

MANONMANIAM SUNDARANAR UNIVERSITY, TIRUNELVELI-12 SYLLABUS UG - COURSES – AFFILIATED COLLEGES



Course Structure for BCA (Choice Based Credit System)

(with effect from the academic year 2023-2024 onwards)

Semester-V							
Part	Subject Status	Subject Title	Subject Code	Credit			
III	CORE	OPERATING SYSTEMS		4			
III	CORE	ASP.NET PROGRAMMING		4			
III	CORE	ASP.NET PROGRAMMING LAB		4			
III	CORE	PROJECT WITH VIVA VOCE		3			
III	ELECTIVE	SOFTWARE PROJECT MANAGEMENT/ AGILE PROJECT MANAGEMENT		3			
III	ELECTIVE	ARTIFICIAL INTELLIGENCE/ MACHINE LEARNING		3			
IV	NAAN MUDHALVAN	PROBLEM SOLVING TECHNIQUES		2			
		INTERNSHIP/ INDUSTRIAL VISIT/ FIELD VISIT/ KNOWLEDGE UPDATION ACTIVITY		2			





Total Marks: 100 Internal Exam: 25 marks + External Exam: 75 marks

A. Scheme for internal Assessment:

Maximum marks for written test: 20 marks 3 internal tests, each of I hour duration shall be conducted every semester. To the average of the best two written examinations must be added the marks scored in. The assignment for 5 marks.

The break up for internal assessment shall be: Written test- 20 marks; Assignment -5 marks Total - 25 marks

B. Scheme of External Examination

3 hrs. examination at the end of the semester

- A Part : 1 mark question two from each unit
- B Part: 5 marks question one from each unit
- C Part: 8 marks question one from each unit

> Conversion of Marks into Grade Points and Letter Grades

S.No	Marks	Letter Grade	Grade point (GP)	Performance
1	90-100	0	10	Outstanding
2	80-89	A+	9	Excellent
3	70-79	А	8	Very Good
4	60-69	B+	7	Good
5	50-59	В	6	Above Average
6	40-49	С	5	Pass
7	0-39	RA	-	Reappear
8	0	AA	-	Absent

<u>Cumulative Grade Point Average (CGPA)</u>

$$\mathsf{CGPA} = \frac{\Sigma \left(\mathsf{GP} \times \mathsf{C}\right)}{\Sigma \mathsf{C}}$$

- **GP** = Grade point, **C** = Credit
- CGPA is calculated only for Part-III courses
- CGPA for a semester is awarded on cumulative basis

> Classification

a)	First Class with Distinction	:	$CGPA \ge 7.5*$
b)	First Class	:	$CGPA \ge 6.0$
c)	Second Class	:	$CGPA \ge 5.0 \text{ and } \le 6.0$

d) Third Class : CGPA< 5.0



OPERATING SYSTEMS

Course Objectives

- Understanding the design of the Operating System
- Imparting knowledge on CPU scheduling, Process and Memory Management.
- To code specialized programs for managing overall resources and operations of the computer.
- To study about the concept of Job and Processor scheduling
- To learn about the concept of memory organization and multiprogramming

UNIT I

Introduction: operating system, history (1990s to 2000 and beyond), distributed computing, parallel computation. Process concepts: definition of process, process states-Life cycle of a process, process management- process state transitions, process control block(PCB), process operations , suspend and resume, context switching, Interrupts -Interrupt processing, interrupt classes, Inter process communication-signals, message passing.

UNIT II

Asynchronous concurrent processes: mutual exclusion- critical section, mutual exclusion primitives, implementing mutual exclusion primitives, Peterson's algorithm, software solutions to the mutual Exclusion Problem-, n-thread mutual exclusion- Lamports Bakery Algorithm. Semaphores – Mutual exclusion with Semaphores, thread synchronization with semaphores, counting semaphores, implementing semaphores. Concurrent programming: monitors, message passing

UNIT III

Deadlock and indefinite postponement: Resource concepts, four necessary conditions for deadlock, deadlock prevention, deadlock avoidance and Dijkstra''s Banker''s algorithm, deadlock detection, deadlock recovery.

UNIT IV

Job and processor scheduling: scheduling levels, scheduling objectives, scheduling criteria, preemptive vs non-preemptive scheduling, interval timer or interrupting clock, priorities, scheduling algorithms- FIFO scheduling, RR scheduling, quantum size, SJF scheduling, SRT scheduling, HRN scheduling, multilevel feedback queues, Fair share scheduling.

UNIT V

Real Memory organization and Management: Memory organization, Memory management, Memory hierarchy, Memory management strategies, contiguous vs non-



contiguous memory allocation, single user contiguous memory allocation, fixed partition multiprogramming, variable partition multiprogramming, Memory swapping Virtual Memory organization: Virtual memory basic concepts, multilevel storage organization, block mapping, paging basic concepts, segmentation, paging/segmentation systems. Virtual Memory Management: Demand Paging, Page replacement strategies

Text Book

1. H.M. Deitel, Operating Systems, Third Edition, Pearson Education Asia, 2011

Reference Books

- 1. William Stallings, Operating System: Internals and Design Principles, Seventh Edition, Prentice-Hall of India, 2012.
- A.Silberschatz, and P.B. Galvin., Operating Systems Concepts, Nineth Edition, John Wiley & Sons (ASIA) Pte Ltd., 2012

ASP.NET PROGRAMMING

Course Objectives

- To identify and understand the goals and objectives of the .NET framework and ASP.NET with C# language.
- To develop ASP.NET Web application using standardcontrols.
- To implement file handling operations.
- To handles SQL Server Database using ADO.NET.
- Understand the Grid view control and XML classes.

UNIT I

Overview of .NET framework: Common Language Runtime (CLR), Framework Class Library- C# Fundamentals: Primitive types and Variables – Operators - Conditional statements -Looping statements – Creating and using Objects – Arrays – String operations.

UNIT II

Introduction to ASP.NET - IDE-Languages supported Components -Working with Web Forms – Web form standard controls: Properties and its events – HTML controls -List Controls: Properties and its events.

UNIT III

Rich Controls: Properties and its events – validation controls: Properties and its events– File Stream classes - File Modes – File Share – Reading and Writing to files – Creating, Moving, Copying and Deleting files – File uploading.



UNIT IV

ADO.NET Overview – Database Connections – Commands – Data Reader - Data Adapter - Data Sets - Data Controls and its Properties – Data Binding

UNIT V

Grid View control: Deleting, editing, Sorting and Paging. XML classes – Web form to manipulate XML files - Website Security - Authentication - Authorization – Creating a Web application.

Text Book

- 1. Svetlin Nakov, Veselin Kolev & Co, Fundamentals of Computer Programming with C#, Faber Publication, 2019.
- 2. Mathew, Mac Donald, The Complete Reference ASP.NET, Tata McGraw-Hill, 2015.

Reference Books

- 1. Herbert Schildt, The Complete Reference C#.NET, TataMcGraw-Hill, 2017.
- 2. Kogent Learning Solutions, C# 2012 Programming Covers .NET 4.5 Black Book, Dreamtech pres,2013.
- 3. Anne Boehm, Joel Murach, Murach"s C# 2015, Mike Murach& Associates Inc. 2016.
- 4. DenielleOtey, Michael Otey, ADO.NET: The Complete reference, McGrawHill, 2008.
- 5. Matthew MacDonald, Beginning ASP.NET 4 in C# 2010, A PRESS, 2010.

Web Resources

- 1. <u>https://www.geeksforgeeks.org/introduction-to-net-framework/</u>
- 2. <u>https://www.javatpoint.com/net-framework</u>

ASP.NET PROGRAMMING LAB

Course Objectives

- To develop ASP.NET Web application using standard controls.
- To create rich database applications using ADO.NET.
- To implement file handling operations.
- To implement XML classes.
- To utilize ASP.NET security features for authenticating the website

Exercises

- 1. Create an exposure of Web applications and tools
- 2. Implement the Html Controls
- 3. Implement the Server Controls
- 4. Web application using Web controls.



- 5. Web application using List controls.
- 6. Web Page design using Rich control. Validate user input using Validation controls. Working with File concepts.
- 7. Web application using Data Controls.
- 8. Data binding with Web Controls.
- 9. Data binding with Data Controls.
- 10. Database application to perform insert, update and delete operations.
- 11. Database application using Data Controls to perform insert, delete, edit, paging and sorting operation.
- 12. Implement the XML classes.
- 13. Implement Authentication Authorization.
- 14. Ticket reservation using ASP.NET controls.
- 15. Online examination using ASP.NET controls

Text Books

- 1. Svetlin Nakov, Veselin Kolev & Co, Fundamentals of Computer Programming with C#, Faber publication, 2019.
- 2. Mathew, Mac Donald, The Complete Reference ASP.NET, Tata McGraw-Hill, 2015.

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- 1. Herbert Schildt, The Complete Reference C#.NET, TataMcGraw-Hill, 2017.
- 2. Kogent Learning Solutions, C# 2012 Programming Covers .NET 4.5 Black Book, Dreamtech press, 2013.
- 3. Anne Boehm, Joel Murach, Murach"s C# 2015, Mike Murach & Associates Inc. 2016.
- 4. DenielleOtey, Michael Otey, ADO.NET: The Complete reference, McGrawHill, 2008.
- 5. Matthew MacDonald, Beginning ASP.NET 4 in C# 2010, APRESS, 2010.

Web Resources

- 1. https://www.geeksforgeeks.org/introduction-to-net-framework/
- 2. https://www.javatpoint.com/net-framework



ELECTIVE: SOFTWARE PROJECT MANAGEMENT/ AGILE PROJECT MANAGEMENT

SOFTWARE PROJECT MANAGEMENT

Learning Objectives

- To define and highlight importance of software project management.
- To formulate and define the software management metrics & strategy in managing projects
- Understand to apply software testing techniques in commercial environment

Unit I

Introduction to Competencies - Product Development Techniques - Management Skills - Product Development Life Cycle - Software Development Process and models - The SEI CMM - International Organization for Standardization.

UNIT II

Managing Domain Processes - Project Selection Models - Project Portfolio Management - Financial Processes - Selecting a Project Team - Goal and Scope of the Software Project -Project Planning - Creating the Work Breakdown Structure -Approaches to Building a WBS - Project Milestones - Work Packages - Building a WBS for Software.

UNIT III

Tasks and Activities - Software Size and Reuse Estimating - The SEI CMM -Problems and Risks - Cost Estimation - Effort Measures - COCOMO: A Regression Model - COCOMO II - SLIM: A Mathematical Model - Organizational Planning -Project Roles and Skills Needed.

UNIT IV

Project Management Resource Activities - Organizational Form and Structure -Software Development Dependencies - Brainstorming - Scheduling Fundamentals -PERT and CPM - Leveling Resource Assignments - Map the Schedule to a Real Calendar - Critical Chain Scheduling.

UNIT V

Quality: Requirements – The SEI CMM - Guidelines - Challenges - Quality Function Deployment - Building the Software Quality Assurance - Plan - Software Configuration Management: Principles - Requirements - Planning and Organizing -Tools - Benefits - Legal Issues in Software - Case Study



Textbook

1. Robert T. Futrell, Donald F. Shafer, Linda I. Safer, "Quality Software Project Management", Pearson Education Asia 2002.

Reference Books

- 1. Pankaj Jalote, "Software Project Management in Practice", Addison Wesley 2002.
- 2. Hughes, "Software Project Management", Tata McGraw Hill 2004, 3rd Edition.

NOTE: Latest Edition of Textbooks May be Used

Web Resources

- 1. NPTEL & MOOC courses titled Software Project Management
- 2. www.smartworld.com/notes/software-project-management

AGILE PROJECT MANAGEMENT

Course Objectives

- Learning of software design, software technologies and APIs.
- Detailed demonstration about Agile development and testing techniques.
- Learning about Agile Planning and Execution.
- Learning of Agile Management Design and Quality Check.
- Detailed examination of Agile development and testing techniques.

UNIT I

Introduction: Modernizing Project Management: Project Management Needed a Makeover – Introducing Agile Project Management. Applying the Agile Manifesto and Principles: Understanding the Agile manifesto – Outlining the four values of the Agile manifesto – Defining the 15 Agile Principles – Adding the Platinum Principles – Changes as a result of Agile Values – The Agile litmus test. Why Being Agile Works Better: Evaluating Agile benefits – How Agile approaches beat historical approaches – Why people like being Agile.

UNIT II

Being Agile

Agile Approaches: Diving under the umbrella of Agile approaches – Reviewing the Big Three: Lean, Scrum, Extreme Programming - Summary Agile Environments in Action: Creating the physical environment – Low-tech communicating – High-tech communicating – Choosing tools. Agile Behaviours in Action: Establishing Agile roles – Establishing new values – Changing team philosophy.

UNIT III

Agile Planning and Execution Defining the Product Vision and Roadmap: Agile planning – Defining the product vision – Creating a product roadmap – Completing the product backlog. Planning Releases and Sprints: Refining requirements and estimates – Release planning – Sprint planning. Working Throughout the Day:

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Planning your day – Tracking progress – Agile roles in the sprint – Creating shippable functionality – The end of the day. Showcasing Work, Inspecting and Adapting: The sprint review – The sprint retrospective. Preparing for Release: Preparing the product for deployment (the release sprint) – Preparing the operational support – Preparing the organization for product deployment - Preparing the marketplace for product deployment

UNIT IV

Agile Management Managing Scope and Procurement: What's different about Agile scope management – Managing Agile scope – What's different about Agile procurement – Managing Agile procurement.

Managing Time and Cost: What''s different about Agile time management – Managing Agile schedules – What''s different about Agile cost management – Managing Agile budgets. Managing Team Dynamics and Communication: What''s different about Agile team dynamics – Managing Agile team dynamics – What''s different about Agile communication – Managing Agile communication. Managing Quality and Risk: What''s different about Agile quality – Managing Agile quality – What''s different about Agile risk management – Managing Agile risk.

UNIT V

Implementing Agile Building a Foundation: Organizational and individual commitment – Choosing the right pilot team members – Creating and environment that enables Agility – Support Agility initially and over time. Being a Change Agent: Becoming Agile requires change – why change doesn't happen on its own – Platinum Edge's Change Roadmap – Avoiding pitfalls – Signs your changes are slipping. Benefits, Factors for Success and Metrics: Ten key benefits of Agile project management – Ten key factors for project success – Ten metrics for Agile Organizations.

Text Books

- 1. Mark C. Layton, Steven J. Ostermiller, Agile Project Management for Dummies, 2nd Edition, Wiley India Pvt. Ltd., 2018.
- 2. Jeff Sutherland, Scrum The Art of Doing Twice the Work in Half the Time, Penguin, 2014.

Reference Books

- 1. Mark C. Layton, David Morrow, Scrum for Dummies, 2nd Edition, Wiley India Pvt. Ltd., 2018.
- 2. Mike Cohn, Succeeding with Agile Software Development using Scrum, Addison-Wesley Signature Series, 2010.
- 3. Alex Moore, Agile Project Management, 2020.
- 4. Alex Moore, Scrum, 2020.
- 5. Andrew Stellman and Jennifer Greene, Learning Agile: Understanding Scrum,

XP, Lean, and Kanban, Shroff/O'Reilly, First Edition, 2014.

Web Resources

1. <u>www.agilealliance.org/resources</u>

ELECTIVE: ARTIFICIAL INTELLIGENCE/ MACHINE LEARNING ARTIFICIAL INTELLIGENCE

Course Objectives

- To learn various concepts of AI Techniques.
- To learn various Search Algorithm in AI.
- To learn probabilistic reasoning and models in AI.
- To learn about Markov Decision Process.
- To learn various types of Reinforcement learning.

UNIT I

Introduction: Concept of AI, history, current status, scope, agents, environments, Problem Formulations, Review of tree and graph structures, State space representation, Search graph and Search tree

UNIT II

Search Algorithms: Random search, Search with closed and open list, Depth first and Breadth first search, Heuristic search, Best first search, A* algorithm, Game Search

UNIT III

Probabilistic Reasoning: Probability, conditional probability, Bayes Rule, Bayesian Networks- representation, construction and inference, temporal model, hidden Markov model

UNIT IV

Markov Decision process: MDP formulation, utility theory, utility functions, value iteration, policy iteration and partially observable MDPs.

UNIT V

Reinforcement Learning: Passive reinforcement learning, direct utility estimation, adaptive dynamic programming, temporal difference learning, active reinforcement learning- Q learning

Text Book

- Stuart Russell and Peter Norvig, "Artificial Intelligence: A Modern Approach", 3rd Edition, Prentice Hall.
- 2. Elaine Rich and Kevin Knight, "Artificial Intelligence", Tata McGraw Hill



Reference Books

- 1. Trivedi, M.C., "A Classical Approach to Artificial Intelligence", Khanna Publishing House, Delhi.
- 2. Saroj Kaushik, "Artificial Intelligence", Cengage Learning India, 2011
- 3. David Poole and Alan Mackworth, "Artificial Intelligence: Foundations for Computational Agents", Cambridge University Press 2010

Web Resources

- 1. NPTEL & MOOC courses titled Artificial Intelligence and Expert Systems
- 2. https://nptel.ac.in/courses/106106140/
- 3. https://nptel.ac.in/courses/106106126/

MACHINE LEARNING

Learning Objectives

- To Learn about Machine Intelligence and Machine Learning applications
- To implement and apply machine learning algorithms to real-world applications
- To identify and apply the appropriate machine learning technique to classification, pattern recognition, optimization and decision problems
- To create instant based learning
- To apply advanced learning

UNIT I

Introduction Machine Learning - Difference between AI, Machine Learning and Big data. Supervised and unsupervised learning, parametric vs non-parametric models, parametric models for classification and regression- Linear Regression, Logistic Regression, Naïve Bayes classifier, simple non-parametric classifier-K-nearest neighbour, support vector machines

UNIT II

Neural networks and genetic algorithms Neural Network Representation – Problems – Perceptrons – Multilayer Networks and Back Propagation Algorithms – Advanced Topics – Genetic Algorithms – Hypothesis Space Search – Genetic Programming – Models of Evaluation and Learning.

UNIT III

Bayesian and computational learning Bayes Theorem – Concept Learning – Maximum Likelihood – Minimum Description Length Principle – Bayes Optimal Classifier – Gibbs Algorithm – Naïve Bayes Classifier – Bayesian Belief Network – EM Algorithm – Probability Learning – Sample Complexity – Finite and Infinite Hypothesis Spaces – Mistake Bound Model.



UNIT IV

Instant based learning K- Nearest Neighbour Learning – Locally weighted Regression – Radial Basis Functions – Case Based Learning.

UNIT V

Advanced learning Recommendation systems – opinion mining, sentiment analysis. Learning Sets of Rules – Sequential Covering Algorithm – Learning Rule Set – First Order Rules – Sets of First Order Rules – Induction on Inverted Deduction – Inverting Resolution – Analytical Learning – Perfect Domain Theories – Explanation Base Learning – FOCL Algorithm – Reinforcement Learning – Task – Q-Learning – Temporal Difference Learning.

Textbooks

- 1. Tom M. Mitchell, —Machine Learning, McGraw-Hill Education (India) Private Limited, 2013.
- 2. Bengio, Yoshua, Ian J. Goodfellow, and Aaron Courville. "Deep learning" 2015, MIT Press

Reference Books

- 1. EthemAlpaydin, —Introduction to Machine Learning (Adaptive Computation and Machine Learning), The MIT Press 2004.
- 2. Stephen Marsland, —Machine Learning: An Algorithmic Perspective, CRC Press, 2009.

NAAN MUDHALVAN PROBLEM SOLVING TECHNIQUES

Course Objective

- Understand the systematic approach to problem solving.
- Know the approach and algorithms to solve specific fundamental problems.
- Understand the efficient approach to solve specific factoring-related problems.
- Understand the efficient array-related techniques to solve specific problems.
- Understand the efficient methods to solve specific problems related to text processing. Understand how recursion works.

UNIT I

Introduction: Notion of algorithms and programs – Requirements for solving problems by computer – The problem-solving aspect: Problem definition phase, Getting started on a problem, The use of specific examples, Similarities among problems, Working backwards from the solution – General problem-solving strategies - Problem solving using top-down design – Implementation of algorithms – The concept of Recursion.

UNIT II

Fundamental Algorithms: Exchanging the values of two variables - Counting -

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Summation of a set of numbers - Factorial computation - Sine function computation - Fibonacci Series generation - Reversing the digits of an integer – Base Conversion.

UNIT III

Factoring Methods: Finding the square root of a number – The smallest divisor of an integer – Greatest common divisor of two integers - Generating prime numbers – Computing the prime factors of an integer – Generation of pseudo-random numbers - Raising a number to a large power – Computing the nth Fibonacci number.

UNIT IV

Array Techniques: Array order reversal – Array counting or histograming – Finding the maximum number in a set - Removal of duplicates from an ordered array - Partitioning an array – Finding the kth smallest element – Longest monotone subsequence.

UNIT V

Text Processing and Pattern Searching: Text line length adjustment – Left and right justification of text – Keyword searching in text – Text line editing – Linear pattern search. Recursive algorithms: Towers of Hanoi – Permutation generation.

Text Book

1. R.G. Dromey, How to Solve it by Computer, Pearson India, 2007

Reference Books

- 1. George Polya, Jeremy Kilpatrick, The Stanford Mathematics Problem Book: With Hints and Solutions, Dover Publications, 2009 (Kindle Edition 2013).
- 2. Greg W. Scragg, Problem Solving with Computers, Jones & Bartlett 1st edition, 1996.

Web Resources

- 1. https://www.studytonight.com/
- 2. https://www.w3schools.com/

