St. Xavier's College – Autonomous, Mumbai
Syllabus
For1ˢᵗ Semester Courses in Information Technology
(June 2017 onwards)

Contents:

SITS0101	PROFESSIONAL COMMUNICATION SKILLS
SITS0102	APPLIED MATHEMATICS-1
SITS0103	DIGITIAL ELECTRONICS
SITS0104	THE ART OF PROGRAMMING
SITS0105	DATA COMMUNICATION AND NETWORK STANDARDS
SITS01PR	THE ART OF PROGRAMMING & DIGITIAL ELECTRONICS

F.Y.B.Sc.I.T.   **COURSE: SITS0101**
TITLE: PROFESSIONAL COMMUNICATION SKILLS

LEARNING OBJECTIVE:
To equip the students with communication skills required in the Information Technology Industry.

Number of lectures: 60

UNIT 1	**The Seven Cs of Effective Communication** Completeness, Conciseness, Consideration, Concreteness, Clarity, Courtesy, Correctness **Communication: Its interpretation** Basics, Nonverbal Communication, Barriers to Communication	15
UNIT 2	**Business Communication at Work Place** Letter Components and Layout, Planning a Letter, Process of Letter Writing, E-mail Communication, Memo and Memo Reports, Employment Communication, Notice Agenda and Minutes of Meeting, Brochures **Report Writing** Effective Writing, Types of Business Reports, Structure Of Reports, Gathering Information, Organization Of Material, Writing Abstracts and Summaries, Writing Definitions, Visual Aids, User Instruction Manual	15
UNIT 3	**Required Skills** Reading Skills, Listening Skills, Note Making, Precise Writing, Audiovisual Aids, Oral Communication	15
UNIT 4	**Mechanics of Writing** Transitions, Spelling Rules, Hyphenation, Transcribing Numbers, Abbreviating Technical and Non-Technical Terms, Proof Reading	15

Continuous Internal Assessment
Industrial Visits, Group Discussions, Presentations / Seminars Mid-Term Test

List of Text Books
1. ArunaKoneru, McGrawHill – Professional Communication.
2. Herta A Murphy, Herbet W Hildebrandt, Jane P Thomas, McGrawHill – Effective Business Communication.
3. Lesikar and Petit, McGrawHill – Business Communication
4. Summers Wiley, India – Communication Skills Handbook
5. Rai and Rai, Himalaya Publishing House – Business Communication (Revised Edition)
6. R.C. Sharma and Krishna Mohan, TMH – Business Correspondence and Report Writing

F.Y.B.Sc.I.T.   **COURSE: SITS0102**
TITLE: APPLIED MATHEMATICS - I

LEARNING OBJECTIVE: To study basic mathematics required for developing algorithms for systems and application software

Number of Lectures: 60

UNIT 1	**Matrices, Eigen Values and Eigen Vectors** Rank of a Matrix, System of Homogeneous and Non-Homogeneous Linear Equations, Linearly Independent and Linearly Dependent Vectors, Characteristic Equation of a Square Matrix, Derogatory and Non-Derogatory Matrices, Eigen Values and Eigen Vectors of a Square Matrix, Diagonalization of a Square Matrix, Cayley-Hamilton Theorem, Adjoint of a Matrix.	15
UNIT 2	**Real Valued Functions of One Variable** Intermediate Value Theorem, Successive Differentiation, Higher Order Derivatives and Leibnitz Rule, Mean Value Theorems, Increasing and Decreasing Functions, Finding Extreme Values by first and second Derivative Test, Concavity, Points of Inflection, Asymptotes, Tracing of Curves using first and second derivatives, Graphs of some standard function, Taylor's Series and Taylor's Polynomials.	15
UNIT 3	**Real Valued Functions of Two or Three Variables** Limit(Two path test) and Continuity of Functions in 2 or 3 variables, Level Curves to draw Quadric Surfaces, Partial Differentiation, Implicit Differentiation, Chain Rule, Euler's Theorem, Directional Derivatives and Gradients, Extreme Values of a Function of two variables by second derivative test and by the method of Lagrange's Multiplier.	15
UNIT 4	**Differential Equation** Exact Differential Equations of first order and first degree and Integrating Factors, Linear Differential Equations and Bernoulli's Differential Equation, Linear Differential Equations with Constant Coefficient	15

List of Recommended / Reference Books
1. B.S. Grewal, Khanna Publications – Higher Engineering Mathematics
2. B.V. Ramana, McGrawHill – Higher Engineering Mathematics
3. David C. Lay, Pearson – Linear Algebra and its Applications
4. Shanti Narayan. S. Chand – Differential Calculus
5. Thomus and Finney, Pearson – Calculus

**Use of software like Maple.

F.Y.B.Sc (IT) **COURSE: SITS0103**

TITLE: DIGITAL ELECTRONICS

Number Of Lectures : 60

UNIT 1	**Number System**	15
	Analog System, Digital System, Numbering System, Binary Number System, Octal Number System, Hexadecimal Number System, Conversion form One Number System to Another, Floating Point Numbers, Weighted Codes Binary Code Decimal, Non-Weighted Codes Excess – 3 Code, Gray 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	
	Boolean Algebra	
	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	
UNIT 2	**Logics Gates**	15
	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, K – Maps for Product of Sum Form, Minimize Boolean Expression using K – Map and obtain K – Map from Boolean Expression, Quine Mc Cluskey Method.	
	Combinational Logic Circuits	
	Introduction, Multi-input, multi-output Combinational Circuits, Code Converters Design and Implementations	
UNIT 3	**Arithmetic Circuits**	15
	Introduction, Adder, BCD Adder, Excess – 3 Adder, Binary Subtractors, BCD Subtractor, Multiplier, Comparator	
	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, JK Flip-Flop, Race-Around Condition, Master-Slave JK Flip-Flop, T Flip-Flop Conversion from one type of Flip-Flop to another, Applications of Flip-Flops	
UNIT 4	**Counters**	15
	Intorduction, Asynchronous Counter, Terms related to Counters, IC7493 (4-bit Binary Counter) , Synchronous Counter, Bushing, Type T Design, Type JK Design, Presettable 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, IC 7495, Seven Segment Displays, Analysis of Shift Counters	

Reference Books
1. Anil K. Maini Wiley – Digital Electronics: Principles, Devices and Applications
2. Charles Platt, O'Reilly – Make Electronics
3. Malvino and Leach, TataMcGrawHill – Digital Principles and Applications
4. N.G. Palan, Technova – Digital Electronics and Logic Designs

R.P.Jain, TataMcGrawHill – Modern Digital Electronics

F.Y.B.Sc (IT)   **COURSE: SITS0104**

TITLE: ART OF PROGRAMMING

OBJECTIVE: To ignite the logical ability in order to develop algorithms, for real world problems, independent of computer type, language or application.

Number Of Lectures : 60

UNIT-I	**Algorithm Design, Program Structure** Meaning of Algorithm, Control Structure, Pseudo Code, and Flowchart. Understanding need of: if and for statements. Understanding when and why multiple for statements required. Algorithm, Flowchart and Control Structure construction for area of triangle. Algorithm, Flowchart and Control Structure construction for finding gross pay for employee. Algorithm, Flowchart and Control Structure construction for date validation of a calendar date. Algorithm Construction for 5 more examples. Program Structure: Understanding Problem definition, input, processing, output. Case study of Program structure with Motor Vehicle Enquiries. Writing proper documentation for program/algorithm.	15
UNIT-II	**Module Design and Abstract Data Structure** Concept of module design, How to divide a given problem to modules, Inter module communication, module coupling, local and global data. Understanding Stack and its operation pop, push, peek and write corresponding Methods/pseudo code for it. Understanding Queue and its operation enqueue dequeue and write corresponding Pseudo code for it.	15
UNIT-III	**Programming fundamentals in C** Understanding while Loop, for loop in C through examples. The break Statement and continue Statement. Logical operators in C with single and multiple conditions. Understanding Arrays 1D, 2D, 3D in C through examples. Understanding if and Case statement in C. Writing program involving both arrays and loop.	15
UNIT-IV	**Functions and Pointers in C** What is a Function? Why Use Functions? Passing Values between Functions, Scope Rule of Functions, Calling Convention, Advanced Features of Functions, Return Type of Function Call by Value and Call by Reference, An Introduction to Pointers, Pointer Notation and corresponding memory diagram. Recursion and examples of it.	15

Continuous Internal Assessments
Assignments / Project / Presentation / Case Study / Mid Term Test

REFERENCE BOOKS:
Peter Juliff –Interface Publication- The Art of Structured Programming
Yashwant Kanetkar—BPB Publication.- Let us C
Yashwant Kanetkar—BPB Publication- Exploring C

F.Y. B.Sc.IT   **Course: SITS0105**
Title: Data Communication and network standards

Total Number of lectures: 60

UNIT 1	**Introduction to data communication and networking, Network models** Components of data communication, data flow, topology-bus, ring, star, hybrid, protocols and standards, The OSI reference model, Layers in OSI reference model, TCP/IP protocol suite	[15]
UNIT 2	**Media and Transmission modes** Data and signals, Periodic analog signals, Digital signals , Transmission impairment , Digital to digital, Analog to digital conversion, Transmission modes, Digital to analog conversion, Analog to analog conversion, Guided media and Unguided media	[15]
UNIT 3	**Switching and routing algorithms** Switching basics, circuit switching, packet switching and Message switching. datagram networks and virtual circuit networks, routing algorithms- distance vector routing and link state routing **Information Encoding, Error Detection and Correction** Introduction, representing different symbols, Minimizing errors, Error classification, types of errors, redundancy, detection versus correction, hamming distance, cyclic redundancy check, checksum	[15]
UNIT 4	**IP** IPV4 addressing**,** IPv6 addresses, IP v 6 header formats, IPv6 extension headers, IPv6 auto configuration, configuration via DHCP v6 , IPv6 transition strategies	[15]

List of Recommended Reference Books
1. Achyut Godbole - Data communications and Networks, TMH
2. Behrouz A Forouzan, Mc-Graw Hill – Data communications and Networking *(*Fourth Edition)
3. Dr.SidnieFeit - TCP/IP (Second Edition) TMH
4. W.Stallings, Pearson Education - Data and Computer Communications (Eighth Edition)

ASSESSMENT:
THEORY:
CIA I: Written test **for 15 marks**
CIA II: Assignments / Project / Presentation / Case Study/ Written Test **for 25 marks**

F.Y. B.Sc.IT   **Course: SITS01PR**

Practical:

The Art of Programming

1) Write C program to find the Fibonacci series

2) Write C program for matrix addition.

3) Write C program for matrix multiplication.

4) Write C program to check for leap year. Accept the date from user.

5) Write C program to find sum of squares of natural numbers. Take the end number from user.

6) Write C program to generate the multiplication table.

7) Write C program to display simple calculator using switch case.

8) Write C program to convert decimal system to binary, octal and hexadecimal.

9) C program to count the number of vowels, consonants and so on.

10) C Program to Read a Line From a File and Display it.

11) Write a C program to create a pyramid pattern.

12) C Program to Store Information (name, roll and marks) of a Student Using Structure.

13) C Program to remove all Characters in a String except Alphabet.

14) C Program to Calculate Difference between Two Time Periods.

Digital Electronics Practical   **SITS01PR**

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.

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.

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 Gray – to – Binary code converter.
b. Design and implement Binary – to – BCD code converter
c. 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.

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

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 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.

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. 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		

Semester Syllabus for Courses in Information Technology. St. Xavier's College –Autonomous, Mumbai.

St. Xavier's College – Autonomous, Mumbai
Syllabus
For 2nd Semester Courses in Information Technology
(November 2017 onwards)

Contents:

SITS0201	COMPUTER GRAPHICS
SITS0202	APPLIED MATHEMATICS-II
SITS0203	MICROPROCESSOR AND MICROCONTROLLERS
SITS0204	DESCRIPTIVE STATISTICS
SITS0205	INTRODUCTION TO C++ PROGRAMMING
SITS02PR	C++ PROGRAMMING &COMPUTER GRAPHICS & MICROPROCESSOR AND MICROCONTROLLERS

F.Y.B.Sc (IT)   **COURSE: SITS0201**

TITLE: COMPUTER GRAPHICS

OBJECTIVES: TO understand the logic used in drawing graphs and to implement it through the use of a programming language.

Number Of Lectures : 60

UNIT1	**Introduction. Application and Algorithmic Implementation** **Introduction and Application** Areas of Computer graphics, Video Display Devices, Raster-Scan Systems, Random-Scan System, Input Devices, Hard-Copy Devices **Algorithms** Line Drawing Algorithms-DDA Algorithm, Bresenham's Line Algorithm, Circle-Generating Algorithms, Ellipse Generating Algorithms, Filled Area Permitives	15
UNIT2	**Modeling Attributes and 2D Transformation** **Modeling and Approaches to System Requirements** Line Attributes, Curve Attributes, Color and Grayscale levels, Area-Fill Attributes, Character Attributes, Aliasing **Two Dimensional Geometric Transformation and Viewing** Basic Transformation, Matrix Representation, Composite Transformation, Other Transformation- Reflection, Shear, Viewing Pipeline, Window-two-ViewPort, Co-ordinate Transformation, Clippling Operation, Point-Clipping, Line-Clipping, Polygon Clipping, Curve Clipping, Text Clipping	15
UNIT 3	**Three-Dimensional Concept** **Display Methods** Three-Dimensional Display Methods-Parallel Projection, Perspective Projection, Depth Cueing, Visible Line and Surface Identification, Surface Rendering **Curves** Three-Dimensional Object Representation-Bezier Curves and Surfaces, B-Spline Curves and Surfaces	15
UNIT 4	**Hidden Surface Removal Technique** **Visible-Surface Detection Method** Classification of visible-surface detection algorithms, back-face detection, painter's algorithm, scan-line algorithm, depth-sorting method, area-subdivision method, image and object precision, z-buffer algorithm, floating horizons	15

List of Reference Books and URL:
1. A.P. Godse, Technical Publications Pune – Computer Graphics
2. Donald Hearn and M.Pauline Baker, Pearson Education – Computer Graphics
3. Hill Jr – Computer Graphics
4. J.D.Foleya, A.Van Dan, S.K.Feiner and R.L.Phillips, Addision Wesley – Computer Graphics Principles and Practise

5. J.D.Foleya, A.Van Dan, S.K.Feiner and R.L.Phillips, Addision Wesley – Introduction to Computer Graphics
6. Rogers – Computer Graphics
7. Steven Harrington, McGrawHill – Computer Graphics
8. William M.Newman, Robert F.Sproull, McGrawHill – Principles of Interactive Computer Graphics

F.Y.B.Sc (IT)   **COURSE: SITS0202**

TITLE: Applied Mathematics - II

OBJECTIVES: To study basic mathematics required for developing algorithms for system and application software.

Number of Lectures: 60

UNIT 1	**Complex Variables** De Moivre's Theorem and its Applications, Circular and Hyperbolic Functions, Inverse Hyperbolic Functions, Limit and Continuity of f (z), Differentiable and analytic functions, Cauchy-Riemann Equations (In Cartesian And Polar Form), Harmonic Functions. Conformal Mapping, Cross Ratio, Bilinear Transformation, Fixed (Invariant) Points. Complex Integration, Cauchy's Theorem and its Consequences, Cauchy's Integral formula, Types of Singularities, Taylor and Laurent Series, Residues, Cauchy's Residue Theorem and its Applications.	15
UNIT 2	**Laplace Transform** Definition, Properties of Laplace Transform, Laplace Transform of Standard Functions. Inverse Laplace Transform, Inverse Laplace Transform of Standard Functions, Properties of Inverse Laplace Transform, Applications to Solve Differential Equations.	15
UNIT 3	**Special Integrals** Differentiation under Integral Sign, Error Function, Gamma Function, Beta Function.	15
UNIT 4	**Series** Series of Real Numbers, Sequence Of Partial Sums and Convergence of Series, Convergent and Divergent Series, Geometric Series, Cauchy Criterion of Convergence of Series, Comparison Test, Limit Form Of Comparison Test, Condensation Test, Alternating Series, Leibnitz Theorem (Alternating Series Test), Absolute Convergence, Conditional Convergence, Ratio Test, Root Test, Tests for Absolute Convergence.	15

List of recommended / Reference Books

1. A.R Vasishta, Dr. R.K. Gupta, Krishna Prakash Mandir – Integral Transforms
2. B.V. Ramana, McGrawHill – Higher Engineering Mathematics
3. B.S. Grewal, Khanna Publications - Higher Engineering Mathematics
4. R.K. Jain, S.R.K. Iyengar, Narosa Publishing House – Advanced Engineering Mathematics
5. Thomus and Finney. Pearson - Calculus

F.Y.B.Sc (IT)   **COURSE: SITS0203**

TITLE: MICROPROCESSROR AND MICROCONTROLLERS

OBJECTIVES: To understand the architecture and functioning of a microprocessor and microcontroller, which happen to be the prototypes of the modern large computers.

Number of Lectures: 60

UNIT 1	**Logic Devices** Tristate Devices, Buffers, Encoder, Decoder, Latches, Types of Memories, Concept of Control lines Such as Read/Write Chip Enable **Introduction to 8085 Microprocessor** Organization of Microprocessor based System, 8085 µp architecture, Concept of Address Line and Memory Interfacing, Address Decoding and Memory Interfacing	
UNIT 2	**8085 Programming Model** Instruction Classification, Instruction Format, 8085 Instruction Set **Introduction to Modern Day Computer Systems** Organizations and Architecture, Structure and Function. **System Bus** Computer Components, Computer Functions **PCI** Features of PCI bus, Why PCI bus is needed?, Concept of PCI Arbitration **Internal Memory** Concept of Cache Memory, Methods of Cache Mapping, Concept and Need for Cache Coherency **External Memory** RAID	
UNIT 3	**The 8051 Microcontroller** Introduction And Overview of 8051 family, 8051 Assembly Language Programming, Jumps	
UNIT 4	**Interfacing the 8051 Microcontroller** 8051 I/O Port Programming, Addressing Modes, Arithmetic and Logical Instructions	

Continuous Internal Assessment

Assignments / Projects / Mid Term Test

List of Recommended Books

1. Andrew C. Tanenbaum ,PHI – Structured Computer Organization (3rd Edition)
2. John P Hayes,McGrawHill,1998 – Computer Architecture and Organization
3. M. Morris Memo, PHI, 1998 – Computer System Architecture
4. M.A Mazidi, J.G. Mazidi & R.D – The 8051 Microcontroller and Embedded Systems
5. McKinlay, Pearson Education
6. Malvino – Digital Computer Fundamentals
7. R.S. Gaonkar, PRI (3rd Edition) – Microprocessor Architecture and Programming and Applications with the 8085.
8. Thomas C Bartee, TMG – Digital Computer Fundamentals
9. William Stallings , PHI,1998 – Computer Organization and Architecture (4th Edition)

F.Y.I.T   **Course Code: SITS0204**
Title: Descriptive Statistics
Learning Objectives:
1. To introduce the technique of data collection and its presentation.
2. To emphasize the need for numerical summary measures for data analysis.

Total Number of lectures: 60

Unit I	Types of data from a population : Qualitative and Quantitative data; Geographical, Time series data; Discrete and Continuous data. Different types of scales: Nominal, Ordinal, Ratio and Interval. Collection of Data : Concepts of statistical population and sample. Primary data- designing a questionnaire , distinction between them, Problems when collecting data through the questionnaire. Secondary data– its major sources including s o m e government publications. Elementary Categorical Data Analysis Preparation of tables with two or three factors (variable /attributes) Of classification. Requisites of a good table.	12
Unit II	Univariate : Frequency distribution of discrete and continuous variables. Cumulative frequency distribution. Graphical representation of frequency distribution by Histogram, Frequency polygon, Frequency curve and Ogives. Diagrammatic representation using Bar diagrams and Pie chart. Exploratory data analysis: Stem and Leaf diagram, Dot plot. Bivariate : Frequency distribution, Marginal and Conditional frequency distributions.	12
Unit III	Measures of central tendency Arithmetic mean and its properties (simple and weighted), Combined mean. Geometric mean and Harmonic mean. Quartiles (Median, Quartiles, Deciles, Percentiles.) Mode. (Grouping Method not expected). Empirical relationship between mean, Median and Mode. Merits, Demerits and Uses of Mean, Median, Mode, G.M. and H.M. Requisites of a good average Choice of scale of measurement for each measure of central tendency.	13
Unit IV	Measures of Dispersion Definition of dispersion, objectives of measuring dispersion, absolute and relative measures, range, coefficient of range, inter quartile range ,mean deviation, standard deviation, coefficient of variation, graphic method of dispersion Skewness Skewness introduction, objectives of Skewness , Measures of Skewness, Karl Pearson's coefficient of Skewness. Moments and Kurtosis	17

List of Recommended Reference Books

1. Statistics [Theory ,Methods & Application] - D.C Sancheti ,V.K.Kapoor , Sultan Chand & Sons
2. Fundamentals of Statistics, Volume I -Goon A.M., Gupta M.K., Dasgupta B. The   World Press Private Limited, Calcutta. Fifth edition.
2. Research Methodology, Methods and Techniques - Kothari, C.R.: Wiley Eastern Limited. First Edition.
3. Descriptive Statistics -Shah R.J, Seth Publications, Eighth edition.

ASSESSMENT:
THEORY:
CIA I: Written test **for 20 marks**
CIA II: Assignments / Project / Presentation / Case Study/ Written Test **for 20 marks**

F.Y.B.Sc (IT)   **COURSE: SITS0205**

TITLE: INTRODUCTION TO C++ PROGRAMMING

OBJECTIVES: To learn a Programming Language and to learn structured and procedural programming concepts

Unit 1	C++ concepts	(15 Lectures)
	Variables and Assignments	
	Variables	
	Identifiers	
	Variable declarations	
	Assignment Statements	
	Reference variable	
	Symbolic constant	
	Input and Output	
	cin, cout	
	Escape sequences	
	include directives and Namespaces	
	Indenting and Comments	
	Operator precedence	
	Data types and expressions	
	Arithmetic operators	
	Type compatibilities	
Unit 2	**Flow of Control and Functions**	(15 Lectures)
	Compound statements	
	Loops	
	while	
	for	
	do while	
	Nested loops.	
	Decision making	
	if – else	
	nested if else	
	switch	
	break and continue	
	Manipulators	
	endl	
	setw	
	sizeof	
	Increment and decrement operators	
	Type Cast Operators	
	Scope resolution operators	
	Function Prototypes	
	Built in functions and user defined functions	
	Function overloading	
	Call by reference	
	Call by value	
	const member functions	
	Inline Functions and recursive functions	

	Math Library Functions Virtual Functions	

Unit 3	**Arrays, Pointers, Strings, Vectors**
	String functions
	        strcmp
	        strcat
	        strlen
	        strcpy
	Vector Basics
	
	Arrays
	        Introduction to arrays
	        Arrays in functions
	        2-D arrays
	        Multidimensional arrays
	
	Pointers and Functions
	        Introduction to pointers
	        void pointers
	        Pointers in function
	        Pointer to constant and constant pointer
	        Generic pointer
		(15 Lectures)

Unit 4	**Object Oriented Feature**
	
	Classes and Objects
	        -Class Specification
	        - Constructors and types
	        -Accessing class members
	        -Structures and classes
	        - Passing Objects as Arguments
	        - Returning Objects from functions
	        -Data Hiding
	        - Friend Function and Friend Class
	Inheritance
	        -Inheritance and member accessibility
	        -Multiple Inheritance
	        - Constructors in derived class
	        -Object Composition
	Polymorphism
	
	Generic programming with Templates
	        -Function Templates
	        - Class Templates
	        - Overloading Function Templates
		(15 Lectures)

Continuous Internal Assessment
>   Assignments / Project
>   Mid Term test.

List of Recommended Reference Books
1. Y.P.Kanetkar, "Let us C++" , seventh edition, BPB publication
2. Problem Solving with C++, Walter Savitch, Sixth Edition, Pearson Education.
3. J. R. Hubbard, Schaum's outlines "Programming with C++", Second Edition , Tata McGrawHill

4. Mastering C++ KR Venugopal
5. Object oriented programming with C++, E Balagurusamy, Third Edition, and Tata McGraw Hill.
6. Object oriented programming with C++ PoonamchandraSarang, PHI Second Edition.
7. Pure C++ programming, Amir Afzal, Pearson Education.

Introduction to C++ Programming   **SITS02PR**

Learning Objective:
To help students learn to write an algorithm, convert it to program logic and execute the same on a Computer, thus instilling the foundations of basic programming principles in them.

I.   Write a C++ program for Formatting the following statement using setw and endl:
>   " Nothing is difficult than beginning"
>   >   "So Let's start the voyage of technology"
II.   Write a C++ program to Calculate simple and compound interest.
III. Write C++ programs to perform the following:
>   a. Calculate sum of the digits of a number.
>   b. Find the reverse of a number, entered by the user.
IV.   Write a C++ program for:
>   a. solving the quadratic equation
>   b. printing all the prime numbers in a given range (ask user input for lower bound and upper bound of the range)
>   c. Write a C++ program for displaying the Fibonacci series.
VI) Write a C++ program for converting number to words. (switch, break, continue)

V.   Write a C++ function for:
>   a. Swapping two numbers with the use of a third variable
>   b. Swapping two numbers without using third variable.
VI.   Write a recursive C++ function for calculating the factorial of a given number
VII. Write a C++ program for (1D arrays):
>   a. sorting an array of numbers in ascending and descending order
>   b. Finding the max in the array
VIII. Write a C++ program for the following(2D arrays):
>   a. Matrix Transpose
>   b. Matrix Addition.
>   c. Matrix Multiplication.
>   d. Inverse of a matrix.
IX.   Write your own function for string reverse, string palindrome, string comparison

X. Write a program for implementing the concept of structures
XI. Write a C++ program for finding the greatest and smallest number using vector
XII. Write a C++ program for:
   a. Implementing the concept of call by value and call by reference.
   b. Programs on use of pointers

COMPUTER GRAPHICS

Learning Objective: To develop a program to implement following algorithms

I) Write a program to implement the DDA Algorithm.
II) Write a program to implement the Bresenham's Algorithm.
III) Write a program to implement the Mid-point Circle Algorithm.
IV) Write a program to implement the Ellipse Algorithm.
V) Write a program to implement the Pie-Algorithm.
VI) Write a program to design any given pattern.
VII) Write a program to implement the 2D Translation Concept.
VIII) Write a program to implement Translation Concept.
IX) Write a program to implement Scaling Concept.
X) Write a program to implement Reflection Concept.
XI) Write a program to implement the Cohen-Sutherland Line Clipping Concept.
XII) Write a program to implement the Bezier Curve

MICROPROCESSOR AND MICROCONTROLLERS

Learning Objective:
To be able to develop and execute assembly language programs for microprocessors and microcontrollers.

8085 programs:
I) Simple 8-bit and 16-bit addition and subtraction
II) Transfer a block of data from one location to another.
III) Find the largest/smallest of the numbers stored at one location. IV)
Addition of 10 numbers.
V) Multiplication of 8-bit and 16-bit numbers. VI) BCD
addition

8051 programs:
I) To search a number from a given set of numbers. The end of the data is indicated by 00. II)
Finding the average of signed numbers.
III) Multiplication of signed numbers.
IV) Convert the BCD 0111 0101 number to two binary numbers and transfer this number to registers.