C# PROGRAMMING AND .NET

Subject Code	
:	
06CS761	
IA Marks	
:	
25	
No. of Lecture Hrs./ Week	
:	
04	
Exam Hours	
:	

03

Total No. of Lecture Hrs.

:

52

Exam Marks

:

100

PART - A

UNIT - 1

THE PHILOSOPHY OF .NET: Understanding the Previous State of Affairs, The .NET Solution, The Building Block of the .NET Platform (CLR,CTS, and CLS), The Role of the .NET Base Class Libraries, What

C# Brings to the Table,

An Overview of .NET Binaries (aka

Assemblies), the Role of the Common Intermediate Language, The Role of .NET

Type Metadata, The Role of the Assembly Manifast, Compiling CIL to Platform –Specific Instructions, Understanding the Common Type System, Intrinsic

CTS Data Types, Understanding the Common Languages Specification, Understanding the Common Language Runtime A tour of the .NET Namespaces, Increasing Your Namespace Nomenclature, Deploying the .NET Runtime.

6 Hours

UNIT - 2

BUILDING C# APPLICATIONS: The Role of the Command Line Complier (csc.exe), Building C # Application using csc.exe Working with csc.exe Response Files, Generating Bug Reports , Remaining C# Compiler Options, The Command Line Debugger (cordbg.exe) Using the, Visual Studio .NET IDE, Other Key Aspects of the VS.NET IDE, C# “Preprocessor:” Directives, An Interesting Aside: The System. Environment Class.

6 Hours

UNIT - 3

C# LANGUAGE FUNDAMENTALS: The Anatomy of a Basic C# Class, Creating objects: Constructor Basics, The Composition of a C# Application, Default Assignment and Variable Scope, The C# Member Initialization Syntax, Basic Input and Output with the Console Class, Understanding Value Types and Reference Types, The Master Node: System, Object, The System Data Types (and C# Aliases), Converting Between Value Types and Reference Types: Boxing and Unboxing, Defining Program Constants, C# Iteration Constructs, C# Controls Flow Constructs, The Complete Set of C# Operators, Defining Custom Class Methods, Understating Static

Methods, Methods Parameter Modifies, Array Manipulation in C #, String Manipulation in C#, C# Enumerations, Defining Structures in C#, Defining Custom Namespaces.

8 Hours

UNIT - 4

OBJECT- ORIENTED PROGRAMMING WITH C#: Forms Defining of the C# Class, Definition the “Default Public Interface” of a Type, Recapping the Pillars of OOP, The First Pillars: C#’s Encapsulation Services, Pseudo- Encapsulation: Creating Read-Only Fields, The Second Pillar: C#’s Inheritance Supports, keeping Family Secrets: The “Protected” Keyword, Nested Type Definitions, The Third Pillar: C #’s Polymorphic Support, Casting Between.

6 Hours

PART - B

UNIT - 5

EXCEPTIONS AND OBJECT LIFETIME: Ode to Errors, Bugs, and Exceptions, The Role of .NET Exception Handing, the System. Exception Base Class, Throwing a Generic Exception, Catching Exception, CLR System – Level Exception (System. System Exception), Custom Application-Level Exception (System. System Exception), Handling Multiple Exception, The Family Block, the Last Chance Exception Dynamically Identifying Application – and System Level

Exception

Debugging System Exception Using VS. NET, Understanding Object Lifetime, the CIT of “new’, The Basics of Garbage Collection,, Finalization a Type, The Finalization Process, Building an Ad Hoc Destruction Method, Garbage Collection Optimizations, The System. GC Type.

6 Hours

UNIT - 6

INTERFACES AND COLLECTIONS: Defining Interfaces Using C# Invoking Interface Members at the object Level, Exercising the Shapes Hierarchy, Understanding Explicit Interface Implementation, Interfaces As Polymorphic Agents, Building Interface Hierarchies, Implementing, Implementation, Interfaces Using VS .NET, understanding the IConvertible Interface, Building a Custom Enumerator (IEnumerable and Enumerator), Building Cloneable objects (ICloneable), Building Comparable Objects (I Comparable), Exploring the system. Collections

Namespace, Building a Custom Container (Retrofitting the Cars Type).

6 Hours

UNIT - 7

Callback Interfaces, Delegates, and Events, Advanced Techniques: Understanding Callback Interfaces, Understanding the .NET Delegate Type, Members of System. Multicast Delegate, The Simplest Possible Delegate Example, Building More a Elaborate Delegate Example, Understanding Asynchronous Delegates, Understanding (and Using) Events. The Advances Keywords of C#, A Catalog of C# Keywords Building a Custom Indexer, A Variation of the Cars Indexer Internal Representation of Type Indexer. Using C# Indexer from VB .NET. Overloading operators, The Internal Representation of Overloading Operators, interacting with

Overload Operator from Overloaded- Operator- Challenged Languages, Creating Custom Conversion Routines, Defining Implicit Conversion Routines, The Internal Representations of Customs Conversion Routines

8 Hours

UNIT - 8

UNDERSTANDING .NET ASSEMBLES: Problems with Classic COM Binaries, An Overview of .NET Assembly, Building a Simple File Test Assembly, A C#. Client Application, A Visual Basic .NET Client Application, Cross Language Inheritance, Exploring the CarLibrary's, Manifest, Exploring the CarLibrary's Types, Building the Multifile Assembly ,Using Assembly, Understanding Private Assemblies, Probing for Private Assemblies (The Basics), Private A Assemblies XML Configurations Files, Probing for Private

Assemblies (The Details), Understanding Shared Assembly,

Understanding Shared Names, Building a Shared Assembly, Understanding Delay Signing, Installing/Removing

Shared Assembly,

Using a Shared Assembly,

6 Hours

Text Books:

1. **Pro C# with .NET 3.0** – Andrew Troelsen, Special Edition, Dream tech Press, India, 2007.

2. **Programming in C#** – E. Balagurusamy, 5th Reprint, Tata McGraw Hill, 2004. (For Programming Examples)

REFERENCE BOOKS:

1. **Inside C#** – Tom Archer, WP Publishers, 2001.

2. **C#: The Complete Reference** – Herbert Schildt, Tata McGraw Hill, 2004.

DIGITAL IMAGE PROCESSING

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PART - A

UNIT - 1

DIGITIZED IMAGE AND ITS PROPERTIES: Basic concepts, Image digitization, Digital image properties.

6 Hours

UNIT - 2

Image Preprocessing: Image pre-processing: Brightness

and geometric transformations, local preprocessing.
7 Hours

UNIT - 3

SEGMENTATION – 1: Thresholding, Edge-based segmentation.

6 Hours

UNIT - 4

SEGMENTATION – 2: Region based segmentation, Matching.

7 Hours

PART - B

UNIT - 5

IMAGE ENHANCEMENT: Image enhancement in the spatial domain: Background, Some basic gray level transformations, Histogram processing, Enhancement using arithmetic / logic operations, Basics of spatial filtering, Smoothing spatial filters, Sharpening spatial filters. Image enhancement in the frequency domain: Background, Introduction to the Fourier transform and the frequency domain, Smoothing Frequency-Domain filters, Sharpening Frequency Domain filters, Homomorphic filtering.

7 Hours

UNIT - 6

IMAGE COMPRESSION: Image compression: Fundamentals, Image compression models, Elements of information theory, Error-Free Compression, Lossy compression.

6 Hours

UNIT - 7

SHAPE REPRESENTATION: Region identification, Contour-based shape representation and description, Region based shape representation and description, Shape classes.

7 Hours

UNIT - 8

MORPHOLOGY: Basic morphological concepts, Morphology principles, Binary dilation and erosion, Gray-scale dilation and erosion, Morphological segmentation and watersheds.

6 Hours

TEXT BOOKS:

1. **Image Processing, Analysis and Machine Vision** – Milan Sonka, Vaclav Hlavac and Roger Boyle, 2nd Edition, Thomson Learning, 2001.

2. **Digital Image Processing –** Rafel C Gonzalez and Richard E Woods, 2nd Edition, Pearson Education, 2003.

REFERENCE BOOKS:

1. **Fundamentals of Digital Image Processing** – Anil K Jain, Pearson Education/Prentice-Hall of India Pvt. Ltd., 1997.

2. **Digital Image Processing and Analysis** – B.Chanda, D Dutta Majumder, Prentice-Hall India, 2002.

GAME THEORY

Subject Code	
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06CS763	□□□
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PART - A

UNIT - 1

INTRODUCTION; STRATEGIC GAMES: What is game theory? The theory of rational choice; Interacting decision makers. Strategic games; Example: The prisoner's dilemma; Nash equilibrium; Examples of Nash equilibrium; Best-response functions; Dominated actions; Equilibrium in a single population: symmetric games and symmetric equilibria.

6 Hours

UNIT - 2

MIXED STRATEGY EQUILIBRIUM: Introduction; Strategic games in which players may randomize; Mixed strategy Nash equilibrium; Dominated actions; Pure equilibria when randomization is allowed, illustration; Equilibrium in a single population, illustration; The

formation of players' beliefs; Extensions; Representing preferences by expected payoffs.

6 Hours

UNIT - 3

EXTENSIVE GAMES: Extensive games with perfect information; Strategies and outcomes; Nash equilibrium; Subgame perfect equilibrium; Finding subgame perfect equilibria of finite horizon games.

6 Hours

UNIT - 4

EXTENSIVE GAMES: EXTENSIONS, COALITIONAL GAMES AND THE CORE: Extensions: Allowing for simultaneous moves, illustration: entry in to a monopolized industry; Discussion: subgame perfect equilibrium and backward induction.Coalition games; The core; Illustration: ownership and the distribution of wealth; Other solution concepts.

8 Hours

PART - B

UNIT - 5

BAYESIAN GAMES: Motivational examples; General definitions; Two examples concerning information; Illustration: auctions; Auctions with an arbitrary distribution of valuations.

Extensive games with imperfect information; Strategies; Nash equilibrium; Beliefs and sequential equilibrium; Signaling games; Illustration: strategic information transmission.

6 Hours

UNIT - 6

STRICTLY COMPETITIVE GAMES, RATIONALIZABILITY: Strictly competitive games and maximization; Maximization and Nash equilibrium; Strictly competitive games; Maximization and Nash equilibrium in strictly competitive games. Rationalizability; Iterated elimination of strictly dominated actions; Iterated elimination of weakly dominated actions; Dominance solvability.

6 Hours

UNIT - 7

EVOLUTIONARY EQUILIBRIUM, ITERATED GAMES: Monomorphic pure strategy eulibrium; Mixed strategies and polymorphic equilibrium; Asymmetric contests; Variations on themes: Sibling behavior, Nesting behavior of wasps, the evolution of sex ratio. Repeated games: The main idea; Preferences; Repeated games; Finitely and infinitely repeated

Prisoner’s dilemma; Strategies in an infinitely repeated

Prisoner’s dilemma; Some Nash equilibria of an infinitely repeated

Prisoner’s dilemma.

7 Hours

UNIT - 8

REPEATED GAMES: GENERAL RESULTS, BARGAINING: Nash equilibria of general infinitely repeated games; Subgame perfect equilibria of general infinitely repeated games; Finitely repeated gazmes; Imperfect observability. Bargaining as an extensive game; Trade in market as an illustration; Nash's axiomatic model; Relation between strategic and axiomatic models.

7 Hours

TEXT BOOK:

1. **An Introduction to Game Theory –** Martin Osborne, Oxford University Press, Indian Edition, 2004.

REFERENCE BOOKS:

1. **Game Theory: Analysis of Conflict** – Roger B. Myerson, Harvard University Press, 1997.
2. **Microeconomic Theory** – Andreu Mas-Colell, Michael D. Whinston, and Jerry R. Green, Oxford University Press, New York, 1995.
3. **Game Theory and Strategy** – Philip D. Straffin, Jr., The Mathematical Association of America, January 1993.

ARTIFICIAL INTELLIGENCE

Subject Code	
:	
06CS764	
IA Marks	

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25

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04

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PART - A

UNIT - 1

INTRODUCTION: What is AI? Intelligent Agents: Agents and environment; Rationality; the nature of environment; the structure of agents. Problem-solving: Problem-solving agents; Example problems; Searching for solution; Uninformed search strategies.

7 Hours

UNIT - 2

INFORMED SEARCH, EXPLORATION, CONSTRAINT SATISFACTION, ADVERSIAL SEARCH: Informed search strategies; Heuristic functions; On-line search agents and unknown environment. Constraint satisfaction problems; Backtracking search for CSPs. Adversial search: Games; Optimal decisions in games; Alpha-Beta pruning.

7 Hours

UNIT - 3

LOGICAL AGENTS : Knowledge-based agents; The wumpus world as an example world; Logic; propositional logic Reasoning patterns in propositional logic; Effective propositional inference; Agents based on propositional logic.

6 Hours

UNIT - 4

FIRST-ORDER LOGIC, INFERENCE IN FIRST-ORDER LOGIC – 1:

Representation revisited; Syntax and semantics of first-order logic; Using first-order logic; Knowledge engineering in first-order logic. Propositional versus first-order inference; Unification and lifting.

6 Hours

PART - B

UNIT - 5

INFERENCE IN FIRST-ORDER LOGIC – 2: Forward chaining; Backward chaining; Resolution.

6 Hours

UNIT - 6

KNOWLEDGE REPRESENTATION: Ontological engineering; Categories and objects; Actions, situations, and events; Mental events and mental objects; The Internet shopping world; Reasoning systems for categories; Reasoning with default information; Truth maintenance systems.

7 Hours

UNIT - 7

PLANNING, UNCERTAINTY, PROBABILISTIC REASONING: Planning: The problem; Planning with state-space approach; Planning graphs; Planning with propositional logic. Uncertainty: Acting under certainty; Inference using full joint distributions; Independence; Bayes' rule and its use.

Probabilistic Reasoning: Representing knowledge in an uncertain domain; The semantics of Bayesian networks; Efficient representation of conditional distributions; Exact inference in Bayesian networks.

7 Hours

UNIT - 8

LEARNING, AI: PRESENT AND FUTURE: Learning: Forms of Learning; Inductive learning; Learning decision trees; Ensemble learning; Computational learning theory.

AI: Present and Future: Agent components; Agent architectures; Are we going in the right direction? What if AI does succeed?

6 Hours

TEXT BOOK:

1. **Artificial Intelligence: A Modern Approach** – Stuart Russel, Peter Norvig, 2nd Edition, Pearson Education, 2003.

REFERENCE BOOKS:

1. **Artificial Intelligence** - Elaine Rich, Kevin Knight, 2nd Edition, Tata McGraw Hill, 1991.
2. **Principles of Artificial Intelligence** – Nils J. Nilsson, Elsevier, 1980.

VLSI DESIGN AND ALGORITHMS

Subject Code	
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06CS765	□□ □ □ □
IA Marks	
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100

PART - A

UNIT - 1

DIGITAL SYSTEMS AND VLSI: Why Design Integrated Circuits? Integrated Circuits manufacturing; Integrated Circuit Design Technology.

6 Hours

UNIT - 2

TRANSISTORS AND LAYOUT: Fabrication Processes; Transistors; Wires and Vias; Design Rules; Layout design and Tools.

6 Hours

UNIT - 3

LOGIC GATES: Combinational logic functions; Static Complementary Gates; Alternative gate circuits; Low power gates; Delay through resistive interconnect; Delay through inductive interconnect.

7 Hours

UNIT - 4

COMBINATIONAL LOGIC NETWORKS: Standard cell-based layout; Simulation; Combinational Network delay; Logic and interconnect design; Power Optimization; Switch Logic networks; Combinational logic testing.

7 Hours

PART - B

UNIT - 5

SEQUENTIAL MACHINES: Latches and flip-flops; Sequential systems and clocking disciplines; Sequential systems design; Sequential testing.

6 Hours

UNIT - 6

FLOOR PLANNING: Floor planning methods; Off chip connections.

6 Hours

UNIT - 7

ARCHITECTURE DESIGN: Register Transfer design; High-level synthesis; Architecture for low power; Architecture testing.

6 Hours

UNIT - 8

CAD SYSTEMS AND DESIGN: CAD systems; Switch level simulation; Layout Synthesis; Layout analysis; Timing Analysis and optimization; Logic Synthesis; Test Generation; Sequential machine optimization; Scheduling and bonding; Placement algorithms; partitioning algorithm; Channel routing and global routing algorithms.

8 Hours

TEXT BOOKS:

1. **Modern VLSI Design** – Wayne Wolf, 3rd edition, Pearson Education, 2007.
2. **Algorithms for VLSI Design Automation** Sabih H Gerez, Wiley India, 2007.

FUZZY LOGIC

Subject Code	
:	
06CS766	
IA Marks	
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25	
No. of Lecture Hrs./ Week	
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04	
Exam Hours	
:	

03

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52

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100

PART - A

UNIT - 1

INTRODUCTION, CLASSICAL SETS AND FUZZY SETS: Background, Uncertainty and Imprecision, Statistics and Random Processes, Uncertainty in Information, Fuzzy Sets and Membership, Chance versus Ambiguity. Classical Sets - Operations on Classical Sets, Properties of Classical (Crisp) Sets, Mapping of Classical Sets to Functions. Fuzzy Sets - Fuzzy Set operations, Properties of Fuzzy Sets. Sets as Points in Hypercubes.

7 Hours

UNIT - 2

CLASSICAL RELATIONS AND FUZZY RELATIONS: Cartesian Product, Crisp Relations - Cardinality of Crisp Relations, Operations on Crisp Relations, Properties of Crisp Relations, Composition. Fuzzy Relations - Cardinality of Fuzzy Relations, Operations on Fuzzy Relations, Properties of Fuzzy Relations, Fuzzy Cartesian Product and Composition, Non-interactive Fuzzy Sets. Tolerance and Equivalence Relations - Crisp Equivalence Relation, Crisp Tolerance Relation, Fuzzy Tolerance and Equivalence Relations. Value Assignments - Cosine Amplitude, Max-min Method, Other Similarity methods.

6 Hours

UNIT - 3

MEMBERSHIP FUNCTIONS: Features of the Membership Function, Standard Forms and Boundaries, Fuzzification, Membership Value Assignments – Intuition, Inference, Rank

Ordering, Angular Fuzzy Sets, Neural Networks, Genetic Algorithms, Inductive Reasoning.

6 Hours

UNIT - 4

FUZZY-TO-CRISP CONVERSIONS, FUZZY ARITHMETIC: Lambda-Cuts for Fuzzy Sets, Lambda-Cuts for Fuzzy Relations, Defuzzification Methods. Extension Principle - Crisp Functions, Mapping and Relations, Functions of fuzzy Sets – Extension Principle, Fuzzy Transform (Mapping), Practical Considerations. Fuzzy Numbers Interval Analysis in Arithmetic, Approximate Methods of Extension - Vertex method, DSW Algorithm, Restricted DSW Algorithm, Comparisons. Fuzzy Vectors.

7 Hours

PART - B

UNIT - 5

CLASSICAL LOGIC AND FUZZY LOGIC: Classical Predicate Logic – Tautologies, Contradictions, Equivalence, Exclusive Or and Exclusive Nor, Logical Proofs, Deductive Inferences. Fuzzy Logic, Approximate Reasoning, Fuzzy Tautologies, Contradictions, Equivalence and Logical Proofs, Other forms of the Implication Operation, Other forms of the Composition Operation.

6 Hours

UNIT - 6

FUZZY RULE- BASED SYSTEMS: Natural Language, Linguistic Hedges, Rule-Based Systems - Canonical Rule Forms, Decomposition of Compound Rules, Likelihood and Truth Qualification, Aggregation of Fuzzy Rules. Graphical Techniques of Inference.

6 Hours

UNIT - 7

FUZZY DECISION MAKING: Fuzzy Synthetic Evaluation, Fuzzy Ordering, Preference and consensus, Multiobjective Decision Making, Fuzzy Bayesian Decision Method, Decision Making under Fuzzy States and Fuzzy Actions.

7 Hours

UNIT - 8

FUZZY CLASSIFICATION: Classification by Equivalence Relations - Crisp Relations, Fuzzy Relations. Cluster Analysis, Cluster Validity, c-Means Clustering - Hard c-Means (HCM), Fuzzy c-Means (FCM). Classification Metric, Hardening the Fuzzy c-Partition, Similarity Relations from Clustering.

7 Hours

TEXT BOOK:

1. **Fuzzy Logic with Engineering Applications –** Timothy J. Ross, McGraw- HHill, 1997.

REFERENCE BOOK:

1. **Neural Networks and Fuzzy systems: A Dynamical System Approach** – B Kosko,

Prentice Hall, 1991.