



SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY

(DEEMED TO BE UNIVERSITY)

Accredited A++ Grade by NAAC | 12B Status by UGC | Approved by AICTE

www.sathyabama.ac.in

School of Science and Humanities Department of Computer Science

1.1.3 Courses having focus on Employability / Entrepreneurship / Skill Development

Programme:

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Employability			
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 Employabil

 Entrepreneurs

 Skill

Entrepreneurship			
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6	SBSB1603	BLOCKCHAIN TECHNOLOGY	25
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Skill Development			
1	SBSB1101	PROBLEM SOLVING TECHNIQUE IN C	3
2	SBSB1102	FUNDAMENTALS OF COMPUTER TECHNOLOGY	5
3	SBSB1303	OPERATING SYSTEMS	12
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SBSB1101	PROBLEM SOLVING TECHNIQUES WITH C	L	T	P	EL	Credits	Total Marks
		3	0	0	0	3	100

COURSE OBJECTIVES

- To learn the fundamental of PST and methodologies which are essential to building good C program.
- To demonstrate a thorough understanding of modular programming by designing programs which require the use of programmer - defined functions.
- To demonstrate Structures, pointers and file processing in C

UNIT1 INTRODUCTION TO COMPUTER PROBLEM SOLVING

9Hrs.

Algorithms - Building blocks of algorithms (statements, control flow, functions)-Notation (pseudo code, flow chart) - Algorithmic problem solving for socio economic conditions in global perspectives- Simple strategies for developing algorithms (iteration, recursion)- Efficiency of algorithms.

UNIT2 BASICS OF C PROGRAMMING

9Hrs.

Introduction to C: Features of C - Structure of C Program-Data Types- 'C' Tokens-Input/output statements-Control Statement, Functions: - Types of Functions -Recursion. Algorithms: Reversing the digits of a number - Generation of Fibonacci sequence- FactorialComputation.

UNIT3 ARRAYS AND STRINGS

9Hrs.

Arrays: Single and Multidimensional Arrays-- Array as Function Arguments, Strings: Declaring and Initializing String Variables, Reading Strings from Terminal, Writing Strings to Screen, Arithmetic Operations on Characters, String-handlingFunctions, ExamplePrograms(withandwithoutusingbuilt-in string functions).

UNIT4 STRUCTURES

9Hrs.

Structure: Nested Structures - Array of Structures - Structure as Function Argument-Function that Returns Structure, Union. Algorithms: Sum of array elements- Removal of duplicates from an array- Finding the Kth smallest element.

UNIT5 POINTERS AND FILE PROCESSING

9Hrs.

Pointers: Introduction, Arrays Using Pointers - Structures Using Pointers - Functions Using Pointer, DynamicMemoryAllocation,StorageClasses,FileHandlingin 'C'. Algorithms: Swap elements using Call by Reference - Sorting Arrays using pointers- Finding sum of array elements using Dynamic Memory Allocation.

Max.45Hrs.

COURSE OUTCOMES

On completion of the course, student will be able to

CO1-Develop solutions for the given problem.

CO2-Understand and design solutions for a problem

CO3-Able to understand variables, tokens and keywords in C

CO4-Design and Implement applications using memory allocation, arrays and string

CO5-Understand and design program using structures and unions

CO6-Demonstrate file processing functions in C

TEXT/REFERENCEBOOKS

1. Dromey.R.G, "HowtoSolveitbyComputer", Prentice-HallofIndia, 8thIndianReprint, 2008.
2. Aho.A.V., Hopcroft.J.E and Ullman.J.D, "The Design and Analysis of Computer Algorithms", Pearson education, 2004. Deitel and Deitel, C how to Program, 7th Eition, Pearson Education, 2013.
3. Brian W.Kernighan and Dennis M.Ritchie, The C Programming Language, Pearson Education, 2015.
4. Yashavant Kanetkar, Understanding Pointers in C, 4th Revised& Updated Edition, Bbp Publications, 2008.

END SEMESTER EXAM QUESTION PAPER PATTERN

Max.Marks:100

Exam Duration:3Hrs.

PART A :10 Questions of 2 marks each uniformly distributed - No choice

20Marks

PARTB:2 Questions from each unit of internal choice, each carrying 16marks

80Marks

SBSB1102	FUNDAMENTALS OF COMPUTER TECHNOLOGY	L	T	P	EL	Credits	Total Marks
		3	0	0	0	3	100

COURSE OBJECTIVES

- To understand the basic of computer and working with OS.
- To learn about internet, its types and its applications.
- To understand basics of communication and networks.

UNIT1 INTRODUCTION TO COMPUTERS

9Hrs.

Definition-Characteristics of a computer-Classification of Computers- Basic Anatomy of the Computer- Applications/Uses of Computers in different fields.

UNIT2 INPUT AND OUTPUT DEVICES

9Hrs.

Input devices-Output devices-Data Representation-Programming Languages/Computer Languages-Software: System software-Application software.

UNIT3 DATA COMMUNICATION AND COMPUTER NETWORKS

9Hrs.

Data Communication-Computer Network-The Uses of a Network-Types of Networks-Network Topologies-Transmission Media: Guided Transmission Media- Wireless Transmission.

UNIT4 INTERNET AND ITS APPLICATIONS

9Hrs.

History of Internet- Uses of Internet- Advantages of Internet - ISP - Internet Services - IP Address - Web Browser - URL - DNS - Internet Explorer - Types of Internet Connections - E-mail - Search Engine.

UNIT5 OPERATING SYSTEM

9Hrs.

Evolution of Operating Systems-Function of Operating System-Classification of Operating system-Example of Operating System- DOS- Windows-UNIX- Linux.

COURSE OUTCOMES

On completion of the course, student will be able to

- CO1-Converse in basic computer terminology
- CO2-Apply algorithmic reasoning to a variety of computational problems
- CO3-Solve basic computation problems
- CO4-Formulate opinions about the impact of computers in society
- CO5-Possess the knowledge of basic hardware peripherals
- CO6-Describe the use of internet and its applications

TEXT/REFERENCE BOOKS

1. Alex Leon and Methews Leon "Fundamentals of information Technology" Vikas Publishing House Pvt.Ltd.
2. Introduction to Information Technology, P.Rizwan Ahmed, Second Edition, Margham Publications, 2016.
3. Introduction to Information Technology, Pelin Aksoy, Leura De Nardis, Cengage Learning India Pvt.Ltd.

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Max.Marks:100

Exam Duration:3Hrs.

PART A :10 Questions of 2 marks each uniformly distributed - No choice

20Marks

PART B:2 Questions from each unit of internal choice, each carrying 16marks

80Marks

SBSB1201	DATABASE MANAGEMENT SYSTEM	L	T	P	EL	C	Total Marks
		3	0	0	0	3	100

COURSE OBJECTIVES

- To gain knowledge in fundamentals of data models using ER diagram.
- To make a study of SQL and relational database design.
- To understand about Query processing, optimization, and Concurrency control technique

UNIT1

9Hrs.

Basic Concepts: Database and Database users- Database system concepts and architecture- Data modeling using Entity Relationship model- Enhanced entity relationship and object modeling- Record storage and file organizations - Index Structures for files

UNIT2

9Hrs.

Relational Model, Languages and Systems: The Relational Data Model, Relational Constraints, and the relational Algebra - SQL - The Relational Database Standard - ER and EER to Relational Mapping and Other Relational Languages - Examples of Relational Database Management Systems: Oracle and Microsoft Access.

UNIT3

9Hrs.

Database Design, Theory and Methodology: Functional dependencies and normalization for relational database - Relational database design algorithms and further dependencies - Practical database design and tuning.

UNIT4

9Hrs.

System Implementation Techniques: Database system architectures and the system catalog- Query processing and optimization.

UNIT5

9Hrs.

Transaction processing concepts - Concurrency control techniques- Database recovery techniques- Database security and Authorization. Introduction to Emerging Database Technologies and Application

Max.45Hrs.

COURSE OUTCOMES

On completion of the course, student will be able to

CO1-Design ER- model store presents implement database application scenarios

CO2-Ability to understand and design data modelling using Entity-Relationship model

CO3-Implement SQL to abroad range of query and data update problems

CO4-Articulate socio-economic applications of distributed databases and use database recovery mechanisms

CO5-Familiarize with data warehousing and datamining applications

CO6-Apply Normalization techniques to normalize and improve the data base design

TEXT/REFERENCE BOOKS

1. Elmasri&Navathe,FundamentalsofDatabaseSystems,6thEdition,AddisonWesley,2010
2. Korth,Silberschatz&Sudarshan,DatabaseSystemConcepts,5thEdition,TataMcGrawHill, 2010.
3. RaghuRamakrishnan&Johannesgerhrke,DataBaseManagementSystems,3rdEdition,Tata Mc Graw Hill, 2002.
4. AbrahamSilberschatz, Henry.F.KorthandS.Sudharshan,“DatabaseSystemConcepts”,4th Edition, 2002.
5. JiaweiHanandMichelineKamber,“DataMiningConceptsandTechniques”,3rdEdition,Elsevier, 2012
6. JanL.Harrington,“Objectorienteddatabasedesign”,HarcourtIndiaprivatelimited2000.
7. http://nptel.iitm.ac.in/courses/IIT-MADRAS/Intro_to_Database_Systems_Design/index.php

END SEMESTER EXAM QUESTION PAPER PATTERN

Max.Marks:100

Exam Duration:3Hrs.

PART A :10 Questions of 2 marks each uniformly distributed - No choice

20Marks

PARTB:2 Questions from each unit of internal choice, each carrying 16marks

80Marks

SBSB1202	DIGITAL COMPUTER FUNDAMENTALS	L	T	P	EL	Credits	Total Marks
		3	0	0	0	3	100

COURSE OBJECTIVES

- To Understand the concept of digital systems
- To operate on various number systems and Simplify Boolean functions.
- To Design counters and understand the working of arithmetic logic and control unit

UNIT1

9Hrs.

Number systems - Conversion from one number system to another - compliments - Binary codes - Binary logic - Logic gates - Truth tables.

UNIT2

9Hrs.

Boolean Algebra - Axioms - Truth table simplification of Boolean function - Canonical and Standard forms: Sum of product, Product of Sum, Minterm-Canonical Sum of product Expression: Maxterm - Canonical Sum of product Expression: -Map method (up to 4 Variables).

UNIT3

9Hrs.

Combinational logic - Adders - Subtractors - Decoders - Encoders - Multiplexer - Demultiplexer -- Memory Unit ROM and RAM: SRAM and DRAM.

UNIT4

9Hrs.

Sequential Logic - RS, JK, D and T Flip flops - Registers -Shift Registers - Counters - Ripple Counters - Synchronous Counter - Design of Counters.

UNIT5

9Hrs.

Application of Digital Circuit: Mobile phones, Calculator, Digital Computer, Smart Card, Radio and Sensors- DigitalDesign of ALU - Design of Status Register- Design of accumulator

Max.45Hrs.

COURSE OUTCOMES

- CO1-To Understand the concept to digital systems
CO2-To operate on various number systems and Simplify Boolean functions.
CO3-To Distinguish logical and combinational circuits
CO4-To Design counters and understand the working of counters
CO5-To Design arithmetic logic and control unit
CO6-To evaluate the combinational circuits

TEXT/REFERENCE BOOKS

1. M.MorrisMano, "ComputerSystemArchitecture", PearsonEducation, 2008.
2. CarterNicholas, "ComputerArchitecture", SchaunoutlineSevies, TataMcGraw-Hill, 2008.
3. J.P.Hayes, "ComputerArchitecture&Organization", TataMcGrawHill
4. Leach.D.P&Malvino.A.P, (2002), "DigitalPrinciplesand Applications", FifthEdition, TMH.(UNIT I, II, III)
5. MorisMano.M, (2001), "DigitalLogicandComputerDesign", FourthEdition,
6. AnanthiShashasaayee, Sheshasaayee.J.G, (2003), "DigitalLogicFundamentals", FirstEdition, Margham Publications

END SEMESTER EXAM QUESTION PAPER PATTERN

Max.Marks:100

ExamDuration:3Hrs.

PART A :10 Questions of 2 marks each uniformly distributed - No choice

20Marks

PARTB:2 Questions from each unit of internal choice, each carrying16marks

80Mark

SBSB1301	ADVANCED JAVA PROGRAMMING	L	T	P	EL	Credits	Total Marks
		3	0	0	0	3	100

COURSE OBJECTIVES

- Develop server side programs in the form of servlets and JSP
- To know about Enterprise architecture models
- To introduce the basics of session tracking

UNIT1

9Hrs.

Introduction-Procedure vs.object-oriented programming- Concepts:Classes and Objects-Operator&FunctionOverloading-Inheritance-Polymorphism and Virtual Functions-Class Fundamentals-Declaring Objects-Methods-Constructors-Garbage Collection.Inheritance-Basics-Using Super - Method Overriding -Abstract Classes - Using final with inheritance. String Handling - String class - String buffer class.

UNIT2

9Hrs.

Introduction to Packages - User Defined Packages - Importing packages - Access protection - Interfaces- Exception Handling -Exception Types - Using try, catch, throw, throws and finally - Multithreading - Java Thread Model - Main thread - Creating multiple thread - Thread priorities - Synchronization.

UNIT3

9Hrs.

IO Package - Introduction- Input Stream and Output Stream classes- Data Output Stream and Data Input Stream classes -File Input Stream - File Output Stream. - Reader and Writer Classes - File Reader and File WriterJ2EEPlatform- - RMI Architecture- Overview of JNDI Java Database Connectivity -Introduction - Driver Types- Establishing a connection - Creating and Executing SQL Statement - Prepared Statement -The Result Set Object.

UNIT4

9Hrs.

Servlets: Servlets- Background- Life Cycle of a Servlet- HTTP protocol-Generic and Http Servlet-Handling HTTP Requests and Responses- Handling form data with get and post request.- App-Demonstrating Session-cookies- A simple Shopping cart using Sessions-Servlet Context Interface-ServletContextLifecycle-EventHandling-ServletCollaboration-ServletChaining-RequestDispatching.

UNIT5

9Hrs.

Java Server Pages - JSP Technologies - Difference between Servlets and JSP- JSP Directives - Scripting elements - Standard Actions - Implicit Objects -Simple Application - Introduction to Enterprise Java Beans -Session Beans-Entity Beans-Message Driven Beans.

Max.45Hrs.

COURSE OUTCOMES

On completion of the course, student will be able to

CO1- Implement Java programs with its functions and methods

CO2-Implement and develop J2EE Platform and packages **CO3-**

Outline the concept of Servlets and its lifecycle

CO4-ExtendtheServletsCollaborationandcookies

CO5-MakeuseofJSPTechnologies

CO6-TodevelopenterprisejavaapplicationstherebymeetingtheIndustrialrequirements

TEXT/REFERENCE BOOKS

1. Subrahmanyam Allamaraju, Cedric Buest, John Davies, Tyler Jewell, Rod Johnson, Andy Longshaw, Ramesh Nagappan, P.G. Sarang, Alex Toussaint, Sameer Tyagi, Gary Watson,
2. Marc Wilcox, Alan Williamson, Professional Java Server Programming J2EE", 1.3 Edition, Wrox Publications.
3. Patrick Naughton, Herbert Schildt, "The Complete Reference Java 2", Third Edition, Tata McGrawhill
4. Thomas A. Powell, Fritz Schneider, "JavaScript: The Complete Reference", Third Edition, McGraw Hill / Osborne.
5. Jayson Falkner, Kevin Jones, "Servlets and Java Server Pages, The J2EE Technology Web Tier", Pearson Education
6. James Holmes-Struts, "The complete Reference", 2nd Edition, Tata McGraw Hill, 2007.
7. Subrahmanyam Allamaraju and Cedric Buest, "Professional Java Server Programming", A press, J2EE 1.3, 2007.

END SEMESTER EXAM QUESTION PAPER PATTERN

Max.Marks:100

Exam Duration:3Hrs.

PART A :10 Questions of 2 marks each uniformly distributed - No choice

20Marks

PART B:2 Questions from each unit of internal choice, each carrying 16 marks

80Marks

SBSB1302	COMPUTER ARCHITECTURE	L	T	P	EL	Credits	Total Marks
		3	0	0	0	3	100

COURSE OBJECTIVES

- To impart knowledge on various types of Registers and Microinstructions.
- To discuss about the Data path design and Process or design in detail.
- To understand the types of memory organizations.

UNIT1

9Hrs.

Number systems - Conversion from one number system to another - Compliments - **Binary codes** - Binary logic - Binary Arithmetic - **Logic gates** - Truth tables. Boolean Algebra - Axioms - Truth table simplification of Boolean function - Map method - Mc-Clausky tabulation method.

UNIT2

9Hrs.

Combinational Logic: Adders-Half Adders-Full Adders - Subtractors-Half Subtractor-Full Subtractor - Decoders - Encoders - Multiplexer - Demultiplexer Sequential logic: RS, JK, D and T Flip flops - Registers -Shift Registers Counters -Design of Counters.

UNIT3

9Hrs.

Associative Memory - Cache Memory - Virtual Memory - Auxiliary Memory **Management Hardware. Peripheral Devices - Input-Output Interface** - Asynchronous Data Transfer: Handshaking - Serial Transfer - **Communication Interface - Modes of Transfer - Priority Interrupt - DMA -Serial Communication- Devices - Input-Output Interface - Asynchronous Data Transfer: Handshaking- Serial Transfer - Communication Interface - Modes of Transfer - Priority Interrupt - DMA -Serial Communication.**

UNIT4

9Hrs.

Introduction to microcomputers, Microprocessors and Assembly languages - **Microprocessor architecture and its operations**- 8085 MPU - 8085 instruction set and Classifications.

UNIT5

9Hrs.

Central Processing unit: General register and stack organizations, instruction formats- Addressing modes, Data transfer and manipulation - program control, RISC - Pipelining - Arithmetic and instruction, RISC pipeline - vector processing and array processors.

Max.45Hrs.

COURSE OUTCOMES

CO1-Classifythevarioustypesofregisters,microinstructionsandaddressingmodes.

CO2-Designthedatapathforprocessor

CO3-DemonstratetheusageofMemoryOrganization.

CO4-DescribeabouttheI/Odevices.

CO5-Explainthecharacteristics,structure,communication,andsynchronizationofmultiprocessor.

CO6-Statetheinterprocessorcommunicationandsynchronization.

TEXT/REFERENCE BOOKS

1. M.MorisMano,ComputersystemArchitecture.PHI(Thirddedition,1993)
2. M.M.Mano,DigitalLogicandComputerDesign,PrenticeHallofIndia,1994.
3. CarlHamacher,uonkoG.Vranesic,SafwatG.Zaky-ComputerOrganisation,McGrawhillISE 1987.
4. John,P.Hayes.,ComputerSystemarchitecture,McGrawHill,ISE,1988.
5. Hwang.K.Briggs.F.A-ComputerArchitectureandparallelProcessing,McGrawHillISE,1988.
6. T.C.Bartee,ComputerArchitectureandlogicalDesign,McGrawHill,1991

END SEMESTER EXAMQUESTION PAPER PATTERN

Max.Marks:100

Exam Duration:3Hrs.

PART A :10 Questions of 2 marks each uniformly distributed - No choice

20Marks

PARTB:2 Questions from each unit of internal choice, each carrying 16marks

80Marks

SBSB1303	OPERATING SYSTEMS	L	T	P	EL	Credits	Total Marks
		3	0	0	0	3	100

COURSE OBJECTIVES

- To learn how computers work and to learn about system design (performance vs. simplicity, HW vs. SW, etc.)
- To have an overview of different types of operating systems.
- To learn and implement the concept to process management.

UNIT1 INTRODUCTION TO OPERATING SYSTEM

9Hrs.

Introduction: Basic of Operating system -Views and Goals - Types of System- OS Structure - Components - Services - System Structure - Layered Approach - Process Management Introduction to Process - Process State- PCB- Process Scheduling - Cooperating Process - Thread- Inter process Communication.

UNIT2 OS SCHEDULING

9Hrs.

CPU Scheduling: Introduction types of CPU Schedulers- Scheduling Criteria - Scheduling Algorithms- FCFS Scheduling- SJF Scheduling- Priority Scheduling- Round Robin Scheduling- Multilevel Queue Scheduling- Data Dead lock- Basic concept of dead lock prevention - Deadlock Avoidance- Dead lock Detection and Memory.

UNIT3 MEMORY MANAGEMENT

9Hrs.

Basic Concept of Memory Address -Binding logical - Physical Address Space - Memory Allocation- Production Fragmentation and Compaction.

UNIT4 SWAPPING

9Hrs.

Using bits maps- using linked list Paging- Mapping of pages to frames- Hierarchical page tables- Segmentation Virtual Memory demand paging- Transaction look a side Buffer (TLB)- Inventor page table- Page replacement algorithms.

UNIT5 FILE MANAGEMENT

9Hrs.

File System: Basic Concepts of Files - Access Methods - Directory Structures - Protection Consistency Semantics - File System Structures - Allocation Methods - Various Disk Scheduling Algorithm. Free Space Management.

Max.45Hrs.

COURSE OUTCOMES

On completion of the course, student will be able to

- CO1-Understand the fundamental components of a computer operating system and how computing resources are managed by the operating system.
- CO2-Apply the concepts of CPU scheduling, synchronization, and deadlocks in real computing problems.
- CO3-Demonstrate the different memory and I/O management techniques used in Operating Systems.
- CO4-Have practical exposure to the concepts of semaphores and monitors for process synchronization.
- CO5-Create design and construct the following OS components: Schedulers, Memory management systems in the modern operating system.
- CO6-Underst and file system structure and implementation file system such asFAT.

TEXT/REFERENCE BOOK

1. SilberschatzP.B.Galvin,Gange.,OperatingSystemConcepts,6th Edition., Addison-Wesley Publishing Co., 2002.
2. WilliamStallings,OperatingSystems,FourthEdition,PHI.
3. AndrewSTanenbaum,OperatingSystems:DesignandImplementation,ThirdEdition,

END SEMESTER EXAMQUESTION PAPER PATTERN

Max.Marks:100

Exam Duration:3Hrs.

PART A :10 Questions of 2 marks each uniformly distributed - No choice

20M

arks PARTB:2 Questions from each unit of internal choice, each carrying16marks

SBSB1305	FOUNDATION OF AI	L	T	P	EL	Credits	Total Marks
		3	0	0	0	3	100

COURSE OBJECTIVES

- To understand the various characteristics of intelligent agents
- To learn the different search strategies in AI.
- To understand the knowledge in solving AI problems.

UNIT1

9Hrs.

Introduction - Foundations of AI - History of AI - Intelligent agent - Types of agents - Structure - Problem solving agents - Uninformed search strategies - Breadth first search - Uniform cost search - Depth first search - Depth limited search - Bidirectional search - Searching with partial Information.

UNIT2

9Hrs.

Informed search - Strategies - A* Heuristic function - Hill Climbing - Simulated Annealing - Constraint Specification problem Local Search in continuous space - Genetic algorithm - Optimal decisions in games-Pruning-Imperfect decisions -Alpha-Beta pruning-Gamesthatincludeanelementof chance.

UNIT3

9Hrs.

Knowledge based agent - The Wumpus world environment - Propositional logic - Inference rules - First-order logic - Syntax and semantics - Situation calculus - Building a knowledge base - Electronic circuit domain-Ontological Engineering-Forward and backward chaining-Resolution-Truth maintenance system-Mental Events and Mental Objects.

UNIT4

9Hrs.

Planning - Representation of planning - Partial order planning -Planning and acting in real world - Acting under uncertainty-Bayes's rules-Semantics of Belief networks-Inference in Belief networks-Making simple decisions-Making complex decisions.

UNIT5

9Hrs.

Applications-Language Models-Information Retrieval-Information Extraction-Fields of Natural Language Processing, Chatbots and its types, Artificially Intelligent Chatbots, Introduction to Chatbot Applications(Retrieval based- Conversation based)-Machine Translation - Speech Recognition - Robot-Hardware-Perception-Planning-Moving.

Max.45Hrs.

COURSE OUTCOMES

On completion of the course, student will be able to

CO1-Ability to identify, analyze these arch algorithm for the AI problems.

CO2-Represent a problem using first order logic.

CO3-Provide the knowledge based agent to solve the problem.

CO4-Understand the Informed search strategies.

CO5-Apply the bayes's rule to solve the problem for societal concern.

CO6-Design user centric applications that use AI concepts

TEXT/REFERENCEBOOKS

1. StuartJ.Russel,PeterNorvig,“ArtificialIntelligenceAModernApproach”,3rdEdition,Pearson Education, 2009.
2. ElaineRich,KevinKnight,“ArtificialIntelligence”,3rdEdition,TataMcGrawHill,2009.
3. M.TimJones,“ArtificialIntelligence:ASystemsApproach(ComputerScience)”,Jonesand BartlettPublishers, Inc., First Edition, 2008.
4. ArtificialIntelligence:FoundationsofComputationalAgents,2ndEdition,DavidL.PooleandAlan K.Mackworth,2010
5. IntroductiontoArtificialIntelligence,Ertel,Wolfgang,1stEdition,2017

ENDSEMESTEREXAMQUESTIONPAPERPATTERN

Max.Marks:100

ExamDuration:3Hrs.

PART A :10 Questions of 2 marks each uniformly distributed - No choice

20Marks

PARTB:2 Questions from each unit of internal choice, each carrying 16marks

80Marks

SBSB1401	PYTHON PROGRAMMING	L	T	P	EL	Credits	Total Marks
		2	0	0	3	3	100

COURSE OBJECTIVES

- To provide Basic knowledge of Python
- To learn how to design and program Python applications.
- To learn how to use lists, tuples, and dictionaries in Python programs

UNIT1

9Hrs.

Overview of Programming: Structure of a Python Program ,ElementsofPython.

UNIT2

9Hrs.

Introduction to Python: Python Interpreter, Using Python as calculator, Python shell, Indentation. Atoms, Identifiersandkeywords,Literals,Strings,Operators(Arithmeticoperator,Relationaloperator,Logicalor Boolean operator, Assignment, Operator, Ternary operator, Bit wise operator, Increment or Decrement operator).

UNIT3

9Hrs.

Creating Python Programs: Input and Output Statements, Control statements (Branching, Looping, Conditional Statement, exit function, Difference between break, continue and pass.), Defining Functions, default arguments, Errors and Exceptions.

UNIT4

9Hrs.

Iteration and Recursion: Conditional execution, Alternative execution, Nested conditionals, The return statement, Recursion, Stack diagrams for recursive functions, Multiple assignment, The while statement, Tables, Two-dimensional tables.

UNIT5

9Hrs.

Strings and Lists: String as a compound data type, Length, Traversal and the for loop, String slices, String comparison, A find function, Loopingand counting, List values, accessingelements, List length, List membership, Lists and for loops, List operations, List deletion. Cloning lists, Nested lists.

Max.45Hrs.

COURSE OUTCOMES

On completion of the course, student will be able to

CO1-To provide Basic knowledge of Python

CO2-To learn how to design and program Python applications.

CO3-To learn how to use lists, tuples, and dictionaries in Python programs

CO4-To learn syntax of Python language

CO5-To create dynamic applications in Python

CO6-To implement object-oriented concepts using Python

TEXT/REFERENCE BOOKS

1. Allen Downey, Jeffrey Elkner, Chris Meyers. How to think like a computer scientist learning with Python / 1st Edition, 2012
2. Kenneth A. Lambert, The Fundamentals of Python: First Programs, 2011, Cengage Learning, ISBN: 9781111822705

END SEMESTER EXAM QUESTION PAPER PATTERN

Max.Marks:100

Exam Duration:3Hrs.

PART A :10 Questions of 2 marks each uniformly distributed - No choice

20Marks

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80Marks

SBSB1402	FOG AND CLOUD COMPUTING	L	T	P	EL	C	Total Marks
		3	0	0	0	3	100

COURSE OBJECTIVES

- To understand the basic concepts of cloud computing and cloud enables.
- To understand cloud services and multi-tenancy computing.
- To study about various models of cloud environments and virtualization.

UNIT1 INTRODUCTION OF CLOUD COMPUTING

9Hrs.

Basic Concepts and Cloud Computing - Cloud Computing Architectural Framework - Types of Clouds - pros and cons of cloud computing - Cloud Characteristics - difference between web 2.0 and cloud - key challenges in cloud computing - Major Cloud players - Virtualization in Cloud Computing - Parallelization in Cloud Computing

UNIT2 CLOUD SERVICE MODELS

9Hrs.

Service Models - Software as a Service (SaaS) - Infrastructure as a Service (IaaS) - Platform as a Service (PaaS) - pros and cons of Cloud Service Models Web services - Service Oriented Architecture (SoA) - Elastic Computing - On Demand Computing - Service Management in Cloud Computing - Characteristics of Cloud Service Management - Multitenancy computing, architecture - Benefit and Drawbacks of Multitenancy - Multitenant Cloud architecture.

UNIT3 CLOUD DEPLOYMENT MODELS AND VIRTUALIZATION

9Hrs.

Deployment models: Public cloud - Private Cloud - Hybrid cloud - Community cloud - Cloud Deployment of application on the cloud - Need for virtualization - Types of Virtualizations - Pros and cons of Virtualization - VMware - Process VM - Virtual Machine Monitor - Properties - Hypervisor - Xen Hypervisor, HyperV - VirtualBox, Eucalyptus.

UNIT4 UNDERSTANDING FOG COMPUTING

9Hrs.

Fog Computing: The Next Evolution of Cloud Computing - Cloud computing vs Fog Computing - Goal Of Fog Computing - Pros and Cons of Fog computing - Fog computing vs. edge computing - Fog computing and the Internet of Things -, Connecting IoT to cloud, Cloud Storage for IoT- Data management and analysis in Fog Computing.

UNIT5 FOG COMPUTING ARCHITECTURE & APPLICATIONS

9Hrs.

From Cloud to Fog - Fog Computing architecture - fog networks Fog Computing in the IoT Environment: Principles, Features, and Models - Role of Cloud Computing in IoT - Applications of fog computing - Security and privacy in Fog.

Max. 45Hrs.

COURSE OUTCOMES

On completion of the course, student will be able to

CO1- Analyze the Cloud computing setup with its vulnerabilities and applications using different architectures.

CO2- Implement and install the cloud tools to make enable the cloud computing infrastructures.

CO3- Apply and design suitable Virtualization concept, and Cloud deployment Model. **CO4-**

Construct combinatorial auctions for cloud resources and services as commercial. **CO5-**

Assess cloud, Fog Network and cloud to Fog with IoT.

CO6- Ability to understand fog computing architecture, Security, and privacy

TEXT/REFERENCEBOOKS

1. Cloudcomputingconcepts,technologyand Architecture-ThomasErl, ZaighamMahmood, Ricardo Puttini , Pearson , 2017.
2. InstantGuidetoCloudComputing,AnandNayar(Ed),Ashokkumar,sudeepTanwar,BPB,2019.
3. Cloudcomputingapradicalapproach-AnthonyT.Velte,TobyJ.VelteRobertElsenpeterTATAMcGraw - Hill, New Delhi - 2010.
4. CloudComputing:Web-BasedApplicationsThatChangetheWayYouWorkandCollaborate Online - Michael Miller - Que 2008.
5. Fog ComputingConcepts, Frameworks andTechnologies,Mahmood,Zaigham (Ed.),Springer,2018.
6. <https://internetofthingsagenda.techtarget.com/definition/fog-computing-fogging>

ENDSEMESTEREXAMQUESTIONPAPERPATTERN

Max.Marks:100

ExamDuration:3Hrs.

PART A :10 Questions of 2 marks each uniformly distributed - No choice

20Marks

PARTB:2 Questions from each unit of internal choice, each carrying 16marks

80Marks

SBSB1405	INTRODUCTION TO ROBOTICS	L	T	P	EL	Credits	Total Marks
		3	0	0	0	3	100

COURSE OBJECTIVES

- To develop the student knowledge in various aspects of robotic system.
- To develop student skills in perform kinematics analysis of robot systems.
- To develop student skills in selecting various sensors associated with the robotic operations.

UNIT1

9Hrs.

Types and components of a robot, Classification of robots, closed-loop and open-loop control systems. Kinematics systems; Definition of mechanisms and manipulators, Social issues and safety.

UNIT2

9Hrs.

Kinematic Modelling: Translation and Rotation Representation, Coordinate transformation, DH parameters, Jacobian, Singularity, and Statics Dynamic Modelling: Equations of motion: Euler-Lagrange formulation

UNIT3

9Hrs.

Sensor: Contact and Proximity, Position, Velocity, Force, Tactile etc. Introduction to Cameras, Camera calibration, Geometry of Image formation, Euclidean/Similarity/Affine/Projective transformations.

UNIT4

9Hrs.

Basics of control: Transfer functions, Control laws: P, PD, PID Non-linear and advanced controls

UNIT5

9Hrs.

Actuators: Electric, Hydraulic and Pneumatic; Transmission: Gears, Timing Belts and Bearings, Parameters for selection of actuators. Control Hardware and Interfacing: Embedded systems: Architecture - Robotic applications.

Max. 45Hrs.

COURSE OUTCOMES

On completion of the course, student will be able to

CO1-Perform kinematic and dynamic analyses with simulation.

CO2-Design control laws for a robot.

CO3-Integrate mechanical and electrical hardware for all prototype of robotic device.

CO4-Select a robotic system for given application.

CO5-Simulate Real time Robot for Industrial applications.

CO6-Create and AI based Robot for any real time applications.

TEXT/REFERENCE BOOKS

1. Saha, S.K., "Introduction to Robotics, 2nd Edition, McGraw-Hill Higher Education, New Delhi, 2014.
2. Ghosal, A., "Robotics", Oxford, New Delhi, 2006.

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks: 100

Exam Duration: 3Hrs.

PART A : 10 Questions of 2 marks each uniformly distributed - No choice

20 Marks

PART B: 2 Questions from each unit of internal choice, each carrying 16 marks

80 Marks

SBSBLH51	FULL STACK WEB DEVELOPMENT	L	T	P	EL	Credits	Total Marks
		2	0	4	0	4	100

COURSE OBJECTIVES

- To provide knowledge of languages, frameworks, and tools to create interactive and engaging websites
- To provide basic design principles to present ideas, information, products, and services on websites
- To induce basic programming principles to the construction of websites

UNIT1

9Hrs.

Introduction to Dynamic Web Content-Three-tier architecture-architecture for client-server applications- Introduction to HTML5-Elements, Tags and Attributes- Formatting Tags - Styles - List, Table, Phrase- Embedding Audio and Video - Block elements and Layouts- Forms -The HTML5 Canvas.

Practice:

1. Write an HTML document with an example of Ordered List and Unordered List.
2. Write an HTML document with an example of Table format to print your Bio-Data.

UNIT2

9Hrs.

Introductions to CSS-Box Model and Text properties- Font and Display Properties- Float and Overflow- Link - List - Table- Forms- Web Layout- Accessing CSS from JavaScript- Expressions and Control Flow in JavaScript-JavaScript Functions, Objects, and Arrays- Event and Event Listeners - Closure- Classes - Fetch API.

Practice:

1. Create a login form with verification and validations
2. Create a simple web page with website visitor counter

UNIT3

9Hrs.

Introduction to PHP -Expressions and Control Flow in PHP. -PHP Functions and Objects-PHP Arrays- GET, POST variables- Embedding PHP-PHP and MySQL

Practice:

1. Write a PHP script to:-
2. a) transform a string all uppercase letters
b) transform a string all lowercase letters.
3. Write a PHP script to remove comma(s) from the following numeric string
4. Write a PHP script to remove part of a string

UNIT4

9Hrs.

Introduction to AngularJS -AngularJS-Overview-Environment Setup-MVC Architecture-Directives- Expressions- Controllers - Filters - Tables- Animations

Practice:

1. Create a weather application
2. Create a sound note application

UNIT5

9Hrs.

HTML DOM -Modules-Forms - Includes - AJAX - Views -Scopes -Services-Dependency Injection -Custom Directives - Fetching Data from a PHP Server Running MySQL

1. Create a program using PHP and MySQL
 - a. Student Information System
 - b. Payroll System
 - c. Inventory Management System

COURSE OUTCOME

On the completion of the course, students will be able to

CO1-Understand and develop HTML applications

CO2-Design and style webpage using CSS

CO3-Designwebpagetoperformformvalidationusingclient-sidescriptinglanguage

CO4-ImplementnewtechnologiessuchasAngularJS

CO5-Developwebapplicationsusingserver-side scripting language..

CO6-Understandthedifferencesbetweenusabilityanduserexperience.

SBSB1502	FUNDAMENTALS OF MICROPROCESSOR	L	T	P	EL	Credits	Total Marks
		3	0	0	0	3	100

COURSE OBJECTIVES

- The prime objective of this course is to introduce to the students the fundamentals of Microprocessor Microcontroller and Arduino.
- The students will be equipped with the basic knowledge of microprocessor, microcontroller, and Arduino
- The students will have the knowledge of interfacing microprocessor, microcontroller, Arduino and their applications.

UNIT1 INTRODUCTION TO INTEL 8085

9Hrs.

Evolution of Microprocessor-Architecture of 8085-Instruction format-Addressing modes-Basic timing diagram of opcode fetch, memory read, memory write I/O read and I/O write- Interrupts of 8085-Software interrupts, Hardware interrupts, Priorities of interrupts 8085 based system design.

UNIT2 INTEL 8085 INTERFACING

9Hrs.

Interfacing devices-8255 Programmable Peripheral Interface-Architecture & various modes of operation- 8251 USART Architecture and programming features-8237, interfacing with ADC and DAC, LCD, keyboard Interface. Application: Stepper Motor Control, Temperature Control.

UNIT3 INTRODUCTION TO 8051

9Hrs.

Introduction to 8-bit Microcontrollers - 8051/8051, Microcontroller Architecture - Internal RAM & Internal ROM, Instruction set, Addressing Modes, Simple programs.

UNIT4 INTERNAL PERIPHERALS OF 8051

9Hrs.

Modes of Timer/Counter operation - Serial Port operation & Modes - Interrupt Structure of 8051 - Memory Interfacing with 8051- I/O ports- Input and output devices interfacing with 8051.

UNIT5 ARDUINO UNO

9Hrs.

Arduino - Architecture, Pin diagram, Programming Structure, Simple program to blink LED, Subroutine, 16x2 LED display, interfacing with Arduino: LCD, Temperature Sensor, Humidity Sensor and ultrasonic sensor.

Max.45Hrs.

COURSE OUTCOMES

On completion of the course, student will be able to

CO1-Understanding architectural principle of 8085 & 8051.

CO2-Interpret the various peripheral devices with 8085 & 8051 microprocessor

CO3-Design and implement programs on 8051 microprocessors.

CO4-Examine various I/O devices with 8051 microcontrollers

CO5-Apply Arduino code and how to interface various sensors with the Arduino Board.

CO6-Implement the interface circuit with various sensor and I/O devices with microprocessor and microcontroller and Arduino Board.

TEXT/REFERENCE BOOKS

1. Ramesh S Gaonkar, Microprocessor Architecture, Programming, and application with 8085, 4th Edition, Penram International Publishing, New Delhi, 2000.
2. Kenneth J. Ayala, 8051 Microcontroller, Thomson, 2005.
3. Charles M. Gilmore, Microprocessor Principle and Application, McGraw Hill Publication, 1995.
4. Nagor Kani A., Microprocessor & Microcontroller, Tata McGraw Hill, 3rd Edition, 2012.
5. Ram B., Fundamentals of Microprocessors and Microcomputers, Dhanpat Rai Publications, 2001.
6. Michael McRoberts, beginning Arduino, 2nd Edition, 2013.

END SEMESTER EXAM QUESTION PAPER PATTERN

Max.Marks:100

Exam Duration:3Hrs.

PART A :10 Questions of 2 marks each uniformly distributed - No choice

20Marks

PART B:2 Questions from each unit of internal choice, each carrying 16marks

80Marks

SBSB1503	HUMAN COMPUTER INTERACTION	L	T	P	EL	Credits	Total Marks
		3	0	0	0	3	100

COURSE OBJECTIVES

- To learn the foundations of Human Computer Interaction.
- To become familiar with the design technologies for individuals and persons with disabilities.
- To be aware of mobile HCI.

UNIT1

9Hrs.

The Components of Human: Human Memory-Thinking-Emotion-Individual Preferences-Psychology and Design of Interactive Systems. The Computer: Text Entry Devices-Pointing Devices- Display Devices - Devices for Virtual Reality and 3D interaction - Physical Controls, Sensors and Special Devices-Memory-Processing and Networks.

UNIT2

9Hrs.

HCI in the software process: Interactive Design: Basics - process-scenarios-navigation-screen design - Iteration and prototyping. HCI in software process: Software life cycle - usability engineering - Prototyping in practice - design rationale. Design Rules: Introduction - Principles to support usability - Standards-Guidelines-Golden rules and heuristics-HCI patterns.

UNIT3

9Hrs.

Models and Theories HCI Models: Cognitive models: Socio-Organizational issues and stakeholder requirements-Communication and collaboration models-Face-to-face communication-conversation- text based - group working; Task analysis - difference between other techniques - task decomposition - Knowledge based analysis - ER based techniques- uses.

UNIT4

9Hrs.

Implementation support: Windowing system elements-using toolkits-user interface management; Evaluation techniques- goals - expert analysis - choosing a method; universal design principles - multimodal interaction; user support - requirements - Approaches - adaptive help systems - designing user support systems.

UNIT5

9Hrs.

Web Interface Design: Designing Web Interfaces - Drag and Drop, Direct Selection, Contextual Tools, Overlays, Inlays and Virtual Pages, Process Flow-Case Studies

Max.45Hrs.

COURSE OUTCOMES

On completion of the course, student will be able to

CO1-Design effective dialog for HCI

CO2-Design effective HCI for individuals and persons with disabilities.

CO3-Assess the importance of user feedback.

CO4-Explain the HCI implications for designing multimedia/e-commerce/e-learning Websites.

CO5-Develop meaningful user interface.

CO6-Analyze and identify user models and the appropriate tools.

TEXT/REFERENCE BOOKS

1. Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale, Human Computer Interaction, 3rd Edition, Pearson Education, 2004 (Unit I, II and III).
2. Human Computer Interaction, Springer publications, 2018.
3. Brian Fling, Mobile Design and Development, First Edition, O'Reilly Media Inc., 2009 (Unit-IV)
4. Bill Scott and Theresa Neil, Designing Web Interfaces, First Edition, O'Reilly, 2009. (Unit-V)

END SEMESTER EXAM QUESTION PAPER PATTERN

Max.Marks:100

Exam Duration:3Hrs.

PART A : 10 Questions of 2 marks each uniformly distributed - No choice

20Marks

PART B: 2 Questions from each unit of internal choice, each carrying 16 marks

80Marks

SBSB1504	COMPUTER COMMUNICATION	L	T	P	EL	Credits	Total Marks
		3	0	0	0	3	100

COURSE OBJECTIVES

- To understand the basics of communication
- To impart knowledge on basics of analog and digital communication.
- To analyze the data communication models and understand how to employ.

UNIT1

9Hrs.

Introduction to Communication systems -basic model, point to point, broadcast communication; modulation need for modulation, types of modulation, Baseband and Passband transmission; Demodulation (detection) - Coherent and Noncoherent detection; Noise - types of noise; Analog to Digital Conversion (ADC) process - Sampling, Quantization and Coding; Sampling theorem, types of sampling - ideal, natural and flat-top sampling; Nyquist rate, Signal reconstruction, types of quantization, Quantization noise, Aliasing.

UNIT2

9Hrs.

Amplitude modulation- types of amplitude modulation- Standard AM with Full Carrier, Comparison of different amplitude modulations; Angle modulation (FM and PM), FM generation using PM, PM generation using FM, Comparison of Narrowband and Wideband FM, Comparison of AM, FM and PM. Analog pulse modulation - PAM, PWM, PPM; Digital pulse modulation- Pulse Code Modulation (PCM), Delta modulation (DM), Adaptive Delta modulation (ADM), Multiplexing - Frequency Division Multiplexing (FDM), Time Division Multiplexing.

UNIT3

9Hrs.

Introduction to computer communication: Transmission modes- Switching: circuit switching and packet switching, OSI model, Layers in OSI model, TCP/IP protocol suite. Physical Layer: Guided and unguided transmission media (Co-axial cable, UTP, STP, Fiber optic cable), Data Link Layer: Framing, Flow control (stop and wait, sliding window flow control), Error control, HDLC, Media access control: Ethernet (802.3), CSMA/CD, Logical link control, Wireless LAN (802.11), CSMA/CA.

UNIT4

9Hrs.

Network Layer Logical addressing: IPv4 & IPv6, Subnetting, DHCP, Virtual LAN, Networking devices (Hubs, Bridges & Switches), Network topologies. Routing: Routing and Forwarding, Static routing and Dynamic routing, Routing Algorithms: Distance vector routing algorithm, Link state routing (Dijkstra's algorithm), Routing Protocols: Routing Information protocol (RIP), Open Shortest Path First (OSPF), Border Gateway Protocol (BGP), MPLS.

UNIT5

9Hrs.

Transport Layer-UDP, TCP, Congestion Control & Quality of Service - Data traffic, Congestion, Congestion Control, QoS and Flow Characteristics, Application Layer- DNS, Remote Logging (Telnet), SMTP, FTP, WWW, HTTP, POP3, MIME, SNMP.

Max. 45Hrs

COURSE OUTCOMES

On completion of the course, student will be able to

- CO1- Describe the essential basics of communication
- CO2- Classify different types of analog and digital modulation schemes
- CO3- Comprehend the need of data communication models
- CO4- Identify the required network layer components and functions
- CO5- Analyze the various protocols required in various layers
- CO6- Acquire the needs for building a communication model

TEXT/REFERENCEBOOKS

1. William Stallings, Data and Computer Communications, 10th Edition, Pearson, 2014.
2. Wayne Thomas, "Advanced Electronic Communication Systems", 6th Edition, PHI Publishers, 2003.
3. Simon Haykins, "Communication Systems" John Wiley, 5th Edition, March 2009.
4. John G. Proakis, Masoud Salehi, "Digital Communication", McGraw Hill 5th edition November 6, 2007.
5. Behrouz A. Forouzan, "Data communication and Networking", Fourth Edition, Tata McGraw- Hill, 2011.
6. Andrew S. Tanenbaum, "Computer Networks", 5th Edition, Pearson, 2011.

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks: 100

Exam Duration: 3 Hrs.

PART A : 10 Questions of 2 marks each uniformly distributed - No choice

20 Marks

PART B : 2 Questions from each unit of internal choice, each carrying 16 marks

80 Marks

SBSB1603	BLOCK CHAIN TECHNOLOGY	L	T	P	EL	Credits	Total Marks
		3	0	0	0	3	100

COURSE OBJECTIVES

- To introduce Bitcoin and other cryptocurrencies.
- To study the algorithms and techniques in blockchain.
- To understand the practical aspects in the design of cryptocurrency.

UNIT1

9Hrs.

Basics of blockchain-Public Ledgers-Block Chains as Public Ledgers-Types of Blockchains-Pillars of Block chain- Government Initiatives of BlockChain- **Bitcoin - Smart Contracts**.

UNIT2

9Hrs.

Block in a Block chain-find Transactions-Distributed Consensus-Proof of work, Stake, **Space-Attacks on POW-Ethereum Pos/POW Hybrids-Crypto currency to block chain 2.0, Model of Blockchain-Algorand**.

UNIT3

9Hrs.

Hash Function and Merkle Tree-Security Properties-Security Considerations for block chain-Digital Signature-Public Key Cryptography-Bitcoin blockchain incentive structures-Nash Equilibriums-evolutionary stable strategies, **-and Pareto efficiency (game theory)** Weaknesses and new Point of Failure- Mitigation Methods-Redundancies and fallback methods.

UNIT4

9Hrs.

Mining-Pools-Impact of CPU and GPU- **Transaction in Bitcoin Network**-Block Mining-Block propagation and block relay.

UNIT5

9Hrs.

Industry applications of Blockchain-Blockchain in Government-Government use cases- **Preventing Cybercrime through blockchain-Block Chain in defense, tax payments**.

Max.45Hrs.

COURSE OUTCOMES

On completion of the course, student will be able to

- CO1**-Explain the structure of a block chain.
- CO2**-Analyze the incentive structure in a block chain-based system.
- CO3**-Judge the scenario where "smart" contract is most appropriate.
- CO4**-Identify Basic knowledge of Bitcoin, Ethereum.
- CO5**-Apply Blockchain in future use cases for security.
- CO6**-Understand the various BlockChain applications.

TEXT/REFERENCE BOOKS

1. Mastering Bitcoin: Unlocking Digital Cryptocurrencies, by Andreas Antonopoulos O'Reilly, Second Edition, 2018.
2. Blockchain by Melanie Swa, O'Reilly Media 2015.
3. Zero to Blockchain-An IBM Redbook course, by Bob Dill, David Smits.

END SEMESTER EXAM QUESTION PAPER PATTERN

Max.Marks:100

Exam Duration:3Hrs.

PART A :10 Questions of 2 marks each uniformly distributed - No choice

20Marks

PART B:2 Questions from each unit of internal choice, each carrying 16 marks

80Marks

SBSB1602	SOCIETY 5.0	L	T	P	EL	Credits	Total Marks
		3	0	0	0	3	100

COURSE OBJECTIVE

- To understand the society 5.0, Cyberspace And Physical Space to solve
- To Provide knowledge and overview about Bigdata, IoT and Artificial Intelligence for Society 5.0.
- To discuss about Challenges and Technologies towards Society 5.0, Security of Cyber Physical Systems

UNIT1 INTRODUCTION OF SOCIETY 5.0

9Hrs.

Introduction -Schema of society 5.0-**Characteristics of Society 5.0**. Introduction to communication technologies: **Artificial Intelligence robotics - 3D Printing. People: Centric Society -Knowledge Sharing-Physical space-Cyberspace** - Humanity VS Society 5.0 - Elements of Society 5.0-Data Driven to Society- Modeling real world Issues.

UNIT2 EMERGING TECHNOLOGIES WITH SOCIETY 5.0

9Hrs.

Introduction to Big Data - Issues and Challenges in the traditional systems-**Intelligent Data Analysis -Big Data Storage Statistical Concepts**. Sampling Distributions -Re-Sampling-Prediction Error - Random Sampling- Artificial Intelligence - - Foundations of AI - Intelligent agent - Types of agents - Structure - Problem solving agents - **Internet of Things- Introduction to IoT-Basic Architecture of an IoT, From M2M to IoT, M2M towards IoT-Robotics- Robotics system components - Robot classification Coordinate frames - degree of freedom - dynamic stabilization of robots.**

UNIT3 INTRODUCTION TO INDUSTRY 4.0

9Hrs.

Introduction-Globalization and Emerging Issues, LEAN Production Systems, Smart and Connected Business Perspective, **Cyber Physical Systems and Next Generation Sensors**, Augmented Reality and Virtual Reality, Artificial Intelligence, Big Data and Advanced Analysis- An emerging industrial structure for IoT -Cyber security in Industry 4.0- Basics of Industrial IoT. Common Issues in Industry 4.0 and Society 5.0.

UNIT4 CHALLENGES AND TECHNOLOGIES TOWARDS SOCIETY 5.0

9Hrs.

Overcome with **Economic Development and Solution to Social Problems in Society 5.0- Security of Cyber Physical Systems** -Embedded and CPS security - attacks and countermeasures, authentication, identification, confidentiality, data integrity, authorization, access control, malware attacks and countermeasures, security protocols-Social Issues in Society 5.0-human-centered society (Society 5.0)- Sustainable Development Goals-Economic Advancement- Resolution to Social Problems..

UNIT5 INNOVATION WITH FUTURE TRENDS WITH APPLICATIONS

9Hrs.

Mobility-Health Care-Agriculture-Food Products-Disaster Prevention.

Max.45Hrs.

COURSE OUTCOMES

On completion of the course, student will be able to

C01- Able to understand the Social Problems By A System That Highly Integrates Cyberspace and Physical Space to solve

C02- Ability to get skills For Economic Development And A Human-Centered Society That Balances Economic Advancement

C03- Achieve A High Degree Of Convergence Between Cyberspace (Virtual Space) And Physical Space (Real Space)

C04- Able to Use Of Emerging Technologies With Society 5.0 To Achieve The More Production / Avoid Loss Of Productions

C05- Able Internet and IoT, Big data for production line to be adaptive, intelligent, and flexible enough to meet the updated requests.

C06- Design and apply in Health Care, Agriculture, Food Products, Disaster Prevention

TEXT/REFERENCEBOOKS

1. Society5.0A People-Centric Super-Smart Society, Hitachi-Utokyo Laboratory, Springer, 2020.
2. Society5.0 Industry of the Future Technologies Methods and Tools By Bruno Salgues, Wiley, 2018
3. Stuart J. Russel, Peter Norvig, "Artificial Intelligence A Modern Approach ", 3rd Edition, Pearson Education, 2009.
4. The Internet of Things: Applications and Protocols, Wiley publications. Author(s): Oliver Hersent, David Boswarthick, Omar Elloumi., 2012.
5. McKerrow P.J. "Introduction to Robotics", Addison Wesley, USA, 1991.

END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks: 100

Exam Duration: 3 Hrs.

PART A : 10 Questions of 2 marks each uniformly distributed - No choice

20 Marks

PART B : 2 Questions from each unit of internal choice, each carrying 16 marks

80 Marks