Department of Computer Science and Applications
Bachelor (Honours/Honours with Research) of
Physical Science - Computer Science
Duration4 Years (8 Semesters) w.e.f. Academic Session 2023-24

Semester–V Scheme C

Course Code	Course Title	Credit	L:T:P:CH	Internal Marks		External Marks		Total Marks	
				Th	Pr	Th	Pr	Min	Max
Major/Core Courses									
B23-CSE-501	Artificial Intelligence	4	3:0:1:5	20	10	50	20	40	100
B23-CSE-502	Data Structures	4	3:0:1:5	20	10	50	20	40	100
DSE-A2	**Student need to opt any one of two**								
B23-DSE-503	Back End Development	4	3:0:1:5	20	10	50	20	40	100
B23-DSE-504	Cloud Computing	4	3:0:1:5	20	10	50	20	40	100
DSE-A3	**Student need to opt any one of two**								
B23-DSE-505	Programming with Python	4	3:0:1:5	20	10	50	20	40	100
B23-DSE-506	Block Chain Technology	4	3:0:1:5	20	10	50	20	40	100
Minor/Vocational Courses									
B23-CSE-507	Data Communication and Networking	4	3:0:1:5	20	10	50	20	40	100
Multidisciplinary Courses									
Ability Enhancement Courses									
Skill Enhancement Courses									
B23- SEC- INT	Internship	4		0	50	0	50	40	100
Value Added Courses									
	Total	**24**							**600**

Semester–VI Scheme C

Course Code	Course Title	Credit	L:T:P:CH	Internal Marks		External Marks		Total Marks	
				Th	Pr	Th	Pr	Min	Max
Major/Core Courses									
B23-CSE-601	Computer Graphics	4	3:0:1:5	20	10	50	20	40	100
B23-CSE-602	Object Oriented Modeling with UML	4	3:0:1:5	20	10	50	20	40	100
DSE-A4	**Student need to opt any one of two**								
B23-DSE-603	Advanced Web Development	4	3:0:1:5	20	10	50	20	40	100
B23-DSE-604	Data Science	4	3:0:1:5	20	10	50	20	40	100
DSE-A5	**Student need to opt any one of two**								
B23-DSE-605	Machine Learning	4	3:0:1:5	20	10	50	20	40	100
B23-DSE-606	Design and Analysis of Algorithms	4	3:0:1:5	20	10	50	20	40	100
Vocational Courses									
B23-CC-M6(V)	AI in Day to Day Life	4	3:0:1:5	20	10	50	20	40	100
Skill Enhancement Course									
B23-SEC-607	Dot Net Framework and C#	2	1:0:1:3	10	5	25	10	20	50
	Total	**22**	**28**						**550**

B23-CSE –501

Artificial Intelligence

Maximum marks: 70
Time: 3 hours

External: 50
Internal: 20
Credit: 4

Course Objectives:

1. *To understand the Domain of Artificial intelligence and basics techniques used for searching*
2. *To understand different methods of knowledge representation*
3. *To understand nature and goals of Neural computing*
4. *To understand the Fuzzy Logic and Arithmetic*

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 5 parts (objective type/short-answer type questions) covering the entire syllabus and will carry 10 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 10 marks.
Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting One question from each Unit.

UNIT-I

Basics of AI: Definition of AI, History, Domains AI, AI problems & State space, Some examples problems representations like Travelling Salespersons, Syntax analysis Problem, Basic issues to solve AI problems, Underlying assumptions, AI techniques, Level of model, Criteria for success, Control strategies.
Searching Techniques: DFS, BFS, Heuristic Search Techniques: Generate & Test: Hill Climbing (simple & steepest), Best first search/A*, Problem Reduction/AO*, Constraint satisfaction, Alpha-Beta pruning.

UNIT-II

Reasoning in logic : Brief revision of propositional and predicate logic. Different characterizations of reasoning. Generalized modus ponens. Resolution.
Forward and backward chaining. Knowledge Representation, Diversity of knowledge.
Inheritance hierarchies. Semantic networks. Knowledgebase ontologies. Handling uncertainty,

UNIT-III

Nature and Goals of Neural Computing: Comparison with rule-based AI. Overview of network
architectures and learning paradigms. Binary Decision Neurons, The McCullough-Pitts model.
Single-layer perceptrons and their limitations. The Multilayer Perceptron, The sigmoid output function.Hidden units and feature detectors. Training by error backpropagation. The error surface

and local minima. Generalisation, how to avoid overtraining.

UNIT-IV

Introduction to Fuzzy Logic, Classical and Fuzzy Sets: Overview of Classical Sets, Membership Function, Fuzzy rule generation.
Operations on Fuzzy Sets: Compliment, Intersections, Unions, Combinations of Operations, Aggregation Operations.
Fuzzy Arithmetic: Fuzzy Numbers, Linguistic Variables, Arithmetic Operations on Intervals; Numbers,Lattice of Fuzzy Numbers, Fuzzy Equations.
Fuzzy Logic: Classical Logic, Multivalued Logics, Fuzzy Propositions, Fuzzy Qualifiers, Linguistic Hedges.

(PRACTICUM)

Practicum:
In practical component the teacher concerned / instructor will ensure minimum 15 programs / case studiesexecution based on HTML, CSS and Java Script during the laboratory work.

Suggested Evaluation Methods:

Internal Assessment:	**Theory**	**Practicum**	**End Term Examination:**
Class Participation	5	5	A three hour exam for both Theory and Practicum
Seminar/presentation/assignment/quiz/class test etc	5	-	
Seminar/Demonstration/Viva-voce/Lab records etc.:	-	5	
Mid-Term Exam	10	-	
Total	20	10	

Suggested Readings:

1. R. Beale, T. Jackson, " *Neural Computing-an introduction*", CRC Press, 1990.
2. Stuart Russell and Peter Norvig, "*Artificial Intelligence: A Modern Approach*", Prentice-Hall, 4th edition, 2020.
3. George J. Klir and Bo Yuan, "*Fuzzy Sets and Fuzzy Logic: Theory and Applications*" Prentice Hall, 1996.
4. M. Ganesh , "*Introduction To Fuzzy Sets And Fuzzy Logic*", PHI Learning, 2006.
5. Narayanan, A., & Kapoor, S, "*AI Snake Oil: What Artificial Intelligence Can Do, What It Can't, and How to Tell the Difference*", Princeton University Press, 2024.

B23-CSE– 502

Data and File Structures

Maximum marks: 70
Time: 3 hours

External: 50
Internal: 20
Credit: 4

Course Objectives:

1. *To Understand the concepts of data types, data structure like arrays, records, linked list, stacks, queues, trees and graphs and their memory representation and Applications*
2. *To learn various searching and sorting algorithms*
3. *Apply fundamental algorithmic problems including Tree traversal, graph traversal and their applications.*
4. *To understand the file system.*

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 5 parts (objective type/short-answer type questions) covering the entire syllabus and will carry 10 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 10 marks.
Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting One question from each Unit.

UNIT-I

Fundamentals of algorithm analysis: Big 'O' notations, Time and space complexity of algorithms, Elementary data structures and their applications
Arrays: ordered lists, representation of arrays, sparse matrices, linked lists: singly and doubly linked lists, stacks, queues, multiples stacks and queues, Applications: polynomial arithmetic, infix, postfix and prefix arithmetic expression conversion and evaluations.

UNIT-II

Lists, Stacks & Queues: Abstract Data Types, Representation & implementation of linked list, Doubly linked list, Circular linked lists, Stacks, array representation of stack. Applications of stacks. Queues, array representation of Queues, Circular queues, Deques, priority queues, Applications of Queues.

UNIT-III

Trees: Introduction to trees, binary trees, representation and traversal of trees, operations on binary trees, types of binary trees, threaded binary trees, B Trees, AVL Trees, Application of trees.
Graphs: Representation, traversal, connected components, shortest path and transitive closure, topological sort, activity network, critical path, path enumeration. Dijkstra's Algorithm, Floyd Warshall's Algorithm, Minimum Spanning Tree Definitions.

UNIT-IV

Searching & Sorting: searching techniques, Hash function, Hash table, Internal sort: Radixsort, Insertion sort, Exchange sort, Selection sort, Quicksort, Mergesort, Heaport, External sort: K-way mergesort, balanced mergesort.
Files: Files, Queries and sequential organization; Cylinder surface indexing, Hashed Indexed, Tree Indexing, Sequential file organizational, random file organization, Hashed file organization, Inverted files, cellular partitions.

(PRACTICUM)

Practicum:
In practical component the teacher concerned / instructor will ensure minimum 15 programs / case studiesexecution based on HTML, CSS and Java Script during the laboratory work.

Suggested Evaluation Methods:

Internal Assessment:	**Theory**	**Practicum**	**End Term Examination:**
Class Participation	5	5	A three hour exam for both Theory and Practicum
Seminar/presentation/assignment/quiz/class test etc	5	-	
Seminar/Demonstration/Viva-voce/Lab records etc.:	-	5	
Mid-Term Exam	10	-	
Total	20	10	

Suggested Readings:

1. Gupta S., "*Data Structures and Algorithms*", Toronto Academic Press, 2024
2. Agate J., "*Data Structures and Algorithms*", Brilliance Publications, 2024
3. E. Horowitz and S. Sahani, "*Fundamentals of Data Structures*", Galgotia Books Pvt. Ltd, 1999.
4. Mark Allen Weiss , "*Data Structures & Algorithm Analysis in C++*", Second edition, Pearson Edition. Asia,1996.
5. A.V. Aho, J.E. Hopcroft and T.D. Ullman , "*Data Structures and Algorithms*", Original edition, Addison-Wesley, 1999, Low Priced Edition.
6. John Hubbard, "*Schaum's Outline of Data Structures with C++*", McGraw-Hill Education , 2000.

B23-DSE-503
Back End Development

Maximum marks: 70
Time: 3 hours

External: 50
Internal: 20
Credit: 4

Course Objectives:

1. *To understand Client side scripting using Java Script.*
2. *To provide an overview of Data Types and operators in Java Script.*
3. *To understand Function, flow control and dialog boxes.*
4. *To know how to deal with Regular expressions.*
5. *To provide the concept of Form handling and State management using JavaScript.*

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 5 parts (objective type/short-answer type questions) covering the entire syllabus and will carry 10 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 10 marks.
Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting One question from each Unit.

UNIT-I

Introduction and overview of Java Script: Common uses of JavaScript, Overview of JavaScript Core Language Features, input and output in JavaScript.
Data Types and variables: Numbers, Strings, Booleans, Null, Objects, Arrays, type conversion, identifiers, variable declaration, implicit variable declaration, variable scope, constants.
JavaScript Operators: assignment, arithmetic, bitwise, increment/decrement, comparison, logical, ? and comma operator, typeof, Object operators, operator precedence and associativity.

UNIT–II

JavaScript Flow Control statements: if statements, switch, for loops, while loops, do-while loops, break, continue, label, return.
JavaScript Functions: Parameter passing basics, return statements, parameter passing: In and Out, Global and Local variable scope, recursive functions.
Dialog boxes: Alert dialog box, prompt dialog box, confirm dialog box

UNIT-III

Objects in JavaScript: Object creation, object destruction and garbage collection, common properties and methods, Array object, Date object, Math object, Number object, Boolean object and String object.
Regular Expressions: The need for Regular expressions, Creating Patterns, RegExp object, test( ), compile(), exec( ), RegExp Properties, String methods for Regular expressions: search(), split(), replace() , match( )
JavaScript Object Models:Object Model overview, The initial JavaScript Object Model, Accessing Document Elements by Position and by Name, Event handling, DOM Event Model. Window object.

UNIT- IV

Form Handling: The need for Form checking, Accessing Forms and Fields, Form Fields: Common input element properties, Text fields, Text Area, Buttons, Checkboxes and Radio Buttons, Select Menus, Hidden Fields, Form Validation.
State Management: Using Cookies in JavaScript for User state management, storing cookies, reading cookies, setting cookie expiry date, deleting a cookie, Cookie Limitations

(PRACTICUM)

Practicum:
In practical component the teacher concerned / instructor will ensure minimum 15 programs / case studiesexecution based on HTML, CSS and Java Script during the laboratory work.

Suggested Evaluation Methods:

Internal Assessment:	**Theory**	**Practicum**	**End Term Examination:**
Class Participation	5	5	A three hour exam for both Theory and Practicum
Seminar/presentation/assignment/quiz/class test etc	5	-	
Seminar/Demonstration/Viva-voce/Lab records etc.:	-	5	
Mid-Term Exam	10	-	
Total	20	10	

Suggested Readings:

1. Flanagan, D., JavaScript: The Definitive Guide, O'Reilly Media.,2020
2. David Flanagan, "*JavaScript: The Definitive Guide: Activate Your Web Pages*", O' Reilly, 6th edition, 2011.
3. Thomas Powell, "*JavaScript: the Complete Reference*", McGraw Hill, 3rd edition, 2012.
4. Douglas Crockford, "JavaScript: The Good Parts", O' Reilly, 1st edition, 2008.
5. Deitel, Deitel, Goldberg, "*Internet & World Wide Web How To Program*", 4th Edition, Pearson Education, 2009.
   Robert. W. Sebesta, "*Programming the World Wide Web*", 4th Edition, Pearson Education, 2011.

B23-DSE-504
Cloud Computing

Maximum marks: 70
Time: 3 hours

External: 50
Internal: 20
Credit: 4

Course Objectives:

1. *To understand the concept of Clouding Computing.*
2. *To know about Seven Step Model of Migration into a Cloud.*
3. *To get familiar with Cloud Paradigms.*
4. *To know about Virtual Machine infrastructure and Security in Cloud.*
5. *To understand the Integration of Private and Public Cloud*

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 5 parts (objective type/short-answer type questions) covering the entire syllabus and will carry 10 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 10 marks.
Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting One question from each Unit.

UNIT-I

Introduction to Cloud, Cloud Computing Reference Model, Distributed Systems, Virtualization, Web 2.0, Service Oriented Computing, Utility Oriented Computing, Parallel vs Distributed Computing.
Virtualization : Characteristics of Virtualiization Environment, Taxonomy of Virtualization Techniques, Pros and Cons of Virtualization.
Cloud Reference Model : Architecture, SAAS, PAAS, IAAS.

UNIT-II

Types of Cloud : Public, Private, Hybrid, Community.
Economics of Cloud.
Concurrent Computing : Programming Applications with Threads, Multithreading, Domain Decomposition, Functional Decomposition.
Task Computing : Characterizing a Task, Computing Categories, Framework for Task Computing.
Task Based Application Models : Embarrassingly Parallel Applications, Parameter Sweep Applications, MPI Applications, Workflow Applications with Task Dependency.

UNIT-III

Data Intensive Computing : Characterizing Data Intensive Computing, Challenges Ahead, Historical Prespectives, Storage System, Programming Platforms, Map Reduce Programming.
Cloud Platforms in Industry : Case Study of Amazon Web Services, Google App Engine, Microsoft Azure.

UNIT-IV

Scientific Applications of Cloud : Healthcare, Protein Structure Prediction, Gene Expression Data Analysis, Satellite Image Processing.
Business and Consumer Applications of Cloud : CRM, ERP, Productivity, Social Networking, Media Applications, Multiplayer Online Gaming.
Energy Efficient and Green Cloud Computing Architecture.

Market Based Management of Cloud : Market Oriented Cloud Computing, Reference Model for Market Oriented Cloud Computing, Technologies and Initiative Supporting Market Oriented Cloud Computing, Observations.
Federal Cloud / Inter Cloud : Characterization and Definition, Cloud Federation Stack, Aspects of Interest, Technologies for Cloud Federations, Observations.
Third Party Cloud Service.

(PRACTICUM)

Practicum:
In practical component the teacher concerned / instructor will ensure minimum 15 programs / case studiesexecution based on HTML, CSS and Java Script during the laboratory work.

Suggested Evaluation Methods:

Internal Assessment:	**Theory**	**Practicum**	**End Term Examination:**
Class Participation	5	5	A three hour exam for both Theory and Practicum
Seminar/presentation/assignment/quiz/class test etc	5	-	
Seminar/Demonstration/Viva-voce/Lab records etc.:	-	5	
Mid-Term Exam	10	-	
Total	20	10	

Suggested Readings:

1. Gupta, D., "*The Cloud Computing Journey*" Packt Publishing, 2024
2. Rajkumar Buyya, Christian Vecchiola and S. ThamaraiSelvi, "*Mastering Cloud Computing*", McGraw Hill Education, 2016.
3. Lizhe Wang, Rajiv Ranjan, Jinjun Chen and BaualemBenatallah, "*CludComputing : Methodology Systems and Applications*", CRC Press, 2012.
4. Kris Jamsa, "*Cloud Computing*", Jones and Bartlett Learning, 2013.
5. NayanRuparelia, "*Cloud Computing*", MIT Press, 2015

B23-DSE-505
Programming with Python

Maximum marks: 70
Time: 3 hours

External: 50
Internal: 20
Credit: 4

Course Objectives:

1. *To understand the basics of Python programming.*
2. *To provide the detail of various components of Python.*
3. *To understand the strings and lists in Python.*
4. *To understand working of dictionaries and tuples.*
5. *To understand files in Python.*

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 5 parts (objective type/short-answer type questions) covering the entire syllabus and will carry 10 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 10 marks.
Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting One question from each Unit.

UNIT-I

Overview of Python, Comments, Reserve Keywords, Identifiers, Variables, Constants, Standard Data types, Operators, Control Statements, Iterative Statements..
Functions: Built in functions, Composition of functions, User defined Functions, Parameters, Function call, Return statement, Recursive function.

UNIT-II

Strings: Compound Data Type, Len function, Slices, Traversal, Escape Character, Formatting Operator, Formatting Functions.
Lists: Values & Accessing Elements, Traversal, Deleting Element, Built-in Operators, Built-in Methods.

UNIT-III

Tuples: Creating, Accessing Values in Tuples, Tuples Assignment, Tuples as Return Values, Variable length Argument Tuple, Basic Operations, Built-in- Tuple Function.
Dictionaries: Creating, Accessing Values, Updating Dictionary, Deleting Elements from Dictionary, Properties of Dictionary Keys, Operations in Dictionary, Built-in Dictionary Methods

UNIT-IV

Text Files and Exceptions: Text Files, Dictionaries, Exceptions, Exception with arguments, User defined exceptions.
Applications in Python: Managing Database using SQL: Database concept, Creating database & tables, Inserting data into tables, Retrieving data from table, Deleting data from table & deleting table.

(PRACTICUM)

Practicum:
In practical component the teacher concerned / instructor will ensure minimum 15 programs / case studiesexecution based on HTML, CSS and Java Script during the laboratory work.

Suggested Evaluation Methods:

Internal Assessment:	**Theory**	**Practicum**	**End Term Examination:**
Class Participation	5	5	A three hour exam for both Theory and Practicum
Seminar/presentation/assignment/quiz/class test etc	5	-	
Seminar/Demonstration/Viva-voce/Lab records etc.:	-	5	
Mid-Term Exam	10	-	
Total	20	10	

Suggested Readings:

1. E. Balagurusamy , "*Introduction to Computing and Problem Solving Using Python*", McGrawHill Education, 2017.
2. Sheetal Taneja, Naveen Kumar, "*Python Programming A Modular Approach*", Pearson, 2017.
3. Rao R. Nageswara , "*Core Python Programming*", Dream Tech, New Delhi, 2018.
4. Satyanarayana, Mani M. Radhika, Jagadesh B.N , "*Python Programming*", India University Press, 2018.
5. Cassell Laura, Gauld Alan , "*Python Projects*", Wiley Publication, New Delhi, 2014.

B23-DSE-506
Blockchain Technology

Maximum marks: 70
Time: 3 hours

External: 50
Internal: 20
Credit: 4

Course Objectives:

1. To learn elements of Blockchain technology
2. To understand Cryptocurrency-Bitcoin
3. To know the characteristics of a Smart Contract
4. To understand the Security concept of Blockchain
5. To learn Blockchain Platform using Go Language

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 5 parts (objective type/short-answer type questions) covering the entire syllabus and will carry 10 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 10 marks.
Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting One question from each Unit.

Unit – I

Fundamentals of Blockchain: introduction, Origin of Blockchain, Blockchain Solution, components of Blockchain, block in Blockchain, the Technology and the future, Blockchain Types and Consensus Mechanism: Decentralization and Distribution, types of Blockchain, consensus Protocol, Cryptocurrency-Bitcoin, Altcoin and Token: Bitcoin and the Cryptocurrency, Cryptocurrency Basics, Types of Cryptocurrency, Usage, Public Blockchain System: Public Blockchain, Popular Public Blockchains, The Bitcoin Blockchain, Ethereum Blockchain.

Unit – II

Smart Contracts: Introduction, Characteristics of a Smart Contract, Types of Oracles, Smart contracts in Ethereum, Smart Contracts in Industry,
Private Blockchain System: Key Characteristics of private Blockchain, Smart Contracts in Private Environment,
Consortium Blockchain: Introduction, Key characteristics of Consortium Blockchain, need of Consortium Blockchain,
Hyperledger platform

Unit – III

Security in Blockchain: Introduction , Securities Aspects in Bitcoin, Security and Privacy Challenges of Blockchain in General, Performance and Scalability, Identity Management and Authentication, Regulatory Compliance and Assurance ,Safeguarding Blockchain Smart Contract (DApp), Security Aspects in Hyperledger Fabric,
Applications of Blockchain: Blockchain in Banking and Finance, Blockchain in Education, Blockchain in Healthcare, Blockchain in Supply Chain, Blockchain and IoT,
Limitations and challenges of Blockchain.

Unit – IV

Blockchain Platform using Go Language: Introduction, learn to execute GoLang Program in Atom, Basic Programming, Packages, Creating Simple Blockchain using GoLang ,Creating Simple Blockchain with Proof of Work using GoLang, Connecting to Ethereum using GoLang,

(PRACTICUM)

Practicum:
In practical component the teacher concerned / instructor will ensure minimum 15 programs / case studiesexecution based on HTML, CSS and Java Script during the laboratory work.

Suggested Evaluation Methods:

Internal Assessment:	**Theory**	**Practicum**	**End Term Examination:**
Class Participation	5	5	A three hour exam for both Theory and Practicum
Seminar/presentation/assignment/quiz/class test etc	5	-	
Seminar/Demonstration/Viva-voce/Lab records etc.:	-	5	
Mid-Term Exam	10	-	
Total	20	10	

Suggested Readings:

1. Imran Bashir, *Mastering Blockchain*, 2nd Edition, Packt Publishing, 2018.
2. Alan Wright, *Blockchain*, House of Books, 2021.
3. Daniel Dresher, Blockchain Basics, Apress, 2017
4. Roger Wattenhofer, *The Science of Blockchain*, Inverted Forest Publishing; 1st edition, 2016
5. Malanie Swan, *Blockchain: Blueprint for a New Economy*, O' Reilly, 2015
6. Jon Bodner, *Learning Go: An Idiomatic Approach to Real-World Go Programming*, O'Reilly, 2021
7. Alan A. A. Donovan and Brian W. Kernighan, *The Go Programming Language*, Addison-Wesley Professional; 1st edition,2015

B23-CSE-507
Data Communication and Networking

Maximum marks: 70
Time: 3 hours

External: 50
Internal: 20
Credit: 4

Course Objectives:

1. ***To understand the Computer Networks and various types.***
2. ***To provide an overview OSI and TCP/IP Models.***
3. ***To understand the Communication model and Switching.***
4. ***To provide an overview of Data Link Layer and Wireless LAN protocol.***
5. ***To understand the concept of Network layer, Routing and Scheduling.***

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 5 parts (objective type/short-answer type questions) covering the entire syllabus and will carry 10 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 10 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting One question from each Unit.

UNIT-I

Introduction to Computer Networks and its uses, Network categorization and Hardware: Broadcast and point-to-point networks, Local Area Networks (LAN), Metropolitan Area Networks (MAN), Wide Area Networks (WAN), Internetworks, Topologies, Wireless networks, Network Software: Protocols, Services, network architecture, design issues, OSI Reference model, TCP/IP Reference model, Comparison of OSI and TCP/IP Models. Introduction to Example Networks: Internet, Connection-Oriented Networks – X.25, Frame Relay, ATM.

UNIT-II

Data Communication Model, Digital and Analog data and signals, bit rate, baud, bandwidth, Nyquist bit rate, Guided Transmission Media – Twisted Pair, Coaxial cable, Optical fiber; wireless transmission – Radio waves, microwaves, infrared waves; Satellite communication. Switching: Circuit Switching, Packet Switching; Multiplexing: Frequency Division Multiplexing Time Division Multiplexing, Synchronous and Asynchronous TDM, Modems, Transmission Impairments, Manchester and Differential Manchester encoding, ADSL Versus Cable.

UNIT-III

Data Link Layer Design issues: Framing, error control, Flow Control, Error Detection and correction; Elementary Data Link Protocols, Sliding Window Protocols; Medium Access Control: Aloha, CSMA protocols, Collision free protocols, Limited Contention Protocols; Wavelength division Multiple access protocol, Wireless LAN Protocol: MACA; IEEE 802.3 Ethernet, IEEE 802.4 Token Bus; IEEE 802.5 Token ring, Binary Exponential Backoff algorithm, Digital Cellular, Radio: Global System for Mobile Communication (GSM), Code Division Multiple Access(CDMA), Fiber Distributed Data Interface, Distributed Queue Dual Bus (DQDB).

UNIT-IV

Network Layer, Design issues , Virtual Circuit and Datagram Subnet, Routing Algorithms, Optimality principle, Shortest path Routing, Flooding , Distance Vector Routing, Link State Routing, Hierarchical Routing, Broadcast and Multi Cast Routing, Routing for Mobile hosts, Routing in Adhoc Networks,, congestion Control Algorithms, General Principals Traffic Shaping, Leaky bucket token bucket, choke packets, Load Shedding.

(PRACTICUM)

Practicum:

In practical component the teacher concerned / instructor will ensure minimum 15 programs / case studiesexecution based on HTML, CSS and Java Script during the laboratory work.

Suggested Evaluation Methods:

Internal Assessment:	**Theory**	**Practicum**	**End Term Examination:**
Class Participation	5	5	A three hour exam for both Theory and Practicum
Seminar/presentation/assignment/quiz/class test etc	5	-	
Seminar/Demonstration/Viva-voce/Lab records etc.:	-	5	
Mid-Term Exam	10	-	
Total	20	10	

Suggested Readings:

1. Singh, B., " *Data Communication and Networking: Understanding Network Architecture, Design, and Management* ", BPB Publication, 1st Edition, 2024
2. Andrew S. Tanenbaum, "*Computer Networks*", Pearson, 6th Edition, 2021
3. Behrouz A Forouzan, "*Introduction to Data communications and Networking*", Tata Mc-Graw Hill, 4th Edition., 2013
4. Prakash C. Gupta, *"Data Communications and Computer Networks", PHI, 2006.*

B23- CSE – 601

Computer Graphics

Maximum marks: 70
Time: 3 hours

External: 50
Internal: 20
Credit: 4

Course Objectives:

1. *To understand techniques of computer graphics.*
2. *To provide an overview of working principles of graphic devices.*
3. *To provide the working scanning algorithms.*
4. *To understand the applications of computer graphics.*
5. *To provide detail of hidden surface removal techniques.*

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 5 parts (objective type/short-answer type questions) covering the entire syllabus and will carry 10 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 10 marks.
Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting One question from each Unit.

UNIT – I

Computer Graphics: Introduction, applications, Interactive computer graphics, Passive computer graphics.
Devices: Flat panel displays, Three dimensional viewing devices, Stereoscopic and virtual reality system, Joystick, Data glove, Digitizer, Image scanner, Touch panel, Light pen, Voice system.
Graphics Software: Co-ordinate representation, Graphics functions, Software standards, PHIGS workstation.
Drawing Geometry: Point, Line, DDA line drawing algorithm, Bresenham's line drawing algorithm, Properties of circle, Mid point circle drawing algorithm, Pixel addressing & Object geometry.

UNIT – II

Filled area primitive: Scan line polygon fill algorithm, Inside-Outside test, Boundary fill algorithm, Flood fill algorithm.
2-D Transformations: Translation, Rotation, Scaling, Shearing, Reflection Matrix representation & Homogenous coordinate, Composite transformation, General pivot point rotation, General fixed point scaling.

UNIT – III

2-D Viewing: View coordinate reference frame, window to viewport coordinate transformation, two dimensional viewing function, line clipping, Cohen-Sutherland line clipping algorithm, Midpoint Line Clipping Algorithm.
3-D Transformation : Translation, Rotation, Scaling, Matrix representation & Homogenous coordinate, Composite transformation, General pivot point rotation, General fixed point scaling. Parallel and Perspective Projection.

UNIT – IV

CRT & Interactive Input: Interactive Picture construction techniques, Basic positioning method, Constraints, Grids, Gravity Fields, Rubber band method, Dragging, Painting and Drawing, Virtual

reality environment.
Visible Surface Detection: Classification of visible surface detection algorithm, Depth buffer method, A-Buffer method, Scan line method, Depth sorting method.

Suggested Evaluation Methods:

Internal Assessment:	**Theory**	**Practicum**	**End Term Examination:**
Class Participation	5	5	A three hour exam for both Theory and Practicum
Seminar/presentation/assignment/quiz/class test etc	5	-	
Seminar/Demonstration/Viva-voce/Lab records etc.:	-	5	
Mid-Term Exam	10	-	
Total	20	10	

Suggested Readings:

1. Donald Hearn, M. Pauline Baker , *"Computer Graphics C Version"*, Pearson, 2nd Edition.
2. Newman and Sproull, *"Principal of Interactive Computer Graphics"*, Tata Mc Graw Hill,2nd Edition.
3. P.K. Bhatia, "*Computer Graphics*", I.K. Interanational Publisher, 3rd Edition.
4. Zhigang Xiang, *"Computer Graphics"*, Tata Mc Graw Hill, 2006.
   Foley James, *"Computer Graphics Principles and Practice"*, Pearson Education, 3rd Edition.

B23- CSE – 602

Object Oriented Modeling with UML

Maximum marks: 70
Time: 3 hours

External: 50
Internal: 20
Credit: 4

Course Objectives:

1. *To understand the basics of modeling and its components.*
2. *To provide the detail of state model and it's working.*
3. *To understand the steps followed for system design.*
4. *To understand various interaction models with reference to UML design.*

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 5 parts (objective type/short-answer type questions) covering the entire syllabus and will carry 10 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 10 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting One question from each Unit.

UNIT-I

Introduction: Object-Orientation, Object Oriented Methodology, Modeling,
Class Modeling: Object, Class, Value & Attributes, Operation & Method, Link & Association, Association Classes, Qualified association, Multiplicity, Association end name, Ordering, Bag &Sequences, Generalization & Inheritance, Uses of Generalization.

UNIT-II

Advance Class Modeling: Advanced Object & Class Concepts, N-Array association, Aggregation, Abstract Class, Multiple Inheritance, Metadata.
State Modeling: Events, States, Transition & Conditions, State Diagram, State Diagram Behavior.
Advanced State Modeling: Nested State Diagram, Nested States, Signal Generalization, Concurrency.

UNIT-III

System Design: Overview, Estimating Performance, Making a reuse plan, Breaking a system into subsystems, Identifying Concurrency, Allocation of subsystem, Management of data storage, Handling global resources, Choosing a software control strategy, Handling boundary conditions, Setting trade-off priorities.

UNIT-IV

Interaction Modeling:
Use Case Models: Actors, Use case, Use case diagram, Guidelines for use case diagram.
Sequence Model: Scenarios, Sequence Diagrams, Guidelines for Sequence model.
Activity Model: Activities, Branches, Initiation & Termination, Concurrent Activities, Executable Activity Diagram, Guidelines for Activity diagram.
Case Study: Working of ATM with reference to implementation of basic structure, advanced structure, and functionality.

Suggested Evaluation Methods:

Internal Assessment:	Theory	Practicum	End Term Examination:
Class Participation	5	5	A three hour exam for both Theory and Practicum
Seminar/presentation/assignment/quiz/class test etc	5	-	
Seminar/Demonstration/Viva-voce/Lab records etc.:	-	5	
Mid-Term Exam	10	-	
Total	20	10	

Suggested Readings:

1. Michael Blaha, James Rumbaugh, *"Object Oriented Modeling and Design with UML"*, Pearson Education, 2011.
2. Michael R Blaha, James R Rumbaugh, *"Object Oriented Modeling and Design with UML, UML2"*, Pearson, 2007.
3. Daminni Grover, *"Object Oriented Analysis and Design with UML"*, I. K International Publishing House, 1st edition, 2012.
4. Martin Fowler, *"UML Distilled"*, Pearson Education Inc., 2018.
5. Mike O'Docherty, *"Object Oriented Analysis And Design Understanding System Development with UML 2.0"*, Wiley Dreamtech, 2005.

B23-DSE–603

Advanced Web Development

Maximum marks: 70
Time: 3 hours

External: 50
Internal: 20
Credit: 4

Course Objectives:

1. *To provide the understanding of core features and applications of Angular JS.*
2. *To give an idea of Directives and built-in Filters.*
3. *To understand modules, scopes and Services of Angular JS.*
4. *To provide an overview of Node.JS modules and Node Package Manager.*
5. *To understand the concept of Event handling and database connectivity in Node.js*

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 5 parts (objective type/short-answer type questions) covering the entire syllabus and will carry 10 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 10 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting One question from each Unit.

UNIT-I

AngularJS - Overview: Need of Angular JS, Applications of Angular JS, Core features, MVC Architecture
Directives: ng-app, ng-init, ng-model, ng-bind, ng-repeat, Directive Lifecycle, Binding Controls to Data, Matching Directives, Angular Expressions
Built in Filters, Using Angular JS Filters. Role of Controller, Controllers and Modules, Nested Controllers, Using Filters in Controllers

UNIT-II

Introduction to Angular JS Modules, Working with Angular forms, Model Binding Forms, Updating Models with a twist.
Scope, Scope Lifecycle, Scope Inheritance, Scope and Controllers, Rootscope, Scope Broadcasting.
Dependency Injection, Creating Services, Factory Service and Provider.

UNIT-III

Introduction to Node.gs, REPL Terminal, Node.js Modules, Module Types, Core Modules, Local Modules, Module Experts
Node Packet Manager (NMP), Installing Packages Locally, Adding dependency in Packages, Installing Packages Globally, Updating packages. Creating Web Server, Handling http requests, sending requests.
Buffers, Streams, Files, reading, writing, updating files, synchronous and asynchronous.

UNIT-IV

Events in Node JS, significance of the events, writing own events, Event Emitter class, inhering events.
Express framework to create web applications: Configuring Routes, Working with Express. How to serve Static HTML pages to the browser, and serving other file formats and restricting certain files.
Database Connectivity: MySQL Database, Creating Connection, Creating database and tables, Insert, Select, Delete , Update records.

Suggested Evaluation Methods:

Internal Assessment:	**Theory**	**Practicum**	**End Term Examination:**
Class Participation	5	5	A three hour exam for both Theory and Practicum
Seminar/presentation/assignment/quiz/class test etc	5	-	
Seminar/Demonstration/Viva-voce/Lab records etc.:	-	5	
Mid-Term Exam	10	-	
Total	20	10	

Suggested Readings:

1. Ruebbelke L., "*Angular JS in Action*", Manning Publications, 2015.
2. Sandro Pasquali, Kevin Faaborg, "*Mastering Node.js*", Packt Publishing Limited, 2017
3. Dhruti Shah,"*Node .Js*", BPB Publications, 1st edition, 2018.
4. Seshadri S., Green B., "*Angular JS Up and Running*", O'Reilly, 2014.
5. Jim R. Wilson, "*Node.js the Right Way*", O'Reilly, 2013.
6. Alex Young, Bradley Meck, Mike Cantelon, Tim Oxley, Marc Harter, T.J. Holowaychuk, Nathan Rajlich , "*Node.js in Action*", Dreamtech Press; 2nd edition, 2017.

B23- DSE – 604

Data Science

Maximum marks: 70
Time: 3 hours

External: 50
Internal: 20
Credit: 4

Course Objectives:

1. To understand and formulate data driven questions.
2. Clean and preprocess data efficiently.
3. Conduct exploratory analysis and statistical inference.
4. Visualize findings effectively.

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 5 parts (objective type/short-answer type questions) covering the entire syllabus and will carry 10 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 10 marks.
Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting One question from each Unit.

Unit – I

Data acquisition, cleaning, and aggregation, Exploratory data analysis and visualization, Feature engineering, Model creation and validation
Numerical Data, Summary Statistics, From Population to Sampled Data, Different Types of Biases, Random Number Genertion and their applications.

Unit – II

Probability, Expectation and Probability Distribution.
Introduction to Statistical Inference., Association and Dependence, Association and Causation, Conditional Probability and Bayes Rule, Simpsons Paradox, Confounding, Introduction to Linear Regression, Special Regression Models

Unit – III

Bayesian inference: combining models and data in a forecasting problem, Bayesian hierarchical modeling for studying public opinion, Bayesian modeling for Big Data
Goals of statistical graphics and data visualization, Graphs of Data, Graphs of Fitted Models, Graphs to Check Fitted Models, What makes a good graph?, Principles of graphics

Unit – IV

Introduction, Classification, Linear Classification, Ensemble Classifiers, Model Selection, Cross Validation, Holdout, Probabilistic modelling, Topic modelling, Probabilistic Inference, Application: prediction of preterm birth, Data description and preparation, Relationship between machine learning and statistics

Suggested Evaluation Methods:

Internal Assessment:	**Theory**	**Practicum**	**End Term Examination:**
Class Participation	5	5	A three hour exam for both Theory and Practicum
Seminar/presentation/assignment/quiz/class test etc	5	-	
Seminar/Demonstration/Viva-voce/Lab records etc.:	-	5	
Mid-Term Exam	10	-	
Total	20	10	

Reference Books:

1. Jain V K, "*Data Science and Analytics*", Khanna Book Publishing House, 2021.
2. Bruce P. & Bruce A., "*Practical Statistics for Data Scientists*", O'Reilly, 2017
3. Tamhane, C.Ajit & Dorothy D, *"Statistics and Data Analysis: From Elementary to Intermediate", PHI, 1999*
4. Dirk P. Kroese *"Data Science and Machine Learning", CRC, 2019*

B23- DSE – 605

Machine Learning

Maximum marks: 70
Time: 3 hours

External: 50
Internal: 20
Credit: 4

Course Objectives:

1. To learn the concept and importance of Machine Learning.
2. To develop a solid understanding of core algorithms and models used in Machine Learning, their selection and evaluation.
3. To learn strengths and weaknesses of various Software Engineering Techniques used in industrial applications.

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 5 parts (objective type/short-answer type questions) covering the entire syllabus and will carry 10 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 10 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting One question from each Unit.

Unit – I

What Is Machine Learning?, How Do We Define Learning?, How Do We Evaluate Our Networks?, How Do We Learn Our Network?, What are datasets and how to handle them?, Feature sets, Dataset division: test, train and validation sets, cross validation.
Applications of Machine Learning, processes involved in Machine Learning

Unit – II

Introduction to Machine Learning Techniques: Supervised Learning, Unsupervised Learning and Reinforcement Learning, Real life examples of Machine Learning.
Classification and Regression: K-Nearest Neighbor, Linear Regression, Logistic Regression, Support Vector Machine (SVM), Evaluation Measures: SSE, MME, R2, confusion matrix, precision, recall, F-Score, ROC-Curve.

Unit – III

Introduction to clustering, Types of Clustering: Hierarchical, Agglomerative Clustering and Divisive clustering; Partitional Clustering - K-means clustering.

Suggested Evaluation Methods:

Internal Assessment:	Theory	Practicum	End Term Examination:
Class Participation	5	5	A three hour exam for both Theory and Practicum
Seminar/presentation/assignment/quiz/class test etc	5	-	
Seminar/Demonstration/Viva-voce/Lab records etc.:	-	5	
Mid-Term Exam	10	-	
Total	20	10	

Unit – IV

Dimensionality reduction techniques: PCA, LDA, ICA. Introduction to Deep Learning, Gaussian Mixture Models, Natural Language Processing, Computer Vision.

Reference Books:

1) Jeeva Rose, *Introduction to Machine Learning*, Khanna Book Publishing Co., 2020
2) Chopra Rajiv, *Machine Learning*, Khanna Book Publishing Co., 2021
3) Ethem A., *Machine Learning: The New AI*, MIT Press, 2016

B23- DSE – 606

Design and Analysis of Algorithms

Maximum marks: 70
Time: 3 hours

External: 50
Internal: 20
Credit: 4

Course Objectives:

1. *To understand the concept of Algorithm Design.*
2. *To know about various Sorting techniques.*
3. *To get familiar with Dynamic Programming and Greedy algorithms.*
4. *To understand NP-complete problems and String matching.*

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 5 parts (objective type/short-answer type questions) covering the entire syllabus and will carry 10 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 10 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting One question from each Unit.

UNIT-I

Introduction: Analyzing algorithms, Designing algorithms, asymptotic notation, Standard notations and common functions, the substitution method, the recursion tree method, the master method.
Sorting: Heaps- maintaining the heap property, building a heap, The heapsort algorithm, description of quick sort, performance of quicksort, Analysis of quicksort, Lower bounds for sorting-Counting sort, Radix sort, Bucket sort.

UNIT-II

Dynamic Programming: Assembly-line scheduling, Matrix chain multiplicationelements of dynamic programming, longest common subsequence, optimal binary search trees.
Greedy algorithms: An activity selection problem, Elements of greedy strategy, Huffman codes, a task scheduling problem.

UNIT-III

Graph algorithms: Representation of graphs, Breadth first search, Depth first search, Topological sort, strongly connected components, Growing a minimum spanning treeKruskal and Prims algorithms, Single source shortest paths in directed acyclic graphs-The Bellman-Ford Algorithm, Dijkstra's Algorithm. All pairs shortest paths and matrix multiplication- The Floyd-Warshall algorithm, Johnson's algorithm for sparse matrices.

UNIT-IV

NP-completeness: Polynomial time and its verification-NP-completeness-reducibilityproofs and NP-complete problems- The vertex cover problem, The travelling salesman's problem, The set cover problem-Randomization and linear programming, The subset-sum problem. String Matching: the naïve string matching algorithm, the Rabin Karp algorithm, string matching with finite automata, the Knuth-Morris-Pratt algorithm.

Suggested Evaluation Methods:

Internal Assessment:	**Theory**	**Practicum**	**End Term Examination:**
Class Participation	5	5	A three hour exam for both Theory and Practicum
Seminar/presentation/assignment/quiz/class test etc	5	-	
Seminar/Demonstration/Viva-voce/Lab records etc.:	-	5	
Mid-Term Exam	10	-	
Total	20	10	

Suggested Readings:

1. Thomas H. Corman, Charles E. Leiserson, Ronald R. Rivest& Clifford Stein , *"Introduction to Algorithms"*, MIT Press, 3rd Edition, 2009.
2. Aho, Hopcroft and Ullman , "*The Design and Analysis of Computer Algorithms*", Pearson Education, 2nd Edition.
3. Michel T. Goodrich & Roberto Tamassia, "*Algorithm Design and Applications*", Weily, 1st Edition, 2014.

B23-CC –M6 (V)

AI in Day to Day Life

Maximum marks: 70
Time: 3 hours

External: 50
Internal: 20
Credit: 4

Course Objectives:

1. *To understand the concept of Artificial Intelligence.*
2. *To know about various applications of AI.*
3. *To get familiar with AI Applications.*
4. *To understand AI and Its Ethical Usage in Day to Day Life.*

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 5 parts (objective type/short-answer type questions) covering the entire syllabus and will carry 10 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 10 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting One question from each Unit.

UNIT-I

What is AI? Basic concepts explained simply, AI vs. Human Intelligence, AI in historical and philosophical context, AI narratives in literature, cinema, and media.

Everyday applications: social media, recommendation systems, digital assistants; AI in governance: smart cities, predictive policing, e-governance, AI in education, healthcare, media, and cultural heritage; Social acceptance and resistance to AI

UNIT-II

AI in language and translation (Google Translate, ChatGPT); AI and creative industries (art, music, film, journalism); AI and cultural preservation (digitization, archives); Changing nature of human communication with AI

Bias and discrimination in AI, Privacy, surveillance, and data ethics, Algorithmic fairness and accountability, Philosophical debates: Can machines be moral?

UNIT-III

Impact on jobs and future of work, Automation in service and knowledge industries, Inequality: AI-rich vs. AI-poor societies, Global perspectives on AI-driven development

AI in legal decision-making and judiciary, Intellectual property and AI-generated content, International policies and AI governance (EU, India, US, China), Regulation, responsibility, and accountability of AI systems

UNIT-IV

AI in elections and political campaigns (microtargeting, deepfakes), AI, propaganda, and misinformation; Surveillance states vs. digital freedoms, AI and geopolitics (global competition in AI)

Human–AI collaboration: augmentation vs. replacement, AI in addressing social challenges (climate change, health crises, education gaps), Risks of AGI (Artificial General Intelligence), Imagining futures: utopian vs. dystopian AI

Suggested Evaluation Methods:

Internal Assessment:	**Theory**	**Practicum**	**End Term Examination:**
Class Participation	5	5	A three hour exam for both Theory and Practicum
Seminar/presentation/assignment/quiz/class test etc	5	-	
Seminar/Demonstration/Viva-voce/Lab records etc.:	-	5	
Mid-Term Exam	10	-	
Total	20	10	

Reference Books:

1. Data, A. (2025). *Zenith: Mastering AI for Everyday Life and Work*. Rupa Publications.
   This is a practical guide by Indian innovator Dr. Ajay Data, showing how to apply AI tools in daily routines and work, grounded in the Indian context
2. Pandey, J. (2023). *AI Made Simple: A Beginner's Guide to Artificial Intelligence in Everyday Life*. Pothi Books.
3. Dandotiya, A. S., Gupta, S. K., Dandotiya, N., & Sharma, P. (2024). *AI in Everyday Life: Transforming Society* (1st ed.). Navi International Book Publication House.

B23- SEC – 607

DOT NET Framework and C#

Maximum marks: 35
Time: 3 hours

External: 25
Internal: 10
Credit: 2

Course Objectives:

1. *To understand .Net Framework and base classes*
2. *To know the basics of C# language.*
3. *To understand .Net Assemblies and Attribute.*
4. *To provide information about ASP.Net and ADO.Net*

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of total 5 parts (objective type/short-answer type questions) covering the entire syllabus and will carry 10 marks. In addition to the compulsory question there will be four units i.e. Unit-I to Unit-IV. Examiner will set two questions from each Unit of the syllabus and each question will carry 10 marks. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting One question from each Unit.

UNIT-I

The .Net framework: Introduction, The Origin of .Net Technology, Common Language Runtime (CLR), Common Type System (CTS), Common Language Specification (CLS), Microsoft Intermediate Language (MSIL), Just-In –Time Compilation, Framework Base Classes.

UNIT-II

C -Sharp Language (C#): Introduction, Data Types, Identifiers, Variables, Constants, Literals, Array and Strings, Object and Classes, Inheritance and Polymorphism, Operator Overloading, Interfaces, Delegates and Events. Type conversion.

UNIT-III

C# Using Libraries: Namespace- System, Input-Output, Multi-Threading, Networking and sockets, Managing Console I/O Operations, Windows Forms, Error Handling.
.Net Assemblies and Attribute: .Net Assemblies features and structure, private and share assemblies, Built-In attribute and custom attribute. Introduction about generic.

UNIT-IV

Advanced Features Using C#: Web Services, Window Services, Asp.net Web Form Controls, ADO.Net. Distributed Application in C#, Unsafe Mode, Graphical Device interface with C#.

Suggested Evaluation Methods:

Internal Assessment:	Theory	Practicum	End Term Examination:
Class Participation	5	5	A three hour exam for both Theory and Practicum
Seminar/presentation/assignment/quiz/class test etc	5	-	
Seminar/Demonstration/Viva-voce/Lab records etc.:	-	5	
Mid-Term Exam	10	-	
Total	20	10	

Suggested Readings:

1. Fergal Grimes,"*Microsoft .Net for Programmers*", Manning Publications, 2002.
2. E. Balagurusamy,"*Programming with C#*", Tata McGrawHill, 3rd Edition.
3. Karli Watson, Chrisian Nagel, Jacob Hammer Pedersen, Jon D. Reid, Morgan Skinner, Eric White,"*Beginning Visual C#*", Wrox, *2008*
4. Mark Michaelis, "*Essential C# 3.0: For .NET Framework 3.5*", Pearson Education, 2nd Edition.