Hindi Vidya Prachar Samiti's

Ramniranjan Jhunjhunwala College

of Arts, Science & Commerce

(Autonomous College)

Affiliated to

UNIVERSITY OF MUMBAI

Syllabus for the F.Y.B.Sc.

Program: B.Sc. INFORMATION TECHNOLOGY

Program Code: RJSUIT

(CBCS 2019-20)

F.Y. B.Sc. INFORMATION TECHNOLOGY Syllabus Semester I & II

DISTRIBUTION OF TOPICS AND CREDITS

F.Y. B.Sc. INFORMATION TECHNOLOGY SEMESTER I

Course	Nomenclature	Credits	Topics
RJSUIT101	Imperative Programming	2	1. Basic Programming Concepts 2. Arrays, Pointers and Structures
RJSUIT102	Digital Electronics	2	1. Numbering system and Boolean Algebra 2. Sequential and combinational Logic
RJSUIT103	Operating Systems	2	1. Basic OS concepts 2. Virtualization and Cloud
RJSUIT104	Discrete Mathematics	2	1. Set Theory, Number theory and related concepts 2. Graphs, Trees and Probability
RJSUIT105	Communication Skills	2	1. Business Communication 2. Soft Skills and Communication Needs
RJSUITP101	Imperative Programming Practical	2	
RJSUITP102	Digital Electronics Practical	2	
RJSUITP103	Operating Systems Practical	2	
RJSUITP104	Discrete Mathematics Practical	2	
RJSUITP105	Communication Skills Practical	2	

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F.Y. B.Sc. INFORMATION TECHNOLOGY SEMESTER II

Course	Nomenclature	Credits	Topics
RJSUIT201	Python Programming	2	1. Basic Programming Concepts. 2. Functions, Lists, Tuples, Dictionaries. 3. Object Oriented Concepts using python 4. Regular Expressions.
RJSUIT202	Microprocessor Architecture	2	1. 8-bit Microprocessor architecture and Assembly Language 2. Next Generation Microprocessors
RJSUIT203	Web Programming	2	1. Internet and WWW 2. HTML, PHP, JavaScript and MySQL
RJSUIT204	Numerical and Statistical Methods	2	1.Mathematical Modeling and Engineering Problem Solving 2. Regression, Linear Programming and Random Variables
RJSUIT205	Green Computing	2	1. Issues and Minimizing Power usage 2.Going Paperless, Recycling and Greening
RJSUITP201	Python Programming Practical	2	
RJSUITP202	Microprocessor Architecture Practical	2	
RJSUITP203	Web Programming Practical	2	
RJSUITP204	Numerical and Statistical Methods Practical	2	
RJSUITP205	Green Computing Practical	2	

F.Y. B.Sc. INFORMATION TECHNOLOGY Syllabus Semester I & II

B.Sc. (Information Technology)		Semester–I	
Course Name: Imperative Programming		**Course Code:RJSUIT101**	
Periods per week(1Period is 50 minutes)		5	
Credits		2	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2	60
	Internal	1	40

Unit	Details	Lectures
I	**Introduction:** Simple program logic, program development cycle, algorithms, pseudo code, flowchart, Structure of a program, Preprocessor directive - #define and #include, Compilation and Execution of a Program. **Tokens, Data Types, Expressions and constants:**Tokens, identifiers, keywords, data types – basic, user defined and derived, type casting, constants – symbolic and defined, variables - declarations, initialization and use, expressions – operators & operator precedence, macros	12
II	**Types ofOperators:**Arithmetic operators, Assignment operators, relational operators, logical operators, Boolean operators, increment and decrement operators, conditional operator and special operators. **Data Input and output:**Single character input and output, Accepting user input and displaying output, manipulators. **Control Statements:** Decision Making Within A Program, Conditions, If Statement, If-Else Statement, Switch Statement **Iterative statements:**While Loop, Do While, For Loop, Nested Loops, Infinite Loops.	12
III	**Arrays:**Declaration, definition and initialization of an array, accessing array elements, multidimensional arrays. **Functions:**Overview, built in and user defined functions, function prototype, function definition, function call - call by value, call by reference, return by	12

	reference, default arguments, constant arguments, Function Overloading, recursive function, passing arrays to functions, returning array from function	
IV	**Storage classes**: automatic, external, static and register storage classes. **Structures, Unions and Enumerations:**Structure Variables, Initialization, Assignment, Structures and Functions, Structures and Arrays, Arrays of Structures, Unions**,** Enumerations.	12
V	**Pointers:** declaration, initialization, pointer expressions, pointer arithmetic, pointers and strings. **Working with Files:** Classes for file stream operations, opening a file, closing file, reading a file, writing into a file. File pointers and their manipulations, Sequential Input and Output operations, Updating a file, Error Handling during file operations.	12

Books and References					
Sr.No	**Title**	**Authors**	**Publisher**	**Edition**	**Year**
1.	Object oriented programming with C++	E Balagurusamy	Tata Mc GRAW- Hill		
2.	The Complete Reference C++	K R Venugopal,Rajkum ar Buyya,T Ravishankar	Tata Mc GRAW- Hill		
3.	Mastering C++	K R Venugopal,Rajkumar Buyya,T Ravishankar	Tata Mc GRAW- Hill		
4.	C++ for Beginners	B. M. Hirwani	SPD		

F.Y. B.Sc. INFORMATION TECHNOLOGY Syllabus Semester I & II

B.Sc.(Information Technology)		Semester–I	
Course Name: Imperative Programming Practical		**Course Code:RJSUITP101**	
Periods per week(1 Period is 50 minutes)		**3**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**
	Internal	**--**	**--**

Practical No.	Details
1.	**Basic Programs:**
a)	Write a program to declare some variables of type int, float and double. Assign some values to these variables, type cast them and display these values.
b)	Write a program to use different types of operators.
2.	**Programs on variables**
a)	Write a program to swap two numbers with and without using third variable.
b)	Write a program to find the area of rectangle, square and circle. Also find the volume of a cube, sphere, and cylinder.
3.	**Conditional statements and loops(basic)**
a)	Write a program to check whether the number is even or odd. Also check whether the number is positive, negative or zero.
b)	Write a program to find the factorial of a number.
c)	Write a program to find the largest of three numbers.(Note:- Use conditional operator).
d)	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
e)	Write a program to check whether the entered number is prime or not.
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 check whether the entered number is Armstrong or not.
c)	Write a program to print the Fibonacci series.
d)	Write a program to find the reverse of a number.
e)	Write a program to find whether a given number is palindrome or not.
f)	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.
b)	Write a program to find the factorial of a number using recursive function.
c)	Write a program to find the sum of natural number using recursive function.
7.	**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.
8.	**Structures and Unions**
a)	Programs on structures.
b)	Programs on unions.
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.

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10.	**File Handling**
a)	Write a program to write content into a file.
b)	Write a program to read a file and copy its content in another file.

F.Y. B.Sc. I.T.	Semester I Theory
RJSUIT101 **Imperative Programming**	Course Outcomes : The Course will enable the student 1. To understand programming languages and problem solving techniques. 2. To develop programming skills using the fundamentals and basics of C++ Language. 3. To effectively use arrays, structures, functions, pointers and File handling. 4. To develop logics to help them in creating programs and applications in C++. Learning outcomes: ➢ After the completion of this course, the students will be able to develop programs and small applications.
RJSUITP101 **Imperative Programming Practical**	Course Outcomes : 1. Problem solving using standard programming techniques and Turbo C compiler

F.Y. B.Sc. INFORMATION TECHNOLOGY Syllabus Semester I & II

B.Sc.(Information Technology)		Semester–I	
Course Name: Digital Electronics		**Course Code: RJSUIT102**	
Periods per week(1 Period is 50 minutes)		**5**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2	60
	Internal	--	40

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, Error detection and correction, Universal Product Code, Code conversion. **Binary Arithmetic:**Binary addition, Binary subtraction, Negative number representation, Subtraction using1's complement and 2's complement Binary multiplication and division, 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 McCluskey 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-flop, J K flip-flop, Race-around condition, Master–slave JK flip-flop, T flip-flop, Conversion from one type of flip-flop to another, Application of flip-flops.	**12**
V	**Counters:**Introduction, Asynchronous counter, Terms related to counters, IC7493 (4-bit binary counter), Synchronous counter, Bushing, Type T Design, Type JK Design, Preset table counter, IC7490, IC7492, 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.	Modern Digital Electronics	R. P. Jain	TataMcGraw Hill	3rd	
3.	Digital Principles and Applications	Malvino and Leach	McGraw Hill		
4.	Digital Electronics: Principles, Devices and Applications	Anil K. Maini	Wiley		2007

F.Y. B.Sc. INFORMATION TECHNOLOGY Syllabus Semester I & II

B.Sc.(Information Technology)		Semester–I	
Course Name: Digital Electronics Practical		Course Code:RJSUITP102	
Periods per week(1 Period is 50 minutes)		3	
Credits		2	
		Hours	Marks
Evaluation System	Practical Examination	2½	50
	Internal	--	--

Practical No.	Details
1.	**Study of Logic gates and their ICs and universal gates:**
a.	Study of AND, OR, NOT, XOR, XNOR, NAND and NOR gates
b.	IC7400, 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
5.	**Implement Adder and Subtractor Arithmetic circuits.**
a.	Design and implement Half adder and Full adder.

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b.	Design and implement BCD adder.
d.	Design and implement binary subtractor.
e.	Design and implement BCD 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.
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 IC7490, 7492, 7493 and designing mod-n counters using these.
b.	Designing mod-n counters using IC 7473 and7400 (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 IC7474.
b.	Study of ID 7495.

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F.Y. B.Sc. I.T.	Semester I Theory
RJSUIT102 **Digital Electronics**	**Course Outcomes :** 1. To understand and implement the concepts in Boolean algebra and design logic circuits based on these concepts. 2. Implement the sequential and combinational logic circuits to build applications **Learning outcomes:** ➢ After completion of this course, students will be able to build small digital circuits, like the ALU, multiplexers and shift registers. ➢ They can understand formation of complex designs like microcontrollers based on the basic logic circuits.
RJSUITP102 **Digital Electronics** **Practical**	**Course Outcomes :** 1. Study of logic gates, their IC's and universal gates. 2. Formulate and employ a Karnaugh Map to reduce Boolean expressions and logic circuits to their simplest forms. 3. Design and implement combinational logic circuits using reprogrammable logic devices for Binary Arithmetic. 4. Interfacing with the Analog World: Multiplexing, Demultiplexing, Encoder and decoder. 5. Implementing sequential Circuits: Latches, Clock Signals and Clocked Flip-Flops.

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B.Sc.(Information Technology)		Semester–I	
Course Name: Operating Systems		**Course Code: RJSUIT103**	
Periods per week 1 Period is 50 minutes		**5**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2	60
	Internal	--	40

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 concept, Process scheduling, Operations on processes, Inter process communication, IPC problems, Threads-usage, classical thread model, implementing threads in user and kernel space.	12
II	**Memory Management:**Swapping, Contiguous memory Allocation, Paging, Page table structure, Page Replacement Algorithm, Design Issues of Paging, Segmentation, Virtual Memory and Implementation Issues. **File Systems:**Files, directories, file system implementation, file-system management and optimization, MS-DOS file system, UNIXV7 file system, CDROM file system.	12
III	**Input-Output:**Principles of I/O hardware, Application I/ O Interface, Kernel I/O Subsystems, Streams, disks, clocks, power management. **Deadlocks:**Resources, introduction to deadlocks, the ostrich algorithm, deadlock detection and recovery, deadlock avoidance, deadlock prevention, issues.	12

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IV	**Virtualization and Cloud:** History, requirements for virtualization, type1 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, multi computers, distributed systems.	12
V	**Case Study on LINUX and ANDROID:** History of Unix and Linux, Linux Overview, Processes in Linux, Memory management in Linux, Linux file system, security in Linux. Android **Case Study on Windows:** History of windows through Windows10, system structure, processes and threads in windows, memory management, caching in windows, Windows NT file system.	12

Books and References:

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

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B.Sc.(Information Technology)		Semester–I	
Course Name: Operating Systems Practical		**Course Code:RJSUITP103**	
Periods per week(1 Period is 50 minutes)		**3**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**
	Internal	**--**	**--**

Practical No.	Details
1.	Installation of virtual machine software.
2.	Installation of Linux operating system (RedHat/Ubuntu) on virtual machine.
3.	Installation of Windows operating system on virtual 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

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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**

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F.Y. B.Sc. I.T.	Semester I Theory
RJSUIT103 **Operating** **Systems**	Course Outcomes : 1. To understand OS as a resource manager and how various resources like Processor, Memory and I/O are handled by Operating System. Learning Outcomes: ➢ To gain knowledge on process scheduling, synchronization, implementation of virtualization using paging and segmentation, various techniques to implement file structures, I/O management and resource deadlock.
RJSUITP103 **Operating** **Systems** **Practical**	Course Outcomes : 1. Installing virtual machine and various operating systems on VM 2. To understand the use of various LINUX Commands like, files related, directory related, process related and system admin related. 3. To understand the use of DOS Commands. 4. To understand the working of various desktop utilities in like, word, paint, browsers, configuring network settings and creating users, vi editor etc. 5. To install utility software on WINDOWS and LINUX.

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B.Sc.(Information Technology)		Semester–I	
Course Name: Discrete Mathematics		**Course Code: RJSUIT104**	
Periods per week(1 Period is 50 minutes)		**5**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2**	**60**
	Internal	**1**	**40**

Unit	Details	Lectures
I	**Set Theory:** Definitions and the Element Method of Proof, Properties of Sets, Disproof's, Algebraic Proofs, Boolean Algebras **The Logic of Compound Statements:** Logical Form and Logical Equivalence, Conditional Statements, Valid and Invalid Arguments **Quantified Statements:** Predicates and Quantified Statements, Statements with Multiple Quantifiers, Arguments with Quantified Statements.	**12**
II	**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**

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IV	**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. **Relations:** Relations on Sets, Reflexivity, Symmetry, and Transitivity, Equivalence Relations, Partial Order Relations	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, rCombinations 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		

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B.Sc.(Information Technology)		Semester–I	
Course Name: Discrete Mathematics Practical		Course Code:RJSUITP104	
Periods per week(1 Period is 50 minutes)		3	
Credits		2	
		Hours	Marks
Evaluation System	Practical Examination	2½	50
	Internal	--	-

Practical No.	Details
	Write the programs for the following using SCILAB
1.	**Set Theory** a. Inclusion Exclusion principle. b. Power Sets c. Mathematical Induction
2.	**Implement in-built mathematical functions in Scilab** a. gcd b. lcd c. factorial d. poly and more…
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. Addition Principle
	     d. Conditional Probability
	     e. Multiplication theorem for conditional probability

5.	**Graph Theory**
	     a. Paths and connectivity
	     b. Minimum spanning tree
	     c. Isomorphism

6.	**Properties of integers**
	     a. Division algorithm
	     b. Primes
	     c. Euclidean algorithm
	     d. Fundamental theorem of arithmetic
	     e. Congruence relation
	     f. Linear congruence equation

7.	**Boolean Algebra** a. Basic definitions in Boolean Algebra

8.	**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

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F.Y. B.Sc.I.T.	Semester I Theory
RJSUIT104 **Discrete** **Mathematics**	Course Outcomes : 1. This course emphasis on problem solving in main areas of discrete mathematics, which provide important knowledge and skills for the applied scientists. 2. The subject demonstrates the importance of the discrete mathematical topics in applied science. Learning outcomes: Students will be able to: ➢ Understand the basic principles of sets and operations in sets. ➢ Apply counting principles to determine probabilities. ➢ Demonstrate an understanding of relations and functions and will be able to determine their properties. ➢ Model problems in Computer Science using graphs and trees.
RJSUITP104 **Discrete** **Mathematics** **Practical**	Course Outcomes : 1. Installation of the software Scilab. Basic syntax, Mathematical Operators, Predefined constants, Built in functions 2. Complex numbers, Polynomials, Vectors, Matrix. Handling these data structures using built in functions 3. Programming - Functions - Loops - Conditional statements - Handling .sci files

F.Y. B.Sc. INFORMATION TECHNOLOGY Syllabus Semester I & II

B.Sc.(Information Technology)		Semester–I	
Course Name: Communication Skills		**Course Code:RJSUIT105**	
Periods per week (1 Period is 50 minutes)		**5**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2	60
	Internal	--	40

Unit	Details	Lect ures
I	**The Seven C's 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, Instructions Business Reports and Proposals, Career building and Resume writing **Developing Oral Communication Skills for Business:**Business Presentations, **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.	12
III	**Developing Oral Communication Skills for Business:**Effective Listening, Public Speaking, Interviews, Meetings and Conferences.	12
IV	**Developing Oral Communication Skills for Business:** Group Discussions and Team Presentations, Team Briefing **Understanding Specific Communication Needs:**Communication across Functional Areas	12

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V	**Understanding Specific Communication Needs:**Corporate Communication, Persuasive Strategies in Business Communication, Ethics in Business Communication, Business Communication Aids	**12**

Books and References:					
Sr. No.	**Title**	**Author/s**	**Publisher**	**Edition**	**Year**
1.	Business Communication	Meenakshi Raman and Prakash Singh	Oxford University Press	2nd	
2.	Professional Communication	Aruna Koneru	Tata McGraw Hill		
3.	Strategies for improving your business communication	Prof. M. S. Rao	Shroff		2016
4.	Business Communication	Dr. Rishi pal 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	Universityof CaliforniaPress		1966
8.	Business Communication Today	Bovee, Courtla ndL.Th ill, John V.	Pearson Education Ltd.		2015
9.	Communication Skills	Dr. Nageshwar Rao Dr. Rajendra P. Das	Himalaya		

F.Y. B.Sc. INFORMATION TECHNOLOGY Syllabus Semester I & II

B.Sc.(Information Technology)		Semester–I	
Course Name: Communication Skills Practical		**Course Code:RJSUITP105**	
Periods per week(1 Period is 50 minutes)		**3**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**
	Internal	**--**	**--**

Practical No.	Details
1.	Communication Origami, Guessing Game, Guessing the emotion
2.	The Name Game, Square Talk (Effective Communication), Room101 (Influential and persuasive skills)
3.	Back to Back Communication, Paper Shapes (Importance of two-way communication), Memory Test (Presentation Skills)
4.	Exercises on Communication Principles
5.	Exercises on communication icebreakers
6.	Communication Exercises
	For the following practical, Microsoft Office, Open Office, Libre Office or any other software suite can be used.
7.	Use of word processing tools for communication
8.	Use of spread sheet tools for communication
9.	Use of presentation tools for communication

F.Y. B.Sc. INFORMATION TECHNOLOGY Syllabus Semester I & II

F.Y. B.Sc. I.T.	Semester I Theory
RJSUIT105 **Communication** **Skills**	Course Outcomes : 1. To offer critical knowledge about the complexities of modern communication in organizations. 2. With equal opportunity to develop and practice the verbal, nonverbal, written and digital communication techniques. Learning outcomes: ➤ Conducting effective business research and communicating the process and findings in a range of business documents and oral presentations. ➤ Planning and managing a business project and communication strategy. ➤ Demonstrating advanced interpersonal communication, business etiquette and relationship building skills. ➤ Utilizing constructive negotiation and conflict management skills. ➤ Embedding ethical considerations in all communication modes.
RJSUITP105 **Communication** **Skills** **Practical**	Course Outcomes : 1. To improve overall communication skill ability towards empathy, friendliness and professionalism in speaking and attitude. 2. To infuse healthy feeling of completion and positive behavior and collaborative efforts in solving problems

F.Y. B.Sc. INFORMATION TECHNOLOGY Syllabus Semester I & II

B.Sc.(Information Technology)		Semester–II	
Course Name: Python Programming		**Course Code: RJSUIT201**	
Periods per week(1 Period is 50 minutes)		**5**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2**	**60**
	Internal	**--**	**40**

Unit	Details	Lectures
I	**Introduction:** The Python Programming Language, History, features, Installing Python, Running Python program, Debugging : Syntax Errors, Runtime Errors, Semantic Errors, Experimental Debugging, Formal and Natural Languages, The Difference Between Brackets, Braces, and Parentheses, **Variables and Expressions:** Values and Types, Variables, Variable Names and Keywords, Type conversion, Operators and Operands, Expressions, Interactive Mode and Script Mode, Order of Operations. **Conditional Statements:** if, if-else, nested if –else **Looping**: for, while, nested loops **Control statements:** Terminating loops, skipping specific conditions	**12**
II	**Functions:** Function Calls, Type Conversion Functions, Math Functions, Composition, Adding New Functions, Definitions and Uses, Flow of Execution, Parameters and Arguments, Variables and Parameters Are Local, Stack Diagrams, Fruitful Functions and Void Functions, Why Functions? Importing with from, Return Values, Incremental Development, Composition, Boolean Functions, More Recursion, Leap of Faith, Checking Types **Strings:** A String Is a Sequence, Traversal with a for Loop, String Slices,	**12**

	Strings Are Immutable, Searching, Looping and Counting, String Methods, The in Operator, String Comparison, String Operations	
III	**Lists:** Values and Accessing Elements, Lists are mutable, traversing a List, Deleting elements from List, Built-in List Operators, Concatenation, Repetition, In Operator, Built-in List functions and methods	12
	Tuples and Dictionaries: Tuples, Accessing values in Tuples, Tuple Assignment, Tuples as return values, Variable-length argument tuples, Basic tuples operations, Concatenation, Repetition, in Operator, Iteration, Built-in Tuple Functions Creating a Dictionary, Accessing Values in a dictionary, Updating Dictionary, Deleting Elements from Dictionary, Properties of Dictionary keys, Operations in Dictionary, Built-In Dictionary Functions, Built-in Dictionary Methods	
	Files: Text Files, The File Object Attributes, Directories	
	Exceptions: Built-in Exceptions, Handling Exceptions, Exception with Arguments, User-defined Exceptions	
IV	**Regular Expressions:** Concept of regular expression, various types of regular expressions, using match function.	12
	Classes and Objects: Overview of OOP (Object Oriented Programming), Class Definition, Creating Objects, Instances as Arguments, Instances as return values, Built-in Class Attributes, Inheritance, Method Overriding, Data Encapsulation, Data Hiding	
	Multithreaded Programming: Thread Module, creating a thread, synchronizing threads, multithreaded priority queue	
	Modules: Importing module, Creating and exploring modules, Math module, Random module, Time module	
V	**Creating the GUI Form and Adding Widgets:**	12
	Widgets: Button, Canvas, Checkbutton, Entry, Frame, Label, Listbox, Menubutton, Menu, Message, Radiobutton, Scale, Scrollbar, text, Toplevel,	

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Spinbox, PanedWindow, LabelFrame, tkMessagebox. Handling Standard attributes and Properties of Widgets. **Layout Management:** Designing GUI applications with proper Layout Management features. **Look and Feel Customization**: Enhancing Look and Feel of GUI using different appearances of widgets. **Storing Data in Our MySQL Database via Our GUI:** Connecting to a MySQL database from Python, Configuring the MySQL connection, Designing the Python GUI database, Using the INSERT command, Using the UPDATE command, Using the DELETE command, Storing and retrieving data from MySQL database.	

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Think Python	Allen Downey	O'Reilly	1st	2012
2.	An Introduction to Computer Science using Python 3	Jason Montojo, Jennifer Campbell, Paul Gries	SPD	1st	2014
3.	Python GUI Programming Cookbook	Burkhard A. Meier	Packt		2015
4.	Introduction to Problem Solving with Python	E. Balagurusamy	TMH	1st	2016
5.	Murach's Python programming	Joel Murach, Michael Urban	SPD	1st	2017
6.	Object-oriented Programming in Python	Michael H. Goldwasser, David Letscher	Pearson Prentice Hall	1st	2008
7.	Exploring Python	Budd	TMH	1st	2016

F.Y. B.Sc. INFORMATION TECHNOLOGY Syllabus Semester I & II

B.Sc.(Information Technology)		Semester–II	
Course Name: Python Programming Practical		**Course Code: RJSUITP201**	
Periods per week(1 Period is 50 minutes)		**3**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**
	External	**--**	**--**

Practical No	Details
1.	**Write the program for the following:**
a.	Create a program that asks the user to enter their name and their age. Print out a message addressed to them that tells them the year that they will turn 100 years old.
b.	Enter the number from the user and depending on whether the number is even or odd, print out an appropriate message to the user.
c.	Write a program to generate the Fibonacci series.
d.	Write a function that reverses the user defined value.
e.	Write a function to check the input value is Armstrong and also write the function for Palindrome.
f.	Write a recursive function to print the factorial for a given number.
2.	**Write the program for the following:**
a.	Write a function that takes a character (i.e. a string of length 1) and returns True if it is a vowel, False otherwise.
b.	Define a function that computes the *length* of a given list or string.

c.	Define a *procedure* histogram() that takes a list of integers and prints a histogram to the screen. For example, histogram([4, 9, 7]) should print the following: **** ********* *******
3.	**Write the program for the following:**
a.	A *pangram* is a sentence that contains all the letters of the English alphabet at least once, for example: *The quick brown fox jumps over the lazy dog*. Your task here is to write a function to check a sentence to see if it is a pangram or not.
b.	Take a list, say for example this one: a=[1,1,2,3,5,8,13,21,34,55,89] and write a program that prints out all the elements of the list that are less than 5
4.	**Write the program for the following:**
a.	Write a program that takes two lists and returns True if they have at least one common member.
b.	Write a Python program to print a specified list after removing the 0th, 2nd, 4th and 5th elements.
c.	Write a Python program to clone or copy a list
5.	**Write the program for the following:**
a.	Write a Python script to sort (ascending and descending) a dictionary by value.
b.	Write a Python script to concatenate following dictionaries to create a new one. Sample Dictionary : dic1={1:10, 2:20} dic2={3:30, 4:40}

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	dic3={5:50,6:60} Expected Result : {1: 10, 2: 20, 3: 30, 4: 40, 5: 50, 6: 60}
c.	Write a Python program to sum all the items in a dictionary.
6.	**Write the program for the following:**
a.	Write a Python program to read an entire text file.
b.	Write a Python program to append text to a file and display the text.
c.	Write a Python program to read last n lines of a file.
7.	**Write the program for the following:**
a.	Design a class that store the information of student and display the same
b.	Implement the concept of inheritance using python

c.	Create a class called Numbers, which has a single class attribute called MULTIPLIER, and a constructor which takes the parameters x and y (these should all be numbers).
	
	  i. Write a method called add which returns the sum of the attributes x and y.
	  ii. Write a class method called multiply, which takes a single number parameter a and returns the product of a and MULTIPLIER.
	  iii. Write a static method called subtract, which takes two number parameters, b and c, and returns b - c.
	  iv. Write a method called value which returns a tuple containing the values of x and y. Make this method into a property, and write a setter and a deleter for manipulating the values of x and y.

8.	**Write the program for the following:**
a.	Open a new file in IDLE ("New Window" in the "File" menu) and save it as geometry.py in the directory where you keep the files you create for this course. Then copy the functions you wrote for calculating volumes and areas in the "Control Flow and Functions" exercise into this file and save it. Now open a new file and save it in the same directory. You should now be able to import your own module like this:

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	importgeometry Try and add print dir(geometry) to the file and run it. Now write a function pointy Shape Volume(x, y, squareBase) that calculates the volume of a square pyramid if squareBase is True and of a right circular cone if squareBase is False. x is the length of an edge on a square if squareBase is True and the radius of a circle when squareBase is False. y is the height of the object. First use squareBase to distinguish the cases. Use the circleArea and squareArea from the geometry module to calculate the base areas.
b.	Write a program to implement exception handling.
9.	**Design the database applications for the following:**
a.	Design a simple database application that stores the records and retrieve the same.

F.Y. B.Sc. I.T.	Semester II Theory
RJSUIT201 **Python** **Programming**	Course Outcomes 2.1 : Students will be able to 1. Understand basics of Python programming. 2. Use object oriented concepts using Python. Learning outcomes: ➢ Students will design, code, test and debug Python language programs.
RJSUITP201 **Python** **Programming** **Practical**	Course Outcomes : 1. Students will be able to design, code, test, and debug Python language programs.

F.Y. B.Sc. INFORMATION TECHNOLOGY Syllabus Semester I & II

B.Sc.(Information Technology)		Semester–II	
Course Name: Microprocessor Architecture		**Course Code:RJSUIT202**	
Periods per week (1 Period is 50 minutes)		5	
Credits		2	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2	60
	Internal	--	40

Unit	Details	Lectures
I	**Microprocessor, microcomputers, and Assembly Language:** Microprocessor, Microprocessor Instruction Set and Computer Languages, From Large Computers to Single-Chip Micro controllers Applications. **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. **8085 Microprocessor Architecture and Memory Interface:** Introduction, 8085 Microprocessor unit, 8085-Based Microcomputer, Memory Interfacing, Testing and Troubleshooting Memory Interfacing Circuit	**12**
II	**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. **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. **Introduction to 8085 Instructions:** Data Transfer Operations, Arithmetic Operations, Logic Operation, Branch Operation, Writing Assembly Languages Programs, Debugging a Program.	**12**

III	**Programming Techniques With Additional Instructions:** Programming Techniques: Looping, Counting and Indexing, Additional Data Transfer and 16-Bi t Arithmetic Instructions, Arithmetic Instruction Related to Memory, Logic Operations: Rotate, Logics Operations: Compare, Dynamic Debugging. **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. **Stacks and Sub-Routines:** Stack, Subroutine, Restart, Conditional Call, Return Instructions, Advanced Subroutine concepts.	**12**
IV	**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. **Software Development System and Assemblers:** Microprocessors- Based Software Development system, Operating System and Programming Tools, Assemblers and Cross-Assemblers, Writing Program Using Cross Assemblers. **Interrupts:** The 8085 Interrupt,8085 Vectored Interrupts, Restart as S/W Instructions, Additional I/O Concepts and processes.	**12**
V	**Introduction to 16 bit microprocessor – 8086 :** 8086 Microprocessor family overview, Features of 8086, Architecture of 8086, Bus Interface Unit, Additional Instructions in 8086, comparison between 8085 and 8086 **Introduction to 32 bit microprocessor -80286, 80386 and 80486:** The Intel 80286 microprocessor - Architecture, signals, New Enhanced Instructions,	

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The Intel 80386 microprocessor - Architecture, operating modes, enhanced instructions, Intel 80486 microprocessor - internal block diagram and functional signal groups. **Introduction to Intel Pentium Processor** Operating modes, Memory model, New instructions of Pentium processors, The P6 pro family processors, i3, i5, i7 processors and their features, SPARC microprocessors, Features, data types and instruction format.	**12**	

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Microprocessors Architecture, Programming and Applications with the 8085.	Ramesh Gaonkar	PENRAM	5th	2012
2.	Computer System Architecture	M. Morris Mano	PHI		1998
3.	Structured Computer Organization	Andrew C. Tanenbaum	PHI		
4.	Microprocessors and Interfacing	Douglas V Hall	TMH		

F.Y. B.Sc. INFORMATION TECHNOLOGY Syllabus Semester I & II

B.Sc.(Information Technology)		Semester–II	
Course Name: Microprocessor Architecture Practical		**Course Code:RJSUITP202**	
Periods per week(1 Period is 50 minutes)		**3**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**
	Internal	**--**	**--**

Practical No.	Details
1.	**Perform the following Operations related to memory locations.**
a.	Store the data byte 32 H into memory location 8000H.
b.	A block of data consisting of 256 bytes is stored in memory starting at 8000H. write an assembly language program to shift this block in memory from 8050H onwards.
c.	Exchange the contents of memory locations 8000H and 9000H
2.	**Simple assembly language programs for arithmetic operations.**
a.	Add two 8 bit numbers
b.	Subtract the contents of memory location 8001H from the memory location 8000 Hand place the result in memory location 8002H.
c.	Add the16-bit number in memory locations 8000H and 8001H to the16-bit number in memory locations 8002H and 8003H. The most significant eight bits of the two numbers to be added are in memory locations 8001H and 8003H. Store the result in memory locations 8004H and 8005H with the most significant byte in memory location 8005H.
d.	Subtract the16-bit number in memory locations 8002H and 8003H from the16-bit number in memory locations 8000H and 8001H.The most significant eight bits of the two numbers are in memory locations 8001H and 8003H.Store the result in memory locations 8004H and 8005H with the most significant byte in memory location 8005H.
e.	Find the l's complement of the number stored at memory location 8400H and store the complemented number at memory location 8300H.
f.	Find the 2's complement of the number stored at memory location 8200H and store the complemented number at memory location 8300H.
3.	**Packing and unpacking operations.**

a.	Write a simple program to Split a HEX data into two nibbles and store it in memory
b.	Pack the two unpacked BCD numbers stored in memory locations 8200H and 8201H and store result in memory location 8300H. Assume the least significant digit is stored at 8200H.
c.	Two digit BCD number is stored in memory location 8200H. Unpack the BCD number and store the two digits in memory locations 8300H and 8301H such that memory location 8300H will have lower BCD digit.
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 a16-bit data1bit left. Assume data is in the HL register pair
c.	Write a program to count number of l's in the contents of D register and store the count in the B register.
5.	**Operations with Memory locations.**
a.	Calculate the sum of series of numbers. The length of the series is in memory location 8200H and the series begins from memory location 8201H. a. Consider the sum to be 8 bit number. So, ignore carries. Store the sum at memory location 8300H. b. Consider the sum to be 16 bit number. Store the sum at memory locations 8300H and 8301H
b.	Calculate the sum of series of even numbers from the list of numbers. The length of the list is in memory location 8200H and the series itself begins from memory location 8201H. Assume the sum to be 8 bit number so you can ignore carries and store the sum at memory location 8000 H
c.	Multiply two8-bit numbers stored in memory locations 8200H and 8201H by repetitive addition and store the result in memory locations 8300H and 8301H.
d.	Divide 16 bit number stored in memory locations 8200H and 8201H by the 8 bit number stored at memory location 8202H. Store the quotient in memory locations 8300H and 8301H and remainder in memory locations 8302H and 8303H.
e.	Find the number of negative elements (most significant bit 1) in a block of data. The length of the block is in memory location 8200H and the block itself begins in memory location 8201H. Store the number of negative elements in memory location 8300H

f.	Find the square of the given numbers from memory location 8100H and store the result from memory location 9000H
6.	**Search and sort data with respect to memory locations.**
a.	Write a program to sort given 10 numbers from memory location 2200H in the ascending order.
b.	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 8200H and 8201H. Assume byte is in the C register and starting address of the list is 8000H. If byte is not found store 00 at 8200H and 8201H
c.	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.
7.	**Assembly programs on memory locations.**
a.	Write an assembly language program to separate even numbers from the given list of 10 numbers and store them in the another list starting from 2300H. Assume starting address of 10 number list is 2200H
b.	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.
c.	A list of 20 numbers is stored in memory, starting at 8000H. Find number of negative, zero and positive numbers from this list and store these results in memory locations 9000H, 9001H, and 9002H respectively
d.	Write an assembly language program to generate Fibonacci number.
e.	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.
9.	**Subroutine**
a.	DAA instruction is not present. Write a

	Sub routine which will perform the same task as DAA.
b.	Multiply two 8-bit numbers stored in memory locations 8200H and 8201H by repetitive addition and store the result in memory locations 8300H and 8301H. Write a subroutine to store the content of carry to register B.
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

F.Y. B.Sc. I.T.	Semester II Theory
RJSUIT202 **Microprocessor** **Architecture**	Course Outcomes : 1. To study the architecture and assembly language for 8085 microprocessor. 2. Understand the functionality of new generation microprocessors. Learning outcomes: ➢ After this course students will be able to write assembly language program ➢ Students will be able to design basic interface of hardware components such as memory devices
RJSUITP202 **Microprocessor** **Architecture** **Practical**	Course Outcomes : 1. Developing and implementing assembly language programs to perform arithmetic and logical operations 2. Perform various memory related operations with 8085 microprocessor. 3. Utilize internal register structure of 8085 microprocessor to perform various operations.

F.Y. B.Sc. INFORMATION TECHNOLOGY Syllabus Semester I & II

B.Sc.(Information Technology)		Semester–II	
Course Name: Web Programming		**Course Code:RJSUIT203**	
Periods per week (1 Period is 50 minutes)		**5**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Theory Examination**	**2**	**60**
	Internal	**--**	**40**

Unit	Details	Lectures
I	**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 **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.	**12**
II	**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. **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	**12**

	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 checkboxes 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.	
III	**JavaScript:** Introduction, Client-Side JavaScript, Server-Side JavaScript, JavaScript Objects, Java Script Security, **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 **Statements:** Break, comment, continue, delete, do...while, export, for, for...in, function, if...else, import, labelled, return, switch, var, while, with, **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 **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	**12**
IV	**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, super global arrays, strings and string functions, arrays, number handling, basic PHP errors/problems	**12**

V	**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	**12**

Books and References:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Web Design The Complete Reference	Thomas Powell	Tata McGra w Hill		-
2.	HTML5 Step by Step	Faithe Wempen	Microso ft Press		2011
3.	PHP5.1 for Beginners	Ivan Bayross Sharanam Shah,	SPD		2013
4.	PHP Project for Beginners	Sharanam Shah,Vaishali Shah	SPD		2015
5.	PHP6 and MySQL Bible	Steve Suehring, Tim Converse, Joyce Park	Wiley		2009
6.	JavaScript 2.0: The Complete Reference	Thomas Powell and Fritz Schneider	Tata McGra w Hill	2nd	

F.Y. B.Sc. INFORMATION TECHNOLOGY Syllabus Semester I & II

B.Sc.(Information Technology)		Semester–II	
Course Name: Web Programming Practical		**Course Code:RJSUITP203**	
Periods per week(1 Period is 50 minutes)		**3**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**
	Internal	**--**	**--**

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.
c.	Design a web page demonstrating all Style sheet types
2.	**Image maps, Tables, Forms and Media**
a.	Design a web page with Image maps.
b.	Design a web page demonstrating different semantics
c.	Design a web page with different tables. Design a web pages 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.	**JavaScript**
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 JavaScript.
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 Java Script 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 JavaScript 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.
b.	Write a PHP program to display the following Binary Pyramid: 1 0 1 1 0 1 0 1 0 1
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: ● CreateadatabaseCollege ● 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 ofyourchoice.Displaythenamesofthestudentswhosepercentageisbetween35to75 in a tabular format.
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

F.Y. B.Sc. I.T.	Semester II Theory
RJSUIT203 **Web** **Programming**	Course Outcomes : 1. To introduce students about various web programming language concepts and structures for writing programs. 2. Provide students with skills to solve problem with respect to web page design and development. Learning outcomes: ➢ Understanding the major areas and challenges of web programming. Using advanced topics in HTML5, CSS3, JavaScript ➢ Understanding server-side scripting language, PHP using a relational DBMS, MySQL ➢ Designing and implementation of typical static web pages and interactive web applications.
RJSUITP203 **Web Programming Practical**	Course Outcomes : 1. Implementing web programming concept of HTML, javascript and php. 2. To attain expertise in building web sites with advanced programming features.

F.Y. B.Sc. INFORMATION TECHNOLOGY Syllabus Semester I & II

B.Sc.(Information Technology)		Semester–II	
Course Name: Numerical and Statistical Methods		**Course Code: RJSUIT204**	
Periods per week(1 Period is 50 minutes)		5	
Credits		2	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2	60
	Internal	--	40

Unit	Details	Lectures
I	**Mathematical Modeling and Engineering Problem Solving:** A Simple Mathematical Model, Conservation Laws and Engineering Problems **Approximations and Round-Off Errors:** Significant Figures, Accuracy and Precision, Error Definitions, Round-Off Errors **Truncation Errors and the Taylor Series:** The Taylor Series, Error Propagation, Total Numerical Errors, Formulation Errors and Data Uncertainty	12
II	**Solutions of Algebraic and Transcendental Equations:** The Bisection Method, The Newton-Raphson Method, The Regula-falsi method, The Secant Method. **Interpolation:** Forward Difference, Backward Difference, Newton's Forward Difference Interpolation, Newton's Backward Difference Interpolation, Lagrange's Interpolation.	12
III	**Solution of simultaneous algebraic equations (linear) using iterative methods:** Gauss-Jordan Method, Gauss-Seidel Method. **Numerical differentiation and Integration:** Numberical differentiation, Numerical integration using Trapezoidal Rule, Simpson's $1/3^{rd}$ and $3/8^{th}$ rules. **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.	12

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IV	**Least-Squares Regression:** Linear Regression, Polynomial Regression, Multiple Linear Regression, General Linear Least Squares, Non linear Regression **Linear Programming:** Linear optimization problem, Formulation and Graphical solution, Basic solution and Feasible solution.	12
V	**Random variables:** Discrete and Continuous random variables, Probability density function, Probability distribution of random variables, Expected value, Variance. **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.	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 McGraw Hill	6th	2010
3.	Numerical Analysis	Richard L. Burden, J. Douglas Faires	Cengage Learning	9th	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. Grih, Pune	Volume1 and 2	

F.Y. B.Sc. INFORMATION TECHNOLOGY Syllabus Semester I & II

B.Sc.(Information Technology)		Semester–II	
Course Name: Numerical and Statistical Methods Practical		**Course Code:RJSUITP204**	
Periods per week(1 Period is 50 minutes)		3	
Credits		2	
		Hours	**Marks**
Evaluation System	**Practical Examination**	2½	50
	Internal	--	--

Practical No.	Details
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 using in finite 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**

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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 2nd order and 4th order methods.
8.	**Regression**
a.	Program for Linear regression.
b.	Program for Polynomial Regression.
c.	Program for multiple linear regression.
d.	Program for non-linear regression.
9.	**Random variables and distributions**
a.	Program to generate random variables.
b.	Program to fit binomial distribution.
c.	Program to fit Poisson distribution.
10.	**Distributions**
a.	Program for Uniform distribution.
b.	Program for Bernoulli distribution
c.	Program for Negative binomial distribution.

F.Y. B.Sc. INFORMATION TECHNOLOGY Syllabus Semester I & II

F.Y. B.Sc. I.T.	Semester II Theory
RJSUIT204 **Numerical and Statistical Methods**	Course Outcomes : 1. To learn basic modelling and engineering of problem solving 2. To learn essential statistical concepts like Regression and distribution. Learning outcomes: ➢ After this course students will be able to solve mathematical problems using various approximations.
RJSUITP204 **Numerical and Statistical Methods Practical**	Course Outcomes : 1. Implementation and application of numerical methods to solve complex engineering problems. 2. Use Scilab and programming as a tool in solving problems.

F.Y. B.Sc. INFORMATION TECHNOLOGY Syllabus Semester I & II

B.Sc.(Information Technology)		Semester–II	
Course Name: Green Computing		**Course Code: RJSUIT205**	
Periods per week(1 Period is 50 minutes)		5	
Credits		2	
		Hours	**Marks**
Evaluation System	**Theory Examination**	2	60
	Internal	--	40

Unit	Details	Lectures
I	**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. **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.	12
II	**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. **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.	**12**
III	**Changing the Way of Work:** Old Behaviors, 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. **Going Paperless:** Paper Problems, The Environment, Costs: Paper and Office, Practicality, Storage, Destruction, Going Paperless, Organizational Realities, Changing Over, Paperless Billing, Hand held Computers vs. the Clipboard, Unified Communications, Intranets, What to Include, Building an Intranet, Microsoft Office Share Point Server 2007, Electronic Data Interchange(EDI), Nuts and Bolts, Value Added Networks, Advantages, Obstacles.	**12**
IV	**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 **Hardware Considerations:** Certification Programs, EPEAT, RoHS, Energy Star, Computers, Monitors,	**12**

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	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	
V	**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. **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.	**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

F.Y. B.Sc. INFORMATION TECHNOLOGY Syllabus Semester I & II

B.Sc.(Information Technology)		Semester–II	
Course Name: Green Computing Practical		**Course Code:RJSUITP205**	
Periods per week(1 Period is 50 minutes)		**3**	
Credits		**2**	
		Hours	**Marks**
Evaluation System	**Practical Examination**	**2½**	**50**
	Internal	**--**	**--**

Project and Viva Voce	
1.	A project should be done based on the objectives of Green Computing. Are port of minimum 50 pages should be prepared. The report should have a font size of 12, Times new roman and1.5 line spacing. The headings should have font size14.There port 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.

F.Y. B.Sc. I.T.	Semester II Theory
RJSUIT205 **Green** **Computing**	Course Outcomes : 1. Develop an understanding of the emerging problem of electronic waste and various ways to effectively handle it. 2. Various global level initiatives and standards in Green IT to help reduce the use of hazardous materials for electronics. Learning outcomes: ➢ Student understand the global level E-waste problem, power usage problem in datacentres, measuring carbon foot prints, and adopting various other practices like going paperless, telecommuting etc.
RJSUITP205 **Green Computing** **Practical**	Course Outcomes : 1. To do a small research project on any environmental related topic like, Carbon Footprint, Energy Conservation, Recycling, Data centers design for efficient energy usage, Review of Green Initiatives in India and abroad

F.Y. B.Sc. INFORMATION TECHNOLOGY Syllabus Semester I & II

Scheme of Examinations

1. Two Internals of 20 marks each. Duration 30 min for each.

2. One External (Semester End Examination) of 60 marks. Duration 2 hours.

3. Practical Examination for each subject at the end of Semester. Total five practical components, one each subject 50 marks each with separate passing out of 50

4. Minimum marks for passing Theory and Practical Exam is 40 %.

5. Student must appear for at least one of the two Internal Tests to be eligible for the Semester End Examination.

6. A candidate will be allowed to appear for the practical examinations if he/she submits a certified journal of F.Y. B.Sc. Information Technology or a certificate from the Coordinator / Head of the Institute to the effect that the candidate has completed the practical course of F.Y. B.Sc. Information Technology as per the minimum requirements.

7. In case of loss of journal, a candidate must produce a certificate from the Head of the department /Institute that the practicals for the academic year were completed by the student. However, such a candidate will be allowed to appear for the practical examination, but the marks allotted for the journal will not be granted.

8. Decision of the coordinator, in consultation with the Principal, shall remain final and abiding to all.