



**FACULTY OF SCIENCE**

**Effective from Academic Batch: 2022-23**

**Programme:** Master of Science (Information Technology)

**Semester:** I

**Course Code:**

**Course Title:** Software Engineering

**Course Group:** CORE COURSES

**Course Objectives:**

1. To provide the idea of decomposing the given problem into Analysis, Design, Implementation, Testing and Maintenance phases. To give the knowledge of how Analysis, Design, Implementation, Testing and Maintenance processes are conducted in a software project.
2. Understanding of software requirements and the SRS documents. Understanding of the role of project management including planning, scheduling, risk management, etc.
3. Explain the different software architectural styles. Understanding of implementation issues such as modularity and coding standards.
4. Understanding of software testing approaches such as unit testing and integration testing.
5. Describe software measurement and software risks. Understanding of software evolution and related issues such as version management. Analyzing on quality control and how to ensure good quality software.

**Teaching & Examination Scheme:**

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
Lecture	Tutorial	Practical		Theory		J/V/P*		Total
				Internal	External	Internal	External	
4	--	--	4	50/20	50/20	--	--	100/40

\* J: Jury; V: Viva; P: Practical

**Detailed Syllabus:**

Sr.	Contents	Hours
1	<b>Introduction:</b> Introduction to Software Engineering, Defining Software, Changing Nature of Software, Attributes of a Good Software, Software Development Life Cycle, Software Process, Software Myths, Current Trends in Software Engineering, Web Engineering, Reengineering <b>Software Process Models:</b> Waterfall Model, Prototyping Model, Iterative Model, Time Boxing Model and Spiral Model, Introduction to Basic Concepts of Agile Software Development	15



2	<b>Software Project Management:</b> Responsibilities of a Software Project Manager, Project Planning, Metrics or Project Size Estimation, Project Estimation Techniques, Empirical Estimation Techniques, COCOMO Model, An Analytical Technique, Staffing Level Estimation, Scheduling, Organization and Team Structures, Staffing, Risk Management, Software Configuration Management <b>Requirements Analysis and Specification:</b> Requirements Gathering and Analysis, Software Requirements Specification, Formal System Specification, Axiomatic Specification, Algebraic Specification	15
3	<b>Software Design:</b> Design Concepts and Design Principal, Cohesion and Coupling, Layered Arrangement of Modules, Approaches to Software Design, Function-Oriented Software Design (Overview), User Interface Design (Characteristics of A Good User Interface, Basic Concepts, Types of User Interfaces) <b>Object Oriented Analysis &amp; Design Tool – UML:</b> UML Overview, Class Diagram, Activity Diagram, Sequence and Collaboration Diagram, State Chart Diagram, Use Case Diagram	17
4	<b>Software Coding &amp; Testing:</b> Coding, Code Review, Software Documentation, Testing, Unit Testing, Debugging, Program Analysis Tools, Integration Testing. <b>Software Maintenance:</b> Characteristics of Software Maintenance, Software Reverse Engineering, Software Maintenance Process Models, Estimation of Maintenance Cost	13

### Reference Books:

1	Jalote Pankaj : Integrated Approach to Software Engineering, 3rd Edition, Narosa Publishing House, 2005 (ISBN 978-81-7319-702-4).
2	Roger Pressman , Software Engineering, A Practitioners Approach, McGraw Hill Publication
3	Ivar Jacobson, Object Oriented Software Engineering A use case Approach , Pearson
4	Rajib Mall : Fundamentals of Software Engineering, 2 nd Edition, Prentice-Hall of India, 2006 (ISBN-81-203-2445-5).
5	James A Senn : Analysis and Design of Information Systems McGraw Hill Intl. Std. Edn, 1985
6	C Lliu: Elements of Discrete Mathematics – TMH
7	Swapan Kumar chakraborty and Bikash Kanti Sarkar: Discrete Mathematics – OXFORD Higher Education.
8	Ian Sommerville : Software Engineering, 6th edition, Pearson Education, 2001, (ISBN 81 7808-497-X).

### Supplementary learning Material:

1	<a href="https://nptel.ac.in/courses/106101061">https://nptel.ac.in/courses/106101061</a>
2	<a href="https://www.edx.org/course/software-engineering-essentials">https://www.edx.org/course/software-engineering-essentials</a>
3	<a href="https://www.mooc-list.com/course/object-oriented-design-coursera">https://www.mooc-list.com/course/object-oriented-design-coursera</a>
4	<a href="https://onlinecourses.nptel.ac.in/noc20_cs68/preview">https://onlinecourses.nptel.ac.in/noc20_cs68/preview</a>

### Pedagogy:

At the start of course, the course delivery pattern, prerequisite of the subject will be discussed. The assessment and evaluation process will be broadly classified with the following 02 components viz.,:

1. In- Semester continuous Internal assessment and evaluation, and



## 2. End- Semester final examination

The weightage of internal assessment for theory/practical course will be 40%.

However, the remaining 60% weightage for theory/practical courses will be for End-Semester final examination, both evaluation two (02) hours duration for theory and three (03) hours for practical.

### In-Semester Continuous internal evaluation:

1. One Internal exam will be conducted as a part of internal theory/practical evaluation.
2. Assignments based on the course content will be given to the students for each unit and will be evaluated at regular interval evaluation.
3. Weekly Tests/Quizzes/Seminar/Attendance will be considered in the overall internal evaluation.
4. Presentation/Online Course Work/Research Paper are part of the internal evaluation.

### Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):

Distribution of Theory Marks in %						R: Remembering; U: Understanding; A: Applying; N: Analyzing; E: Evaluating; C: Creating
R	U	A	N	E	C	
20	40	15	15	5	5	

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

### Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Understand about the Software Development Life Cycle. Distinguish different process model for a software development. Analyze the model according the requirement.	25
CO-2	Design software requirements specification solution for a given problem definitions of a software system. Identify user needs and formulate software specifications, analyze requirements by applying various modeling techniques, Translate the requirements model into the design model.	25
CO-3	Understand the importance of User-interface design principles in software development, the concepts of clean room software development.	25
CO-4	Examine testing concepts and identify them to develop error free software. Evaluate the risk and quality issues in project management, validate the solutions and construct alternate solutions if there is a need. Students can apply the knowledge, techniques, and skills in the development of a software product.	25

### Curriculum Revision:

Version:	1.0
Drafted on (Month-Year):	April-2021
Last Reviewed on (Month-Year):	April-2022
Next Review on (Month-Year):	April-2023

**FACULTY OF SCIENCE**

**Effective from Academic Batch: 2022-23**

**Programme:** Master of Science (Information Technology)

**Semester:** I

**Course Code:**

**Course Title:** Advanced Java

**Course Group:** CORE COURSES

**Course Objectives:**

1. This course introduces the generic, multithreaded and GUI-based programming and understands concepts of database connectivity using Java Database Connectivity (JDBC).
2. Students will be able to do develop server side applications with database handling using Servlets, JSP, and JDBC.
3. Understanding the basics of the Spring Framework. Develop Web Application using spring framework and Handling crosscutting concerns using Spring AOP.
4. Understand the role of EJB in the broader Java EE platform. Describe the features that are implemented by an EJB container on behalf of application components.

**Teaching & Examination Scheme:**

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
Lecture	Tutorial	Practical		Theory		J/V/P*		Total
				Internal	External	Internal	External	
4	--	--	4	50/20	50/20	--	--	100/40

\* J: Jury; V: Viva; P: Practical

**Detailed Syllabus:**

Sr.	Contents	Hours
1	<b>Multithreading:</b> Life Cycle of a Thread, Creating Thread and Running it, Creating Multiple Threads, Waiting for Threads, Thread Group, Thread Priorities, Synchronization <b>Introduction to J2EE Technology:</b> Introduction to J2EE Platform, J2EE Architecture, Introduction to J2EE APIs <b>Java Database Connectivity (JDBC):</b> JDBC Overview & Architecture, Introduction to JDBC, JDBC Architecture, Database Connectivity using JDBC	15
2	<b>Servlets:</b> Introduction to Java Servlet, Servlet Interface and the Servlet Life Cycle, Handling HTTP Get and Post Requests, Session Tracking, Cookies <b>Java Server Pages (JSP):</b> Introduction, Java Server Pages Overview, JSP Architecture & Life Cycle, JSP Directives, JSP Scripting Elements, JSP Action Elements, JSP Implicit Objects	15



3	<b>The Spring Framework:</b> Introduction to The Spring Framework and Architecture, Beans (Definition, Scope, Lifestyle), Aspect- Oriented Spring, Spring MVC, Security, JDBC Framework <b>Web Service:</b> Introduction About Restful Web Service	17
4	<b>Enterprise Java Beans (EJB):</b> Introduction to Enterprise Java Beans, Enterprise Bean Architecture, Benefits of Enterprise Bean, Types of Enterprise Bean, Accessing Enterprise Beans, Enterprise Bean Application, Entity Beans, Session Beans, Message Driven Beans	13

### Reference Books:

1	Java the complete reference, 8 <sup>th</sup> edition by Herbert Schildt
2	Professional Java Server Programming by Subrahmanyam Allamaraju, Cedric Buest Wiley Publication
3	Bayross Ivan, Shah Sharanam, Bayross Cynthia and Shah Vaishali: Java Server Programming, 2nd Edition, Shroff Publishers and Distributors Pvt. Ltd., 2008
4	"Restful Java Web Services", Jose Sandoval, Packt Publication
5	"Spring MVC Beginner's Guide", Amuthhan Ganeshan, Packt Publication
6	"Advanced Java 2 Platform HOW TO PROGRAM" by H. M.Deitel, P. J. Deitel, S. E. Santry – Prentice Hall Java the complete reference , 8th Edition by Herbert Schildt
7	Panda, Rahman and Lane : EJB 3 in Action, Dreamtech Press, 2010
8	Java the complete reference, 8 <sup>th</sup> edition by Herbert Schildt

### Supplementary learning Material:

1	<a href="http://www.javatpoint.com">www.javatpoint.com</a>
2	<a href="https://docs.oracle.com/javaee/6/tutorial/doc/bnaafd.html">https://docs.oracle.com/javaee/6/tutorial/doc/bnaafd.html</a>
3	<a href="http://www.tutorialspoint.com">www.tutorialspoint.com</a>
4	<a href="http://www.geeksforgeeks.org/java">www.geeksforgeeks.org/java</a>
5	<a href="https://www.edureka.co/blog/advanced-java-tutorial">https://www.edureka.co/blog/advanced-java-tutorial</a>

### Pedagogy:

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1. In- Semester continuous Internal assessment and evaluation, and
2. End- Semester final examination

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However, the remaining 60% weightage for theory/practical courses will be for End-Semester final examination, both evaluation two (02) hours duration for theory and three (03) hours for practical.

### In-Semester Continuous internal evaluation:

1. One Internal exam will be conducted as a part of internal theory/practical evaluation.
2. Assignments based on the course content will be given to the students for each unit and will be evaluated at regular interval evaluation.
3. Weekly Tests/Quizzes/Seminar/Attendance will be considered in the overall internal evaluation.
4. Presentation/Online Course Work/Research Paper are part of the internal evaluation.





## Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):

Distribution of Theory Marks in %						R: Remembering; U: Understanding; A: Applying; N: Analyzing; E: Evaluating; C: Creating
R	U	A	N	E	C	
10	40	20	10	10	10	

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

## Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Learn Basic Concepts of Java and multi-threading. Understanding the process of accessing database through Java programs, using java data base connectivity.	25
CO-2	Develop server side programs using Servlets and JSP Tags. Solve real-world problems using Advanced Java. Understand the Model Java EE architectural components, Servlet creation and session management for web applications.	25
CO-3	Design applications based on Spring Framework. Apply Model-View-Controller architecture to build complex client-server applications via Spring framework.	25
CO-4	Understanding the multi-tier architecture of web-based enterprise applications using enterprise JavaBeans. Use advanced concepts related to Web Services, spring and EJB.	25

## Curriculum Revision:

Version:	1.0
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Next Review on (Month-Year):	April-2023



**CVM**  
**UNIVERSITY**

Aegis: Charutar Vidya Mandal (Estd.1945)

**FACULTY OF SCIENCE**

**Effective from Academic Batch: 2022-23**

**Programme:** Master of Science (Information Technology)

**Semester:** I

**Course Code:**

**Course Title:** ASP .NET USING C#

**Course Group:** CORE COURSES

**Course Objectives:**

1. Explain how to create dynamic Web pages by using ASP.NET.
2. Configure an ASP.NET application by using .Config files
3. Create a user interface on an ASP.NET page by using standard Web server controls.
4. Create a user control and a custom server control and add them to an ASP.NET page.
5. Able to create your own Website, enhanced by using Master pages and Themes.
6. Find and eliminate bugs in an ASP.NET application.
7. Display dynamic data from a data source by using ADO.Net and data binding.
8. Maintaining State management throughout the Application.
9. Use Web service to enhance a Web application.
10. Deploy an ASP.NET application to a production Web server.

**Teaching & Examination Scheme:**

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
Lecture	Tutorial	Practical		Theory		J/V/P*		Total
				Internal	External	Internal	External	
4	--	--	4	50/20	50/20	--	--	100/40

\* J: Jury; V: Viva; P: Practical

**Detailed Syllabus:**

Sr.	Contents	Hours
1	Introduction to .NET Framework - Architecture of .NET Framework – BCL (Base Class Library), CLR (Common Language Runtime), Etc. - .NET Languages – Introduction, Types of Applications Supported by .NET Technology - Managed Code, Compilation to Intermediate Language, Just-In-Time Compilation, Garbage Collection, Assemblies and the GAC	11



2	C#.NET – Introduction and Features - General Structure of C#.NET Program - C#.NET – Basic Data Types, Variable, Constant, Type Conversion - Boxing and Unboxing - C#.NET – Statements (Conditional and Looping) – Types of Applications. Advance Features - OOPS Concepts, Class and Object - Inheritance; Polymorphism – Overloading, Overriding, Etc., Class Types and Interface - Working with Strings, Arrays, Lists and Collections - Exception Handling	18
3	Introduction To ASP.NET And Programming In ASP.NET; Web Server – Internet Information Server (IIS); Architecture Of ASP.NET; ASP.NET Page Lifecycle; ASP .NET Page Directives; Controls – HTML Controls And ASP.Net Server Controls ; Control Properties And Events ;PostBack ; Exception Handling ; Validation Controls ; Navigation Controls ; Login Controls; MasterPages Web Application Management; State Management; ViewState; Application; Session; Cookie; QueryString; Web.Config And Machine.Config ; Global.Asax ; Authentication Methods ; Caching	16
4	Database Programming with ADO.NET and Reports - The ADO.NET architecture (connected and disconnected mode) - ADO.NET Data providers, Dataset, DataAdapter, DataReader - Working with Data Controls; Design time data binding; Runtime data binding; Working with Stored Procedures, Generating reports	15

#### Reference Books:

1	C# and the .NET Platform by Andrew Troelsen : APress
2	C# The Basics by Vijay Mukhi : BPB
3	C# Essentials by Ben Albabari : O'Reilly
4	Professional C# by Simon Robinson : Wrox
5	ASP.NET - A Beginner's guide by Dave Mercer : TMH
6	Professional ASP.NET : Wrox
7	ASP.NET Programmer's Reference : Wrox
8	ADO.NET Programmer's Reference : Wrox
9	Professional C# 2008 by Christian Nagel : Wrox
10	C# The Nuts & Bolts by Akash Sarat & Sonal Mukhi : BPB
11	C# Made Simple : BPB Publication
12	C# 3.0 Unleashed: With the .NET Framework 3.5 by Joseph Mayo : Sams

#### Supplementary learning Material:

1	<a href="https://www.w3schools.com">https://www.w3schools.com</a>
2	<a href="https://www.coursera.org/in">https://www.coursera.org/in</a>
3	<a href="https://futureskills.nasscom.in">https://futureskills.nasscom.in</a>
4	<a href="http://www.swayam.gov.in">http://www.swayam.gov.in</a>

#### Pedagogy:

At the start of course, the course delivery pattern, prerequisite of the subject will be discussed. The assessment and evaluation process will be broadly classified with the following 02 components viz.,:

1. In- Semester continuous Internal assessment and evaluation, and
2. End- Semester final examination





The weightage of internal assessment for theory/practical course will be 40%. However, the remaining 60% weightage for theory/practical courses will be for End-Semester final examination, both evaluation two (02) hours duration for theory and three (03) hours for practical.

**In-Semester Continuous internal evaluation:**

1. One Internal exam will be conducted as a part of internal theory/practical evaluation.
2. Assignments based on the course content will be given to the students for each unit and will be evaluated at regular interval evaluation.
3. Weekly Tests/Quizzes/Seminar/Attendance will be considered in the overall internal evaluation.
4. Presentation/Online Course Work/Research Paper are part of the internal evaluation

**Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):**

Distribution of Theory Marks in %						R: Remembering; U: Understanding; A: Applying; N: Analyzing; E: Evaluating; C: Creating
R	U	A	N	E	C	
5	10	25	10	10	40	

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

**Course Outcomes (CO):**

Sr.	Course Outcome Statements	%weightage
CO-1	To Understand the .NET framework, analyze & evaluate various components of .NET framework, and the concepts of .Net framework Technology	25
CO-2	To develop a proficiency in the C# programming language. To apply latest client server technologies to develop client server applications. Able to apply the principles of object-oriented programming. Write clear and effective C# code. Demonstrate the C# console applications. Develop the web applications using ASP.NET Web Forms. Develop and use ASP.NET Web Services Create a rich GUI for web based applications using a rich set of controls Create secure (authentication and authorization) web applications. Design & develop distributed data-driven applications using .Net	25
CO-3	To proficiently develop ASP.NET web applications using C#. To design web based client server applications using .net technologies and relevant tools. Personalize a web page using Web Parts. Create asynchronous web applications using ASP.NET AJAX Create and use web services	25
CO-4	To configure and manage web servers and to use ADO.NET for data persistence in a web application.	25

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Aegis: Charutar Vidya Mandal (Estd.1945)

**FACULTY OF SCIENCE**

**Effective from Academic Batch: 2022-23**

**Programme:** Master of Science (Information Technology)

**Semester:** I

**Course Code:**

**Course Title:** Practical Based on Advanced Java

**Course Group:** CORE COURSES

**Course Objectives:**

1. To prepare students to become familiar with the Standard Java technologies of J2SE, J2EE, HTML and JavaScript.
2. To provide Students with a solid foundation in Advanced Java topics like Servlet, JSP and Spring Framework.
3. To train Students with good advanced java programming breadth so as to comprehend, analyze, design and create novel products and solutions for the real life problems.
4. To inculcate in students professional and ethical attitude, multidisciplinary approach and an ability to relate java programming issues to broader application context.
5. To provide student with an academic environment aware of excellence, written ethical codes and guidelines and lifelong learning needed for a successful professional career.

**Teaching & Examination Scheme:**

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
Lecture	Tutorial	Practical		Theory		J/V/P*		Total
				Internal	External	Internal	External	
--	--	8	4	--	--	50/20	50/20	100/40

\* J: Jury; V: Viva; P: Practical

**List of Practicals / Tutorials:**

1	To implement the Thread programs using class and interface.
2	To implement the methods of Thread class.
3	To implement the JDBC programs using Statement.
4	To implement the JDBC programs using PreparedStatement.
5	To implement the Servlet Program.
6	Write a Servlet Program to implement a dynamic HTML using Servlet (Username and Password should be accepted using HTML and displayed using a Servlet).
7	Write a Servlet Program to implement and demonstrate get() and Post methods(Using HTTP Servlet Class).
8	To implement a Servlet Program using cookies to remember user preferences.
9	Write a Servlet program to implement sessions(Using http session interface).



10	To implement a Servlet and JSP Program to insert data into Student DATA BASE and retrieve info based on particular queries(For example update, delete, search etc...).
11	To implement the JSP Program.
12	Write a JSP program to implement verification of a particular user login and display a welcome page.
13	To implement a JSP program to demonstrate the page directive nine predefined attributes.
14	To implement a JSP Program which uses jsp:include and jsp:forward action to display a Webpage.
15	To implement the implicit objects in JSP.
16	To implement the program using Spring Framework.
17	An EJB Application that demonstrates Session Bean(with Appropriate Business Logic).

### Reference Books:

1	Java the complete reference, 8 <sup>th</sup> edition by Herbert Schildt
2	Professional Java Server Programming by Subrahmanyam Allamaraju, Cedric Buest Wiley Publication
3	Bayross Ivan, Shah Sharanam, Bayross Cynthia and Shah Vaishali: Java Server Programming, 2nd Edition, Shroff Publishers and Distributors Pvt. Ltd., 2008
4	Restful Java Web Services, Jose Sandoval, Packt Publication
5	Spring MVC Beginner's Guide, Amuthhan Ganeshan, Packt Publication
6	Advanced Java 2 Platform HOW TO PROGRAM, H. M.Deitel, P. J. Deitel, S. E. Santry – Prentice Hall Java the complete reference , 8th Edition by Herbert Schildt
7	Panda, Rahman and Lane : EJB 3 in Action, Dreamtech Press, 2010
8	Java the complete reference, 8 <sup>th</sup> edition by Herbert Schildt

### Supplementary learning Material:

1	<a href="http://www.javatpoint.com">www.javatpoint.com</a>
2	<a href="https://docs.oracle.com/javaee/6/tutorial/doc/bnafd.html">https://docs.oracle.com/javaee/6/tutorial/doc/bnafd.html</a>
3	<a href="http://www.tutorialspoint.com">www.tutorialspoint.com</a>
4	<a href="http://www.geeksforgeeks.org/java">www.geeksforgeeks.org/java</a>
5	<a href="https://www.edureka.co/blog/advanced-java-tutorial">https://www.edureka.co/blog/advanced-java-tutorial</a>

### Pedagogy:

At the start of course, the course delivery pattern, prerequisite of the subject will be discussed. The assessment and evaluation process will be broadly classified with the following 02 components viz.,:

1. In- Semester continuous Internal assessment and evaluation, and
2. End- Semester final examination

The weightage of internal assessment for theory/practical course will be 40%.

However, the remaining 60% weightage for theory/practical courses will be for End-Semester final examination, both evaluation two (02) hours duration for theory and three (03) hours for practical.

### In-Semester Continuous internal evaluation:

1. One Internal exam will be conducted as a part of internal theory/practical evaluation.
2. Assignments based on the course content will be given to the students for each unit and will be evaluated at regular interval evaluation.



3. Weekly Tests/Quizzes/Seminar/Attendance will be considered in the overall internal evaluation.
4. Presentation/Online Course Work/Research Paper are part of the internal evaluation.
5. The course includes a laboratory, where students have an opportunity to build a lab index for the concepts being taught in lectures/lab demonstrations.

### Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):

Distribution of Theory Marks in %						R: Remembering; U: Understanding; A: Applying; N: Analyzing; E: Evaluating; C: Creating
R	U	A	N	E	C	
5	15	20	10	20	30	

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

### Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Implement thread and Learn the fundamental of Connecting to the database.	20
CO-2	Designing HTML pages to demonstrate Java Servlets, JSP, Bean, Spring and EJB programs. Implementing Dynamic HTML using Servlet and demonstration of service methods, auto web page refresh, Session tracking using cookie and Http Session in Servlet.	40
CO-3	Demonstrate JSP (page attributes, action tags and all basic tags), Develop the Application using Spring Framework. Understand the MVC concept in Spring Framework.	25
CO-4	Develop the types of EJB application.	15

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**FACULTY OF SCIENCE**

**Effective from Academic Batch: 2022-23**

**Programme:** Master of Science (Information Technology)

**Semester:** I

**Course Code:**

**Course Title:** Practical based on ASP.NET Using C#

**Course Group:** CORE COURSES

**Course Objectives:**

1. Introduce to .Net IDE Component Framework.
2. C# Programming and OOP concepts in .Net Framework.
3. Create user interactive web pages using ASP.Net.
4. Creating website using ASP.Net Controls.
5. Create simple data binding applications using ADO.Net connectivity.
6. Performing Database operations for ASP.NET web applications.

**Teaching & Examination Scheme:**

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
Lecture	Tutorial	Practical		Theory		J/V/P*		Total
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--	--	8	4	--	--	50/20	50/20	100/40

\* J: Jury; V: Viva; P: Practical

**List of Practicals / Tutorials:**

1	To understand the development and deployment cycles of enterprise applications.
2	To utilize the .NET framework to build distributed enterprise applications
3	To understand the structure of C#.NET Program
4	To understand the concepts of Basic Data Types, Variable, Constant, Type Conversion and Boxing Unboxing process using C#.
5	To utilize C# statements and designing different types of applications.
6	To implement OOPS concepts and working with Arrays, Lists, Collections and Exception Handling.
7	To understand ASP.NET architecture and Page Life Cycle
8	To understand use of ASP.NET Controls – HTML Controls and Server Controls
9	To implement the use of ASP.NET Validation Controls ; Navigation Controls ; Login Controls.
10	To implement ASP.NET State management techniques.
11	To develop web applications using a combination of client-side (JavaScript, HTML, XML, WML) and server-side technologies (ASP.NET, ADO.NET).
12	To implement Database Programming with ADO.NET.





13	To perform CRUD Database Operations Working with Stored Procedures and Reports generations.
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### Reference Books:

1	C# and the .NET Platform by Andrew Troelsen : APRESS
2	C# The Basics by Vijay Mukhi : BPB
3	C# Essentials by Ben Albahari : O'Reilly
4	Professional C# by Simon Robinson : Wrox
5	ASP.NET - A Beginner's guide by Dave Mercer : TMH
6	Professional ASP.NET : Wrox
7	ASP.NET Programmer's Reference : Wrox
8	ADO.NET Programmer's Reference : Wrox
9	Professional C# 2008 by Christian Nagel : Wrox
10	C# The Nuts & Bolts by Akash Sarat & Sonal Mukhi : BPB
11	C# Made Simple : BPB Publication
12	C# 3.0 Unleashed: With the .NET Framework 3.5 by Joseph Mayo : Sams

### Pedagogy:

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### In-Semester Continuous internal evaluation:

1. One Internal exam will be conducted as a part of internal theory/practical evaluation.
2. Assignments based on the course content will be given to the students for each unit and will be evaluated at regular interval evaluation.
3. Weekly Tests/Quizzes/Seminar/Attendance will be considered in the overall internal evaluation.
4. Presentation/Online Course Work/Research Paper are part of the internal evaluation
5. The course includes a laboratory, where students have an opportunity to build lab index for the concepts being taught in lectures/lab demonstrations.

### Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):

Distribution of Theory Marks in %						R: Remembering; U: Understanding; A: Applying; N: Analyzing; E: Evaluating; C: Creating
R	U	A	N	E	C	
5	5	10	10	20	50	

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

**Course Outcomes (CO):**

Sr.	Course Outcome Statements	%weightage
<b>CO-1</b>	To Understand the .NET framework. analyze and evaluate various components of .NET framework. Understand the concepts of .Net framework Technology	<b>20</b>
<b>CO-2</b>	To develop a proficiency in the C# programming language. To apply latest client server technologies to develop client server applications. Develop the web applications using C# Demonstrate the C# console applications Design and develop the distributed data driven applications using .Net framework	<b>30</b>
<b>CO-3</b>	To proficiently develop ASP.NET web applications using C#. To design web based client server applications using .net technologies and relevant tools.	<b>30</b>
<b>CO-4</b>	To configure and manage web servers and to use ADO.NET for data persistence in a web application.	<b>20</b>

**Curriculum Revision:**

Version:	1.0
Drafted on (Month-Year):	April-2021
Last Reviewed on (Month-Year):	April-2022
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**FACULTY OF SCIENCE**

**Effective from Academic Batch: 2022-23**

**Programme:** Master of Science (Information Technology)

**Semester:** I

**Course Code:**

**Course Title:** Comprehensive Viva-Voce

**Course Group:** CORE COURSES

**Course Objectives:**

The comprehensive viva – voce examination should be based on the theoretical knowledge, skills and the practices in which students have undergone in the period of four courses of theory of the semester. The viva shall normally cover the subjects taught in all the semesters of M.Sc. IT Programme.

**Teaching & Examination Scheme:**

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
Lecture	Tutorial	Practical		Theory		J/V/P*		Total
				Internal	External	Internal	External	
--	--	--	1	--	--	--	50/20	50/20

\* J: Jury; V: Viva; P: Practical

**Course Outcomes (CO):**

Sr.	Course Outcome Statements	%weightage
CO-1	It is overall oral examination of all four theory papers as mentioned above.	40
CO-2	Expert shall evaluate and examine the knowledge acquired in the semesters to solve the problems, applications, skills and techniques.	30
CO-3	Students should be able to give lucid explanation of questions asked by the experts of the different topics learnt by themselves during the semester.	30

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**CVM**  
**UNIVERSITY**

Aegis: Charutar Vidya Mandal (Estd.1945)

**FACULTY OF SCIENCE**

**Effective from Academic Batch: 2022-23**

**Programme:** Master of Science (Information Technology)

**Semester:** I

**Course Code:**

**Course Title:** Artificial Intelligence

**Course Group:** ELECTIVE COURSE

**Course Objectives:**

1. This course provides an introduction to the fundamentals of artificial intelligence. It contains a theory component about the concepts and principles that underlie modern AI algorithms, and a practice component to relate theoretical principles with practical implementation.
2. The course divides into four parts.
3. The first part of the course discusses search algorithms (BFS, DFS, A\*, Min-Max trees).
4. The second part of the course discusses Knowledge Representation & Reasoning, Symbolic Reasoning under Uncertainty and Probabilistic Reasoning.
5. Third part of the course overviews Game Playing, Planning and Natural Language Processing, Planning and natural language processing (NLP).
6. The last part concerns Connectionist Models, Expert Systems and Genetic algorithm.

**Teaching & Examination Scheme:**

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
Lecture	Tutorial	Practical		Theory		J/V/P*		Total
				Internal	External	Internal	External	
4	--	--	4	50/20	50/20	--	--	100/40

\* J: Jury; V: Viva; P: Practical

**Detailed Syllabus:**

Sr.	Contents	Hours
1	<b>Introduction and Search Techniques:</b> The AI Problems, The Underlying Assumption, AI techniques, The Level of The Model, Criteria for Success, Defining the Problems, As A State Space Search, Production Systems, Production Characteristics, Production System Characteristics and Issues in the Design of Search Programs, Generate-And-Test, Hill Climbing, Best-First Search, Problem Reduction, Constraint Satisfaction, Means-Ends Analysis	15



2	<b>Knowledge Representation &amp; Reasoning:</b> Representations and Mappings, Approaches to Knowledge Representation, Representation Simple Facts in Logic, Representing Instance and Isa Relationships, Computable Functions and Predicates, Resolution, Procedural versus Declarative Knowledge, Logic Programming, Forward versus Backward Reasoning <b>Symbolic Reasoning Under Uncertainty:</b> Introduction to Nonmonotonic Reasoning, Logics for Non-monotonic Reasoning. <b>Probabilistic Reasoning:</b> Probability and Bays' Theorem, Certainty Factors and RuleBase Systems, Bayesian Networks, Dempster-Shafer Theory, Fuzzy Logic	15
3	<b>Game Playing, Planning and Natural Language Processing: Overview,</b> MiniMax Search Procedure, Alpha-Beta Cut-offs, Refinements, Iterative deepening <b>Planning:</b> The Blocks World, Components of a Planning System, Goal Stack Planning, Nonlinear Planning Using Constraint Posting, Hierarchical Planning, Reactive Systems <b>Natural Language Processing:</b> Introduction, Syntactic Processing, Semantic Analysis, Discourse and Pragmatic Processing, Spell Checking	14
4	<b>Connectionist Models:</b> Introduction to Hopfield Network, Learning in Neural Network, Application of Neural Networks, Recurrent Networks, Distributed Representations, Connectionist AI And Symbolic AI. <b>Expert Systems:</b> Representing and Using Domain Knowledge, Expert System Shells, Explanation, Knowledge Acquisition. <b>Genetic Algorithms:</b> A Peek into the Biological World, Genetic Algorithms (GAs), Significance of the Genetic Operators, Termination Parameters.	16

### Reference Books:

1	Qiangfu ZHAO and Tatsuo Higuchi, Artificial Intelligence: from fundamentals to intelligent searches, Kyoritsu, 2017, ISBN:978-4-320-12419-6 (in Japanese).
2	Rich and Knight, Artificial Intelligence, Tata McGraw Hill Publishing Co. Ltd., 21st Indian Reprint, 2001
3	Akerkar RA and Sajja P S, Knowledge-Based Systems, Jones & Bartlett Publishers, Sudbury, MA, USA, 2009
4	Vijyalaxmi Pai and Rajasekaran, Neural Network, Fuzzy Logic and Genetic Algorithms, Prentice Hall of India, 2003
5	Introduction to Artificial Intelligence, Shinji Araya, KYORITSU SHUPPAN, ISBN4-320-12116-3 (in Japanese)
6	New Artificial Intelligence (Fundamental), Takashi Maeda and Fumio Aoki, Ohmsha, ISBN4-274-13179 (in Japanese)
7	Artificial Intelligence: a modern approach, S. Russell and P. Norvig, Prentice Hall, ISBN0-13-080302-2

### Supplementary learning Material:

1	<a href="http://www.journals.elsevier.com/artificial-intelligence/">http://www.journals.elsevier.com/artificial-intelligence/</a>
2	<a href="https://www.technologyreview.com/s/534871/our-fear-of-artificial-intelligence/">https://www.technologyreview.com/s/534871/our-fear-of-artificial-intelligence/</a>
3	<a href="https://onlinecourses.nptel.ac.in/">https://onlinecourses.nptel.ac.in/</a>
4	<a href="http://www.sanfoundry.com/artificial-intelligence-mcqs-inductive-logic-unification-lifting-1/">http://www.sanfoundry.com/artificial-intelligence-mcqs-inductive-logic-unification-lifting-1/</a>





## Pedagogy:

At the start of course, the course delivery pattern, prerequisite of the subject will be discussed. The assessment and evaluation process will be broadly classified with the following 02 components viz.,:

1. In- Semester continuous Internal assessment and evaluation, and
2. End- Semester final examination

The weightage of internal assessment for theory/practical course will be 40%.

However, the remaining 60% weightage for theory/practical courses will be for End-Semester final examination, both evaluation two (02) hours duration for theory and three (03) hours for practical.

## In-Semester Continuous internal evaluation:

1. One Internal exam will be conducted as a part of internal theory/practical evaluation.
2. Assignments based on the course content will be given to the students for each unit and will be evaluated at regular interval evaluation.
3. Weekly Tests/Quizzes/Seminar/Attendance will be considered in the overall internal evaluation.
4. Presentation/Online Course Work/Research Paper are part of the internal evaluation

## Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):

Distribution of Theory Marks in %						R: Remembering; U: Understanding; A: Applying; N: Analyzing; E: Evaluating; C: Creating
R	U	A	N	E	C	
15	15	15	15	15	25	

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

## Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Understand various search methods	25
CO-2	Understand knowledge representation methods	25
CO-3	Understand various game playing techniques	25
CO-4	Understand connectionist models, expert systems and genetic algorithms	25

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**FACULTY OF SCIENCE**

**Effective from Academic Batch: 2022-23**

**Programme:** Master Of Science (Information Technology)

**Semester:** I

**Course Code:**

**Course Title:** Network Security & Cryptography

**Course Group:** ELECTIVE COURSE

**Course Objectives:**

1. This course provides a basics understanding of Cryptography and Network Security.
2. To make the student learn different encryption techniques along with hash functions, MAC, digital signatures and their use in various protocols for network security and system security.
3. To be able to secure a message over insecure channel by various advanced Encryption Standards. Symmetrical and Asymmetrical cryptography. Data integrity using Key Management, Authentication, Digital Signatures.
4. Various network security applications, Email Security, IP Security, Firewall, IDS, Web security, Firewall and Malicious software etc.

**Teaching & Examination Scheme:**

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
Lecture	Tutorial	Practical		Theory		J/V/P*		Total
				Internal	External	Internal	External	
4	--	--	4	50/20	50/20	--	--	100/40

\* J: Jury; V: Viva; P: Practical

**Detailed Syllabus:**

Sr.	Contents	Hours
1	<b>Introduction:</b> Security trends, The OSI Security Architecture, Security Attacks, Security Services and Security Mechanisms, A model for Network security <b>Classical Encryption Techniques:</b> Symmetric Cipher Modes, Substitute Techniques, Transposition Techniques, Rotor Machines, Stenography	11
2	<b>Block Cipher and Data Encryption Standards:</b> Block Cipher Principles, Data Encryption Standards, the Strength of DES, Differential and Linear Crypt Analysis, Block Cipher Design Principles <b>Advanced Encryption Standards:</b> Evaluation Criteria for AES, the AES Cipher. MORE ON SYMMETRIC CIPHERS: Multiple Encryption, Triple DES, Block Cipher Modes of Operation, Stream Cipher and RC4	16



3	<b>Public Key Cryptography and RSA:</b> Principles Public key crypto Systems, Diffie Hellman Key Exchange, the RSA algorithm, Key Management, Elliptic Curve Arithmetic, Elliptic Curve Cryptography <b>Message Authentication and Hash Functions:</b> Authentication Requirement, Authentication Function, Message Authentication Code, Hash Function, Security of Hash Function and MACs <b>Hash and MAC Algorithm:</b> Secure Hash Algorithm, Whirlpool, HMAC, CMAC <b>Digital Signature:</b> Digital Signature, Authentication Protocol, Digital Signature Standard	17
4	<b>Email Security:</b> Pretty Good Privacy (PGP) and S/MIME <b>IP Security:</b> Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management <b>Web Security:</b> Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET), Intruders, Viruses and related threats <b>Firewall:</b> Firewall Design principles, Trusted Systems	16

#### Reference Books:

1	William Stallings (2006), Cryptography and Network Security: Principles and Practice, 4th edition, Pearson Education, India.
2	William Stallings (2000), Network Security Essentials (Applications and Standards), Pearson Education, India.
3	Charlie Kaufman (2002), Network Security: Private Communication in a Public World, 2nd edition, Prentice Hall of India, New Delhi.
4	Atul Kahate (2008), Cryptography and Network Security, 2nd edition, Tata Mc Grawhill, India.
5	Robert Bragg, Mark Rhodes (2004), Network Security: The complete reference, Tata Mc Grawhill, India.

#### Supplementary learning Material:

1	<a href="http://nptel.ac.in/courses/106105031/">http://nptel.ac.in/courses/106105031/</a> Lecture by Dr. Debdeep Mukhopadhyay, IIT Kharagpur.
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#### Pedagogy:

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R	U	A	N	E	C	
15	20	15	15	15	20	

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

### Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Completion of this course will enable the students to: Describe network security services and mechanisms. Analyze and design classical encryption techniques and block ciphers	15
CO-2	Understand and analyze data encryption standard. Symmetrical and Asymmetrical cryptography. Understand and analyze public-key cryptography, RSA and other public-key cryptosystems.	30
CO-3	Understand key management and distribution schemes integrity, Message Authentication and Hash Functions, Hash and MAC Algorithm, Digital Signatures.	28
CO-4	Design network application security schemes, such as PGP, MIME, IPSec, SSL etc. Other various network security applications, IPSec, Firewall, IDS, Web security, Email security, and Malicious software etc. Firewall Characteristics, Types of Firewalls, Firewall Location and Configurations.	27

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