

Shantilal Shah Engineering College, Sidsar, Bhavnagar

Department of Information Technology

B.E. / M.E. Mid Semester Examination Syllabus - March 2020

BE Semester 4

| Subject (Code) | Syllabus |
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| Operating System and Virtualization (3141601) | <p>Unit-1 Introduction: Computer system overview, Architecture, Goals & Structures of O.S, Basic functions, Interaction of O.S. & hardware architecture, System calls, Batch, multiprogramming. Multitasking, time sharing, parallel, distributed & real-time O.S.</p> |
| | <p>Unit-2 Process and Threads Management: Process Concept, Process states, Process control, Threads, Uni-processor Scheduling: Types of scheduling: Preemptive, Non preemptive, Scheduling algorithms: FCFS, SJF, RR, Priority, Thread Scheduling, Real Time Scheduling. System calls like ps, fork, join, exec family, wait.</p> |
| | <p>Unit-3 Concurrency: Principles of Concurrency, Mutual Exclusion: S/W approaches, H/W Support, Semaphores, Pipes, Message Passing, Signals, and Monitors.</p> |
| | <p>Unit-4 Inter Process Communication: Race Conditions, Critical Section, Mutual Exclusion, Hardware Solution, Strict Alternation, Peterson's Solution, The Producer Consumer Problem, Semaphores, Event Counters, Monitors, Message Passing, Classical IPC Problems: Reader's & Writer Problem, Dining Philosopher Problem etc., Scheduling, Scheduling Algorithms.</p> |
| | <p>Unit-5 Deadlock: Principles of Deadlock, Starvation, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, System calls.</p> |
| | <p>Unit-6 Memory Management: Memory Management requirements, Memory partitioning: Fixed and Variable Partitioning, Memory Allocation: Allocation Strategies (First Fit, Best Fit, and Worst Fit), Swapping, Paging and Fragmentation. Demand Paging, Security Issues.</p> |
| Object Oriented Programming -I (3140705) | <p>Unit-1 Introduction to java and elementary programming: Java language specification API, JDK and IDE, Creating, compiling and Executing a simple java program, Programming style, documentation and errors, Reading input from console, identifiers and variables, Assignment statements, Named constants and naming conventions, Data Types (Numeric, Boolean, Character, String) its Operations and Literals, Evaluating Expressions and operator Precedence, Types of Operators (Augmented assignment, Increment and Decrement, Logical), operator precedence and associativity, numeric type conversions.</p> |
| | <p>Unit-2 Selections , Mathematical functions and loops: If statements, Two way, Nested if and multi-way if statements, Switch statements, Conditional Expressions, Common mathematical functions ,While , do-while and for loop, nested loops, Keyword break and continue.</p> |
| | <p>Unit-3 Methods and Arrays: Defining and calling method, Passing argument by values, Overloading methods and scope of variables, Method abstraction and stepwise refinement, Single Dimensional arrays, copying arrays ,Passing and returning array from method, Searching and sorting arrays and the Array class, Two-Dimensional array and its processing, Passing Two-dimensional Array to methods, Multidimensional Arrays.</p> |
| | <p>Unit-4 Objects and Classes: Defining classes for objects, Constructors, accessing objects via reference variable, using classes from the java library, static variables, constants and methods, visibility modifiers and Data field encapsulation, passing objects to methods, array of objects, immutable objects and classes, scope of variable and the this reference.</p> |
| | <p>Unit-5 Object oriented thinking: Class abstraction and Encapsulation, thinking in objects and class relationships, Primitive data</p> |

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| | <p>type and wrapper class types, Big integer and Big decimal class, string class, String Builder and String Buffer class, super class and subclass, using super keyword, overriding and overloading methods, polymorphism and dynamic binding, casting objects and instance of operator, The ArrayList class and its methods, The protected data and methods</p> <p>Unit-6 Exception Handling, I/O, abstract classes and interfaces: Exception types, finally clause, rethrowing Exceptions, chained exceptions, defining custom exception classes, file class and its input and output, Reading data from web, Abstract classes, interfaces, Comparable and Cloneable interface.</p> <p>Unit-7 JAVAFX basics and Event-driven programming and animations: Basic structure of JAVAFX program, Panes, UI control and shapes, Property binding, the Color and the Font class, the Image and Image-View class, layout panes and shapes, Events and Events sources, Registering Handlers and Handling Events, Inner classes, anonymous inner class handlers, mouse and key events, listeners for observable objects, animation</p> |
| <p>Computer Organization & Architecture (3140707)</p> | <p>Unit-1 Computer Data Representation Basic computer data types, Complements, Fixed point representation, Register Transfer and Micro-operations: Floating point representation, Register Transfer language, Register Transfer, Bus and Memory Transfers (Tree-State Bus Buffers, Memory Transfer), Arithmetic MicroOperations, Logic Micro-Operations, Shift Micro-Operations, Arithmetic logical shift unit</p> |
| | <p>Unit-2 Basic Computer Organization and Design Instruction codes, Computer registers, computer instructions, Timing and Control, Instruction cycle</p> |
| | <p>Unit-3 Assembly Language Programming Introduction, Machine Language, Assembly Language Programming: Arithmetic and logic operations, looping constructs, Subroutines, I-O Programming.</p> |
| | <p>Unit-4 Micro programmed Control Organization: Control Memory, Address sequencing, Micro program example, Design of Control Unit</p> |
| <p>Principles of Economics and Management (3140709)</p> | <p>Unit-1 Introduction to Economics; Definitions, Nature, Scope, Difference between Microeconomics & Macroeconomics Theory of Demand & Supply; law of demand, law of supply, equilibrium between demand & supply Elasticity; elasticity of demand, price elasticity, income elasticity, cross elasticity</p> |
| | <p>Unit-2 Theory of production; production function, meaning, factors of production (meaning & characteristics of Land, Labour, capital & entrepreneur), Law of variable proportions & law of returns to scale Cost; meaning, short run & long run cost, fixed cost, variable cost, total cost, average cost, marginal cost, opportunity cost. Break even analysis; meaning, explanation, numerical</p> |
| | <p>Unit-3 Markets; meaning, types of markets & their characteristics (Perfect Competition, Monopoly, Monopolistic Completion, Oligopoly) National Income; meaning, stock and flow concept, NI at current price, NI at constant price, GNP, GDP, NNP, NDP, Personal income, disposal income</p> |
| | <p>Unit-4 Basic economic problems; Poverty-meaning, absolute & relative poverty, causes, measures to reduce Unemployment: meaning, types, causes, remedies Inflation; meaning, types, causes, measures to control</p> |
| | <p>Unit-5 Money; meaning, functions, types, Monetary policy- meaning, objectives, tools, fiscal policy-meaning, objectives, tools Banking; meaning, types, functions, Central Bank- RBI; its functions, concepts; CRR, bank rate, repo rate, reverse repo rate, SLR</p> |

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Department of Information Technology

B.E. / M.E. Mid Semester Examination Syllabus - March 2020

BE Semester 6

| Subject (Code) | Syllabus |
|---|--|
| Advanced Java (2160707) | Unit-1: Java Networking Network Basics and Socket overview, TCP/IP client sockets, URL, TCP/IP server sockets, Datagram, java.net package Socket, ServerSocket, InetAddress, URL, URLConnection |
| | Unit-2: JDBC Programming The JDBC Connectivity Model, Database Programming: Connecting to the Database, Creating a SQL Query, Getting the Results, Updating Database Data, Error Checking and the SQLException Class, The SQLWarning Class, The Statement Interface, PreparedStatement, CallableStatement The ResultSet Interface, Updatable Result Sets, JDBC Types, Executing SQL Queries, ResultSetMetaData, Executing SQL Updates, Transaction Management. |
| | Unit-3: Servlet API and Overview Servlet Model: Overview of Servlet, Servlet Life Cycle, HTTP Methods Structure and Deployment descriptor ServletContext and ServletConfig interface, Attributes in Servlet, Request Dispatcher interface. The Filter API: Filter, FilterChain, Filter Config Cookies and Session Management: Understanding state and session |
| | Unit-4: Java Server Pages JSP Overview: The Problem with Servlets, Life Cycle of JSP Page, JSP Processing, JSP Application Design with MVC, Setting Up the JSP Environment JSP Directives, JSP Action, JSP Implicit Objects JSP Form Processing, JSP Session and Cookies Handling, JSP Session Tracking JSP Database Access, JSP Standard Tag Libraries, JSP Custom Tag, JSP Expression Language, JSP Exception Handling, JSP XML Processing. |
| .Net Technology (2160711) | Unit-1 Introduction to .NET Framework: NET framework, MSIL, CLR, CLS, CTS, Namespaces, Assemblies The Common Language Implementation, Assemblies, Garbage Collection, The End to DLL Hell - Managed Execution |
| | Unit-2 C# - The Basics and Console Applications in C#: Name Spaces - Constructor and Destructors, Function Overloading & Inheritance, Operator Overloading, Modifiers - Property and Indexers , Attributes & Reflection API, When to use Console Applications - Generating Console Output, Processing Console Input |
| | Unit-3 C#.NET: Language Features and Creating .NET Projects, Namespaces Classes and Inheritance -, Namespaces Classes and Inheritance -, C, Exploring the Base Class Library -, Debugging and Error Handling -, Data Types - Exploring Assemblies and Namespaces, String Manipulation ,Files and I/O ,Collections |
| | Unit-4 ADO.NET: Benefits of ADO.NET, ADO.NET compared to classic ADO -, Datasets, Managed Providers -, Data Binding: Introducing Data Source Controls -, Reading and Write Data Using the SqlDataSource Control |
| | Unit-7 Mastering Windows Forms: Printing - Handling Multiple Events, GDI+, Creating Windows Forms Controls |
| | Unit-8 ASP.NET: Introduction to ASP.NET, Working with Web and HTML Controls, Using Rich Server Controls, Login controls, Overview of ASP.NETValidation Controls, Using the Simple Validations, Using the Complex Validators Accessing Data using ADO.NET, Using the Complex Validators Accessing Data using ADO.NET, Configuration Overview |
| Software Engineering (2160701) | Unit-1 Introduction to Software and Software Engineering The Evolving Role of Software, Software: A Crisis on the Horizon and Software Myths, Software Engineering: A Layered Technology, Software Process Models, The Linear Sequential Model, The Prototyping Model, The RAD Model, Evolutionary Process Models, Agile Process Model, Component-Based Development, Process, Product and Process. |

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| | <p>Unit-2 Agile Development Agility and Agile Process model, Extreme Programming, Other process models of Agile Development and Tools.</p> <p>Unit-3 Managing Software Project Software Metrics (Process, Product and Project Metrics), Software Project Estimations, Software Project Planning (MS Project Tool), Project Scheduling & Tracking, Risk Analysis & Management (Risk Identification, Risk Projection, Risk Refinement, Risk Mitigation).</p> <p>Unit-4 Requirement Analysis and Specification Understanding the Requirement, Requirement Modeling, Requirement Specification (SRS), Requirement Analysis and Requirement Elicitation, Requirement Engineering.</p> <p>Unit-5 Software Design Design Concepts and Design Principal, Architectural Design, Component Level Design (Function Oriented Design, Object Oriented Design) (MS Visio Tool), User Interface Design, Web Application Design.</p> | |
| <p>Web Technology (2160708)</p> | <p>Unit-1 Introduction: Concept of WWW, Internet and WWW, HTTP Protocol : Request and Response, Web browser and Web servers, Features of Web 2.0</p> <p>Unit-2 Web Design: Concepts of effective web design, Web design issues including Browser, Bandwidth and Cache, Display resolution, Look and Feel of the Website, Page Layout and linking, User centric design, Sitemap, Planning and publishing website, Designing effective navigation</p> <p>Unit-3 HTML: Basics of HTML, formatting and fonts, commenting code, color, hyperlink, lists, tables, images, forms, XHTML, Meta tags, Character entities, frames and frame sets, Browser architecture and Web site structure. Overview and features of HTML5</p> <p>Unit-4 Style sheets: Need for CSS, introduction to CSS, basic syntax and structure, using CSS, background images, colors and properties, manipulating texts, using fonts, borders and boxes, margins, padding lists, positioning using CSS, CSS2, Overview and features of CSS3</p> <p>Unit-6 XML: Introduction to XML, uses of XML, simple XML, XML key components, DTD and Schemas, Using XML with application. Transforming XML using XSL and XSLT</p> | |
| | <p>Unit -1 Compression Techniques: Lossless Compression , Lossy Compression ,Measures of Performance</p> <p>Unit-2 Mathematical Preliminaries for Lossless Compression Models: Physical Models, Probability Models, Markov Models, Composite Source Model, Coding, Uniquely Decodable Codes, Prefix Codes, Algorithmic Information Theory, Minimum Description Length Principle</p> <p>Unit-3 Huffman Coding: The Huffman Coding Algorithm 41, Minimum Variance Huffman Codes, Adaptive Huffman Coding, Update Procedure, Encoding Procedure, Decoding Procedure, Golomb Codes, Rice Codes, Tunstall Codes, Applications of Huffman Coding, Lossless Image Compression, Text Compression, Audio Compression</p> <p>Unit-4 Arithmetic Coding Introduction, Coding a Sequence, Generating a Tag, Deciphering the Tag, Generating a Binary Code, Uniqueness and Efficiency of the Arithmetic Code ,Algorithm Implementation, Integer Implementation, Comparison of Huffman and Arithmetic Coding, Adaptive Arithmetic Coding</p> <p>Unit-5 Dictionary Techniques Static Dictionary, Digram Coding, Adaptive Dictionary, The LZ77 Approach, The LZ78 Approach, Applications, File Compression—UNIX compress, Image Compression—The Graphics Interchange Format (GIF), Image Compression—Portable Network Graphics (PNG), Compression over Modems—V.42 bis</p> <p>Unit-7 Mathematical Preliminaries for Lossy Coding Distortion criteria, Models, The Quantization Problem, Uniform Quantizer, Adaptive Quantization,</p> | |
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Forward Adaptive Quantization, Backward Adaptive Quantization, Nonuniform Quantization, pdf-Optimized Quantization, Companded Quantization

Unit-9 Boolean retrieval

An example information retrieval problem, A first take at building an inverted index, Processing Boolean queries, The extended Boolean model versus ranked retrieval, The term vocabulary and postings lists, Document delineation and character sequence decoding, Obtaining the character sequence in a document, Choosing a document unit, Determining the vocabulary of terms, Tokenization, Dropping common terms: stop words, Normalization (equivalence classing of terms), Stemming and lemmatization, Faster postings list intersection via skip pointers, Positional postings and phrase queries, Biword indexes, Positional indexes

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Department of Information Technology

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BE Semester 8

| Subject (Code) | Syllabus |
|--|---|
| Artificial Intelligence (2180703) | Unit-1(What is AI?), Unit-2(Problems, State Space Search & Heuristic Search Techniques), Unit-3 (Knowledge Representation Issues), Unit-4 (Using Predicate Logic), Unit-5 (Representing Knowledge Using Rules), Unit-6 (Symbolic Reasoning Under Uncertainty), Unit-7 (Statistical Reasoning Except two topics DempsterShafer Theory, Fuzzy Logic), Unit-8(Weak Slot-and-Filler Structures) , Unit-14(Prolog Concepts upto Fail And Cut-Practical -4). |
| Python Programming (2180711) | Unit-1 Introduction to Python The basic elements of python, Branching Programs, Control Structures, Strings and Input, Iteration Unit-2 Functions, Scoping and Abstraction Functions and scoping, Specifications, Recursion, Global variables, Modules, Files, System Functions and Parameters Unit-3 Structured Types, Mutability and Higher-Order Functions Strings, Tuples, Lists and Dictionaries, Lists and Mutability, Functions as Objects Unit-7 Advance Topics I Regular Expressions – REs and Python, Plotting using PyLab, Networking and Multithreaded Programming – Sockets, Threads and Processes, Chat Application Unit-8 Advance Topics II Security – Encryption and Decryption , Classical Cyphers, Graphics and GUI Programming – Drawing using Turtle, GUI Programming - Buttons, Checkbox, Radio button, label, Textbox, Frame, Tkinter |

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Department of Information Technology

B.E. / M.E. Mid Semester Examination Syllabus - March 2020

ME Semester 2

| Subject (Code) | Syllabus |
|---|--|
| Soft Computing (3720217) | Unit 1 – Introduction to Soft Computing and Neural Networks Unit 2 – Fuzzy Logic |
| IoT Application and Communication Protocol (3722320) | <p>Unit 1 Introduction IoT & The Internet of Things Today: What Is IoT? ,Genesis of IoT, IoT and Digitization , IoT Impact, Connected Roadways & Connected Factory,Smart Connected Buildings ,Smart Creatures , Convergence of IT and OT, IoT Challenges.</p> <p>Unit 2 Identification of IoT Objects and Services: Structural Aspects of the IoT: Environment Characteristics, Traffic Characteristics, Scalability, Interoperability, Security and Privacy, Open Architecture. Key IoT Technologies: Device Intelligence, Communication Capabilities, Mobility Support, Device Power, Sensor Technology, RFID Technology, Satellite Technology.</p> <p>Unit 3 IoT Network Architecture and Design: Comparing IoT Architectures ,The oneM2M IoT Standardized Architecture, The IoT World Forum (IoTWF) Standardized Architecture, Layer 1: Physical Devices and Controllers Layer, Layer 2: Connectivity Layer, Layer 3: Edge Computing Layer, Upper Layers: Layers 4–7 ,IT and OT Responsibilities in the IoT Reference Model, Additional IoT Reference Models, A Simplified IoT Architecture, The Core IoT Functional Stack: Layer 1: Things: Sensors and Actuators Layer, Layer 2: Communications Network Layer,Access Network Sublayer: Gateways and Backhaul Sublayer,Network Transport Sublayer,IoT Network Management Sublayer, Layer 3: Applications and Analytics Layer, Analytics Versus Control Applications, Data Versus Network Analytics, Data Analytics Versus Business Benefits.</p> |
| Advanced Algorithms (3720216) | <p>Unit 1 - Sorting: Review of various sorting algorithms, topological sorting Graph: Definitions and Elementary Algorithms: Shortest path by BFS, shortest path in edge-weighted case (Dijkasra's), depth-first search and computation of strongly connected components, emphasis on correctness proof of the algorithm and time/space analysis, example of amortized analysis.</p> <p>Unit 2 - Matroids: Introduction to greedy paradigm, algorithm to compute a maximum weight maximal independent set. Application to MST. Graph Matching: Algorithm to compute maximum matching. Characterization of maximum matching by augmenting paths, Edmond's Blossom algorithm to compute augmenting path</p> <p>Unit 3 - Flow-Networks: Maxflow-mincut theorem, Ford-Fulkerson Method to compute maximum flow, Edmond-Karp maximum-flow algorithm. Matrix Computations: Strassen's algorithm and introduction to divide and conquer paradigm, inverse of a triangular matrix, relation between the time complexities of basic matrix operations, LUP-decomposition.</p> <p>Unit 4 - Shortest Path in Graphs: Floyd-Warshall algorithm and introduction to dynamic programming paradigm. More examples of dynamic programming. Modulo Representation of integers/polynomials: Chinese Remainder Theorem, Conversion between base-representation and modulo-representation. Extension to polynomials. Application: Interpolation problem</p> |
| Digital Forensics (3722313) | <p>Unit 1 Digital Forensics Science: Forensics science, computer forensics, and digital forensics. Computer Crime: Criminalistics as it relates to the investigative process, analysis of cyber-criminalistics area, holistic approach to cyber-forensics.</p> <p>Unit 2 Cyber Crime Scene Analysis: Discuss the various court orders etc., methods to search and seizure electronic evidence, retrieved and un-retrieved communications, Discuss the importance of understanding what court documents would be required for a criminal investigation.</p> |

Unit 4 Computer Forensics:

Prepare a case, Begin an investigation, Understand computer forensics workstations and software, Conduct an investigation, Complete a case, Critique a case