



FACULTY OF SCIENCE

Effective from Academic Batch: 2022-23

Programme: Master of Science (Information Technology)

Semester: III

Course Code:

Course Title: Computer Networks

Course Group: CORE COURSES

Course Objectives:

1. To develop an understanding of computer networking basics. Understand the concepts of data communication and networks, TCP/IP and OSI reference models.
2. Understand, describe, analyse and evaluate the services of network layer, Link layer, Transport layer and application layer.

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 computer networks and Internet: Understanding of network and Internet, The network edge, The network core, Understanding of Delay, Loss and Throughput in the packet switching network, protocols layers and their service model, History of the computer network Application Layer: Principles of computer applications, Web and HTTP, E-mail, DNS, Socket programming with TCP and UDP	12
2	Transport Layer: Introduction and transport layer services, Multiplexing and Demultiplexing, Connectionless transport (UDP), Principles of reliable data transfer, Connection-oriented transport (TCP), Congestion control, TCP congestion control	16
3	Network Layer: Introduction to forwarding and routing, Network Service models, Virtual and Datagram networks, study of router, IP protocol and addressing in the Internet, Routing algorithms, Broadcast and Multicast routing	16



4	The Link layer and Local area networks: Introduction to link layer services, error-detection and correction techniques, Multiple access protocols, addressing, Ethernet, switches, VLAN	16
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Reference Books:

1	Computer Networking- A Top-Down approach (6th edition), Kurose and Ross, Pearson
2	Computer Networks- A Top-Down approach, Behrouz Forouzan, McGraw Hill
3	Computer Networks (5th edition), Andrew Tanenbaum, Prentice Hall
4	Computer Networking: A Top - Down Approach, by Ames Kurose, Keith Ross
5	Computer Networks - Andrew S Tanenbaum
6	Computer Networks: A Systems Approach Book by Bruce S. Davie and Larry L. Peterson
7	Data Communications and Networking (5th edition), Behrouz Forouzan, McGraw Hill
8	TCP/IP Protocol Suite (4th edition), Behrouz Forouzan, McGraw Hill

Supplementary learning Material:

1	https://www.coursera.org/learn/fundamentals-network-communications
2	https://nptel.ac.in/courses/106105080
3	https://www.tutorialspoint.com/computer_fundamentals/computer_networking.htm

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.



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Aegis: Charutar Vidya Mandal (Estd.1945)

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Understand the basics of computer networks and Internet. Also understand Application Layer in detail.	25
CO-2	Understand the Transport Layer	25
CO-3	Understand the Network Layer	25
CO-4	Understand the Link layer and Local area networks	25

Curriculum Revision:

Version:	1.0
Drafted on (Month-Year):	April-2022
Last Reviewed on (Month-Year):	April-2022
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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: III

Course Code:

Course Title: Mobile Application Development

Course Group: CORE COURSES

Course Objectives:

1. Understanding of how mobile communication works and how to build mobile apps for android operating system.
2. The necessary concepts which are required to understand mobile communication and to develop Android Applications.
3. To develop required skills in the students so that they are able to develop process of open source mobile application.

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	Android OS Introduction to Android, Android System with Architecture, Android Architecture, Development with Android – Platforms, Tools, Versions, Setup Android Environment, Say Hello to Android Application, Building Blocks of Android Application, Work with Activity, Activity Lifecycle, Intents Fragments, Fragment Lifecycle	15
2	Android UI And Component using Fragments Create Android UI, Working with Layout, Create Custom Layouts, Work with UI Components and Events, Material Design Toolbar, Tab Layout, Recycler View and Card View, Android Menus	15
3	Database Connectivity Storage in Android, Shared Preferences, Shared Preferences Layout, Android Requesting Permission at run time (Android 6.0), Work with SD Card and Files, Database in Android, Realm-No SQL Database	15

4	Advanced Android Development Google Map, Location Service and GPS, Creating Google Map, Work with Location, Location service with Location Manager, Find Current Location, Geo coding, Audio, Video and Camera Use Media Player, Recording and Playing sound, Creating a sound pool, Using Camera, Recording Video, Publishing and Distributing Android Application Signing the Android Application, Versioning the Android Application, Publishing the Android Application	15
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Reference Books:

1	Wei-Meng Lee: Beginning Android 4 Application Development, Wiley Publishing, Inc, Wrox Programmer to Programmer, 2013.
2	J. F. DiMarzio: Beginning Android Programming with Android Studio, Wiley Publishing, Inc, 2017.
3	Meier Reto: Professional Android 2 Application Development, Wiley Publishing, Inc., 2010.
4	Android cookbook - Ian F. Darwin Oreilly.
5	Advanced Android Application Development – Joseph Annuzzi, Lauren darcey, Shane Conder – 4th Edition, Addison – Wesley.

Supplementary learning Material:

1	https://developer.android.com/
2	https://www.coursera.org/specializations/android-app-development
3	https://nptel.ac.in/courses/106106147 Lecture by Prof. Sridhar Iyer, Prof. Pushpendra Singh, IIT Madras

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.,:

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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

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Distribution of Theory Marks in %						R: Remembering; U: Understanding; A: Applying; N: Analyzing; E: Evaluating; C: Creating
R	U	A	N	E	C	
5	20	5	15	15	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 Android architecture, activities and their life cycle	15
CO-2	To understand the use View Groups comprising layouts and Views in application. Manage data binding, user interface events, maps.	30
CO-3	To apply knowledge of map, location services, Graphics, android system and background services. To manage system database, remote database operations.	30
CO-4	To work with graphics, animation, still images and video. Also to learn how to publish and distribute Android Application.	25

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FACULTY OF SCIENCE

Effective from Academic Batch: 2022-23

Programme: Master of Science (Information Technology)

Semester: III

Course Code:

Course Title: Web Programming

Course Group: CORE COURSES

Course Objectives:

1. Understand the various HTML tags and CSS with its types and use them to develop the user friendly web pages.
2. Develop the modern web pages using the HTML and CSS features with different layouts as per need of applications. Use the JavaScript to develop the dynamic web pages.
3. Use server side scripting with PHP to generate the web pages dynamically using the database connectivity.
4. Develop the modern Web applications using the client and server side technologies and the web design fundamentals.
5. Understands the Advanced PHP and implement the cookies, sessions and OOP concepts.

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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4	--	--	4	50/20	50/20	--	--	100/40

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

Detailed Syllabus:

Sr.	Contents	Hours
1	HTML Fundamentals: HTML Structure, HTML Tags and Attributes, HTML Forms, Introduction to HTML5 DHTML Fundamentals: Introduction, Applications, CSS and its Types, Properties and Attributes, Class Introduction to JavaScript: Features, DOM, Methods to Implement JavaScript, Arrays, Functions, Dialogue Boxes, Events, Methods and Validations in JavaScript	17
2	Server Side Programming with PHP : Introduction to Open Source , Advantages and Capabilities of Open Source , Introduction to PHP ,Data Types, Variables, Constants, Operators, Flow Control and Looping ,Strings, Arrays, Functions ,Working with Forms , Form Validation, Input Validation, Regular Expression Functions	15



3	PHP and MySQL: Introduction to MySQL: Features, Merits and Demerits Basic Commands with PHP Examples, Connection to Server, Creating Database, Selecting A Database, Listing Database, Listing Table Names, Creating a Table, Inserting Data, Altering Tables, Queries, Deleting Database, Deleting Data and Tables, PHP Myadmin And Database Bugs	14
4	Advanced PHP: Cookies: Creating Cookies, Reading from Cookies, Adding Parameters to a Cookie, Deleting a Cookie Sessions: Creating a Session, Accessing Session Variables, Deleting a Session, File Handling, Error Handling, Exception Handling Object Oriented Programming with PHP: Classes, Objects, Inheritance, Polymorphism	14

Reference Books:

1	Ivan Baryons: "Web Enabled Commercial Applications Development using HTML, DHTML, Javascript, PHP"
2	PHP6, Apache, MySQL Web Development " Michael K.Glass Timothy Boronczyk, Elizabeth Naramore, Jason Gerner, Yann Le Scouarnec, Jeremy Stolz" Wrox Publication
3	Steve Suehring Tim Converse Joyce Park: PHP6 and MySQL Bible - Wiley Publication
4	PHP6 and MySQL" Steve Suehring, Tim Converse, and Joyce Park"- Wiley- INDIA EDITION

Supplementary learning Material:

1	https://developer.mozilla.org/en-US/docs/Web/HTML
2	https://www.w3schools.com/html/
3	https://developer.mozilla.org/en-US/docs/Web/CSS
4	https://www.tutorialspoint.com/javascript/index.htm
5	https://www.tutorialspoint.com/php/index.htm

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.
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Distribution of Theory Marks in %						R: Remembering; U: Understanding; A: Applying; N: Analyzing; E: Evaluating; C: Creating
R	U	A	N	E	C	
10	20	25	10	10	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	Use the various HTML tags with appropriate styles to display the various types of contents effectively. Develop the dynamic web pages using HTML, CSS and JavaScript applying web design principles to make pages effective.	25
CO-2	Develop the server side PHP scripts using various features for creating customized web services.	25
CO-3	Write the server side scripts for designing web based services with database connectivity.	25
CO-4	Develop a web application using advanced web programming features.	25

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FACULTY OF SCIENCE

Effective from Academic Batch: 2022-23

Programme: Master of Science (Information Technology)

Semester: III

Course Code:

Course Title: Practical based on Mobile Application Development

Course Group: CORE COURSES

Course Objectives:

1. The fundamentals of Android programming using the Android SDK.
2. To teach Android programming to create applications for smartphones.
3. To learn the fundamental concepts in Android programming - activities and intents, designing user interface using views, data persistence, content providers, messaging and networking, location-based services, and developing android services.

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	Installing "Android Studio IDE" and "Android SDK"
2	Write your First Android App: Hello-World; Hello-world "by Coding"; Hello-World using "XML Layout"
3	Create an application to demonstrate Android Activity Life Cycle.
4	Create an application that designs a layout and use of Toast.
5	To understand Activity, UI.
6	Understand resource folder & Adapter.
7	Create an application that will create database.
8	Understanding content providers and permissions.
9	Android Program to Demonstrate Layouts in an Activity and Nesting of Layouts and Demonstrate List View Activity.
10	Understand Menu option and Context Menu.
11	Create an application that will have Spinner.
12	Android Program to Demonstrate an Adapter and Advanced Adapter
13	Android Program to Demonstrate Broadcast Receiver
14	Android Program to Demonstrate Creating and Saving Shared Preferences



15	Android Program to Demonstrate Reading a File on SD Card, Reading and Writing to a File in Android and Instance Save State.
16	Create an application that will play a media file from the memory card.

Reference Books:

1	Lauren Darcey and Shane Conder, "Android Wireless Application Development", Pearson Education, 2nd ed. (2011)
2	Mark L Murphy, "Beginning Android", Wiley India Pvt Ltd (2009)
3	Sayed Y Hashimi and Satya Komatineni, "Pro Android", Wiley India Pvt Ltd (2009)

Supplementary learning Material:

1	https://developer.android.com
2	https://nptel.ac.in/courses/106106147
3	https://www.coursera.org/specializations/android-app-development
4	Official Channel of Android Developer on YouTube: https://www.youtube.com/user/androiddevelopers

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	

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Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	This Lab course will help students to achieve the following objectives: To demonstrate their understanding of the fundamentals of Android operating systems.	25
CO-2	To demonstrate their skills of using Android software development tools. To be able to understand the process of developing software for the mobile	25
CO-3	To be able to create mobile applications on the Android Platform To demonstrate their ability to deploy software to mobile devices	25
CO-4	To be able to create mobile applications involving data storage in SQLite database. To demonstrate their ability to debug programs running on mobile devices.	25

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FACULTY OF SCIENCE

Effective from Academic Batch: 2022-23

Programme: Master of Science (Information Technology)

Semester: III

Course Code:

Course Title: Practical Based on Web Programming

Course Group: CORE COURSES

Course Objectives:

1. Understand the various HTML tags and use them to develop the user friendly web pages.
2. Understand the CSS with its types and use them to provide the styles to the web pages at various levels. Develop the modern web pages using the HTML and CSS features with different layouts as per need of applications.
3. Use the JavaScript to develop the dynamic web pages.
4. Use server side scripting with PHP to generate the web pages dynamically using the database connectivity.
5. Develop the modern Web applications using the client and server side technologies and the web design fundamentals. Understands the Advanced PHP and implement the cookies, sessions and OOP concepts.

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 Basic Html Tags with their attributes.
2	To implement the DHTML Tags with their attributes.
3	To implement a table by applying appropriate tags of table.
4	To create an html file to link to different html pages which contains images, tables, and also link within a page.
5	Develop and demonstrate the usage of inline, internal and external style sheet using CSS.
6	To implement an arrays in JavaScript.
7	To implement functions in JavaScript.
8	Develop and demonstrate JavaScript with POP-UP boxes.
9	Write the HTML and JavaScript code to validate the required items using regular expression only.
10	To implement an events in JavaScript.



11	To Install and configure PHP, web server and MYSQL.
12	To implement the data types in PHP.
13	To implement a PHP program to demonstrate the use of Decision making control structures using- a. If statement b. If-else statement c. Switch statement
14	To implement a PHP program to demonstrate the use of Looping structures using- a. While statement b. Do-while statement c. For statement d. Foreach statement
15	To implement a PHP program for creating and manipulating- a. Indexed array b. Associative array c. Multidimensional array
16	To implement a Registration form and apply validation in PHP.
17	To Implement the web applications with Database using (a) PHP
18	To implement the cookies in PHP program.
19	To implement the session in PHP program.
20	To implement an object oriented programming in PHP.

Reference Books:

1	Ivan Baryons: "Web Enabled Commercial Applications Development using HTML, DHTML, Javascript, PHP"
2	PHP6, Apache, MySQL Web Development " Michael K.Glass Timothy Boronczyk, Elizabeth Naramore, Jason Gerner, Yann Le Scouarnec, Jeremy Stolz" Wrox Publication
3	Steve Suehring Tim Converse Joyce Park: PHP6 and MySQL Bible - Wiley Publication
4	PHP6 and MySQL" Steve Suehring, Tim Converse, and Joyce Park" - Wiley- INDIA EDITION

Supplementary learning Material:

1	https://developer.mozilla.org/en-US/docs/Web/HTML
2	https://www.w3schools.com/html/
3	https://developer.mozilla.org/en-US/docs/Web/CSS
4	https://www.tutorialspoint.com/javascript/index.htm
5	https://www.tutorialspoint.com/php/index.htm

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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):

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R	U	A	N	E	C	
10	20	25	10	10	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	Use the various HTML tags with appropriate styles to display the various types of contents effectively. Develop the dynamic web pages using HTML, CSS and JavaScript applying web design principles to make pages effective.	30
CO-2	Develop the server side PHP scripts using various features for creating customized web services.	20
CO-3	Write the server side scripts for designing web based services with database connectivity.	30
CO-4	Develop a web application using advanced web programming features.	20

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FACULTY OF SCIENCE

Effective from Academic Batch: 2022-23

Programme: Master of Science (Information Technology)

Semester: III

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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FACULTY OF SCIENCE

Effective from Academic Batch: 2022-23

Programme: Master of Science (Information Technology)

Semester: III

Course Code:

Course Title: Software Testing

Course Group: ELECTIVE

Course Objectives:

1. To study fundamental concepts in software testing, including software testing objectives, process, criteria, strategies, and methods.
2. Study importance of Software Testing in Software Development.
3. To discuss various Functional Testing and Structural Testing.
4. To understand the Test Cases in brief.
5. Study various Software Testing Tools.

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: Software Testing Perspective (Terminology, Myths, Purpose, Goals, Objectives, Challenges and Issues), Types of Software Testing, Levels of Testing, Principles of Software Testing, Testing Process, Software Testing Life Cycle, Software Testing Documentation, Debugging	15
2	Functional Testing and Structural Testing: Introduction Functional (Black Box) Testing: Techniques - Boundary Value Analysis, Equivalence Class Partitioning, Decision Table Based Testing, Cause-Effect Graphing Structural (White Box) Testing: Techniques -Control Flow Testing, Data Flow Testing, Statement Coverage Testing, Branch Coverage Testing	17
3	Test Cases: Basic Meaning, Typical Test Case Parameters, Test Case Template, Types of Test cases, Test Case Selection Criteria, Test Case Design Techniques, Test Suite, Generating Test Cases, Automated Test Data Generation	15



4	Testing Tools: Introduction to Testing Tools, Advantages and disadvantages of using Testing Tools, Types of Testing Tools, Open Source Software Testing Tools Testing Object Oriented Software: Introduction to OO testing concepts, Differences in OO testing	13
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Reference Books:

1	Software Testing, Yogesh Singh, Cambridge University Press, 2012.
2	Software Testing - A Craftsman's Approach Paul C. Jorgensen, Third Edition Auerbach Publications, 2013.
3	Software Engineering – A practitioner's approach by Roger S. Pressman, 5th Edition, McGraw Hill.
4	Software Testing Concepts and Practices – K.Mustafa & R.A.Khan, Narosa Publishing House.

Supplementary learning Material:

1	https://www.coursera.org/in
2	https://nptel.ac.in/courses/106101163
3	https://www.tutorialspoint.com/software_testing/index.htm
4	https://www.javatpoint.com/software-testing-tutorial

Pedagogy:

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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	30	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.



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Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Acquire knowledge of basic principles and knowledge of software testing and Debugging and test cases.	25
CO-2	Analyze the difference between functional testing and structural testing. Apply various Software testing Techniques to find bugs in software.	25
CO-3	Solve the problems using Software Testing techniques and Approaches And Prepare Test Cases.	25
CO-4	Apply various testing Tools, testing techniques and test plan in.	25

Curriculum Revision:

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



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FACULTY OF SCIENCE

Effective from Academic Batch: 2022-23

Programme: Master of Science (Information Technology)

Semester: III

Course Code:

Course Title: Machine Learning & its Applications

Course Group: ELECTIVE

Course Objectives:

1. To learn basic concepts, and algorithms used in machine learning.
2. Understand the issues and challenges of Machine Learning.
3. Understanding of the strengths and weaknesses of many popular machine learning approaches.
4. Understand the basic concepts of Neural Network.

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 Machine Learning: Introduction, Different Types of Learning, Hypothesis Space, Inductive Bias, Evaluation and Cross Validation	12
2	Basic Machine Learning Algorithms & Dimensionality Reduction: Linear Regression, Decision Trees, Learning Decision Trees, K-nearest Neighbor, Collaborative Filtering, Overfitting, Feature Selection, Feature Extraction	16
3	Logistic Regression and Support Vector Machine: Logistic Regression, Introduction to Support Vector Machine, The Dual Formation, Maximum Margin with Noise, Nonlinear SVM and Kernel Function, SVM: Solution to the Dual Problem	16
4	Basics of Neural Network & Clustering: Introduction to neural network, Multilayer Neural Network, Neural Network and Backpropagation Algorithm, Deep Neural Network, Introduction to Clustering, K-means Clustering, Agglomerative Hierarchical Clustering	16

Reference Books:

1	Tom M Mitchell, Machine Learning, McGraw-Hill Education.
2	Bishop, C., Pattern Recognition and Machine Learning, Springer-Verlag r.



3	Alpaydin, Ethem, Introduction to Machine Learning, MIT Press.
4	Duda, Richard, Peter Hart, and David Stork., Pattern Classification. 2nd ed. New York, NY: Wiley-Interscience.
5	Bishop, Christopher. Neural Networks for Pattern Recognition. New York, Oxford University Press
6	S. N. Sivanandam and S.N.Deepa, Principles of Soft Computing, Wiley India Pvt. Limited.

Supplementary learning Material:

1	https://www.coursera.org/in
2	https://www.tutorialspoint.com/machine_learning_with_python/index.htm
3	https://www.geeksforgeeks.org/machine-learning/
4	https://nptel.ac.in/

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.,:

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R	U	A	N	E	C	
10	25	30	15	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	Understand basic concepts of machine learning as well as challenges involved.	20
CO-2	Learn and implement various basic machine learning algorithms.	30
CO-3	Study dimensionality reduction concept and its role in machine learning techniques. Realize concepts of advanced machine learning algorithms.	25



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CO-4	Comprehend basic concepts of Neural network and its use in machine learning.	25
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