

Bachelor of Science in Information Technology (B.Sc-IT)
Program Specific Outcome (PSO)

1.	Students can get job in various IT Organisation as System Analyst, Database Administrator, Web Programmer, Application Programmer, Web Designer, even in BPO and KPO sectors
2.	They can do Post Graduation In M.Sc-IT/CS, MCA and MBA.
3.	Variety of certification courses is available who have finished their Bachelors Degree in IT. Some of them are Hardware, Network and Security Courses, Software Programmng and Development Courses, Web Designing and Development Courses.
4.	It develops a standardized process of Project Development and Software Quality Assurance based on the globalized model(SDLC) Software Development Lifecycle which includes standards for ISO 9126 quality factors and also deals with the overall handling of the project.
5.	The Degree helps the students understand hardware components and their functions in detail.
6.	The graduates will become successful professional by demonstrating logical and analytical thinking abilities in the field of IT
7.	The graduates will work and communicate effectively in interdisciplinary environment, either independently or in team, and demonstrate scientific leadership in academia and industry.
8.	Develop knowledge of scientific theories and methods, gain experience in working independently with scientific questions and their ability to express clearly on academic issues keeping in view legal, ethical, social security and issues.
9.	Apply Software Engineering Practices and Strategies in real time software project development, using open source project environment or commercial environment to deliver quality product for organisation success
10.	Acquaint with the contemporary trends in industrial/research settings and thereby innovate novel solutions to existing problems.
11.	It enables an IT graduate to start their own Software Development Company.

SEM 1

Semester	I	Class	FY B.Sc IT
Course No.	USIT101	Academic Year	2019-2020
Course Name	Discrete Mathematics		
Name of Faculty	Dr.Sangita Dubey		
Course Objectives	<ol style="list-style-type: none"> 1. Use mathematically correct terminology and notation. 2. Construct correct direct and indirect proofs. 3. Use division into cases in a proof. 4. Use counterexamples. 5. Apply logical reasoning to solve a variety of problems 		

Unit No.	Course Module	Description
CO1	Set Theory The Logic of Compound Statements	<ol style="list-style-type: none"> 1. Set Theory aims at providing foundations for mathematics 2. Logical Form and Logical Equivalence, Conditional Statements, Valid and Invalid Arguments
CO2	Quantified Statements Elementary Number Theory and Methods of Proof	<ol style="list-style-type: none"> 1. Predicates and Quantified Statements, Statements with Multiple Quantifiers, Arguments with Quantified Statements 2. Direct Proofs, Rational Numbers, Divisibility, Division into Cases and the Quotient-Remainder Theorem
CO3	Quantified Statements Elementary Number Theory and Methods of Proof:	<ol style="list-style-type: none"> 1. Predicates and Quantified Statements, Statements with Multiple Quantifiers, Arguments with Quantified Statements 2. Direct Proofs, Rational Numbers, Divisibility, Division into Cases and the Quotient-Remainder Theorem
CO4	Relations: Graphs and Trees	<ol style="list-style-type: none"> 1. Determine whether a given relation is reflexive, symmetric, antisymmetric, or transitive. 2. Given a relation represented as a matrix or a digraph, determine whether two elements are related. Identify paths and circuits in a digraph.
CO5	Counting and Probability	<ol style="list-style-type: none"> 1. Define event, outcome, trial, simple event, sample space and calculate the probability that an event will occur. 2. Calculate the probability of events for more complex outcomes. 3. Solve applications involving probabilities.

Semester	I	Class	FY B.Sc IT
Course No.	USIT102	Academic Year	2019-2020
Course Name	Digital Electronics		
Name of Faculty	Alvina Panakkal		

Unit No.	Course Module	Description
CO1	Number System & Binary Arithmetic	Understanding number systems used in computer Learning binary arithmetic Understanding different types of codes and code conversions
CO2	Boolean Algebra and Logic Gates & Minterm, Maxterm and Karnaugh Maps	To understand basic gates used in electronics Learn the different Boolean theorems and laws Understand use of K-map & to simplify the expression
CO3	Combinational Logic Circuits & Arithmetic Circuits	Understanding multi-output Combinational circuits Learn different code converters design and circuits To study different types of arithmetic circuits
CO4	Multiplexer, Demultiplexer, ALU, Encoder and Decoder & Sequential Circuits, Flip-Flop	Understand sequential circuits Learn what is flip flop & its applications To study Multiplexer, demultiplexer & decoder and encoder
CO5	Counters & Shift Registers	To learn different types of counters and its uses Understanding shift registers and the working of seven segment display

Semester	I	Class	FY B.Sc IT
Course No.	USIT103	Academic Year	2019-2020
Course Name	Operating Systems		
Name of Faculty	Brensa Cerejo		
Course Objectives	1. Use of Operating system, processes and threads. 2. Learning memory management. 3. Learning file management. 4. Use of virtualization and distributed computing. 5. Understanding linux, windows and android.		

Unit No.	Course Module	Description
CO1	Introduction	Introduction, Concepts and History of Operating System. Understanding Processes, threads, IPC, Scheduling in OS.
CO2	Memory Management	Understanding Memory management, memory abstraction, Segmentation, Page replacement algorithm. Overview of File System and types of File system
CO3	Input-Output	Understanding principles of I/O Hardware and I/O Software. Introduction to deadlocks, deadlock detection and recovery, deadlock avoidance, deadlock prevention.
CO4	Virtualization and Cloud	Overview of Virtualisation, requirements of Virtualisation and types of hypervisors. Introduction to Cloud Computing Overview of Multiple Processor Systems.
CO5	Case Study on Linux and Windows	Overview of Unix, Linux and Case studies of Linux, Android. History and Case study of Windows.

Semester	I	Class	FY B.Sc IT
Course No.	USIT105	Academic Year	2019-2020
Course Name	Communication Skills		
Name of Faculty	Calvina Suhas Maharao		

Unit No.	Course Module	Description
CO1	The Seven Cs of Effective Communication. Understanding Business Communication.	Helps in building effective communication that includes Completeness, Conciseness, Consideration, Concreteness, Clarity, Courtesy, Correctness. Techniques of communication like Non-verbal Communication, Cross-cultural communication, Technology-enabled Business Communication is the nature and the scope of communication.
CO2	Writing Business Messages and Documents. Developing Oral Communication Skills for Business.	Develops Business writing, Business Correspondence, Instructions Business Reports and Proposals, Career building and Resume writing. Enhances Effective Listening, Business Presentations and Public Speaking, Conversations and Interview skills.
CO3	Developing Oral Communication Skills for Business. Understanding Specific Communication Needs.	Develops oral communication skills for Meetings and Conferences, Group Discussions and Team Presentations, Team Briefing in business communication. Develops Communication across Functional Areas.
CO4	Understanding Specific Communication Needs.	Understanding Corporate Communication, Persuasive Strategies in Business Communication, Ethics in Business Communication and Business Communication Aids
CO5	Presentation Process.	Planning the presentations including Brainstorming, mind maps / concept maps and executing the presentations including chunking theory, creating outlines, Use of templates. Adding graphics to your presentation: Visual communication, Impress stage with the use of font, colour, layout, Importance of practice and performance.

SEM 2

Semester	II	Class	FY B.Sc IT
Course No.	USIT201	Academic Year	2019-2020
Course Name	Object Oriented Programming		
Name of Faculty	Brensa Cerejo		
Course Objectives	1. Use Object Oriented Methodology. 2. Understanding classes and objects. 3. Learning Polymorphism. 4. Use of Inheritance. 5. Understanding templates and string manipulation.		

Unit No.	Course Module	Description
CO1	Object Oriented Methodology	Introduction to Object Oriented Programming, Advantages and Disadvantages of Procedure Oriented Programming and Object Oriented Programming. Understanding Basic concepts of OOP, Features of OOP.
CO2	Classes and Objects	Overview of Classes and Objects, Friend Classes and functions. Introduction to Constructors, Destructors and types of Constructors.
CO3	Polymorphism	Introduction to Function Overloading, Operator Overloading. Understanding Virtual Functions
CO4	Program development using Inheritance	Introduction and understanding of Inheritance and types of Inheritance. Implementation of Exception Handling
CO5	Templates	Introduction to templates and types of templates Understanding Working of files.

Semester	II	Class	FY B.Sc IT
Course No.	USIT202	Academic Year	2019-2020
Course Name	Numerical Statistical Methods and Techniques		
Name of Faculty	Dr. Sangita Dubey		
Course Objectives	<p>1.The main objective of this course is to understand and implement various concepts of numerical analysis and statistics to solve real life problems..</p> <p>2. Learn how to obtain numerical solution of nonlinear equations using Bisection, Newton – Raphson and fixed-point iteration methods.</p> <p>3.Solve system of linear equations numerically using direct and iterative methods.</p> <p>4. Understand the methods to construct interpolating polynomials with practical exposure.</p>		

Unit No.	Course Module	Description
CO1	Mathematical Modeling and Engineering Problem Approximations and Round-Off Errors Truncation Errors and the Taylor Series:	Modeling entails a systematic approach to problem solving that brings the techniques and structures of mathematics to bear in an effort to describe, understand, and make predictions about a wide range of empirical phenomena. construct new functions by applying function composition, identify the various functions that make up a composite function;
CO2	Solutions of Algebraic and Transcendental Equations Interpolation	Understand the methods to construct interpolating polynomials with practical exposure Solve system of linear equations numerically using direct and iterative methods
CO3	Soluton of simultaneous algebraic equations (linear) using iterative method Numerical differentiation and Integration Numerical solution of 1st and 2nd order differential equations	Demonstrate multiple methods of solving simultaneous equations Identify logical reasoning for choosing one method of solution over another Learn to solve systems of linear equations and application problems requiring them Student will be able to solve first order differential equations utilizing the standard techniques for separable, exact, linear, homogeneous, or Bernoulli cases.
CO4	Least-Squares Regression Linear Programming	The least-squares criterion is a method of measuring the accuracy of a line in depicting the data that was used to generate it The Least Squares Method is a mathematical technique that allows the analyst to determine the best way of fitting a curve on top of a chart of data points

CO5	Random variables Distributions	To learn the concept of a random variable. To learn the distinction between discrete and continuous random variables. Be able to compute probabilities using a binomial probability distribution. Be able to compute probabilities using a Poisson probability distribution.
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Semester	II	Class	BSc-IT
Course No.	USIT203	Academic Year	2019-2020
Course Name	Web Programming		
Name of Faculty	Calvina Suhas Maharao		

Unit No.	Course Module	Description
CO1	Internet and the World Wide Web. HTML5.	Understanding internet and its advantages, its protocols, web browsers, search engine and Web server. Understanding web designing programming language called HTML that includes text formatting tags, types of lists like ordered, unordered and nested list, backgrounds to web pages, Creating hyperlinks and anchors. Style sheets, CSS formatting text using style sheets including internal, external and inline CSS, formatting paragraphs using style sheets.
CO2	HTML5 Page layout and navigation.	Creating navigational aids like 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. Creating tables including creating simple table, specifying the size of the table, specifying the width of the column, merging table cells, using tables for page layout, formatting tables: applying table borders, applying background and foreground fills, changing cell padding, spacing and alignment, creating user forms: creating basic form, using check boxes and option buttons, creating lists, additional input types in HTML5, Incorporating sound and video: audio and video in HTML5, HTML multimedia basics, embedding video clips, incorporating audio on web page.
CO3	Java Script, Operators, Statements, Core JavaScript (Properties and Methods of Each), Document and its associated objects, Events and Event Handlers.	Creating Client-Side JavaScript and Server-Side JavaScript. Operators such as 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 such as 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 for Array, Boolean, Date, Function, Math, Number, Object, String, RegExp Document and its associated objects including document, Link, Area, Anchor, Image, Applet, Layer. Events and Event Handlers such as onAbort, onBlur, onChange, onClick, onDbClick, onDragDrop, onError, onFocus,

		onKeyDown, onKeyPress, onKeyUp, onLoad, onMouseDown, onMouseMove, onMouseOut, onMouseOver, onMouseUp, onMove, onReset, onResize, onSelect, onSubmit, onUnload.
CO4	PHP	Understanding PHP 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, regular expressions, arrays, number handling, basic PHP errors/problems.
CO5	Advanced PHP and MySQL	Understanding 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.

Semester	II	Class	Bsc.IT
Course No.	USIT205	Academic Year	2019-2020
Course Name	Green Computing		
Name of Faculty	Alvina Panakkal		

Unit No.	Course Module	Description
CO1	Overview and Issues & Initiatives and Standards	Understanding the problems faced by e-waste Learning global initiatives for reducing the e-waste problem Understanding different rules and adoptions taken by different countries
CO2	Minimizing Power Usage & Cooling	To understand why cooling is required and different methods for that Learn the different methods to monitor the power consumption Understand how to reduce power usage
CO3	Changing the Way of Work & Going Paperless	Understanding the problems that will come when moving towards paperless Learn different steps for water recycling and other recycling techniques To study different methods for working ,tele commuting ,outsourcing etc
CO4	Recycling & Hardware Considerations	Understand energy star ratings, EPEAT and other certification Learn different methods for hardware recycling To study the life cycle of an electronic product
CO5	Greening Your Information Systems & Staying Green	To learn different certification Understand the role of Chief Green Officer To study different ways for reducing paper in organization

SEM 3

Semester	III	Class	SY B.Sc IT
Course No.	USIT301	Academic Year	2019-2020
Course Name	Maths		
Name of Faculty	Dr.Sangita Dubey		
Course Objectives	1. Use integrals to formulate and solve application problems in science and engineering; 2. Compute a given integral using the most efficient method; 3. Apply mathematical concepts and principles to perform computations		

Unit No.	Course Module	Description
CO1	Matrices Complex Numbers	Eigen values ,eigen vectors ,
CO2	Differential equation of the first order of a degree higher than the first	Students will recognize certain basic types of first order ODEs for which exact solutions may be obtained and to apply the corresponding methods of solution. Students will explore some of the basic theory of linear ODEs, gain ability to recognize certain basic types of higher-order linear ODEs for which exact solutions may be obtained, and to apply the corresponding methods of solution.
CO3	Laplace Transform	Students will be introduced to the concept of the Laplace transform and the application of the Laplace transform and existence and basic properties Use inverse Laplace transform to return familiar functions. Use the Convolution theorem to work with inverse transforms of products
CO4	Multiple Integrals	analyze real world scenarios to recognize when multiple integrals of multivariate and vector valued functions are appropriate, formulate problems about the scenarios, creatively model these scenarios in order to solve the problems using multiple approaches, judge if the results are reasonable, and then interpret and clearly communicate the results.
CO5	Beta and Gamma Functions	Gamma is a single variable function , whereas Beta is two variable function . The relation between beta and gamma function will help to solve many problems in physics and mathematics.

Semester	III	Class	Bsc.IT
Course No.	USIT302	Academic Year	2019-2020
Course Name	Data Structures		
Name of Faculty	Alvina Panakkal		

Unit No.	Course Module	Description
CO1	Introduction to data structure & Array	Understanding data structure and type of data structure. Learning Complexity of an Algorithm & different types of notations. Understanding array and operations performed on it.
CO2	Linked List	To understand the linked list Operations performed in linked list Applications of linked list
CO3	Stack & Queue	Understand stack and queue Learn how stack and queue is represented
CO4	Sorting and Searching Techniques, Tree & advance tree structure	Understand different sorting and searching techniques Learn what is tree data structure ,binary search tree & operations To study what is advance tree structure
CO5	Hashing Techniques & Graph	To learn hashing and different hashing techniques Understanding graph and its terminologies & its representation

Semester	III	Class	SY B.Sc IT
Course No.	USIT303	Academic Year	2019-2020
Course Name	Computer Networks		
Name of Faculty	Brensa Cerejo		
Course Objectives	<ol style="list-style-type: none"> 1. Understanding basics of Computer graphics. 2. Learning 2d and 3d transformations. 3. Using 3d viewing, radiometry, photometry and colorimetry. 4. Use of visible surface determination and curves. 5. Understanding computer animation 		

Unit No.	Course Module	Description
CO1	Introduction	Overview of data communications and network types Implementation of Network models Understanding digital and analog transmission
CO2	Bandwidth Utilization: Multiplexing and Spectrum Spreading	Understanding Multiplexing and spread spectrum Overview of Transmission media and Switching Introduction to data link layer
CO3	Data Link Control	Implementation of DLC services and data link protocols Understanding Media Access Control Learning about Wireless LAN's
CO4	Introduction to the Network Layer	Understanding to Network layer Learning about Unicast routing Understanding IPv4 and IPv6
CO5	Introduction to the Transport Layer	Understanding transport layer protocols Learning about standard client server protocols

Semester	III	Class	BSc-IT
Course No.	USIT304	Academic Year	2019-2020
Course Name	DataBase Management System		
Name of Faculty	Calvina Suhas Maharao		

Unit No.	Course Module	Description
CO1	Introduction to Databases and Transactions, Data Models and Database Design,ER Diagram and Unified Modeling Language.	Understanding database system, purpose of database system, view of data, relational databases, database architecture, transaction management. The importance of data models, Basic building blocks, Business rules, The evolution of data models, Degrees of data abstraction. Database design and ER Model, Constraints, ER Diagrams, ERDIssues, weak entity sets, Codd's rules, Relational Schemas, Introduction to UML.
CO2	Relational database model, Relational Algebra and Calculus.	Elaborates Logical view of data, keys, integrity rules, Relational Database design features of good relational database design, atomic domain and Normalization (1NF, 2NF, 3NF, BCNF). Relational algebra including Selection and projection, set operations, renaming, Joins, Division, syntax, semantics. Operators, grouping and ungrouping, relational comparison. Relational algebra including Tuple relational calculus, Domain relational Calculus, calculus vs algebra, computational capabilities
CO3	Constraints, Views and SQL.	Understanding Constraints, types of constrains, Integrity constraints, Designing Views, data independence, security, updates on views, comparison between tables and views Working with SQL including data definition, aggregate function, Null Values, nested sub queries, Joined relations and Triggers.
CO4	Transaction management and Concurrency.	Understanding Control Transaction management including ACID properties, serializability and concurrency control, Lock based concurrency control (2PL, Deadlocks),Time stamping methods, optimistic methods, database recovery management.
CO5	PL-SQL.	Beginning with PL / SQL, Identifiers and Keywords, Operators, Expressions, Sequences, Control Structures, Cursors and Transaction, Collections and composite data types, Procedures and Functions, Exceptions Handling, Packages, With Clause and Hierarchical Retrieval, Triggers.

SEM 4

Semester	IV	Class	Bsc.IT
Course No.	USIT402	Academic Year	2019-2020
Course Name	Introduction to Embedded Systems		
Name of Faculty	Alvina Panakkal		

Unit No.	Course Module	Description
CO1	Core of embedded system & Characteristics and quality attributes of embedded systems	Understanding embedded systems Learning the characteristics and quality attributes of embedded systems
CO2	Application and Domain Specific & Embedded Hardware & peripherals	To understand application specific and domain specific embedded systems Learn embedded hardware and different peripherals in embedded systems
CO3	The 8051 Microcontrollers & 8051 Programming in C	Understanding microcontroller Learn difference between microcontroller and microprocessor To study programming in 8051 using C
CO4	Designing Embedded System with 8051 Microcontroller & Programming embedded systems	Understand designing 8051 Learn what are the factors to be considered when selecting microcontroller
CO5	Real Time Operating System (RTOS) & Design and Development	To learn what is real time operating system Understand the embedded product development life cycle To study the latest trends in embedded systems

Semester	IV	Class	SY B.Sc IT
Course No.	USIT403	Academic Year	2019-2020
Course Name	Maths		
Name of Faculty	Dr.Sangita Dubey		
Course Objectives	<p>1.To expose students to the fundamentals and concepts of statistical and optimization methods, in particular, with reference to frequency distribution and measures of central tendency, measures of dispersion, skew ness and kurtosis, theory of probability, linear programming problems, transportation, assignment and game problems.</p> <p>2. Help the students to understand important theorems, different formulae and practical applications of these statistical and optimization methods</p> <p>3. To gain insight into consequences of plan by probability techniques and processing samples using sampling techniques</p>		

Unit No.	Course Module	Description
CO1	The Mean, Median, Mode, and Other Measures of Central Tendency	To Learn techniques to calculate the measures of central tendency and different measures of dispersion
CO2	Elementary Probability Theory	To gain insight into consequences of plan by probability techniques and processing samples using sampling techniques
CO3	Statistical Estimation Theory Statistical Decision Theory	Drawing valid conclusion using estimation theory and proper decision using decision theory
CO4	Small Sampling Theory The Chi-Square Test	To measure experimental result based on hypothesis using chi square techniques
CO5	Curve Fitting and the Method of Least Squares Correlation Theory	To learn techniques to correlate the relationship between various variables

Semester	IV	Class	BSc-IT
Course No.	USIT404	Academic Year	2019-2020
Course Name	Software Engineering		
Name of Faculty	Calvina Suhas Maharao		

Unit No.	Course Module	Description
CO1	Introduction, Software Requirements, Software Processes, Software Development Process Models and Agile software development.	Elaborates software engineering, Software Development Life Cycle(SDLC), Requirements Analysis, Software Design, Coding, Testing, Maintenance etc. Functional and Non-functional requirements, User Requirements, System Requirements, Interface Specification, Documentation of the software requirements. Knowledge about Process and Project, Component Software Processes. Study of Software Development Models such as Waterfall Model, Prototyping, Iterative Development, Rational Unified Process, The RAD Model and Time boxing Model. Includes Agile methods, Plan-driven and agile development, Extreme programming, Agile project management, Scaling agile methods.
CO2	Socio-technical system, Critical system, Requirements Engineering Processes and System Models.	Understanding Essential characteristics of socio technical systems, Emergent System Properties, Systems Engineering, Components of system such as organization, people and computers, Dealing Legacy Systems. Types of critical system, A simple safety critical system, Dependability of a system, Availability and Reliability, Safety and Security of Software systems. Feasibility study, Requirements elicitation and analysis, Requirements Validations, Requirements Management. Models and its types, Context Models, Behavioural Models, Data Models, Object Models, Structured Methods.
CO3	Architectural Design, User Interface Design, Project Management and Quality Management.	Taking Architectural Design Decisions, System Organisation, Modular Decomposition Styles, Control Styles, Reference Architectures. Understanding Need of UI design, Design issues, The UI design Process, User analysis, User Interface Prototyping, Interface Evaluation. Software Project Management, Management activities, Project Planning, Project Scheduling, Risk Management.

		Process and Product Quality, Quality assurance and Standards, Quality Planning, Quality Control, Software Measurement and Metrics.
CO4	Verification and Validation, Software Testing,	<p>Planning Verification and Validation, Software Inspections, Automated Static Analysis, Verification and Formal Methods.</p> <p>Different testing techniques like System Testing, Component Testing, Test Case Design, Test Automation.</p> <p>Size-Oriented Metrics, Function-Oriented Metrics, Extended Function Point Metrics.</p> <p>Software Productivity, Estimation Techniques, Algorithmic Cost Modelling, Project Duration and Staffing</p>
CO5	Process Improvement, Service Oriented Software Engineering, Software reuse and Distributed software engineering.	<p>Understanding Process and product quality, Process Classification, Process Measurement, Process Analysis and Modelling, Process Change, The CMMI Process Improvement Framework.</p> <p>Services as reusable components, Service Engineering, Software Development with Services.</p> <p>The reuse landscape, Application frameworks, Software product lines, COTS product reuse.</p> <p>Distributed systems issues, Client–server computing, Architectural patterns for distributed systems, Software as a service.</p>

Semester	IV	Class	SY B.Sc IT
Course No.	USIT405	Academic Year	2019-2020
Course Name	Computer Graphics and Animation		
Name of Faculty	Brensa Cerejo		
Course Objectives	<ol style="list-style-type: none"> 1. Understanding basics of Computer graphics. 2. Learning 2d and 3d transformations. 3. Using 3d viewing, radiometry, photometry and colorimetry. 4. Use of visible surface determination and curves. 5. Understanding computer animation 		

Unit No.	Course Module	Description
CO1	Introduction to Computer Graphics	Overview of Computer Graphics and Applications of Computer Graphics. Implementation of Scan Conversion Algorithm.
CO2	Two-Dimensional Transformations	Overview and Implementation of Two-Dimensional Transformations Overview and Implementation of Three-Dimensional Transformations
CO3	Viewing in 3D	Understanding 3D Viewing, Stages in 3D viewing, Projections. Overview of Radiometry, Photometry and Colorimetry
CO4	Visible-Surface Determination	Understanding Techniques for efficient Visible-Surface Algorithms and types of algorithms. Overview of types of Curves and Surfaces.
CO5	Computer Animation	Introduction to Computer Animation and Understanding Principles of Computer Animation Implementation of Image Processing and Storage.

SEM 5

Semester	V	Class	BSc-IT
Course No.	USIT501	Academic Year	2019-2020
Course Name	Software Project Management		
Name of Faculty	Calvina Suhas Maharao		

Unit No.	Course Module	Description
CO1	Introduction to Software Project Management, Project Evaluation and Programme Management, An Overview of Project Planning.	<p>Understanding Software Project Management, Plans, Methods and Methodologies.</p> <p>Understanding Project Management Life Cycle, Programme Management, Project Portfolio Management, Strategic Programme Management and Benefits Management.</p> <p>Step Wise Project Planning :</p> <p>Step 0: Select Project,</p> <p>Step 1: Identify Project Scope and Objectives,</p> <p>Step 2: Identify Project Infrastructure,</p> <p>Step 3: Analyse Project Characteristics,</p> <p>Step 4: Identify Project Products and Activities,</p> <p>Step 5: Estimate Effort for Each Activity,</p> <p>Step 6: Identify Activity Risks,</p> <p>Step 7: Allocate Resources,</p> <p>Step 8: Review/Publicize Plan,</p> <p>Steps 9 and 10: Execute Plan/Lower Levels of Planning</p>
CO2	Selection of an Appropriate Project Approach and Software Effort Estimation.	<p>Selection of an Appropriate Project Approach Methodologies and Technologies, Software Processes and Process Models like The Waterfall Model, The Spiral Model, Software Prototyping, Rapid Application Development, Agile Methods, Extreme Programming (XP), Scrum, Lean Software Development.</p> <p>Software Effort Estimation including The Basis for Software Estimating, Software Effort Estimation Techniques, Bottom-up Estimating, The Top-down Approach and Parametric Models, Expert Judgement, Estimating by Analogy, Albrecht Function Point Analysis, Function Points Mark II, COSMIC Full Function Points, COCOMO II: A Parametric Productivity Model, Cost Estimation, Staffing Pattern, Effect of Schedule Compression, Capers Jones Estimating Rules of Thumb.</p>
CO3	Activity Planning, Risk Management and Resource Allocation.	<p>Understanding Objectives of Activity Planning, Projects and Activities, Sequencing and Scheduling Activities, Network Planning Models, Formulating a Network Model, Adding the Time Dimension, The Forward Pass, Backward Pass, Identifying the Critical Path, Activity Float, Shortening the Project Duration, Identifying Critical Activities, Activity-on-Arrow Networks. Risk Management: Introduction, Risk, Categories of Risk, Risk Management Approaches, A</p>

		<p>Framework for Dealing with Risk, Risk Identification, Risk Assessment, Risk Planning, Risk Management, Evaluating Risks to the Schedule, Boehm's Top 10 Risks and Counter Measures, Applying the PERT Technique, Monte Carlo Simulation, Critical Chain Concepts. Resource Allocation: Introduction, Nature of Resources, Identifying Resource Requirements, Scheduling Resources, Creating Critical Paths, Counting the Cost, Being Specific, Publishing the Resource Schedule, Cost Schedules, Scheduling Sequence.</p>
CO4	<p>Monitoring and Control, Managing Contracts and Managing People in Software Environments.</p>	<p>Creating the Framework, Collecting the Data, Review, Visualizing Progress, Cost Monitoring, Earned Value Analysis, Prioritizing Monitoring, Getting the Project Back to Target, Change Control, Software Configuration Management (SCM).</p> <p>Managing Contracts including Types of Contract, Stages in Contract Placement, Typical Terms of a Contract, Contract Management, Acceptance.</p> <p>Managing People in Software Environments Including Understanding Behaviour, Organizational Behaviour: A Background, Selecting the Right Person for the Job, Instruction in the Best Methods, Motivation, The Oldham-Hackman Job Characteristics Model, Stress, Stress Management, Health and Safety, Some Ethical and Professional Concerns.</p>
CO5	<p>Working in Teams, Software Quality and Project Closeout.</p>	<p>Working in Teams, becoming a Team, Decision Making, Organization and Team Structures, Coordination Dependencies, Dispersed and Virtual Teams, Communication Genres, Communication Plans, Leadership. Software Quality in Project Planning, Importance of Software Quality, Defining Software Quality, Software Quality Models, ISO 9126, Product and Process Metrics, Product versus Process Quality Management, Quality Management Systems, Process Capability Models, Techniques to Help Enhance Software Quality, Testing, Software Reliability, Quality Plans.</p> <p>Project Closeout with Reasons for Project Closure, Project Closure Process, Performing a Financial Closure, Project Closeout Report.</p>

Semester	V	Class	TY B.Sc IT
Course No.	USIT502	Academic Year	2019-2020
Course Name	Internet of Things		
Name of Faculty	Dr Sangita Dubey		

Unit No.	Course Module	Description
CO1	The Internet of Things	Overview of Internet of Things Understanding design principles for connected devices Introduction to Internet Principles and Internet Communication
CO2	Thinking About Prototyping	Introduction to concepts of Prototyping systems. In depth Understanding of Fundamentals of Embedded systems prototyping
CO3	Prototyping the Physical Design	Preparation and Exploration of Prototyping actual physical design Understanding and Implementing Online Prototyping Components
CO4	Techniques for Writing Embedded Code	Understanding of Memory management, Performance and techniques for writing embedded code. Implementation of Business Models
CO5	Moving Manufacture to	Understanding Manufacturing Process and Deployment of IoT devices Overview of Ethics of Internet of Things

Semester	V	Class	TY B.Sc IT
Course No.	USIT503	Academic Year	2019-2020
Course Name	Advanced Web Programming		
Name of Faculty	Brensa Cerejo		
Course Objectives	<ol style="list-style-type: none"> 1. Use mathematically correct terminology and notation. 2. Construct correct direct and indirect proofs. 3. Use division into cases in a proof. 4. Use counterexamples. 5. Apply logical reasoning to solve a variety of problems. 		

Unit No.	Course Module	Description
CO1	Introducing .NET	Introduction to .NET Environment. Revision of OOP Concepts. Overview of C# Language basics.
CO2	Web Form Fundamentals	Understanding web form and form controls in Visual Studio. In depth understanding of Navigation, Validation and Server controls of Visual Studio.
CO3	Error Handling, Logging, and Tracing	Understanding Error Handling and Logging error methods. Overview of state management. Implementation of Styles, Themes, Master pages in Asp.net.
CO4	ADO.NET Fundamentals	Introduction to Ado.net. Understanding Database connectivity methods in Asp.net. Implementation of Data Controls.
CO5	XML	Implementation of XML in Asp.net Understanding Security requirements, authentication and authorization. Overview of Ajax with Asp.net.

Semester	V	Class	TY B.Sc IT
Course No.	USIT507	Academic Year	2019-2020
Course Name	Next Generation Technologies		
Name of Faculty	Brensa Cerejo		
Course Objectives	<ol style="list-style-type: none"> 1. Use mathematically correct terminology and notation. 2. Construct correct direct and indirect proofs. 3. Use division into cases in a proof. 4. Use counterexamples. 5. Apply logical reasoning to solve a variety of problems. 		

Unit No.	Course Module	Description
CO1	Big Data	Introduction and scope of Big data. Understanding of NoSql Databases, Comparison between NoSql and Sql databases. Introduction to MongoDB
CO2	The MongoDB Data Model	Understanding different data models of MongoDB. Learning to use MongoDB Shell and query syntax of MongoDB. Overview of MongoDB Architecture and types of MongoDB Architecture.
CO3	MongoDB Storage Engine	Understanding different MongoDB Storage engine. Understanding Laminations and best practices of MongoDB.
CO4	The End of Disk? SSD and In-Memory Databases	Introduction to SSD and In-Memory Databases. Overview of jQuery.
CO5	JSON	Introduction to JSON and Integration of JSON with MongoDB.

SEM 6

Semester	VI	Class	BSc-IT
Course No.	USIT601	Academic Year	2019-2020
Course Name	Software Quality assurance		
Name of Faculty	Calvina Suhas Maharao		

Unit No.	Course Module	Description
CO1	Introduction to Quality Software and Quality.	<p>Defining of Quality, Core Components of Quality, Quality View, Financial Aspect of Quality, Customers, Suppliers and Processes, Total Quality Management (TQM), Quality Principles of Total Quality Management, Quality Management Through Statistical Process Control, Quality Management Through Cultural Changes, Continual (Continuous) Improvement Cycle, Quality in Different Areas, Benchmarking and Metrics, Problem Solving Techniques, Problem Solving Software Tools.</p> <p>Software Quality including Constraints of Software Product Quality Assessment, Customer is a King, Quality and Productivity Relationship, Requirements of a Product, Organisation Culture, Characteristics of Software, Software Development Process, Types of Products, Schemes of Criticality Definitions, Problematic Areas of Software Development Life Cycle, Software Quality Management, Processes Related to Software Quality, Quality Management System Structure, Pillars of Quality Management System, Important Aspects of Quality Management</p>
CO2	Fundamentals of testing.	<p>Understanding Necessity of testing, Fundamental test process, The psychology of testing, Historical Perspective of Testing, Definitions of Testing, Approaches to Testing, Testing During Development Life Cycle, Requirement Traceability Matrix, Essentials of Software Testing, Workbench, Important Features of Testing Process.</p> <p>Principles of Software Testing, Salient Features of Good Testing, Test Policy, Test Strategy or Test Approach, Test Planning, Testing Process and Number of Defects Found in Testing, Test Team Efficiency, Mutation Testing, Challenges in Testing, Test Team Approach, Process Problems Faced by Testing, Cost Aspect of Testing, Establishing Testing Policy, Methods, Structured Approach to Testing, Categories of Defect, Defect, Error, or Mistake in Software, Developing Test Strategy, Developing Testing Methodologies (Test Plan), Testing Process, Attitude Towards Testing (Common People Issues), Test Methodologies/Approaches, People Challenges in Software Testing, Raising Management Awareness for Testing, Skills Required by Tester, Testing throughout the software life</p>

		cycle, Software development models, Test levels, Test types, the targets of testing, Maintenance testing
CO3	Unit Testing: Boundary Value Testing, Equivalence Class Testing, Decision Table–Based Testing, Path Testing and Data Flow Testing.	Study of Boundary Value Testing: Normal Boundary Value Testing, Robust Boundary Value Testing, Worst-Case Boundary Value Testing, Special Value Testing, Examples, Random Testing, Guidelines for Boundary Value Testing, Equivalence Class Testing: Equivalence Classes, Traditional Equivalence Class Testing, Improved Equivalence Class Testing, Edge Testing, Guidelines and Observations. Decision Table–Based Testing: Decision Tables, Decision Table Techniques, Cause-and-Effect Graphing, Guidelines and Observations, Path Testing: Program Graphs, DD-Paths, Test Coverage Metrics, Basis Path Testing, Guidelines and Observations, Data Flow Testing: Define/Use Testing, Slice-Based Testing, Program Slicing Tools.
CO4	Software Verification and Validation, V-test Model.	Study of Verification, Verification Workbench, Methods of Verification, Reviews in testing lifecycle, Coverage in Verification, Concerns of Verification, Validation, Validation Workbench, Levels of Validation, Coverage in Validation, Acceptance Testing, Management of Verification and Validation, Software development verification and validation activities. V-test Model: V-model for software, testing during Proposal stage, Testing during requirement stage, Testing during test planning phase, Testing during design phase, Testing during coding, VV Model, Critical Roles and Responsibilities.
CO5	Levels of Testing and Special Tests.	Understanding Proposal Testing, Requirement Testing, Design Testing, Code Review, Unit Testing, Module Testing, Integration Testing, Big-Bang Testing, Sandwich Testing, Critical Path First, Sub System Testing, System Testing, Testing Stages. Special Tests including GUI testing, Compatibility Testing, Security Testing, Performance Testing, Volume Testing, Stress Testing, Recovery Testing, Installation Testing, Requirement Testing, Regression Testing, Error Handling Testing, Manual Support Testing, Intersystem Testing, Control Testing, Smoke Testing, Adhoc Testing, Parallel Testing, Execution Testing, Operations Testing, Compliance Testing, Usability Testing, Decision Table Testing, Documentation Testing, Training testing, Rapid Testing, Control flow graph, Generating tests on the basis of Combinatorial Designs, State Graph, Risk Associated with New Technologies, Process maturity level of Technology, Testing Adequacy of Control in New technology usage, Object Oriented Application Testing, Testing of Internal Controls, COTS Testing, Client Server Testing, Web Application Testing, Mobile Application Testing, eBusiness eCommerce Testing, Agile Development Testing, Data Warehousing Testing.

Semester	VI	Class	TY B.Sc IT
Course No.	USIT602	Academic Year	2019-2020
Course Name	Security in Computing		
Name of Faculty	Dr Sangita Dubey		

Unit No.	Course Module	Description
CO1	Information Security Overview	Understanding Importance of Information Security Overview of Risk Analysis Learning Secure Design Principles
CO2	Authentication and Authorization	Studying key concepts of Authentication and Authorization Learning best Practices for Storage security Overview of key concepts of Database Security
CO3	Secure Network Design	Introduction to Secure Network Design Understanding Network Device Security In depth understanding of Firewalls in security Studying concepts of Wireless Network Security
CO4	Intrusion Detection and Prevention Systems	Understanding concepts of IDS and IPS Overview and Management of Voice over IP (VoIP) and PBX Security Learning Operating System Security Models
CO5	Virtual Machines and Cloud Computing	Learning Virtual Machines and Cloud Computing Implementation of Secure Application Design Understanding Physical Security

Semester	VI	Class	TY B.Sc IT
Course No.	USIT605	Academic Year	2019-2020
Course Name	Enterprise Networking		
Name of Faculty	Brensa Cerejo		
Course Objectives	<p>1.Students study network designing and architecture.</p> <p>2. Learning protocols and security concepts of netowrking.</p>		

Unit No.	Course Module	Description
CO1	General Network Design	Understanding Network design methodologies and Architectures. Overview of Network design models.
CO2	Enterprise LAN Design	Considerations for LAN Design in Enterprises. Overview of Data Center Architectures and understanding implementation of same.
CO3	Wireless LAN Design	Understanding implementation and design considerations of Wirelesss LAN. Implementation of WAN Technologies and Enterprise Edge. Overview of different types of WAN Design types.
CO4	Internet Protocol	Understanding IPv4 and IPv6 Addressing and impenetation of Internet Protocols. Understanding case study of IPv4 and IPv6.
CO5	Managing Security	Integration of Network Security in Enter prise network. Implementing security in Enterprise edge and Data Center.