored in the array in ascending and descending order.
d.	Write a program that performs addition and subtraction of matrices.
e.	Write a program that performs multiplication of matrices.
9.	Pointers
a.	Write a program to demonstrate the use of pointers.
b.	Write a program to perform addition and subtraction of two pointer variables.
10.	Structures and Unions
a.	Programs on structures.
b.	Programs on unions.

B. Sc (Information Technology)		Semester – I	
Course Name: Digital Electronics		**Course Code: USIT102**	
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	**Number System:** Analog System, digital system, numbering system, binary number system, octal number system, hexadecimal number system, conversion from one number system to another, floating point numbers, weighted codes binary coded decimal, non-weighted codes Excess – 3 code, Gray code, Alphanumeric codes – ASCII Code, EBCDIC, ISCII Code, Hollerith Code, Morse Code, Teletypewriter (TTY), Error detection and correction, Universal Product Code, Code conversion. **Binary Arithmetic:** Binary addition, Binary subtraction, Negative number representation, Subtraction using 1's complement and 2's complement, Binary multiplication and division, Arithmetic in octal number system, Arithmetic in hexadecimal number system, BCD and Excess – 3 arithmetic.	12
II	**Boolean Algebra and Logic Gates:** Introduction, Logic (AND OR NOT), Boolean theorems, Boolean Laws, De Morgan's Theorem, Perfect Induction, Reduction of Logic expression using Boolean Algebra, Deriving Boolean expression from given circuit, exclusive OR and Exclusive NOR gates, Universal Logic gates, Implementation of other gates using universal gates, Input bubbled logic, Assertion level. **Minterm, Maxterm and Karnaugh Maps:** Introduction, minterms and sum of minterm form, maxterm and Product of maxterm form, Reduction technique using Karnaugh maps – 2/3/4/5/6 variable K-maps, Grouping of variables in K-maps, K-maps for product of sum form, minimize Boolean expression using K-map and obtain K-map from Boolean expression, Quine Mc Cluskey Method.	12
III	**Combinational Logic Circuits:** Introduction, Multi-input, multi-output Combinational circuits, Code converters design and implementations **Arithmetic Circuits:** Introduction, Adder, BCD Adder, Excess – 3 Adder, Binary Subtractors, BCD Subtractor, Multiplier, Comparator.	12
IV	**Multiplexer, Demultiplexer, ALU, Encoder and Decoder:** Introduction, Multiplexer, Demultiplexer, Decoder, ALU, Encoders. **Sequential Circuits: Flip-Flop:** Introduction, Terminologies used, S-R flip-flop, D flip-fop, JK flip-flop, Race-around condition, Master – slave JK flip-flop, T flip-flop,	12

		conversion from one type of flip-flop to another, Application of flip-flops.					
V		**Counters:** Introduction, Asynchronous counter, Terms related to counters, IC 7493 (4-bit binary counter), Synchronous counter, Bushing, Type T Design, Type JK Design, Presettable counter, IC 7490, IC 7492, Synchronous counter ICs, Analysis of counter circuits. **Shift Register:** Introduction, parallel and shift registers, serial shifting, serial–in serial–out, serial–in parallel–out , parallel–in parallel–out, Ring counter, Johnson counter, Applications of shift registers, Pseudo-random binary sequence generator, IC7495, Seven Segment displays, analysis of shift counters.				**12**	

Books and References:					
Sr. No.	**Title**	**Author/s**	**Publisher**	**Edition**	**Year**
1.	Digital Electronics and Logic Design	N. G. Palan	Technova		
2.	Make Electronics	Charles Platt	O'Reilly	1st	2010
3.	Modern Digital Electronics	R. P. Jain	Tata McGraw Hill	3rd	
4.	Digital Principles and Applications	Malvino and Leach	Tata McGraw Hill		
5.	Digital Electronics: Principles, Devices and Applications,	Anil K. Maini	Wiley		2007

B. Sc (Information Technology)		Semester – I	
Course Name: Digital Electronics Practical		**Course Code: USIT1P2**	
Periods per week (1 Period is 50 minutes)		3	
Credits		2	
		Hours	**Marks**
Evaluation System	**Practical Examination**	2½	50
	Internal	--	--

List of Practical	
1.	**Study of Logic gates and their ICs and universal gates:**
a.	Study of AND, OR, NOT, XOR, XNOR, NAND and NOR gates
b.	IC 7400, 7402, 7404, 7408, 7432, 7486, 74266
c.	Implement AND, OR, NOT, XOR, XNOR using NAND gates.
d.	Implement AND, OR, NOT, XOR, XNOR using NOR gates.
2.	**Implement the given Boolean expressions using minimum number of gates.**
a.	Verifying De Morgan's laws.
b.	Implement other given expressions using minimum number of gates.
c.	Implement other given expressions using minimum number of ICs.
3.	**Implement combinational circuits.**
a.	Design and implement combinational circuit based on the problem given and minimizing using K-maps.
4.	**Implement code converters.**
a.	Design and implement Binary – to – Gray code converter.
b.	Design and implement Gray – to – Binary code converter.
c.	Design and implement Binary – to – BCD code converter
d.	Design and implement Binary – to – XS-3 code converter
5.	**Implement Adder and Subtractor Arithmetic circuits.**
a.	Design and implement Half adder and Full adder.
b.	Design and implement BCD adder.
c.	Design and implement XS – 3 adder.
d.	Design and implement binary subtractor.
e.	Design and implement BCD subtractor.
f.	Design and implement XS – 3 subtractor.
6.	**Implement Arithmetic circuits.**
a.	Design and implement a 2-bit by 2-bit multiplier.
b.	Design and implement a 2-bit comparator.
7.	**Implement Encode and Decoder and Multiplexer and Demultiplexers.**
a.	Design and implement 8:3 encoder.
b.	Design and implement 3:8 decoder.
c.	Design and implement 4:1 multiplexer. Study of IC 74153, 74157
d.	Design and implement 1:4 demultiplexer. Study of IC 74139
e.	Implement the given expression using IC 74151 8:1 multiplexer.
f.	Implement the given expression using IC 74138 3:8 decoder.

8.	**Study of flip-flops and counters.**	
a.	Study of IC 7473.	
b.	Study of IC 7474.	
c.	Study of IC 7476.	
d.	Conversion of Flip-flops.	
e.	Design of 3-bit synchronous counter using 7473 and required gates.	
f.	Design of 3-bit ripple counter using IC 7473.	
9.	**Study of counter ICs and designing Mod-N counters.**	
a.	Study of IC 7490, 7492, 7493 and designing mod-n counters using these.	
b.	Designing mod-n counters using IC 7473 and 7400 (NAND gates)	
10.	**Design of shift registers and shift register counters.**	
a.	Design serial – in serial – out, serial – in parallel – out, parallel – in serial – out, parallel – in parallel – out and bidirectional shift registers using IC 7474.	
b.	Study of ID 7495.	
c.	Implementation of digits using seven segment displays.	

Books and References:					
Sr. No.	**Title**	**Author/s**	**Publisher**	**Edition**	**Year**
1.	Digital Electronics and Logic Design	N. G. Palan	Technova		
2.	Digital Principles and Applications	Malvino and Leach	Tata McGraw Hill		

B. Sc (Information Technology)		Semester – I	
Course Name: Operating Systems		**Course Code: USIT103**	
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	**Introduction:** What is an operating system? History of operating system, computer hardware, different operating systems, operating system concepts, system calls, operating system structure. **Processes and Threads:** Processes, threads, interprocess communication, scheduling, IPC problems.	**12**
II	**Memory Management:** No memory abstraction, memory abstraction: address spaces, virtual memory, page replacement algorithms, design issues for paging systems, implementation issues, segmentation. **File Systems:** Files, directories, file system implementation, file-system management and optimization, MS-DOS file system, UNIX V7 file system, CD ROM file system.	**12**
III	**Input-Output:** Principles of I/O hardware, Principles of I/O software, I/O software layers, disks, clocks, user interfaces: keyboard, mouse, monitor, thin clients, power management, **Deadlocks:** Resources, introduction to deadlocks, the ostrich algorithm, deadlock detection and recovery, deadlock avoidance, deadlock prevention, issues.	**12**
IV	**Virtualization and Cloud:** History, requirements for virtualization, type 1 and 2 hypervisors, techniques for efficient virtualization, hypervisor microkernels, memory virtualization, I/O virtualization, Virtual appliances, virtual machines on multicore CPUs, Clouds. **Multiple Processor Systems** Multiprocessors, multicomputers, distributed systems.	**12**
V	**Case Study on LINUX and ANDROID:** History of Unix and Linux, Linux Overview, Processes in Linux, Memory management in Linux, I/O in Linux, Linux file system, security in Linux. Android **Case Study on Windows:** History of windows through Windows 10, programming windows, system structure, processes and threads in windows, memory management, caching in windows, I/O in windows, Windows NT file system, Windows power management, Security in windows.	**12**

Books and References:					
Sr. No.	**Title**	**Author/s**	**Publisher**	**Edition**	**Year**
1.	Modern Operating Systems	Andrew S. Tanenbaum, Herbert Bos	Pearson	4th	2014
2.	Operating Systems – Internals and Design Principles	Willaim Stallings	Pearson	8th	2009
3.	Operating System Concepts	Abraham Silberschatz, Peter B. Galvineg Gagne	Wiley	8th	
4.	Operating Systems	Godbole and Kahate	McGraw Hill	3rd	

B. Sc (Information Technology)		Semester – II	
Course Name: Operating Systems Practical		**Course Code: USIT1P3**	
Periods per week (1 Period is 50 minutes)		3	
Credits		2	
		Hours	**Marks**
Evaluation System	**Practical Examination**	2½	50
	Internal	--	--

List of Practical	
1.	Installation of virtual machine software.
2.	Installation of Linux operating system (RedHat / Ubuntu) on virtual machine.
3.	Installation of Windows operating system on virtial machine.
4.	**Linux commands: Working with Directories:**
a.	pwd, cd, absolute and relative paths, ls, mkdir, rmdir,
b.	file, touch, rm, cp. mv, rename, head, tail, cat, tac, more, less, strings, chmod
5.	**Linux commands: Working with files:**
a.	ps, top, kill, pkill, bg, fg,
b.	grep, locate, find, locate.
c.	date, cal, uptime, w, whoami, finger, uname, man, df, du, free, whereis, which.
d.	Compression: tar, gzip.
6.	**Windows (DOS) Commands – 1**
a.	Date, time, prompt, md, cd, rd, path.
b.	Chkdsk, copy, xcopy, format, fidsk, cls, defrag, del, move.
7.	**Windows (DOS) Commands – 2**
a.	Diskcomp, diskcopy, diskpart, doskey, echo
b.	Edit, fc, find, rename, set, type, ver
8.	**Working with Windows Desktop and utilities**
a.	Notepad
b.	Wordpad
c.	Paint
d.	Taskbar
e.	Adjusting display resolution
f.	Using the browsers
g.	Configuring simple networking
h.	Creating users and shares
9.	**Working with Linux Desktop and utilities**
a.	The vi editor.
b.	Graphics
c.	Terminal

d.	Adjusting display resolution	
e.	Using the browsers	
f.	Configuring simple networking	
g.	Creating users and shares	
10.	**Installing utility software on Linux and Windows**	

B. Sc. (Information Technology)		Semester – I	
Course Name: Discrete Mathematics		**Course Code: USIT104**	
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	**Introduction**: Variables, The Language of Sets, The Language of Relations and Function **Set Theory**: Definitions and the Element Method of Proof, Properties of Sets, Disproofs, Algebraic Proofs, Boolean Algebras, Russell's Paradox and the Halting Problem. **The Logic of Compound Statements**: Logical Form and Logical Equivalence, Conditional Statements, Valid and Invalid Arguments	12
II	**Quantified Statements**: Predicates and Quantified Statements, Statements with Multiple Quantifiers, Arguments with Quantified Statements **Elementary Number Theory and Methods of Proof**: Introduction to Direct Proofs, Rational Numbers, Divisibility, Division into Cases and the Quotient-Remainder Theorem, Floor and Ceiling, Indirect Argument: Contradiction and Contraposition, Two Classical Theorems, Applications in algorithms.	12
III	**Sequences, Mathematical Induction, and Recursion**: Sequences, Mathematical Induction, Strong Mathematical Induction and the Well-Ordering Principle for the Integers, Correctness of algorithms, defining sequences recursively, solving recurrence relations by iteration, Second order linear homogenous recurrence relations with constant coefficients. general recursive definitions and structural induction. **Functions**: Functions Defined on General Sets, One-to-One and Onto, Inverse Functions, Composition of Functions, Cardinality with Applications to Computability	12
IV	**Relations**: Relations on Sets, Reflexivity, Symmetry, and Transitivity, Equivalence Relations, Partial Order Relations **Graphs and Trees**: Definitions and Basic Properties, Trails, Paths, and Circuits, Matrix Representations of Graphs, Isomorphism's of Graphs, Trees, Rooted Trees, Isomorphism's of Graphs, Spanning trees and shortest paths.	12
V	**Counting and Probability:** Introduction, Possibility Trees and the Multiplication Rule, Possibility Trees and the Multiplication Rule, Counting Elements of Disjoint Sets: The Addition Rule, The Pigeonhole Principle, Counting Subsets of a Set: Combinations, r-Combinations with Repetition Allowed, Probability Axioms and Expected Value, Conditional Probability, Bayes' Formula, and Independent Events.	12

Books and References:					
Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Discrete Mathematics with Applications	Sussana S. Epp	Cengage Learning	4th	2010
2.	Discrete Mathematics, Schaum's Outlines Series	Seymour Lipschutz, Marc Lipson	Tata MCGraw Hill		2007
3.	Discrete Mathematics and its Applications	Kenneth H. Rosen	Tata MCGraw Hill		
4.	Discrete mathematical structures	B Kolman RC Busby, S Ross	PHI		
5.	Discrete structures	Liu	Tata MCGraw Hill		

B. Sc. (Information Technology)		Semester – I	
Course Name: Discrete Mathematics Practical		**Course Code: USIT1P4**	
Periods per week (1 Period is 50 minutes)		3	
Credits		2	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2½	75
	Internal	--	25

List of Practical: Write the programs for the following using SCILAB	
1.	**Set Theory**
a.	Inclusion Exclusion principle.
b.	Power Sets
c.	Mathematical Induction
2.	**Functions and Algorithms**
a.	Recursively defined functions
b.	Cardinality
c.	Polynomial evaluation
d.	Greatest Common Divisor
3.	**Counting**
a.	Sum rule principle
b.	Product rule principle
c.	Factorial
d.	Binomial coefficients
e.	Permutations
f.	Permutations with repetitions
g.	Combinations
h.	Combinations with repetitions
i.	Ordered partitions
j.	Unordered partitions
4.	**Probability Theory**
a.	Sample space and events
b.	Finite probability spaces
c.	Equiprobable spaces
d.	Addition Principle
e.	Conditional Probability
f.	Multiplication theorem for conditional probability
g.	Independent events
h.	Repeated trials with two outcomes
5.	**Graph Theory**
a.	Paths and connectivity
b.	Minimum spanning tree
c.	Isomorphism

6.	**Directed Graphs**	
a.	Adjacency matrix	
b.	Path matrix	
7.	**Properties of integers**	
a.	Division algorithm	
b.	Primes	
c.	Euclidean algorithm	
d.	Fundamental theorem of arithmetic	
e.	Congruence relation	
f.	Linear congruence equation	
8.	**Algebraic Systems**	
a.	Properties of operations	
b.	Roots of polynomials	
9.	**Boolean Algebra**	
a.	Basic definitions in Boolean Algebra	
b.	Boolean algebra as lattices	
10.	**Recurrence relations**	
a.	Linear homogeneous recurrence relations with constant coefficients	
b.	Solving linear homogeneous recurrence relations with constant coefficients	
c.	Solving general homogeneous linear recurrence relations	

B. Sc (Information Technology)		Semester – I	
Course Name: Communication Skills		**Course Code: USIT105**	
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	**The Seven Cs of Effective Communication:** Completeness, Conciseness, Consideration, Concreteness, Clarity, Courtesy, Correctness **Understanding Business Communication:** Nature and Scope of Communication, Non-verbal Communication, Cross-cultural communication, Technology-enabled Business Communication	12
II	**Writing Business Messages and Documents:** Business writing, Business Correspondence, Instructions Business Reports and Proposals, Career building and Resume writing. **Developing Oral Communication Skills for Business:** Effective Listening, Business Presentations and Public Speaking, Conversations, Interviews	12
III	**Developing Oral Communication Skills for Business:** Meetings and Conferences, Group Discussions and Team Presentations, Team Briefing, **Understanding Specific Communication Needs:** Communication across Functional Areas	12
IV	**Understanding Specific Communication Needs:** Corporate Communication, Persuasive Strategies in Business Communication, Ethics in Business Communication, Business Communication Aids	12
V	**Presentation Process:** Planning the presentations, executing the presentations, Impressing the audience by performing, Planning stage: Brainstorming, mind maps / concept maps, executing stage: chunking theory, creating outlines, Use of templates. Adding graphics to your presentation: Visual communication, Impress stage: use of font, colour, layout, Importance of practice and performance.	12

Books and References:					
Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Business Communication	Edited by Meenakshi Raman and Prakash Singh	Oxford University Press	Second	
2.	Professional Communication	Aruna Koneru	Tata McGraw Hill		

3.	Strategies for improving your business communication	Prof. M. S. Rao	Shroff publishers and distributors		2016
4.	Business Communication	Dr. Rishipal and Dr. Jyoti Sheoran	SPD		2014
5.	Graphics for Learning: Proven Guidelines for Planning, Designing, and Evaluating Visuals in Training Materials	Ruth C. Clark, Chopeta Lyons,	Pfeiffer, Wiley		2011
6.	Basic Business Communication: Skills for Empowering the Internet Generation	Lesikar Raymond V and Marie E. Flatley.	Tata McGraw-Hill	10th	2005
7.	Nonverbal Communication: Notes on the Visual Perception of Human Relations	Ruesh, Jurgen and Weldon Kees	University of California Press		1966
8.	Business Communication Today	Bovee, Courtland L.; Thill, John V.	Pearson Education Ltd.		2015
9.	Communication Skills	Dr. Nageshwar Rao Dr. Rajendra P. Das	Himalaya Publishing House		

B. Sc (Information Technology)		Semester – I	
Course Name: Communication Skills Practical		Course Code: USIT1P5	
Periods per week (1 Period is 50 minutes)		3	
Credits		2	
		Hours	Marks
Evaluation System	Practical Examination	2½	50
	Internal	--	--

List of Practical Questions:	
1.	Communication Origami, Guessing Game, Guessing the emotion
2.	Body Language, Follow All Instructions, Effective Feedback Skills
3.	The Name Game, Square Talk (Effective Communication), Room 101 (Influential and persuasive skills)
4.	Back to Back Communication, Paper Shapes (Importance of two-way communication), Memory Test(Presentation Skills)
5.	Exercises on Communication Principles
6.	Exercises on communication icebreakers
7.	Communication exercises
	For the following practicals, Microsoft Office, Open Office, Libre Office or any other software suite can be used.
8.	Use of word processing tools for communication
9.	Use of spreadsheet tools for communication
10.	Use of presentation tools for communication