

SEMESTER-VI

St. Xavier's College (Autonomous), Ahmedabad

Syllabus of Semester – VI of the following departments under Faculty of Computer Science based on Undergraduate Curriculum Framework to be implemented from the Academic Year 2025-26.

DEPARTMENT OF COMPUTER SCIENCE

Major Course-1 : AI Fundamentals

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course Title & Code	Credit Distribution of The Course			Eligibility Criteria	Pre-requisite(s) of the Course (if any)
	Lecture	Tutorial	Practical / Practice		
AI Fundamentals CSMC661C	4	0	0	Nil	Programming Basics

Learning Outcomes:

Upon successful completion, students will be able to implement:

1. To define the basic principles, models, and algorithms of Artificial Intelligence.
2. To understand knowledge representation, reasoning, and machine learning techniques to real-world problems.
3. To choose appropriate Artificial Intelligence functions and components involved in intelligent systems such as Robotic Perception, Image-Processing Operations to create optimal models.
4. To evaluate Artificial Intelligence with Human Intelligence and Traditional Information Processing.

Unit	Unit Details	Hours
I	Foundations of AI Introduction to AI, Goals of AI, Turing Test (Practical 1), Importance of AI, AI Subfields, AI Techniques: Machine Learning • Definition • How does machine work? • Stages of machine learning. • Types of machine learning. • Common machine learning algorithms. • Machine learning python libraries (For practical) Natural Language Processing • Definition • Phases of NLP • NLP Techniques • Approaches in NLP State of the art in AI, Agents and Environments, Concept of Rationality, PEAS, Types of Agents (Simple Reflex, Model-Based, Goal-Based, Utility-Based, Learning Agents) • Handson Practice on above unit	15
II	Problem Solving & Search Techniques A. Classical Search (Uninformed): • Problem formulation • Search strategies: BFS, DFS, UCS, Depth-limited, Iterative Deepening B. Informed Search: • Heuristic functions • Greedy Best-First • A* Search • Heuristic evaluation and admissibility C. Beyond Classical Search: • Local search: Hill Climbing, Simulated Annealing • Genetic algorithms (intro) • Constraint Satisfaction Problems (CSPs): Backtracking, Forward Checking, Arc Consistency Adversarial Search & Games • Game playing • Minimax algorithm • Alpha-beta pruning • Evaluation functions • Stochastic games Handson Practice on above unit	15
III	Knowledge Representation & Reasoning A. Logical Reasoning: • Propositional logic • First-order logic: syntax, semantics	15

- Unification
- Inference: Forward chaining, Backward chaining, Resolution

B. Planning:

- Classical planning: State-space planning
- Planning graphs (overview)
- Hierarchical Planning (HTN basics)

Reasoning Under Uncertainty

- Probabilistic reasoning
- Bayes' rule
- Bayesian Networks
- Conditional Independence
- Inference in Bayesian networks (exact & approximate)
- Hidden Markov Models (basic concept)

Handson Practice on above unit

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Machine Learning Overview

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- Form of learning (supervised, unsupervised, reinforcement)
- Decision trees (ID3 basics)
- Linear models: Regression & Classification
- Neural Networks (basics, perceptron, multilayer networks)
- Introduction to Reinforcement Learning

Applications of AI

- NLP: Language models & text classification
- Basics of Computer Vision: Image processing & object recognition
- Robotics: Robot architecture, perception, motion planning

Handson Practice on above unit

Text Books

1. **"Artificial Intelligence: A Modern Approach" by Stuart Russell and Peter Norvig (3rd Edition)"**
2. **"Introduction to Artificial Intelligence" by Philip C. Jackson**
3. **"Artificial Intelligence: Foundations of Computational Agents" by David Poole and Alan Mackworth**

Reference Books

1. **"Deep Learning" by Ian Goodfellow, Yoshua Bengio, and Aaron Courville**
2. **"Essentials of Artificial Intelligence" by Matt Ginsberg**
3. **"The Ethics of Artificial Intelligence and Robotics" by Vincent C. Müller**
4. **"Machine Learning" by Tom M. Mitchell**

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Syllabus of Semester – VI of the following departments under Faculty of Computer Science based on Undergraduate Curriculum Framework to be implemented from the Academic Year 2026-27.

DEPARTMENT OF COMPUTER SCIENCE

BCS CS(Hons.) Category-V

Major Course – 2: Website Development using .Net (CSMC662C)

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course Title & Code	Credit Distribution of The Course			Eligibility Criteria	Pre-requisite(s) of the Course (if any)
	Lecture	Tutorial	Practical / Practice		
Website Development using .Net CSMC662C	2	0	2	Students with basic coding knowledge	Nil

Course Objective:

- 1) To provide with the practical knowledge of ASP.NET
- 2) To make students capable to develop website using visual studio web development environment.
- 3) To make them understand the framework architecture of .NET
- 4) To provide the students with the knowledge how to work with disconnected architecture of ADO.NET and can store and retrieve data easily from database.

Course Outcome

On the completion of the course students are able to:

- To recognize the concepts and workings of web applications. COBC6501.02: To understand the IDE and the features of .Net framework.
- To demonstrate the working of web page, web controls and code behind feature. COBC6501.04: To learn how to develop the web page, validating different controls and authoring user controls.
- To understand the concepts of intrinsic objects and to demonstrate the workings of files.
- understand the connectivity with database using ADO.Net and also report generation.

Unit	Unit Details	Hours
I	Introduction	15
	• The .Net Platform and the Web ▪ The Pathway to Web Application ▪ The Web Client/Server Model ▪ Components of ASP.NET and the .NET framework ▪ Overview of IIS ▪ Overview of ASP.NET ▪ Language Independence in the .NET framework • Working with ASP.NET ▪ The Features of ASP.NET ▪ The Anatomy of ASP.NET Pages ▪ Introducing Web Forms ▪ Visual Studio IDE Basics ▪ Code-Behind feature	
	Application Configuration	
	Over view of Global.asax file and Web.config flie	
	▪ Web controls for Displaying and Formatting Data	
	Following properties should be consider in each control of ASP.NET Properties	
	▪ AccessKey ▪ BackColor ▪ BorderWidth ▪ BorderStyle ▪ CSSClass ▪ Enabled ▪ Font.Bold ▪ Font.Italic ▪ Font.Name ▪ Font.Overline ▪ Font.Size	

- Font.Strikeout
- Font.Underline
- ForeColor
- Height
- TabIndex
- ToolTip
- Width
- Id
- Runat
- Text
- **Label**
 - o Setting Properties
 - BorderStyle
 - BorderWidth
- **Panel**
 - o Setting Properties
 - BackImageUrl
 - HorizontalAlign
 - Wrap
 - o Add runtime control/s in panel
- **Table**
 - Setting Properties
 - BackImageUrl
 - CellSpecing
 - CellPadding
 - GridLines
 - HorizontalAlign
- **TableRow**
 - o Setting Properties
 - HorizontalAlign
 - VerticalAlign
- **TableCell**
 - o Setting Properties
 - ColumnSpan
 - RowSpan
 - HorizontalAlign
 - VerticalAlign
- Wrap

Web Controls

• Web Controls for Creating Buttons

- Button , Image Button, Link Button
- Setting Properties
- Command
- CommandArgument
- ImageUrl (Only for Image Button)
- Event
 - OnClick

• Web Control for Inputting Text

• Textbox

o Setting Properties

- AutoPostBack
- TextMode
- Columns
- MaxLength
- Rows
- Text
- Wrap

- Event OnTextChanged

• Web Controls for Selecting Choices

• CheckBox

o Setting Properties

- AutoPostBack
- Text
- TextAlign
- Checked
- Event

- OnCheckedChanged

• RadioButton

o Setting Properties

- AutoPostBack
- Checked
- GroupName
- Text
- TextAlign
- Event

- OnCheckedChanged

• CheckBoxList , RadioButtonList

o Setting Properties

- AutoPostBack
- CellPadding
- DataSource
- DataTextField
- DataValueField
- RepeatColumns
- RepeatDirection
- RepeatLayout
- TextAlign
- Items
- SelectedIndex
- SelectedItem

- SelectedItems (only for CheckBoxList)
- Event
 - OnSelectedIndexChanged
- **Web Controls for Creating Lists**
- ListBox , DropDownList
- o Setting Properties
 - DataSource
 - DataTextField
 - DataValueField
 - AutoPostBack
 - Rows
 - SelectionMode(Only for ListBox)
 - Event
 - OnSelectedIndexChanged

o **Rich Controls**

• **Calendar**

- o Setting Properties
 - CellPadding
 - CellSpacing
 - DayHeaderStyle
 - DayNameFormat
 - DayStyle
 - FirstDayOfWeek
 - NextMonthText
 - NextPrevFormat
 - NextPrevStyle
 - OtherMonthDayStyle
 - PrevMonthText
 - PrevMonthText
 - SelectedDate
 - SelectedDates
 - SelectedDayStyle
 - SelectionMode
 - SelectMonthText
 - SelectorStyle
 - SelectWeelText
 - ShowDayHeader
 - ShowGridLine
 - ShowNextPrevMonth
 - ShowTitle
 - TitleFormat
 - TitleStyle
 - TodayDayStyle
 - TodayDate
 - VisibleDate
 - WeekendDayStyle
 - Events
 - o DayRender
 - o SelectionChanged
 - o VisibleMonthChanged

• **AdRotator**

- o Setting Properties

- AdvertisementFile
- OnAdCreated
- KeywordFilter
- Target
- **File Upload**
- o **Other Controls**
- **Hyperlink**
- o Setting Properties
 - NavigateUrl
 - Text
 - ImageUrl
 - Target
- **Image**
- o Setting Properties
 - ImageUrl
 - AlternateText
 - ImageAlign
- **Image Map**
- o Setting Properties
 - HotSpotMode
 - HotSpots
 - ImageUrl
 - AlternateText
- **ASP.NET Page Directives**
 - @Page
 - @Control
 - @Import
 - @Register
 - @Assembly
 - @OutputCache

Validation Controls ASP.NET Objects and Data Collection Class

Validation Controls

- Following properties should be considered in each Validator control of ASP.NET
 - Properties
 - ControlToValidate
 - Display
 - Enabled
 - ErrorMessage
 - ForeColor
 - IsValid

• Required FieldValidator Control

• CompareValidator Control

Setting Properties

- ControlToCompare
- OperatorType
- ValueToCompare

RangeValidator Control

Setting Properties

- MaximumValue

- MinimumValue

RegularExpressionValidator control

o Setting Properties

ValidationExpression

Introduction to Custom Validator control

o Setting Properties

- ClientValidationFunction
- OnServerValidate

Data List Controls

Repeater Control and DataList Control

- Template
- AlternatingItemTemplate
- FooterTemplate
- HeaderTemplate
- ItemTemplate
- SeparatorTemplate

Introduction of GridView Or DataGrid Control

(Simple Demo of view records using above control)

Introduction of FormView and Detail View Controls

(Simple Demo of edit, delete and insert records using above control)

Authoring a User Control

- Login Control
- LoginView Control
- LoginStatus Control
- LoginName Control
- PasswordRecovery Control

ASP.NET Intrinsic Objects

- The HttpRequest Object
- The HttpResponse Object
- The HttpApplicationState Object
- The HttpSessionState Object

I/O and ADO.NET

Handling File I/O

- Reading Text Files
- Writing Text Files Binary Files I/O
- Performing File Operations
- File Information

IV

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ADO.NET

ADO.NET Programming Objects and Architecture

Displaying Database Data

Working with The Data Set and Data Table Objects

Text Book:

ASP.NET and VB.NET Web

Programming Publisher: Pearson

By Matt J. Crouch

Chapter – 1 (1.1, 1.2, 1.3, 1.4, 1.5)

Chapter - 3 (3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.8, 3.9, 3.10, 3.11, 3.12, 3.13, 3.14, 3.15, 3.16, 3.17, 3.18, 3.19, 3.23.1, 3.23.2, 3.24.4, 3.24.5)

Chapter – 4 (4.3.1, 4.3.2, 4.3.3, 4.3.4, 4.3.5, 4.3.6, 4.3.7)

Chapter – 7 (7.1, 7.2, 7.3, 7.4, 7.6)

Reference Books:

ASP.NET Developer's Guide Publisher: McGraw Hill

By Gerg Buczek

Note:

- (1) These topics can be covered using any version of .NET framework and Visual Studio. Therefore, there will be NO restriction in using the version available with the institute.**
- (2) VB.NET programming language should be used with ASP.NET**
- (3) Database should be any version of Ms Access or SQL Express Edition**

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DEPARTMENT OF COMPUTER SCIENCE

BCS CS (Hons.) Category – IV

Major Course - 3 Software Development Project-PART II

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course Title & Code	Credit Distribution of The Course			Eligibility Criteria	Pre-requisite(s) of the Course (if any)
	Lecture	Tutorial	Practical / Practice		
Software Development Project-PART II CSMC663L	4	0	0	10 + 2 from a recognized board in any stream	Nil

Course Objective:

- 1) Synthesize skills and knowledge gained into an innovative technology solution.
- 2) Develop systems development skills.
- 3) Gain experience in exploring/using software development and documentation tools.

Course Outcome:

At the end of the syllabus, the student will be able to:

To gain the knowledge of the new technology and explore the existing technology in depth.

To achieve the desired output of the proposed system by dividing the modules in group and collaborate their modules among team members. COBC6506.03:

To design the interface and implement the code.

To test their code in order to make the system error free and meet the needs of the conducted analysis.

To generate reports and provide the organization with necessary information. To gain an experience of working in live environment.

Mode of study: One day off to work on the project in a week

Course Contents: 1. Developing System Design 2. Writing code for the project 3. Doing testing of the code

Deliverables by the students: At the end of the semester, the student should be able to successfully develop the project and prepare the documentation (hard copy) as well as presentation of the project details.

• **Documentation:** o A single hard bound documentation of SDP Part-II should also consist of the documentation prepared in SDP Part-I. o Although the students might have submitted the documentation of SDP Part-I, it should not be considered for evaluation.

A hard copy of the documentation should consist of the additional following details:

- Cover Page
- Company Certificate
- College Certificate
- Acknowledgement
- Index (with page nos.)
- Screen layouts
- Report layouts
- Sample coding (optional)
- Future Enhancements (optional)
- Conclusion
- Bibliography

Presentation: • Presentations can be prepared through slides using Open Source / Power Point / Flash or any other multimedia tool, covering the work shown in the documentation. • During viva exams, students will be expected to satisfactorily answer the questions pertaining to the tools used, the process, the reports /forms created and the results achieved.