

1. COURSE DETAILS

Programme: CSE/IT	Semester: V/V
Course: Web Development using PHP	Group: A/A*
Course Code: PHP198922	Duration:16 Weeks

2. TEACHING AND EXAMINATION SCHEME

Scheme of Instructions and Periods per Week					Examination Scheme and Maximum Marks								
Theory Hrs L	Practical Hrs P	Drawing Hrs D	Tutorial Hrs T	Credits (L+P+D+T)	Theory Paper Duration and marks(ESE)		SSL	TA	TH	TW	PR	OR	TOTAL
					Hours	Marks							
2	4	-	-	6	-	-	-	-	-	50	50	-	100

3. COURSE OBJECTIVE

PHP is an open source, easy to learn, flexible, well documented, wide community supported and most popular server-side scripting language used to build dynamic websites. It has very simple database integration with a wide range of drivers. This course intends to teach the students the concepts of web development with PHP.

4. SKILL COMPETENCY

The aim of this course is to help the students to attain the following industry identified competency through various teaching learning experiences:

- **Develop web application using PHP**

5. COURSE OUTCOMES (COs) at the end of the semester student will be able to: -

CO No.	COURSE OUTCOME	Bloom's LEVEL
CO1	Use fundamentals, conditional statements, loops, arrays, strings and function in a PHP script.	Remember, Understand, Apply
CO2	Implement Object Oriented Programming concepts of PHP	Remember, Understand, Apply
CO3	Write dynamic web pages by handling forms with cookies, sessions and database.	Remember, Understand
CO4	Build a web application using WordPress and PHP.	Remember, Understand, Apply



6. COURSE CONTENTS

Sr. No	Topics/Sub-Topics	Hours	COs
1	<p>PHP Basics</p> <p>1.1 Introduction: History of PHP ,PHP Features, role of client and server, Apache Application Server, PHP Installation with XAMPP and configuring php.ini, Helloworld PHP script</p> <p>1.2 Fundamentals: Keywords, Identifiers, Variables, Constants Data Types, Type Conversion, Operators and Expressions, Strings, Comments</p> <p>1.3 Conditional Statements: if, if...else, nested if, else if ladder, switch...case</p> <p>1.4 Loops: for, while, do...while</p> <p>1.5 Functions: Defining a user defined function, passing and returning parameters, Call by value and Call by reference</p>	5	CO1
2	<p>Arrays and Strings</p> <p>2.1 Arrays: Anatomy of an Array, Creating index based and Associative array, Accessing array Element Looping with Index based array, Looping with associative array using each() and foreach(), Some useful Library functions</p> <p>2.2 Strings: Creating and accessing String, Searching & Replacing String, Formatting String, String Related Library function</p>	3	CO1
3	<p>Object Oriented Programming Concepts</p> <p>3.1 Declaring a class and objects, The new keyword, constructor, Destructor,</p> <p>3.2 Access method and properties using \$this variable, Public ,private, protected properties and methods, Static properties and functions, Class constant</p> <p>3.3 Inheritance & code reusability, Polymorphism, Parent:: & self:: keyword, Instance of operator, Abstract method and class, Interface, final keyword</p> <p>3.4 Exception Handling: Error handling, Exception Handling, try-catch-throw, Filters</p>	6	CO2
4	<p>Handling Html Form With PHP</p> <p>4.1 Form Handling: Accessing Form controls from web page using \$_GET , \$_POST , \$_REQUEST methods, include, include_once, require, require_once</p> <p>4.2 Cookies: Cookies, Start a PHP Cookies, Cookie variables,</p> <p>4.3 modify Cookie, destroy Cookie</p> <p>4.4 Session: Introduction to sessions, Start a PHP session, session variables, modify session, destroy session</p> <p>4.5 Sending Email through PHP</p>	6	CO3
5	<p>Database Connectivity with MySQL</p> <p>5.1 Working with MySQL Admin: Working with PHP My Admin ,Types Data Type, Creating Database & Tables, Dropping Database & Tables, Adding Fields</p> <p>5.2 MySQL Connection: Establishing Connection with MySQL, Create table and Insert data to the table from PHP application, Retrieve , Update and delete data from MYSQL table and display it in PHP page</p> <p>5.3 PHP web Application: Developing a PHP web application, Deploying and Hosting a PHP Application on a server.</p>	6	CO3



6	WordPress 6.1 Installing WordPress, folder structure, creating custom pages-posts-categories and tags, uploading media, template hierarchy, Choosing, Installing and activating plugins, Themes, 6.2 WordPress hooks: actions and filters, Implementing custom home, category and posts page, Fetching data from Database using custom queries (Querying Posts) , The WordPress Loop	6	CO4
	TOTAL	32	

7. LIST OF PRACTICALS/ASSIGNMENTS/EXERCISES/TUTORIALS/DRAWINGS

Term Work consists of Journal containing minimum 10 experiments/assignments with approx. no of hours required and corresponding CO attained are specified here:

Sr. No.	Title/Aim	Approx. Hrs required	COs
01	To Install and Set up XAMPP to run a HelloWorld PHP script	2	CO1
02	To develop user defined functions in PHP	2	CO1
03	To manipulate arrays and strings	2	CO1
04	To implement Inheritance and handle Exceptions in PHP	6	CO2
05	To extract form fields from an HTML form using \$_GET, \$_POST, \$_REQUEST methods.	4	CO3
06	To create, modify and destroy cookies in PHP	4	CO3
07	To manage sessions in PHP	6	CO3
08	To send an Email using PHP script.	2	CO3
09	To check login of a user using MySQL database connection.	4	CO3
10	To update MySQL database through Signup/Registration process.	4	CO3
11	To develop a web application and to deploy it on the web server. (Case Study)	4	CO3
12	To install WordPress and exploring WordPress admin through creating custom pages, posts, categories, tags and themes.	4	CO4
13	To work with WordPress plugins, hooks, database custom queries and loop	8	CO4
14	Mini Project	12	All
	Total	64	

8. IMPLEMENTATION STRATEGY (PLANNING)

- i. Teaching Plan/Tutorials
- ii. Minimum no of practical/assignments/drawings etc.
- iii. Guest/Expert lectures
- iv. Demonstrations/Simulations
- v. Slides
- vi. Group discussions
- vii. Self-Learning Online Resources




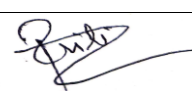


9. LEARNING RESOURCES

Sr. No.	Title Of Book	Author	Publication
1.	The Joy of PHP	Alan Forbes	Plum Island Publishing LLC
2.	PHP: A Beginner's Guide	Vikram Vaswani	McGraw-Hill Education
3.	Learning PHP, MySQL & JavaScript with j Query, CSS & HTML	Robin Nixon	O'Reilly
4.	Building Web Apps with WordPress	Brian Messe Lehner and Jason Coleman	O'Reilly

10. WEB REFERENCES

1. <https://www.guru99.com/php-tutorials.html>
2. <https://www.phptpoint.com/php-tutorial/>
3. <https://www.javatpoint.com/php-tutorial>
4. <https://www.tutorialspoint.com/php/index.htm>

11. COURSE EXPERT COMMITTEE MEMBERS

Sr. No.		NAME	SIGNATURE
1	Internal	Mr.Manish R.Solanki	
2	Internal	Ms. Priti P. Bokariya	
3	Internal	Mr Pratik H. Shah	
4.	External	Mr. Sandeepraj Bhandari, SRES DBOI, Pune	



1. COURSE DETAILS

Programme: Information Technology
Course: #Fibre Optic Communication
Course Code: FOC190907

Semester: V
Group: A*
Duration:16 Weeks

2. TEACHING AND EXAMINATION SCHEME

Scheme of Instructions and Periods per Week					Examination Scheme and Maximum Marks								
Theory Hrs L	Practical Hrs P	Drawing Hrs D	Tutorial Hrs T	Credits (L+P+D+T)	Theory Paper Duration and marks(ESE)		SSL	TA	TH	TW	PR	OR	TOTAL
					Hours	Marks							
3	2	-	-	5	3	70	20	10	70	50	--	50	200

3. COURSE OBJECTIVE

This Course introduces communication techniques to the students to deploy fiber optic technology as it enhances network speed and acts as the backbone of today's communication system. The Bandwidth, Cost, and quality of signal are the major reasons for using fiber optic technology for the present wired communication network. This Course will include fundamentals and properties of Fiber, use of a transmitter, receiver, optical components and networks.

4. SKILL COMPETENCY

The aim of this course is to help the students to attain the following industry identified competency through various teaching learning experiences:

- Use the principles of optical communication systems, identify the components and maintain optical communication networks.

5. COURSE OUTCOMES(COs) At the end of the semester student will be able to: -

CO No.	COURSE OUTCOME	Bloom's LEVEL
CO1	Interpret the characteristics of light propagation in Fiber optics and functions of the various blocks of optical fiber communication system and	Understand
CO2	Measure the losses associated with fiber and Dispersion.	Application
CO3	Identify suitable optical source, optical detector, Cables and connectors for the given application	Understand Application
CO4	Acquaint with the concept of optical network, Multiplexing and Demultiplexing techniques and optical amplifiers.	Remember, Understand



6. COURSE CONTENTS

Sr. No.	TOPIC/ Sub-Topics	Hours	Marks	COs
1	Fundamentals of Fibre Optics 1.1 Electromagnetic spectrum: optical band and its range. Wavelength and Optical windows 1.2 Block diagram of Optical fiber communication system 1.3 Advantages, disadvantages and application of Fiber Optic communication 1.4 Physics Principles - Basic Optical Laws of light Reflection, Refraction 1.5 Ray theory – Snell’s law, definition and concept of Critical angle, numerical aperture, acceptance angle and acceptance cone - (Numerical on above concepts) Total Internal Reflection 1.6. Construction of Fiber optic cable 1.7. Classification of fibres - Step index single mode fibre, step index Multimode fibre, Graded index fibre. 1.8. Refractive Index profile, Standard dimensions. Number of modes 1.9. Advantages, disadvantages of single mode, multimode fibre.	10	12	CO1
2	Transmission Properties of optical Fibre 2.1. Attenuation 2.2. Fibre losses – material absorption, scattering and bending losses 2.3. Dispersion in fibre- intra (material and waveguide) modal, intermodal dispersion	6	10	CO2
3	Optical Fibre Cable 3.1. Fibre materials, fibre selection, 3.2. Optical fibre cable Manufacturing process - perform and fibre drawing process. 3.3. Part of fibre cable, types of Cables – Indoor cables, Breakout, Ribbon, Outdoor, Aerial, Tightly Buffered loose Tube, typical cables with Duty Specification, Environment and Applications, Cable Laying process.	6	8	CO3
4	Optical sources and detectors 4.1. Transmission 4.2. optical Sources - Basic concept of optical absorption and emission of radiations from semiconductor material, Population inversion, Energy level diagrams 4.3 Principle of working, Constructions and types of LED: Edge emitting LED and Surface emitting LED 4.4 Principle of working, Constructions of semiconductor injection LASERs, Hetero junctions structures and characteristics 4.5. Receiver – Basic detection Principle, Absorption coefficient , Quantum efficiency, responsively, cut-off wavelength, Photo 4.6 Detectors (PN diode, PIN diode, avalanche photo diode)	8	12	CO3
5	Optical Components / Devices 5.1 Splicing techniques- Fusion splice, Mechanical splice : V-groove splice and elastic tube splice 5.2 Fiber connectors- Fiber connectors and its types 5.3 Fiber Couplers. Classification	6	8	CO3



6	Optical Measurements and Instruments 6.1 Optical bandwidth, Decibels, Bit Error Rates. 6.2. Fibre Continuity test, Optical Power Metres 6.3 OTDR block diagram, working principle. Functions and applications 6.4 Concept of Link loss & optical power budget	6	12	CO4
7	Optical Networks 7.1 Need for Optical network and its advantages 7.2 Basic concept and classification of optical amplifiers 7.3 Basic concept of WDM and DWDM 7.4 Basic concept and architecture of SONET /SDH network. 7.5 Ethernet standard with respect to optical network	6	8	CO4
	TOTAL	48	70	

7. LIST OF PRACTICALS/ASSIGNMENTS

Term Work consists of a Journal containing minimum 10 experiments/assignments with approx. no of hours required and corresponding CO attained are specified here:

Sr. No.	Title of Experiment	Approx. Hrs required	COs
1.	Setting Up Fiber optics Analog link.	2	CO1
2.	Setting Up Fiber optics Digital link.	2	CO1
3.	Measurement of Numerical aperture and acceptance angle by manual method	2	CO1
4.	Measurement of Numerical aperture and acceptance angle using Module	4	CO1
5.	Measurements of end gap displacement coupling losses in optical fibre Using Module	2	CO1
6.	Measurements of lateral displacement coupling losses in optical fibre Using Module	2	CO1
7.	Calculate the cable attenuation from the fibre end while increasing the length of the fibre cable	4	CO2
8.	Demonstrate the structure of optical fibre cables and different types of cables of optical fibre	2	CO2
9.	Illustrate different Light sources for optical fibre communication	2	CO2
10	Illustrate different Light detectors for optical fibre communication.	2	CO2
11	Analysis trace using optical power Optical Time Domain Reflectometer (OTDR) meter simulation software.	4	CO2
12	To prepare and present comparison of WDM, DWDM and SONET Frame	2	CO4
13	Evaluate and present total attenuation of link power budget for a given optical fiber link.	2	CO3
	TOTAL	32	



8. IMPLEMENTATION STRATEGY(PLANNING)

In depth study and understanding of the course will be implemented by adoption of the following strategy:

1. Conducting lectures as per the teaching plan and conduction tutorials.
2. Use of PowerPoint presentations / demonstration during theory class and practical periods
3. Minimum 10 no's of practical to be conduct.
4. Guest/Expert lectures
5. Self-Learning Online Resources

9. LEARNING RESOURCES

Sr. No.	Title Of Book	Author	Publication
1.	Optical Fiber Communications Principles and practice	Senior John M.	Pearson Education Limited,
2.	Fiber Optic Communication	Kieser Gerd	Mc Graw Hill Higher Education,
3	Data communication and networking.	Forouzan Behrouz A	Mc Graw Hill Higher Education





10. WEB REFERENCES

1. https://www.rp-photonics.com/passive_fiber_optics.html
2. <https://www.cableorganizer.com/learning-center/articles/fiber-optic-tutorials.html>
3. <https://vlab.amrita.edu/>
4. <https://www.vlab.co.in/broad-area-physical-sciences>
5. <http://ofcvlab.vesit.ves.ac.in/>
6. <http://lo-au.vlabs.ac.in/laser-optics/>
7. <https://fiberu.org/>
8. <https://onlinecourses.nptel.ac.in>

11. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Sr No	Topic	Distribution of Theory Marks			
		R level	U Level	A level	Total Marks
1	Fundamentals of Fibre Optics	4	4	4	12
2	Transmission Properties of optical Fibre	4	4	2	10
3	Optical Fibre Cable	2	2	4	8
4	Optical sources and detectors	4	4	4	12
5	Optical Components / Devices	2	2	4	8
6	Optical Measurements and Instruments	4	4	4	12
7	Optical Networks	2	4	2	8
	Total	22	24	24	70

12. COURSE EXPERT COMMITTEE MEMBERS

Sr. No.	NAME	SIGNATURE
1	Mr Abhijit Dongaonkar	
2	Mrs Prachi Arora	
3	Mr Siddhesh Masurakar	
4	Mrs Kaveri Sawant Incharge HOD, Universal College of Engineering	



1. COURSE DETAILS

Programme: Information Technology	Semester: V
Course: Information Theory and Coding	Group: C*
Course Code: ITC190908	Duration:16 Weeks

2. TEACHING AND EXAMINATION SCHEME

Scheme of Instructions and Periods per Week					Examination Scheme and Maximum Marks								
Theory Hrs L	Practical Hrs P	Drawing Hrs D	Tutorial Hrs T	Credits (L+P+D+T)	Theory Paper Duration and marks(ESE)		SSL	TA	TH	TW	PR	OR	TOTAL
					Hours	Marks							
3	2	-	-	5	3	70	20	10	70	50	-	50	200

3. COURSE OBJECTIVE

The aims of this course are to introduce the principles and applications of information theory and how information is measured in terms of probability and entropy. This course also gives the idea about file formats, various compression techniques so that student can have knowledge about image compression, video compression and codec algorithms.

4. SKILL COMPETENCY

The aim of this course is to help the students to attain the following industry identified competency through various teaching learning experiences:

- Compute the entropy encoding and decoding techniques
- Implement the different algorithms and improve their programming skills.
- Differentiate between still image compression and video compression.
- Identify different types of formats and its use.

5. COURSE OUTCOMES(COs) At the end of the semester student will be able to: -

CO. No.	COURSE OUTCOME	Bloom's LEVEL
CO1	Describe the digital communication system and its components	Remember, understand
CO2	Compute Entropy and implement different encoding and decoding Techniques.	Remember, understand Application
CO3	Use Image Compression and decompression Techniques	Remember, understand Application
CO4	Use various file formats and Text , Audio & MIDI	Remember, understand Application
CO5	Use Video Compression and Decompression techniques	Remember, understand Application



6. COURSE CONTENTS

Sr. No.	TOPICS/ Sub-Topics	Hours	Marks	COs
1	INFORMATION THEORY 1.1 Information – Entropy, Information rate, units of information 1.2 Digital communication ,block diagram and its description 1.3 Data and information difference 1.4 Shannon’s Theorem for noisy channel 1.5 Concept of compression and decompression	8	10	CO1
2	ENTROPY ENCODING ALGORITHMS 2.1 Entropy calculation 2.2 Arithmetic encoding algorithm 2.3 Huffman encoding algorithm 2.4 Run length encoding algorithm 2.5 LZW compression algorithm	6	10	CO2
3	IMAGE COMPRESSION / DECOMPRESSION 3.1 Need, Types, Introduction to Standardization of Algorithm, Source, Entropy and Hybrid Encoding 3.2 JPEG-objectives, Architecture 3.3 JPEG-DCT encoding Quantization 3.4 JPEG-statistical coding 3.5 JPEG LS- Block diagram, predictive encoding 3.6 Basics of JPEG 2000	10	15	CO3
4	TEXT, AUDIO AND SPEECH 4.1 Text. Font face, character set, hyper text 4.2 sound: Nature of sound, Pitch & frequency, loudness & amplitude, dynamic and bandwidth 4.3 Computer representation of sound, audio file format, audio hardware and software 4.4 MIDI data, MIDI files, MIDI S/W, MIDI Sound Attributes 4.5 MIDI Protocol, MIDI v/s digital audio.	6	10	CO4
5	FILE FORMATS 5.1 Data and File Format Standards, PNG, 5.2 BMP, bmp header, bitmap info header, bitmap compression. 5.3 TIFF, TIFF File Format 5.4 RTF, rich text format 5.5 RIFF, Organization of RIFF Chunks, RIFF Waveform Audio File Format 5.6 GIF, GIF File Data Blocks, GIF file organization, 5.7 AVI-file format 5.8 MP3-MP4 and WAV format.	10	15	CO4
6	VIDEO COMPRESSION / DECOMPRESSION 6.1 Need of video compression Types 6.2 Spatial Compression, Motion Compression Temporal Compression. 6.3 Introduction to Standardization of Algorithm for video compression / decompression MPEG standard. 6.4 MPEG-objectives, Architecture, BIT stream syntax performance 6.5 MPEG2, MPEG4, MPEG7 and MPEG 21	8	10	CO5
	TOTAL	48	70	



7. LIST OF PRACTICALS/ASSIGNMENTS

Term Work consists of Journal containing minimum 10 experiments/assignments with approx. no of hours required and corresponding CO attained are specified here:

Sr. No.	Title of Experiment	Approx. Hrs required	CO
1.	To Implement Entropy calculation using programming Language	2	CO1, CO2
2.	To Implement arithmetic encoding algorithm	2	CO2
3.	To Implement arithmetic decoding algorithm	2	CO2
4.	To Implement Huffman encoding algorithm	2	CO2
5.	To Implement run length encoding algorithm	2	CO2
6.	To Implement LZW compression algorithm	4	CO2
7.	To Implement Conversion of audio file into wave file.	2	CO4
8.	To prepare and present comparison of lossy and lossless compression techniques	2	CO3
9.	To prepare and present comparison JPEG and JPEG LS image compression standard.	2	CO3
10.	To prepare and present comparison JPEG and JPEG 2000 image compression standard.	2	CO3
11.	To prepare and present comparison of MPEG, MPEG 2, MPEG 4 compression standard.	2	CO5
12.	To prepare and present comparison of MPEG 7 and 21 compression standard.	2	CO5
13.	To prepare and present comparison of TIFF and RIFF file formats.	2	CO4
14.	To prepare and present comparison of GIF and PNG file formats.	2	CO4
15.	To prepare and present comparison of BITMAP and JPEG file formats.	2	CO4
	Total	32	

8. IMPLEMENTATION STRATEGY (PLANNING)

In depth study and understanding of the subject will be implemented by adoption of the following strategy:

1. Conducting lectures as per the teaching plan.
2. Use of PowerPoint presentations/demonstrations during theory classes and practical periods.
3. Implementation of Minimum 5 Algorithms of encoding decoding techniques using C/C++/JAVA Language.
4. Guest/Expert lectures.
5. Assignments on examples of algorithms
6. Presentations on study experiments.
7. Self-Learning Online Resources



9. LEARNING RESOURCES

Sr. No.	Title Of Book	Author	Publication
1.	Information Theory, Coding and Cryptography.	R Bose	Tata McGraw Hill TMH2007
2.	Multimedia Communications: Applications, Networks, Protocols and Standards	Fred Halsall	Pearson Education Asia, 2002
3.	Multimedia system Design	Prabhat K. Andheigh, Kiran Thakkar, John F.	Prentice Hall of India
4.	Multimedia System	Koegel Buford	Pearson Education.
5.	Multimedia Communication Directions and Innovations	J.D.GIBSON	Academics Press, Hard court India.


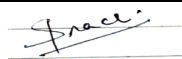


10. WEB REFERENCES

1. <http://ee.stanford.edu>
2. <http://www.inference.phy.com.ac.vk/mackay/itprnn/slides>
3. <http://en.wikipedia.org>
4. <http://www.studymode.com>
5. <http://www.slideshare.net>
6. <http://ee.stanford.edu>
7. <http://www.inference.phy.com.ac.vk/mackay/itprnn/slides>
8. <http://en.wikipedia.org>
9. <http://www.studymode.com>

11. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Sr No	Topic	Distribution of Theory Marks			
		R level	U Level	A level	Total Marks
1	Information theory	4	4	-	8
2	Entropy encoding algorithms	2	2	8	12
3	Image compression / decompression	5	6	4	15
4	Text, audio and speech	2	4	4	10
5	File formats	5	6	4	15
6	Video compression / decompression	4	6	-	10
TOTAL		22	28	20	70

12. COURSE EXPERT COMMITTEE MEMBERS

Sr. No.	NAME	SIGNATURE
1	Mrs Neeta Kadukar	
2	Mrs Prachi Arora	
3	Mrs Krishna Bhatt	
4	Mrs. Vaishali Rane HOD, Thakur Polytechnic, Mumbai	



1. COURSE DETAILS

Programme: Information Technology
Course: #Mobile Application Development
Course Code: MOB190909

Semester: V
Group: C*
Duration:16 Weeks

2. TEACHING AND EXAMINATION SCHEME

Scheme of Instructions and Periods per Week					Examination Scheme and Maximum Marks								
Theory Hrs L	Practical Hrs P	Drawing Hrs D	Tutorial Hrs T	Credits (L+P+D+T)	Theory Paper Duration and marks(ESE)		SSL	TA	TH	TW	PR	OR	TOTAL
					Hours	Marks							
4	2	-	-	6	3	70	20	10	70	50	-	50	200

3. COURSE OBJECTIVE

This course will help students to apply basic Android programming. After completing the course students will be able to build a moderate level mobile application using Android programming.

4. SKILL COMPETENCY

The aim of this course is to help the students to attain the following industry identified competency through various teaching learning experiences:

- **Build an Android app with good User Interface and Data Management**
- **Use Cross-platform tools to build Mobile apps (Android/ iOS).**

5. COURSE OUTCOMES(COs) At the end of the semester student will be able to: -

CO No.	COURSE OUTCOME	Bloom's LEVEL
CO1	Install and Set up Android studio Development Environment, standard development Kit (SDK) and Android virtual machine	Remember, Understand
CO2	Develop Android apps using the Android Application programming interface.	Application
CO3	Build Android app using UI controls with Data Management	Application
CO4	Create a cross platform application.	Application



6. COURSE CONTENTS

Sr. No.	TOPICS/ Sub-Topics	Hours	Marks	COs
1	Introduction to Android 1.1 Android Overview, Features of Android 1.2 Install and Setup Android Studio / Eclipse IDE, SDK Manager, Set-up Android SDK 1.3 Introduction to Android internal Architecture, Libraries, Runtime – Dalvik Virtual Machine (DVM), Java virtual Machine (JVM) Application Framework, Application Components	8	10	CO1
2	Build your first Android app 2.1 Create an Android project 2.2 Android Project structure 2.3 Basic of UI design XML 2.4 Manifest file , java code, App resources 2.5 Build Hello world app 2.6 Set up Virtual Device and Run Application 2.7 Concept LogCat for Debugging	8	8	CO2
3	Introduction to Activities & Intent 3.1 Introduction to Activity Class. 3.2 The Activity Lifecycle, methods and Concept of backstack 3.3 Intents , types of Explicit, Implicit Intent Filters 3.4 StartActivity and StartActivityFor Results methods 3.5 Permissions	10	12	CO2
4	User Interface & Navigation 4.1 User Interface Layouts, UI Controls, Event Handling 4.2 Custom components View 4.3 Notifications Overview, Create notification, Start an Activity From a Notification 4.4 Alarm Manager ,toast message	8	10	CO3
5	Data Management & App data 5.1 Data and file storage overview 5.2 Save files on device storage , Internal, External file storage 5.3 Save key-value data: Shared preferences 5.4 Save data in a local database using SQLite 5.5 Sharing simple data, Sharing files with Bluetooth, NFC	10	12	CO3
6	Media & Telephony 6.1 Working with Media, Audio, video, speech 6.2 camera, Hardware sensors, 6.3 Bluetooth, NFC, Networks and Wi-Fi, 6.4 Maps, location based services, Telephony, SMS and Email	10	08	CO3
7	Cross Platform Tools 7.1 Features, Installation and configuration of cross platform tool i.e. flutter, Dart 7.2 Creating Hello World Application Architecture, building layouts, deployment of app on android/IOS	10	10	CO4
	TOTAL	64	70	



7. LIST OF PRACTICALS/ASSIGNMENTS

Term Work consists of a Journal containing minimum 10 experiments/assignments with approx. no of hours required and corresponding CO attained are specified here:

Sr. No.	Title of Experiment	Approx. Hrs required	COs
1.	Download, Install and configure Android studio/ Eclipse IDE and Setup Android SDK	2	CO1
2.	Create a “Hello World” application. That will display “Hello World” in the middle of the screen in the Blue color with white background.	2	CO2
3.	Build a user interface using UI components such as Layout, TextBox, Button, List, checkbox and Date,time picker etc	2	CO3
4.	Write an android program to implement an activity called from another activity.	2	CO2
5.	Create a login application where you will have to validate UserName (Email ID) and Password (minimum 6 characters). Till the username and password is not validated, the login button should remain disabled.	2	CO2
6.	Create an Android app to demonstrate Activity Lifecycle using navigation between three activities.	2	CO2
7.	Apply concept of content providers and permissions to Read phonebook contacts using content providers and display in list.	2	CO2
8.	Create an application to implement concept of share preferences by using the EditText	2	CO3
9.	Develop a program to implement Toast Message	2	CO2
10.	Develop a program to implement Maps	2	CO2
11.	Create an application that will play a media file from the memory card	2	CO3
12.	Create an Android application to make Insert, update, Delete and retrieve operations on the database (SQLite).	2	CO3
13.	Build an Android application to resolve Content Provider and Content resolver concepts to share data among different android apps.	2	CO3
14.	Creating a simple repeating alarm system with the use of AlarmManager. Alarm will start after 2 minutes.	2	CO2
15.	Build mobile app (Android/ iOS) using Cross platform tool to display “Hello World “ Message	2	CO4
16.	Build customize mobile app (Android/ iOS)using Cross platform tool	2	CO4
	TOTAL	32	

8. IMPLEMENTATION STRATEGY(PLANNING)

In depth study and understanding of the subject will be implemented by adoption of the following strategy:

1. Conducting lectures as per the teaching plan and conduction tutorials.
2. Use of PowerPoint presentations / demonstration during theory class and practical periods
3. Minimum 10 no’s of practical’s
4. Guest/Expert lectures
5. Demonstrations of Android projects
6. Self-Learning Online Resources from <http://developer.Android.com>



9. LEARNING RESOURCES

Sr. No.	Title Of Book	Author	Publication
1.	Android Cookbook	Ian Darwin	O'reilly Media
2.	Professional Android 4 Application Development	Reto Meier	John Wiley & son
3.	Android Mobile Application Development using Kotlin	Dr. Iyad Abu Doush	BookAuthority
4.	Programming Flutter: Native, Cross-Platform Apps the Easy Way	Carmine Zaccagnino	Pragmatic Programmers





10. WEB REFERENCES

1. <https://developer.android.com/guide>
2. <https://www.javatpoint.com/android-tutorial>
3. <https://www.tutorialspoint.com/android/index.htm>

11. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Sr No	Topic	Distribution of Theory Marks			
		R level	U Level	A level	Total Marks
1	Introduction to Android	4	6	-	10
2	Build your first Android app	2	2	4	8
3	Introduction to Activities & Intent	2	4	6	12
4	User Interface & Navigation	2	4	4	10
5	Data Management & App data	2	4	6	12
6	Media & Telephony	2	2	4	8
7	Cross Platform Tools	2	4	4	10
	Total	16	26	28	70

12. COURSE EXPERT COMMITTEE MEMBERS

Sr. No.		NAME	SIGNATURE
1	Internal	Mr Abhijit Dongaonkar	
2	Internal	Mr Manish Solanki	
3	Internal	Mrs Prachi Arora	
4	External	Mr Suraj Singh, Solution Architect/Technical Consultant Director at Samvid Information Services (OPC) Pvt. Ltd., Mumbai, India	



1. COURSE DETAILS

Programme: CSE/IT

Course: #Network Administration

Course Code: NWA198921

Semester: V/V

Group: A*/A*

Duration:16 Weeks

2. TEACHING AND EXAMINATION SCHEME

Scheme of Instructions and Periods per Week					Examination Scheme and Maximum Marks								
Theory Hrs L	Practical Hrs P	Drawing Hrs D	Tutorial Hrs T	Credits (L+P+D+T)	Theory Paper Duration and marks(ESE)		SSL	TA	TH	TW	PR	OR	TOTAL
					Hours	Marks							
2	4	-	-	6	3	70	20	10	70	50	-	50	200

3. COURSE OBJECTIVE

This Course will help the students to comprehend the fundamentals of network administration and tools. This course will also familiarize the students in details of ADS and network security.

4. SKILL COMPETENCY

The aim of this course is to help the students to attain the following industry identified competency through various teaching learning experiences:

- **Configure ADS and DHCP**
- **Install and use network monitoring tools**
- **Network Troubleshooting**

5. COURSE OUTCOMES (COs) at the end of the semester student will be able to: -

CO No.	COURSE OUTCOME	Bloom's LEVEL
CO1	Identify and use various network devices, connectors, topologies, communication basics.	Remember, Understand, Apply
CO2	Implement security for network by understanding internal external threats, wired & wireless security, Kerberos, PGP, SMTP, S_MIME	Remember, Understand
CO3	Install and configure network printer, network administration ,monitoring tools	Apply
CO4	Install windows server edition n configure ADS/DHCP	Apply



6. COURSE CONTENTS

Sr. No.	TOPICS/ Sub-Topics	Hours	Marks	COs
1	Introduction to network 1.1. Network hardware 1.2 Network topology 1.3 Network media	02	06	CO1
2	Network administrator 2.1 Network related jobs 2.2 Network architecture/designer 2.3 Administrator responsibility 2.4 Duties of network engineer	04	10	CO1
3	Network Management Models 3.1 RARP, BOOTP 3.2 DHCP 3.3 DNS 3.4 Network printing 3.5 Printer sharing	06	10	CO4
4	Information models and directories services 4.1 Architecture 4.2 Types of directories services 4.3 LDAP, information models 4.4 ADS	04	10	CO4
5	Network Administration tools 5.1. Web based tools for System and network analysis-ShareEnum, NTFS Permissions Explorer, TcpView, WireShark, Look@LAN etc. 5.2. NetStat, PortScan, HostAlive, TraceRoute and Ping, Network analyzer , NetCat, win dump,Nmap	04	10	CO3
6	Server and network Monitoring tool 6.1. Introduction of server monitoring 6.2. Server monitoring tool 6.3. Introduction server monitoring, local server monitoring and log files, open source and proprietorships third party software /tool case studies: HP Open View and Tivoli. 6.4. Need, features ,case studies : Microsoft Network Monitor, Nagios	04	10	CO3
7	Security 7.1. Wired/wireless – 7.2. Firewalls : concept, design principles, limitations, trusted systems, Kerberos - concept 7.3. Security topologies – security zones, DMZ, Internet, Intranet, VLAN, security implication 7.4. Email security : Email security standards : Working principle of SMTP, PEM, PGP, S/MIME, spam	08	14	CO2
	TOTAL	32	70	



7. LIST OF PRACTICALS/ASSIGNMENTS/EXERCISES/TUTORIALS/DRAWINGS

Term Work consists of Journal containing minimum 16 experiments/assignments with approx. no. of hours required and corresponding CO attained are specified here:

Sr. No.	Title of Experiment/Assignment/Exercise/Tutorial/Drawings	Approx. Hrs required	COs
1.	Install Network Packet Tracer	02	CO1
2.	To configure WAN	04	CO1
3.	To create network cable using RJ-45 connectors	04	CO1
4.	To install a network interface card (NIC) & locate MAC address of computer.	02	CO1
5.	To perform network commands- NetStat, PortScan, HostAlive, TraceRoute and Ping, NetCat	04	CO3
6.	Installing and configuring DHCP and DNS	04	CO4
7.	Installing Windows 2003 Server	02	CO3
8.	Demonstration on installation of Active Directory	02	CO4
9.	To Create user/Group in Active Directory Service	04	CO4
10.	Demonstration on Wireshark	02	CO2
11.	Understanding Wireshark working with filters, menu options	04	CO2
12.	To install a network printer - Windows 2008	02	CO3
13.	To configure VLAN on Network packet tracer	04	CO1
14.	Demonstration on Network monitoring tool - TNM	02	CO3
15.	Demonstration on Nagios	02	CO3
16.	Installing IIS, making web server, web directory, connection via remote desktop, to know browsers	04	CO2
17.	Execution of WinDump / TCPDump, WiFiMan, SysFiles, EmailVerify, etc	04	CO3
18.	Demonstration on Kerberos	04	CO2
19.	To identify different problems of network example- no network, card problem, cable problem, IIS problem	04	CO1, CO2
20.	To implement security algorithms	04	CO2
	Total	64	

8. IMPLEMENTATION STRATEGY (PLANNING)

1. Teaching Plan/Tutorials
2. Minimum no of practical/assignments/drawings etc.
3. Demonstrations
4. Slides
5. Self-Learning Online Resources

9. LEARNING RESOURCES

Sr. No.	Title Of Book	Author	Publication
1.	The Complete Reference Networking	Craig Zacker	Tata McGraw-Hill Education
2.	Networking A Beginner's Guide	Bruce Hallberg	Tata McGraw-Hill Education
3.	Introduction to Networking	Richard A. McMohan, Sir	Tata McGraw-Hill Education
4.	Microsoft Press ,MCSE Training Kit , Networking Essential Plus	Microsoft Press Staff	Microsoft Press



10. WEB REFERENCES

1. <http://www.nmap.org>.
2. <http://www.tamos.com>
3. <http://www.gfi.com/blog/101-free-admin-tools>

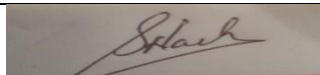
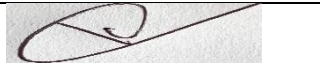
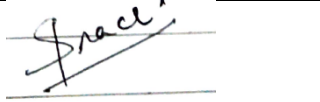
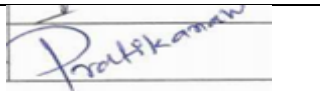
11. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Sr. No.	TOPIC	Distribution of Theory Marks			
		R Level	U Level	A Level	Total Marks
1.	Introduction to network	2	2	2	6
2.	Network administrator	2	4	4	10
3.	Network management models	2	2	6	10
4.	Information models and directory services	2	2	6	10
5.	Network Administration tools	-	4	6	10
6.	Server and network Monitoring tool	-	4	6	10
7.	security	4	4	6	14
TOTAL		12	22	36	70

R Remembering, U Understanding, A Applying, (Bloom's revised taxonomy levels

NOTE: This specification table provides general guidelines to assist students for their learning and to teachers to teach and assess students with respect to attainment of COs. The actual distribution of marks at different taxonomy levels (R, U, A) in the question paper may vary from above table.

12. COURSE EXPERT COMMITTEE MEMBERS

Sr. No.		NAME	SIGNATURE
1	Internal	Mrs. Swapna Naik	
2	Internal	Mrs. Krishna Bhatt	
3	Internal	Mrs. Prachi Arora	
4	External	Mr. Pratik Kanani Asst. Professor, DJSCOE	



1. COURSE DETAILS

Programme: Information Technology
Course: #Python Programming (ML)
Course Code: MLP190910

Semester: V
Group: A*
Duration:16 Weeks

2. TEACHING AND EXAMINATION SCHEME

Scheme of Instructions and Periods per Week					Examination Scheme and Maximum Marks								
Theory Hrs L	Practical Hrs P	Drawing Hrs D	Tutorial Hrs T	Credits (L+P+D+T)	Theory Paper Duration and marks(ESE)		SSL	TA	TH	TW	PR	OR	TOTAL
					Hours	Marks							
4	2	-	-	6	3	70	20	10	70	50	50	-	200

3. COURSE OBJECTIVE

Machine learning is a branch of artificial intelligence based on the idea that systems can learn from data, identify patterns and make decisions with minimal human intervention. This course will serve as a comprehensive introduction to various topics in machine learning. At the end of the course the students should be able to design and implement machine learning solutions to classification, regression, and clustering problems; and be able to evaluate and interpret the results of the algorithms.

4. SKILL COMPETENCY

The aim of this course is to help the students to attain the following industry identified competency through various teaching learning experiences:

- **Execute machine learning algorithms on data sets to get better insight.**
- **Perform evaluation of machine learning algorithm and model.**

5. COURSE OUTCOMES (COs) at the end of the semester student will be able to: -

CO No.	COURSE OUTCOME	Bloom's LEVEL
CO1	Recognize the need of machine learning in real-world problems and classify machine learning algorithms.	Remember, Understand
CO2	Use machine learning libraries effectively.	Remember, Understand, Apply
CO3	Implement Supervised Learning algorithms.	Remember, Understand, Apply
CO4	Implement Un Supervised Learning algorithms.	Remember, Understand, Apply



6. COURSE CONTENTS

Sr. No.	Topics/ Sub-Topics	Hours	Marks	COs
1	Introduction to Machine Learning 1.1 Introduction, Need of Machine Learning 1.2 Categories of Machine Learning i.e. Supervised Learning, Unsupervised Learning, Semi Supervised Learning, Reinforcement Learning. 1.3 Machine Learning Basic Concepts i.e. count, mean, median, mode, standard deviation, importing data, model, training a model, testing a model, accuracy, precision, recall, etc. 1.4 Online Resources for downloading datasets for Machine Learning 1.5 Applications of Machine Learning	10	10	CO1
2	Machine Learning Essential Libraries 2.1 NumPy: Arrays, ndarray, operations, Random Number Generation 2.2 SciPy: Mathematical constants and functions, Statistical functions, Linear Algebra, I/P and O/P of data 2.3 Matplotlib: Plots, Histograms, Error charts, Power spectra, Bar charts, Scatter Plots 2.4 Pandas: Reading from files with CSV, XLSX, TXT among other formats, aligning data and dealing with missing data DataFrame, Filtering data around a condition, Analyzing time series 2.5 Seaborn: Importing Libraries, Importing Datasets, Color Pallet, Statistical Estimation, Categorical Plots 2.6 Scikit-Learn: Importing Data, training and testing data, algorithm functions	22	20	CO2
3	Supervised Learning 3.1 Regression: Correlation, Linear Regression, Non-linear Regression, Logistic Regression 3.2 K-Nearest Neighbour: Working, Choosing K, algorithm and Implementation 3.3 Decision Trees: Expressiveness, boundary, calculating information gain, algorithm and implementation 3.4 Naïve Byes: Probability, Conditional Probability, Naïve Byes Theorem, algorithm and implementation 3.5 Support Vector Machines: separable case, non-separable case, Linear SVM, algorithm and implementation 3.6 Model Evaluation 3.7 Problem Statements	20	25	CO3
4	Unsupervised Learning 4.1 K-Means Clustering: reading data, initializing means, Euclidean Distance, classify items, find means, find clusters, algorithm and implementation 4.2 Hierarchical Clustering: Deciding clusters, selecting centroids, assigning points to the nearest cluster centroids, Calculate the centroid of newly formed clusters, algorithm and implementation 4.3 Model Evaluation 4.4 Problem Statements	12	15	CO4
	TOTAL	64	70	



7. LIST OF PRACTICALS/ASSIGNMENTS/EXERCISES/TUTORIALS/DRAWINGS

Term Work consists of a Journal containing minimum 10 experiments/assignments with approx. no of hours required and corresponding CO attained are specified here:

Sr. No.	Title/Aim	Approx. Hrs required	COs
01	To calculate mean, median, mode and standard deviation of a statistical data using Python.	2	CO1
02	To perform the basic array operations with the Numpy Library.	2	CO2
03	To practice dataframe and file operations with the pandas library.	4	CO2
04	To visualize data using the matplotlib library and seaborn visualization commands.	2	CO2
05	To perform data cleaning and transformation operations using the Numpy and pandas libraries.	2	CO2
06	To predict housing prices on Boston Housing Price Prediction Dataset using linear regression.	2	CO3
07	To perform grouping of flower varieties on the iris dataset using K-Nearest Neighbors.	2	CO3
08	To predict whether a customer will default or not on the credit card dataset using logistic regression.	2	CO3
09	To predict whether a customer will default or not on the credit card dataset using Decision Trees.	2	CO3
10	To predict whether a customer will default or not on the credit card dataset using Naïve Bayesian Classifier.	2	CO3
11	To predict flower species on the iris dataset using Support Vector Machine Classifier.	2	CO3
12	To perform grouping of flowers into flower species on the iris dataset using k-means clustering.	2	CO4
13	To perform grouping of flowers into flower species on the iris dataset using hierarchical clustering.	2	CO4
14	Mini Project: Choose either a supervised or unsupervised learning problem. Obtain the dataset for it and solve the problem using the algorithms taught as a part of the syllabus. The cleaning operations should be chosen wisely by the student.	4	All
	TOTAL	32	

8. IMPLEMENTATION STRATEGY (PLANNING)

1. Teaching Plan/Tutorials
2. Minimum no of practical/assignments/drawings etc.
3. Guest/Expert lectures
4. Demonstrations/Simulations
5. Slides
6. Group discussions
7. Self-Learning Online Resources



9. LEARNING RESOURCES

Sr. No.	Title Of Book	Author	Publication
1.	Python for Data Analytics	Wes McKinney	O'Reilly
2.	An Introduction to Statistical Learning with Applications in R (for conceptual understanding)	Gareth James Daniela Witten Trevor Hastie Robert Tibshirani	Springer
3.	Machine Learning in Action	Peter Harrington	Manning Publications
4.	Introduction to Machine Learning with Python: A Guide for Data Scientists	Andreas C. Müller, Sarah Guido	O'Reilly

10. WEB REFERENCES

- https://www.tutorialspoint.com/machine_learning_with_python/index.htm
- <https://www.geeksforgeeks.org/machine-learning/>
- <https://data-flair.training/blogs/train-test-set-in-python-ml/>
- <https://www.kaggle.com/kanncaa1/machine-learning-tutorial-for-beginners>


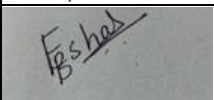
11. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Sr. No.	TOPIC	Distribution of Theory Marks			
		R Level	U Level	A Level	Total Marks
1.	Introduction to Machine Learning	5	5	-	10
2.	Machine Learning Essential Libraries	5	5	10	20
3.	Supervised Learning	5	10	10	25
4.	Unsupervised Learning	3	6	6	15
TOTAL		18	26	26	70

R Remembering, U Understanding, A Applying, (Bloom's revised taxonomy levels)

NOTE: This specification table provides general guidelines to assist students for their learning and to teachers to teach and assess students with respect to attainment of COs. The actual distribution of marks at different taxonomy levels (R, U, A) in the question paper may vary from above table.

12. COURSE EXPERT COMMITTEE MEMBERS

Sr. No.		NAME	SIGNATURE
1	Internal	Mr. Abhijit Dongaonkar	
2	Internal	Mr. Manish Solanki	
3	Internal	Mrs. Priti Bokariya	
4	External	Ms. Ekta Shah Designation & Organisation/Institute: Data Scientist, Viacom 18	



1. COURSE DETAILS

Programme: Information Technology
Course: #IOT and Applications
Course Code: IOT198927

Semester: V
Group: A*
Duration:16 Weeks

2. TEACHING AND EXAMINATION SCHEME

Scheme of Instructions and Periods per Week					Examination Scheme and Maximum Marks								
Theory Hrs L	Practical Hrs P	Drawing Hrs D	Tutorial Hrs T	Credits (L+P+D+T)	Theory Paper Duration and marks(ESE)		SSL	TA	TH	TW	PR	OR	TOTAL
					Hours	Marks							
4	2	-	-	6	3	70	20	10	70	50	-	50	200

3. COURSE OBJECTIVE

IoT (Internet of Things) is an advanced automation and analytics system which exploits networking, sensing, big data, and artificial intelligence technology to deliver complete systems for a product or service. These systems allow greater transparency, control, and performance when applied to any industry or system. IoT systems have applications across industries through their unique flexibility and ability to be suitable in any environment.

4. SKILL COMPETENCY

The aim of this course is to help the students to attain the following industry identified competency through various teaching learning experiences:

- **Develop an IOT Application.**

5. COURSE OUTCOMES (COs) at the end of the semester student will be able to: -

CO No.	COURSE OUTCOME	Bloom's LEVEL
CO1	Provide overview of concept, main trends and challenges of IOT	Remember, Understand
CO2	Develop ability to use IOT related software and hardware	Remember, Understand, Apply
CO3	Apply basic protocols in wireless sensor network	Remember, Understand, Apply
CO4	Maintain IoT applications in different domain and be able to use their performance	Understand, Apply



6. COURSE CONTENTS

Sr. No.	Topic/ Sub-Topics	Hours	Marks	COs
1	Introduction to Internet of Things 1.1 Definition of IOT 1.2 IOT Characteristics 1.3 Physical and Logical design of IOT 1.4 Functional blocks of IOT 1.5 IOT Hardware 1.6 Overview of embedded system 1.7 Communication models and APIs platforms for IOT Real time examples of IOT	12	12	CO1
2	Architectural Overview of IOT 2.1 IOT architecture – state of the art 2.2 architecture reference model , IOT reference model 2.3 Introduction to M2M 2.4 Difference between M2M and IOT , M2M value Chains, IOT value chains 2.5 M2M to IoT-An Architectural Overview– Building an architecture, Main design principles and needed Capabilities, An IoT architecture outline, standards considerations. 2.6 Emerging industrial structure for IoT.	14	12	CO2
3	IOT Sensors and Actuators 3.1 Need of sensors and actuators 3.2 Types of sensors and actuators 3.3 Types of IOT boards 3.4 Introduction to Wireless Sensor Networks 3.5 IOT protocol 3.6 Role of cloud in IOT	12	14	CO3
4	Challenges in IOT 4.1 Design challenges 4.2 Development challenges 4.3 Security challenges 4.4 Compatibility challenges 4.5 IOT security Management	06	08	CO1
5	Data management and Business Process in IOT 5.1 Data management in IOT 5.2 Business process in IOT 5.3 IOT analytics 5.4 Information distribution architecture	08	10	CO4
6	Applications of IOT 6.1 IoT applications for industry: - Future Factory Concepts - Brownfield IoT - IoT for Retailing Industry - IoT For Oil and Gas Industry - IOT for e-Health 6.2 Domain specific application – Home automation, Surveillance applications, Agriculture, smart cities.	12	14	CO4
	TOTAL	64	70	



7. LIST OF PRACTICALS/ASSIGNMENTS/EXERCISES/TUTORIALS/DRAWINGS

Term Work consists of Journal containing minimum 10 experiments/assignments with approx. no of hours required and corresponding CO attained are specified here:

Sr. No.	Title of Experiment/Assignment	Approx. Hrs required	COs
1.	To prepare a survey on various types of sensors & its application	02	CO1
2.	Classify different types of IOT platforms.	02	CO2
3.	To perform Raspberry-Pi/Arduino based program for digital read using LED	02	CO2
4.	To perform Raspberry-Pi/Arduino based program for digital write using LED	02	CO2
5.	To perform Raspberry-Pi/Arduino based program for analog read using sensor.	02	CO2
6.	To perform Raspberry-Pi/Arduino based program for analog write using sensor.	02	CO2
7.	To perform Raspberry-Pi/Arduino based program for measuring temperature and humidity in the environment using sensor. the environment using DHT11 sensor and Raspberry Pi 3.	04	CO2
8.	To demonstrate NodeMCU and its working	02	CO2
9.	WAP using ESP8266 to display alphanumeric characters on Seven Segment Display	02	CO2
10.	Introduction to MQTT and sending sensor data to cloud using Raspberry-Pi/Arduino.	04	CO2
11.	Create a web interface to control connected LEDs remotely using Raspberry-Pi/Arduino.	02	CO2
12.	Demonstrate the use of wireless sensor network simulator with the help of programs.	02	CO3
13	Case study on IOT applications for Industry	02	CO4
14	Case study on domain specific application of IOT	02	CO4
	Total	32	

8. IMPLEMENTATION STRATEGY (PLANNING)

1. Teaching Plan/Tutorials
2. Minimum no of practical
3. Assignments.
4. Slides with animation
5. Self-Learning Online Resources.



9. LEARNING RESOURCES

Sr. no.	Title of book	Author	Publication
1.	Internet of Things (A Hands-on-Approach)	Vijay Madiseti and Arshdeep Bahga	1 st Edition, VPT
2.	IoT Security Advances in Authentication	Madhusanka Liyanage, An Braeken, Mika Ylianttila	Wiley
3.	The Internet of Things Enabling Technologies, Platforms, and Use Cases	Pethuru Raj, Anupama C. Raman	CRC Press
4.	Internet of Things with ARDUINO and BOLT	Ashwin Pajankar	BPB

10. WEB REFERENCES

- <https://www.udemy.com/internet-of-things-iot-for-beginners-getting-started/>
- <https://internetofthingsagenda.techtarget.com/definition/Internet-of-Things-IoT>
- <https://www.edureka.co/blog/iot-applications/>


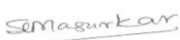

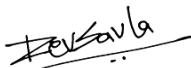
11. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Sr. No.	TOPIC	Distribution of Theory Marks			
		R Level	U Level	A Level	Total Marks
1	Introduction to Internet of Things	6	3	3	12
2	Architectural Overview of IOT	4	4	4	12
3	IOT Sensors and Actuators	2	4	8	14
4	Challenges in IOT	2	4	2	08
5	Data Management & Business process in IOT	-	4	6	10
6	Applications of IOT	2	2	10	14
TOTAL		16	21	33	70

R Remembering, U Understanding, A Applying, (Bloom's revised taxonomy levels)

NOTE: This specification table provides general guidelines to assist students for their learning and to teachers to teach and assess students with respect to attainment of Cos. The actual distribution of marks at different taxonomy levels (R, U, A) in the question paper may vary from above table.

12. COURSE EXPERT COMMITTEE MEMBERS

Sr. No.		NAME	SIGNATURE
1	Internal	Mr. Janardan Kulkarni	
2	Internal	Mr. Siddhesh Masurkar	
3	Internal	Ms. Sharyu Kadam	
4	External	Mr. Dev Savla Organization: HERE Technologies, Software Engineer	



1. COURSE DETAILS

Programme: Information Technology	Semester: V
Course: Middleware Technology	Group: A
Course Code: MIT190911	Duration:16 Weeks

2. TEACHING AND EXAMINATION SCHEME:

Scheme of Instructions and Periods per Week					Examination Scheme and Maximum Marks								
Theory Hrs L	Practical Hrs P	Drawing Hrs D	Tutorial Hrs T	Credits (L+P+D+T)	Theory Paper Duration and marks(ESE)		SSL	TA	TH	TW	PR	OR	TOTAL
					Hours	Marks							
3	2	-	-	5	3	70	20	10	70	50	50	-	200

3. COURSE OBJECTIVE

IT systems are more and more integrated with other software systems. The knowledge of integrating these systems by using middleware technologies can be a key competence for IT engineers. Middleware is commonly understood as an intermediary software layer between the application and the operating system, which encapsulates the heterogeneity of the underlying communication network, operating system or hardware platform.

This course provides details about the modern component platforms and Based on Practical examples, details about modern middleware technologies. Students get the chance to gain in-depth knowledge of popular middleware Platforms.

4. SKILL COMPETENCY

The aim of this course is to help the students to attain the following industry identified competency through various teaching learning experiences:

- **Build advance JAVA applications using server side JAVA technologies and Middleware components.**

5. COURSE OUTCOMES (COs) at the end of the semester student will be able to: -

CO No.	COURSE OUTCOME	Bloom's LEVEL
CO1	Describe the basic building blocks of various middleware technologies.	Remember, Understand
CO2	Develop a middleware component using CORBA and COM/.NET.	Remember, Understand, Apply
CO3	Construct Java based middleware components with EJB.	Remember, Understand, Apply
CO4	Build Web Service oriented middleware applications to integrate data between heterogeneous systems.	Remember, Understand, Apply



6. COURSE CONTENTS

Sr. No.	TOPIC/Subtopics	Hours	Marks	COs
1	Introduction to Object Oriented Systems 1.1. Preview of Object-orientation, Concept of distributed object systems, 1.2. Reasons to distribute for centralized objects. 1.3. Client-server system architecture, Multi-tier system architectures. 1.4. File Server, Database Server, Group Server, Object Server, Web Server.	4	8	CO1
2	Introduction to Middleware Technologies 2.1. Evolution And Development of Middleware, 2.2. Client/Server Building blocks, Remote Procedure Calls, Peer-to-Peer, 2.3. Java RMI, Message Queuing, Object Middleware, Internet Applications, 2.4. Service Oriented Architecture (SOA), 2.5. Middleware Inter-Operability.	6	8	CO1
3	CORBA 3.1. Distributed Systems, Purpose, Exploring CORBA alternatives, 3.2. Architecture overview, CORBA and networking model, CORBA object model, IDL, ORB, 3.3. Building an application with CORBA.	4	8	CO2
4	COM & .NET 4.1. Evolution of DCOM, Introduction to COM, 4.2. Data types, Interfaces, Proxy and Stub, 4.3. Marshalling, Custom and standard marshalling, 4.4. Implementing Server/Client, Interface Pointers, 4.5. Object Creation, Invocation, Destruction, 4.6. Comparison COM and CORBA, 4.7. Introduction to .NET, Overview of .NET architecture, Remoting	8	11	CO2
5	EJB Architecture 5.1 EJB,EJB Architecture, 5.2 Overview of EJB software architecture, View of EJB, 5.3 Conversion Building and Deploying EJBs, Role in EJB.	4	8	CO3
6	EJB APPLICATIONS 6.1 EJB Session Beans, EJB entity beans, 6.2 EJB Clients, EJB Deployment Building an application with EJB.	8	8	CO3
7	SERVICE ORIENTED ARCHITECTURE(SOA) FUNDAMENTALS 7.1. Defining SOA, Business value of SOA, SOA characteristics, 7.2. Concept of a service, Basic SOA, Enterprise Service Bus (ESB), 7.3. SOA enterprise Software Models.	6	8	CO4



8	WEB SERVICES TECHNOLOGIES 8.1 XML, Web Services and SOA, WSDL, SOAP, UDDI, 8.2 WS Standards (WS*) 8.3 Web Services and Service Oriented Enterprise (SOE) 8.4 WS Coordination and Transaction, REST based web services	8	11	CO4
	TOTAL	48	70	

7. LIST OF PRACTICALS/ASSIGNMENTS/EXERCISES/TUTORIALS/DRAWINGS

Term Work consists of Journal containing minimum 10 experiments/assignments with approx. no of hours required and corresponding CO attained are specified here:

Sr. No.	Title/Aim	Approx.Hrs required	COs
01	Creating a distributed Object Application using RMI (DNS, distributed game, some business application etc)	2	CO1
02	Develop a middleware component for retrieving Weather Forecast information using CORBA.	2	CO2
03	Develop a component for converting the currency values using COM/.NET	2	CO2
04	Develop a component for retrieving information from message box using DCOM/.NET	2	CO2
05	Creating Java based middleware applications with Eclipse/NetBeans IDE.	2	CO3
06	Examining the Architecture of Apache Tomcat Java Application Server.	2	CO3
07	Develop an Enterprise Java Bean for banking operations.	4	CO3
08	Creation and Deployment of SOAP based Web Service in Apache Axis2 Web Service engine.	2	CO4
09	One mini project for creating SOAP based web services to integrate business processes	4	CO4
10	Creation and Deployment of RESTful Web Service in Jersey open-source Web Services framework.	2	CO4
11	One mini project for creating RESTful web services to integrate business processes.	4	CO4
12	Testing a SOAP web service using an open-source tool.	2	CO4
13	Testing a RESTful web service using an open-source tool.	2	CO4
	Total	32	



8. IMPLEMENTATION STRATEGY (PLANNING)

In depth study and understanding of the subject will be implemented by adoption of the following strategy:

1. Conduction of lectures & practicals according to theory Teaching Plan
2. Term work plan for practical implementation.
3. Hands-on practice in the laboratory.
4. Conducting 2 periodical tests.
5. Mini Project

9. LEARNING RESOURCES

Sr. No.	Title Of Book	Author	Publication
1.	Distributed Computing, Principles and applications	M.L.Liu	Pearson Education
2.	Client/Server Survival Guide 3rd edition	Robert Orfali Dan Harkey & Jeri Edwards	John Wiley & Sons
3.	Client/Server Computing	D T Dewire	TMH
4.	IBM Webspere Starter kit	Ron Ben Natan Ori Sasson	TMh, New Delhi
5.	Programming C#,	Jesse Liberty	SPD O'Reilly.
6.	C# Precisely	Peter Sestoft and Henrik I. Hansen	Prentice Hall of India
7.	Introduction to C# Using .NET	Robert J. Oberg	Prentice Hall Ptr
8.	C# How to program	Paul Deitel, Harvey Deitel	Pearson Education
9.	EJB 3 in Action	Debu Panda, Reza Rahman, Ryan Cuprak, Michael Remijan	Manning
10.	Teach yourself CORBA in 14 days	Jeremy Rosenberger	Tec Media, 2000
11.	COM/DCOM Blue book	Nathan Wallace	Coriolis Group,U.S

10. WEB REFERENCES

1. <https://msdn.microsoft.com/en-us/default.aspx>
2. <http://www.journaldev.com/255/axis2-web-services-tutorial>
3. <http://www.vogella.com/tutorials/REST/article.html>
4. <http://crunchify.com/how-to-build-restful-service-with-java-using-jax-rs-and-jersey/>






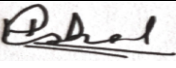
11. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Sr. No.	TOPIC	Distribution of Theory Marks			
		R Level	U Level	A Level	Total Marks
1.	Introduction to Object Oriented Systems	4	4	-	8
2.	Introduction to Middleware Technologies	2	2	4	8
3.	CORBA	2	2	4	8
4.	COM & .NET	2	2	7	11
5.	EJB Architecture	2	6	-	8
6.	EJB Applications	-	-	8	8
7.	Service Oriented architecture(SOA) Fundamentals	4	4	-	8
8.	Web Services Technologies	2	2	7	11
TOTAL		18	22	30	70

Remembering, U Understanding, A Applying, (Bloom's revised taxonomy levels)

NOTE: This specification table provides general guidelines to assist students for their learning and to teachers to teach and assess students with respect to attainment of COs. The actual distribution of marks at different taxonomy levels (R, U, A) in the question paper may vary from above table.

12. COURSE EXPERT COMMITTEE MEMBERS

Sr. No.	NAME		SIGNATURE
1	Internal	Mr. Manish Solanki	
2	Internal	Mrs. Radhika patwardhan	
3	Internal	Mr. Abhijit Dongaonkar	
4.	External	Mr Het Shah, UI Developer, Media.net Pvt Ltd,Mumbai	



1. COURSE DETAILS

Programme: CSE/IT	Semester: V/V
Course: IT Innovative Project & Practices	Group: A
Course Code: IPP198923	Duration:16 Weeks

2. TEACHING AND EXAMINATION SCHEME

Scheme of Instructions and Periods per Week					Examination Scheme and Maximum Marks								
Theory Hrs L	Practical Hrs P	Drawing Hrs D	Tutorial Hrs T	Credits (L+P+D+T)	Theory Paper Duration and marks(ESE)		SSL	TA	TH	TW	PR	OR	TOTAL
					Hours	Marks							
-	2	-	-	2	-	-	-	-	-	50	-	-	50

3. COURSE OBJECTIVE

Today the I.T field is growing rapidly. The use of latest Mobile devices and websites /apps has created curiosity and interest in students to explore emerging domain / technology. This course allow students to identify reliable web resources and domain, cleansing the data and present the report for the project implementation.

4. SKILL COMPETENCY

The aim of this course is to help the students to attain the following industry identified competency through various teaching learning experiences:

- **Identify the domain and technologies useful for project implementation.**

5. COURSE OUTCOMES (COs) at the end of the semester student will be able to: -

CO No.	COURSE OUTCOME	Bloom's LEVEL
CO1	Select the latest domain / technologies and understand the topic	Remember
CO2	Write report on the topic	Remember, Understand
CO3	Prepare the presentation and deliver the seminar	Remember, Apply
CO4	Prepare for the project implementation	Remember, Apply



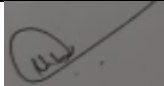



6. Implementation

The coordinator faculty member shall display the list of emerging/innovative topics from IT/CSE field to be selected by the students. The students form a group of Maximum 2 students and submit the topic. The Guide will be assigned by the program coordinator. The student will prepare the detailed report covering emerging trends and technologies, applications etc. and present to the guide.

7. Suggested Guidelines for assessment of Term work

The term work will be assessed on the basis of report and presentation. Both the assessments will be done by the guide. Report and presentation will be awarded 25 marks each (Total 50 Marks).

8. COURSE EXPERT COMMITTEE MEMBERS

Sr. No.	NAME	SIGNATURE
1	Mrs N. G. Kadukar	
2	Mr J. S. Kulkarni	
3	Mr Abhijit Dongaonkar	
4	Dr M. M. Chandane HOD ,Department of Computer Engineering & IT and Local Coordinator: - Global Initiative of Academic Networks (GIAN), MHRD, India.	



1. COURSE DETAILS

Programme: Information Technology	Semester: VI
Course: #Emerging trends in Information Technology	Group: A*
Course Code: EIT190912	Duration:16 Weeks

2. TEACHING AND EXAMINATION SCHEME

Scheme of Instructions and Periods per Week					Examination Scheme and Maximum Marks								
Theory Hrs L	Practical Hrs P	Drawing Hrs D	Tutorial Hrs T	Credits (L+P+D+T)	Theory Paper Duration and marks (ESE)		SSL	TA	TH	TW	PR	OR	TOTAL
					Hours	Marks							
3	2	-	-	5	3	70	20	10	70	50	50	--	200

3. COURSE OBJECTIVE

To provide a revolutionary technology, making it a hot skill to developer for the immediate and near future of modern application development.

4. SKILL COMPETENCY

The aim of this course is to help the students to attain the following industry identified competency through various teaching learning experiences:

- Use JavaScript to develop real-time, fast, scalable, data-driven web applications.
- Adapt the emerging, cutting-edge technologies.

5. COURSE OUTCOMES(COs) At the end of the semester student will be able to: -

CO No.	COURSE OUTCOME	Bloom's LEVEL
CO1	Develop Responsive web for good user experience on different devices.	Remember, Understand Apply
CO2	Develop server-side data-driven web application logic in Node Js	Remember, Understand Apply
CO3	Use DevOps for collaboration between development and operation team to deploy, optimize speed to deliver application	Remember, Understand Apply
CO4	Describe the concept of Data science and Artificial Intelligence	Remember, Understand



6. COURSE CONTENTS

Sr. No.	TOPIC /Sub-Topics	Hours	Marks	COs
1	Responsive Web Design 1.1 Introduction, Best Experience for All Users 1.2 Viewport, Setting the Viewport, Size Content to The Viewport 1.3 Grid-View, Building a Responsive Grid-View 1.4 Media Query, Always Design for Mobile First, Add a Breakpoint, Typical Device Breakpoints, Orientation: Portrait / Landscape, Hide Elements, Change Font Size 1.5 Images, width Property, max-width Property Add an Image Web Page, Background Images, Different Images for Different Devices, HTML5 <picture> Element 1.6 Videos, width Property, max-width Property Add an videos Web Page 1.7 Frameworks, Using W3.CSS, Bootstrap, W3.CSS Web Site Templates	8	10	CO1
2	Node js 2.1 Introduction to Node.js, Features of Node.js 2.2 Local Environment Setup, Download and install Node.js, Command Line Interface 2.3 Creating first Node.js Application 2.4 Node.js as a Web Server, Make a Request to the Node.js Server 2.5 Installing Modules using NPM, Built-in Modules, Include Modules, Create Your Own Modules 2.6 HTTP Module, File System Module, URL Module 2.7 Event-Driven Programming, Event Emitter 2.8 Buffers, Streams 2.9 Upload Files, Email 2.10 Node Js & MYSQL, NoSQL	10	12	CO2
3	Express Framework React JS 3.1 Installing Express, Hello world Example 3.2 Scaling Application 3.3 custom components and using the styled-components, 3.4 React Context API	6	8	CO2
4	DevOps 4.1 Overview of DevOps, Case study on decentralized software development environment. 4.2 Introduction and need of DevOps. 4.3 Features of git, Docker, Kubernetes, Ansible, puppet, Nagios 4.4 Introduction to Docker: Features & Components. 4.5 Installation of Docker. 4.6 Docker Commands.	8	12	CO3
5	Data Science 5.1 Introduction to Data Science, need of Data Science 5.2 Data Science Components Statistics, Visualization, Machine learning, Deep learning 5.3 Data Science Process Discovery, Data protection, Planning, Model, building, Operationalize, Communicate results 5.4 Tools for Data Science 5.5 Difference between Data Science with BI (Business Intelligence) 5.6 Applications of Data science	6	10	CO4



6	Splunk 6.1 Introduction to Splunk, Data Collection, Data Indexing, Search and Analysis 6.2 Need of splunk, 6.3 Application, Operational Data Insights, Machine Data, Business Intelligence etc	6	10	CO4
7	Introduction to Artificial Intelligence 7.1 Concept of Artificial intelligence 7.2 Scope, types and basic components of AI 7.3 Application of AI	4	8	CO4
TOTAL		48	70	

7. LIST OF PRACTICALS/ASSIGNMENTS

Term Work consists of Journal containing minimum 10 experiments/assignments with approx. no of hours required and corresponding CO attained are specified here:

Sr. No.	Title of Experiment	Approx. Hrs required	COs
1.	Create a basic responsive site using meta viewport tag and Media Queries	2	CO1
2.	Using CSS properties: width, max-width, box-sizing to create a container class and understanding why a container is needed	2	CO1
3.	Create a very basic custom float-based grid system. Understanding container, row, cols, margin, gutter and clearfix. Using Bootstrap v3 grid system (col-xs, col-sm, col-md, col-lg).	2	CO1
4.	Creating a very basic custom grid system will be flex-based. Using Bootstrap v4 grid system.	2	CO1
5.	Download and install Node.js, Command Line Interface	2	CO2
6.	Create first Application using Node.js	2	CO2
7.	Creating and using custom components and using the <u>styled-components</u> library for adding CSS to React Components.	2	CO2
8.	Use react hooks: useState and useRef.	2	CO2
9.	Create a basic todo app in ReactJS and using concepts as needed. (mini project)	4	CO2
10.	Deploy a site on git push using netlify (static site)/vercel (static site) / heroku and GitHub.	2	CO3
11.	Use GitHub Actions to create custom build workflow.	2	CO3
12.	Use GulpJS to automatically merge css and js files and live reload a webpage as soon as any file is updated.	2	CO3
13.	Install and Configure Splunk, Upload sample data using Splunk web and Execute search commands in Splunk web.	2	CO4
14.	Prepare and present case study on anyone application of Data Science	2	CO4
15.	Prepare and present case study on anyone application of Artificial Intelligence	2	CO4
TOTAL		32	



8. IMPLEMENTATION STRATEGY(PLANNING)

In depth study and understanding of the subject will be implemented by adoption of the following strategy:

1. Conducting lectures as per the teaching plan and conduction tutorials.
2. Use of PowerPoint presentations / demonstration during theory class and practical periods
3. Minimum 10 no's of practical.
4. Guest/Expert lectures
5. Demonstrations of Android projects
6. Self-Learning Online Resources from <http://developer.Android.com>

9. LEARNING RESOURCES

Sr. No.	Title Of Book	Author	Publication
1.	Node Web Development	David Herron	Packt Publishing
2.	MODERN Quick Start Guide : Build Web Applications with MongoDB, Express. js, React, and Node MERN Quick Start Guide : Build Web Applications with MongoDB, Express. js, React, and Node	Wilson, Eddy	Packt Publishing
3.	Responsive Web Design with HTML5 and CSS3	Frain, Ben	Packt Publishing
4.	Web Development with Node and Express	Ethan Brown	O'Reilly Media,
5.	Data Science for Dummies	Pierson, Lillian;Porway, Jake	John Wiley & Sons,
6.	Artificial Intelligence Basics : A Self-Teaching Introduction	N. Gupta and R. Mangla	ProQuest Ebook

10. WEB REFERENCES




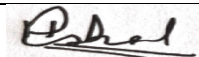
- 1 https://www.w3schools.com/html/html_responsive.asp
- 2 <https://jandrewniak.com/blog/creating-your-own-css-grid-system/>
- 3 <https://styled-components.com/>
- 4 <https://nodejs.dev/learn>
- 5 <http://Splunk.com>
- 6 <https://www.edureka.co/blog/what-is-splunk/>
- 7 <https://www.javatpoint.com/devops>

11. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Sr No	Topic	Distribution of Theory Marks			
		R level	U Level	A level	Total Marks
1	Responsive Web Design	2	4	4	10
2	Node js	2	4	6	12
3	Express Framework React JS	2	2	4	8
4	DevOps	2	4	6	12
5	Data Science	2	4	4	10
6	Splunk	2	4	4	10
7	Introduction to AI	4	4	--	8
TOTAL		16	26	28	70



12. COURSE EXPERT COMMITTEE MEMBERS

Sr. No.	FACULTY	NAME	SIGNATURE
1	Internal	Mr Abhijit Dongaonkar	
2	Internal	Mrs Neeta Kadukar	
3	Internal	Mr Manish Solanki	
4	External	Mr Het Shah, UI Developer, Media.net Pvt Ltd, Mumbai	



1. COURSE DETAILS

Programme: Information Technology	Semester: VI
Course: #Project	Group: A*
Course Code: PRO190913	Duration:16 Weeks

2. TEACHING AND EXAMINATION SCHEME

Scheme of Instructions and Periods per Week					Examination Scheme and Maximum Marks								
Theory Hrs L	Practical Hrs P	Drawing Hrs D	Tutorial Hrs T	Credits (L+P+D+T)	Theory Paper Duration and marks (ESE)		SSL	TA	TH	TW	PR	OR	TOTAL
					Hours	Marks							
-	06	-	-	06	-	-	-	-	-	50		50	100

3. COURSE OBJECTIVE

To develop a project to give an in depth understanding of all the concepts learnt at the lower semesters. To expose students to the various stages of making a project and the capability to work in a team

4. SKILL COMPETENCY

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences.

- **Design and develop Hardware and/or Software system**

5. COURSE OUTCOMES (COs) at the end of the semester student will be able to

CO No.	COURSE OUTCOME	Bloom's LEVEL
CO1	Identify problem definitions that can be addressed by applying the acquired knowledge & skill	Understand, Apply
CO2	Plan the activities with timeline chart, work in groups/team and co-ordinate the work	Understand, Apply
CO3	Select design methodologies & its implementation.	Understand, Apply
CO4	Write the Project Report	Understand, Apply



6. Each student/group of students will submit project synopsis and detailed project report with following details

A) Project synopsis

Abstract

Chapter 1. Problem statement

Chapter 2. System requirement specification

Chapter 3. Proposed system/solution

Chapter 4. Estimation and planning

Chapter 5. Future scope

Chapter 6. Conclusion

Bibliography and References

B) Project Report

The report shall be presented in following sequence:

Title sheet

Project Certificate

Project approval sheet

Acknowledgement

Abstract

Table of contents

List of tables (if desired)

List of Figures (if desired)

Chapter 1: Introduction (domain)

Chapter 2: Problem statement and proposed system (input /output statement, description, feasibility)

Chapter 3: Literature Review

Chapter 4: Design and Implementation (System Architecture, Requirement: hardware software any other , flow diagrams , activity diagrams, DFD , ER diagram if desired, User Interface)

Chapter 5: Result & Conclusions (Reports, future scope and limitation)

Bibliography and References

7. Identification of projects and allocation methodology to faculty members and relevance of the projects and their contribution towards attainments of PO's

- i. In the preceding semester, the Head of Department notifies and briefs the students about project development, industry sponsored project, modification or value addition in previous project, project group formation, selection criteria and project scope. Students are asked to carry out the literature survey, review the latest technologies, look for emerging trends, list software platform available, refer previous project reports to prepare project proposals considering available time, cost, feasibility, environment, safety, standards, lab facility, ethics etc.



- ii. At the beginning of the semester the project groups present their ideas in front of HOD and faculty members.
- iii. Based on above criteria and relevance to contribution towards attainment of POs, the project topics are finalized group-wise and groups are allocated to faculties based on their area of expertise.

8. Process for monitoring and evaluation, process to assess individual and team performance

- i. The students are asked to prepare and submit synopsis and detail implementation plan of 16 weeks to their respective guides.
- ii. Interaction between students and project guide to discuss implementation methodology.
- iii. The project guide monitors the progress of implementation on continuous basis.
- iv. Final evaluation of project by examiners through presentation, demonstration and viva-voce.

9. Methodology to assess individual/collective contribution/understanding:

a. Internal evaluation (50 marks) by project guide.

Phase-I: 30% evaluation

At the end of first month, all the groups are asked to give presentation on progress made till date in front of committee consisting of HOD and project guides. The projects are evaluated based on project idea, knowledge, amount of work done, adherence to plan at every stage, motivation, interest shown, demonstration of skills (hardware, software, presentation), self-motivation, sincerity, punctuality, ethics etc. by the project guide and project evaluation committee.

Phase-II: 30% evaluation

The above activity is carried out at the end of second month. The students are guided for preparation of project reports.

Phase III: 40% evaluation

The above activity is carried out at the end of the semester along with demo and submission of project report.

The internal evaluation will be done on the basis of following criteria and weightage:

	Phase 1 (2-4 Week)	Phase 2 (6- 8 Weeks)	Phase 3 (14-16 Week)	Total
Marks	15	15	20	50
Evaluation Criteria	1. Project idea 2. Presentation	1. Progress made in the project 2. Presentation	1. Progress made in implementation 2 Presentation	

The student/ group will maintain the weekly report to monitor the progress of the project.







b. External evaluation (50 marks) by expert from industry/institute (external examiner)

The students demonstrate the prototype/ working projects and give power point presentation in front of External examiner. Internal and external examiners evaluate the student on the following aspects:

- a. Understanding and completeness of the Project
- b. Approach to the solution of problem
- c. Planning and implementation
- d. Design and testing procedure
- e. Project Report
- f. Students' involvement in the Project

10. COURSE EXPERT COMMITTEE MEMBERS

Sr. No.	Faculty	NAME	SIGNATURE
1	Internal	Mr A .B. Dongaonkar	
2	Internal	Mr. J S Kulkarni	
3	Internal	Mrs. N. G. Kadukar	
4	External	Dr Bhavesh Patel Principal , Organization: Shah & Anchor Kuthchi Engineering College , Mumbai	



1. COURSE DETAILS

Programme: Information Technology	Semester: VI
Course: #Management Information System	Group: M*
Course Code: MIS190914	Duration:16 Weeks

2. TEACHING AND EXAMINATION SCHEME

Scheme of Instructions and Periods per Week					Examination Scheme and Maximum Marks								
Theory Hrs L	Practical Hrs P	Drawing Hrs D	Tutorial Hrs T	Credits (L+P+D+T)	Theory Paper Duration and marks (ESE)		SSL	TA	TH	TW	PR	OR	TOTAL
					Hours	Marks							
4	2	-	-	6	3	70	20	10	70	50	-	50	200

3. COURSE OBJECTIVE

The modern business environment is characterized by intense competition, short product life cycles and technological development. MIS represents the information in a systematic manner so it becomes an integral part of the business. Management Information System facilitates the decision makers to extend their planning horizons and introduce even greater levels of certainty in business plans and processes.

4. SKILL COMPETENCY

The aim of this course is to help the students to attain the following industry identified competency through various teaching learning experiences:

- Use relevant managerial skills for ensuring efficient and effective management.
- Design & develop various MIS systems for different business processes such as CRM, SCM.

5. COURSE OUTCOMES (COs) At the end of the semester student will be able to :-

CO. No.	COURSE OUTCOME	Bloom's LEVEL
CO1	Classify information systems and describe role of Management Information System in modern business environment.	Remember, Understand
CO2	Use principles of Business Process and use various applications of MIS in manufacturing sector and service sector.	Remember, Understand Application
CO3	Elaborates decision support system, its components, and other systems like Artificial intelligence, expert system, knowledge management system.	Remember, Understand Application
CO4	Use principles of Enterprise Resource planning, CRM & SCM software tools and its implementation	Remember, Understand Application
CO5	Use principles of managing global system and Business Intelligence	Remember, Understand



6. COURSE CONTENTS

Sr. No.	TOPICS/Sub-Topics	Hours	Marks	COs
1	Foundation of Information System in Business 1.1 Information System 1.1.1 What is an IS? 1.1.2 The roles of IS in Business 1.1.3 Trends in IS 1.1.4 The Role of E-business in Business 1.1.5 System 1.1.6 Feedback and Control 1.2 Types of IS 1.2.1 Operational Support System 1.2.2 Management Support System 1.2.3 Other classification of IS 1.3 Managerial Challenges of IS 1.3.1 Success and Failure with IT 1.3.2 Developing IS solution 1.3.3 Challenges and Ethics of IT 1.3.4 Challenges of IT Carriers 1.4 Components of IS	10	10	CO1
2	Management Information System 2.1 MIS Concept 2.2 MIS definition 2.3 Role of MIS 2.4 Impact of MIS 2.5 MIS and User 2.6 Management as a control system 2.7 Organization as System 2.8 MIS for Digital Firm 2.9 Strategic design of MIS-Balance score card and Dashboards	10	10	CO1
3	Application of MIS 3.1 Applications in manufacturing sector 3.1.1 Personal Management 3.1.2 Financial Management, 3.1.3 Production Management 3.1.4 Materials Management 3.1.5 Marketing Management 3.2 Applications in Service sector 3.2.1 Airlines, Hotels, Hospitals, 3.2.2 Banking, Insurance, Utilities, and Finance	16	15	CO2
4	Decision Support System and other Support system 4.1 Characteristics of decision making process 4.2 Decision Support System 4.2.1 Concept, 4.2.2 Components, 4.2.3 Development 4.2.4 Risk 4.3 Management Information System and Decision Support System	10	10	CO3



	4.4 Concept of Artificial Intelligence 4.5 Concept of Expert System. 4.6 Concept of Knowledge management system			
5	Enterprise Business Management System 5.1 ERP systems Introduction, Basics of ERP, Evolution of ERP 5.2 Enterprise Systems in Large Organizations 5.3 ERP product Evaluation and Implementation 5.4 Benefits and Challenges of Enterprise Systems 5.5 Examples of ERP 5.6 Customer Relationship Management –The business focus 5.6.1 Introduction and Concept of CRM 5.6.2 The 3 phases of CRM 5.6.3 Benefits and Challenges of CRM 5.6.4 CRM Failure 5.6.5 Trend in CRM 5.7 Supply Chain Management-Business Network 5.7.1 Introduction and Concept of SCM 5.7.2 The role of SCM 5.7.3 Benefits and Challenges of SCM 5.7.4 Trend in SCM	10	15	CO4
6	Managing Global Systems and Business Intelligence 6.1 The growth of International Information System 6.2 Organizing International Information System 6.3 Managing global systems 6.4 Global E-business and Collaboration 6.4.1 Information Systems and enhancement of business processes 6.4.2 Collaborations and teamwork 6.5 Database to improve business performance 6.5.1 Text mining and web mining 6.6 Concept of Business Intelligence system 6.6.1 Business Intelligence Environment 6.6.2 Business Intelligence and analytics capabilities 6.6.3 Business Intelligence applications 6.7 E-Commerce systems and its categories	08	10	CO5
	TOTAL	64	70	



7. LIST OF PRACTICALS/ASSIGNMENTS

Term Work consists of Journal containing minimum 10 experiments/assignments with approx. no of hours required and corresponding CO attained are specified here:

Sr. No.	Title of Experiment	Approx. Hrs required	COs
1.	Prepare case study on Different Information Systems	4	CO1
2.	Prepare and present case study on Management Information system as a digital firm	2	CO1
3.	Prepare case study on decision support system	2	CO3
4.	Prepare case study on Transaction processing system	2	CO2
5.	Prepare case study on ERP system for manufacturing industry	2	CO2, CO4
6.	Prepare case study on ERP system for educational services	2	CO2, CO4
7.	Prepare case study on Customer relationship management	4	CO4
8.	Prepare case study on Supply chain management	2	CO4
9.	Prepare case study on Expert system	2	CO3
10.	Prepare case study on Knowledge management system	2	CO3
11.	Prepare case study on E-commerce system (B2B ecommerce category)	2	CO5
12.	Prepare case study on E-commerce system (B2C ecommerce category)	2	CO5
13.	Mini project: -To design a dashboard on above system (anyone)	4	All COs
	TOTAL	32	

8. IMPLEMENTATION STRATEGY (PLANNING)

In depth study and understanding of the subject will be implemented by adoption of the following strategy:

1. Conducting lectures as per the teaching plan.
2. Use of PowerPoint presentations / demonstration during theory classes and practical periods
3. Minimum 10 Case studies on different information systems
4. Guest/Expert lectures
5. Demonstrations on various case studies and examples
6. Self-Learning Online Resources.



9. Learning Resources

Sr. No.	Title Of Book	Author	Publication
1.	Management Information systems	K.C. Laudon, J.P. Laudo, edition	Pearson
2.	Management Information System	Robert Schulthis & Mary Sumner	Tata McGraw Hill
3.	Management Information systems	W S Jawadekar,	Tata McGraw Hill
4.	Management Information systems,	J.A. O'Brien,	Tata McGraw Hill

10. WEB REFERENCES

1. www.mu.ac.in/mis
2. www.csus.edu/indiv/e/eatonr/mis

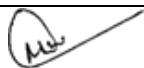

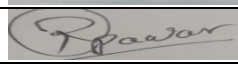

11. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Sr No	Topic	Distribution of Theory Marks			
		R level	U Level	A level	Total Marks
1	Foundation of Information System in Business	4	6	-	10
2	Management Information System	2	2	6	10
3	Application of MIS	5	4	6	15
4	Decision Support System and other Support systems	2	4	4	10
5	Enterprise Business Management System	5	4	6	15
6	Managing Global Systems and Business Intelligence	4	6	-	10
TOTAL		22	26	22	70

R Remembering, U Understanding, A Applying, (Bloom's revised taxonomy levels)

NOTE: This specification table provides general guidelines to assist students for their learning and to teachers to teach and assess students with respect to attainment of Cos. The actual distribution of marks at different taxonomy levels (R, U, A) in the question paper may vary from above table.

12. COURSE EXPERT COMMITTEE MEMBERS

Sr. No.	Faculty	NAME	SIGNATURE
1	Internal	Mrs Neeta Kadukar	
2	Internal	Mrs Radhika Patwardhan	
3	Internal	Mrs Rupali Pawar	
4	External	Mr Milind Ugale Infinite Solutions Pvt. Ltd. (Industry Expert)	



1. COURSE DETAILS

Programme: Information Technology	Semester: VI
Course: #Internet Security	Group: A*
Course Code: ISS190915	Duration:16 Weeks

2. TEACHING AND EXAMINATION SCHEME

Scheme of Instructions and Periods per Week					Examination Scheme and Maximum Marks								
Theory Hrs L	Practical Hrs P	Drawing Hrs D	Tutorial Hrs T	Credits (L+P+D+T)	Theory Paper Duration and marks (ESE)		SSL	TA	TH	TW	PR	OR	TOTAL
					Hours	Marks							
2	4	-	-	6	3	70	20	10	70	50	50	-	200

3. COURSE OBJECTIVE

Internet usage has become the most essential in today's world & so internet security. This course focuses on the need of internet security, different types of threats, worms & viruses, concept of hacking etc. The subject also introduces different ways to secure the computer system against all threats.

4. SKILL COMPETENCY

The aim of this course is to help the students to attain the following industry identified competency through various teaching learning experiences:

- **Detect and mitigate security threats**

5. COURSE OUTCOMES(COs) at the end of the semester student will be able to: -

CO No.	COURSE OUTCOME	Bloom's LEVEL
CO1	Use various cyber forensic tools and technique, ethics in internet security, DOS attacks tools, Email security protocols, DES protocols.	Remember, Understand Application
CO2	Appraise about viruses, worms, firewall types their configuration, wired and wireless security attacks, password cracking software. social engineering, digital signature.	Remember, Understand Application
CO3	Analyse the basic concepts of security to predict and classify, attacks on a network, security risks levels, classes of attack, attack vectors, strategies to secure network.	Remember, Understand Application
CO4	Implement the process of hiding the information with cryptographic, algorithms, steganography, associated tools and keylogger.	Remember, Understand Application



6. COURSE CONTENTS

Sr. No.	TOPIC /Sub-Topics	Hours	Marks	COs
1	Introduction: 1.1. Why require a security picking a Security Policy, 1.2. Strategies for a Secure Network 1.3. The Ethics of Computer Security 1.4. Security Threats and levels 1.5. What are viruses, Trojan Horse, Worms 1.6. How to protect the computer against virus? 1.7. Structure of virus. 1.8. Security Plan	04	10	CO2
2	Classes of Attack 2.1 Stealing Passwords, Bugs and Backdoors, Authentication Failures, Protocol Failures, Information Leakage, Social Engineering 2.2. Introduction to SE 2.2.1Types and Techniques Involved 2.2.2Demo Conversations 2.3 Denial-of-Service Attacks. 2.3.1 Introduction and History of DOS Attacks 2.3.2 Types of DOS Attacks 2.3.3 Tools used in DOS Attacks 2.3.4 Software / Hardware DOS Attack Vulnerabilities	06	12	CO2, CO1
3.	Exponential Attacks: 3.1. Botnets, Active Attacks 3.2. Firewalls- Kinds of Firewalls. 3.3. Packet Filters- Application-Level Filtering., Circuit-Level Gateways. Dynamic Packet Filters. Distributed Firewalls. 3.4. What Firewalls Cannot Do, Filtering Services, Reasonable Services to Filter, Digging for Worms. Packet Filtering 3.5. Implementing policies (Default allow, Default Deny) on proxy 3.6. Proxy Servers 3.6.1. Proxy Introduction 3.6.2. Types of Proxies 3.6.3. What does IP address reveal about you? 3.6.4. How to be anonymous while surfing Internet 3.6.5. Proxy Bouncing Attacks 3.6.6. Countermeasures	06	10	CO3
4	Cryptography & Steganography 4.1. Introduction to Basic encryption and Decryption 4.1.1. Diffie and Hellman Key Exchange 4.1.2. Concept of Public key and Private key 4.1.3. Digital Signatures 4.2. Steganography 4.2.1. - Introduction 4.2.2. - Working mechanism of Steganography 4.2.3. - Tools involved 4.2.4. - Examples	04	10	CO4

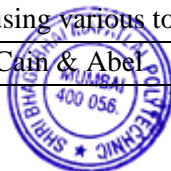


5	Wi Fi Security 5.1. Introduction to Wireless Networks 5.2. Wi-Fi and Wi-Max 5.3. Possible attacks on Wireless Networks 5.4. Password Cracking Techniques & Attacks W3CERT Computer & Internet Security 5.5. War Driving 5.6. Securing Home/Office Wi-Fi Connectivity 5.7. Countermeasures	04	10	CO2
6	Cyber Forensics: 6.1. Cyber Forensic Introduction 6.2. Forensic Tools and Techniques 6.3. Investigating the Crime Scene 6.4. Rules of Evidence 6.5. Cyber Forensics Knowledge Base	04	08	CO1
7	Introduction to Ethical Hacking: 7.1. Hacker & Cracker Introduction 7.2. How this process has come out? 7.3. Hack your own Systems 7.4. Understanding the Dangers your system may face 7.5. Ethical Hacking Commandments	04	10	CO1
	TOTAL	32	70	

7. LIST OF PRACTICALS/ASSIGNMENTS

Term Work consists of Journal containing minimum 10 experiments/assignments with approx. no of hours required and corresponding CO attained are specified here:

Sr. No.	Title of Experiment	Approx. Hrs required	COs
1.	Encryption algorithms (Symmetric key)	4	CO1, CO4
2.	Encryption algorithms (Asymmetric key)	4	CO1, CO4
3.	Implement RSA Algorithm	4	CO4
4.	Implementing i) DES (P-block, permutation)	4	CO1
	ii) DES (S-block, substitution)	4	CO1
5.	Using Email security protocols PGP	4	CO1
6.	Using tools for ethical hacking – i) N_Map	2	CO1
	ii) Nessus	2	CO1
	iii) Burp_suite	2	CO1
	iv) Wireshark	2	CO1
7.	Implementing Digital signature	4	CO2
8.	To implement keylogger	4	CO4
9.	To use tools of Image detection for forensic purpose	4	CO1
10.	using tools to simulate Denial of Service Attacks		
	i) Ping	2	CO3
	ii) ping flood to demonstrate	2	
11.	To use tools for implementing Steganography	4	CO1
12.	To access vulnerability of websites using various tools	4	CO3
13.	To use password cracking tools – i) Cain & Abel	2	CO2



	ii) Brutus	2	CO2
	iii) Aircrack	2	CO2
	iv) creation of Rainbow table	2	CO2
	TOTAL	64	

8. IMPLEMENTATION STRATEGY(PLANNING)

1. Teaching Plan/Tutorials
2. Guest/Expert lectures
3. Demonstrations/Simulations
4. Slides
5. Case Study
6. Video lectures
7. Role Play

9. LEARNING RESOURCES

Sr. No.	Title Of Book	Author	Publication
1	Cryptography & Network Security	Forouzan	McGraw-Hill
2	Cyber Security	Nina Godbole, Sunit Belapure	Wiley
3	Applied Cryptography,	Bruce Schneier	John Wiley & Sons
4	Cryptography and Network Security	Atul Kahate	Tata McGraw-Hill Education, 2013
5.	Firewalls and Internet Security: Repelling the Wily Hacker (2nd Edition)	William Stallings	Wily Hacker (2nd Edition) all
6.	Network Security and Cryptography	Bernard Menezes	Cengage Learning
7.	Practical Unix and Internet Security-	Simson Garfinkel	O'Reilly Media

10. WEB REFERENCES

1. www.securityfocus.com
2. www.sans.org,
3. www.microsoft.com/security
4. www.insecure.org
5. www.w3schools.com




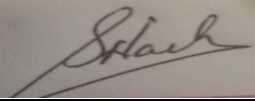


11. SPECIFICATION TABLE

Sr No	TOPIC	Distribution of Theory marks			
		R Level	U Level	A Level	Total Marks
1	Introduction:	4	6	-	10
2	Classes of Attack	2	4	6	12
3	Exponential Attacks:	-	4	6	10
4	Cryptography & Steganography	-	4	6	10
5	Wi Fi Security	3	2	5	10
6	Cyber Forensics:		4	4	08
7.	Introduction to Ethical Hacking:	7	3	-	10
	TOTAL	16	27	27	70

R Remembering, U Understanding, A Applying, (Bloom's revised taxonomy levels)

NOTE: This specification table provides general guidelines to assist students for their learning and to teachers to teach and assess students with respect to attainment of Cos. The actual distribution of marks at different taxonomy levels (R, U, A) in the question paper may vary from above table.

12. COURSE EXPERT COMMITTEE MEMBERS

Sr. No.	Faculty Type	NAME	SIGNATURE
1	Internal	Mrs. Neeta Kadukar	
2	Internal	Mrs. Swapna Naik	
3	Internal	Mr. Manish Solanki	
4	External	Dr Nandini Chaudhary Principal, J T Mahajan College of Engineering.	



1. COURSE DETAILS

Programme: Information Technology	Semester: VI
Course: #Wireless Network	Group: A*
Course Code: WLN190916	Duration:16 Weeks

2. TEACHING AND EXAMINATION SCHEME

Scheme of Instructions and Periods per Week					Examination Scheme and Maximum Marks								
Theory Hrs L	Practical Hrs P	Drawing Hrs D	Tutorial Hrs T	Credits (L+P+D+T)	Theory Paper Duration and marks (ESE)		SSL	TA	TH	TW	PR	OR	TOTAL
					Hours	Marks							
4	2	-	-	6	3	70	20	10	70	50	-	50	200

3. COURSE OBJECTIVE

This course is intended to give students an outline of how wireless communication in computer network works. This includes the interoperability of wireless networks such as WiMax/GPRS and WiFi & wireless network propagation models. Students understand the state-of-the-art in network protocols, architectures and applications. Analyze existing network protocols and networks.

4. SKILL COMPETENCY

The aim of this course is to help the students to attain the following industry identified competency through various teaching learning experiences:

- **Configure and diagnose wireless connectivity problems.**
- **Use wireless protocols and their applications.**

5. COURSE OUTCOMES(COs)at the end of the semester student will be able to: -

CO No.	COURSE OUTCOME	Bloom's LEVEL
CO1	Configure and diagnose basic wireless network connectivity	Remember, Understand Application
CO2	Compare various radio propagation modes and multiple access techniques/protocols	Remember, Understand Application
CO3	Analyse, configure and compare various wireless routing protocols.	Remember, Understand Application
CO4	Classify different wireless technologies and evaluate a wireless network.	Remember, Understand Application



6. COURSE CONTENTS

Sr. No.	TOPIC /Sub-Topics	Hours	Marks	COs
1	Introduction to wireless network architectures 1.1. Cellular networks 1.2. wireless local area networks 1.3. multi-hop networks 1.4. wireless PAN/LAN/MAN 1.5. mobile ad-hoc and sensor networks,	10	10	CO1
2	Radio propagation models 2.1. Narrowband digital modulation 2.2. Multiple division techniques: FDMA, TDMA, CDMA, OFDM, SDMA 2.3. Cellular concept, frequency reuse, cell splitting, cell sectoring	10	10	CO2
3	Multiple radio access protocols and division techniques 3.1. CSMA, CSMA/CD, CSMA/CA 3.2. FDMA, TDMA, CDMA, OFDM, SDMA 3.3. Randomized medium access. Channel allocation in (TDMA/FDMA/CDMA-based) wireless networks under the protocol model.	12	15	CO3
4	Introduction to wireless network routing. 4.1. Ad-hoc networks, routing in MANETs 4.2. routing in MANETs 4.3. AODV and OLSR protocols for mobile ad-hoc networks 4.4. Opportunistic routing and Cooperative Routing: 4.5. routing in sensor networks, MAC protocols for wireless sensor networks, routing in sensor networks	12	15	CO3
5	Wireless technologies 5.1. Wireless PAN (Bluetooth), 5.2. Wireless LAN (Wi-Fi), 5.3. Wireless MAN (WiMAX) 5.4. MAC protocols for wireless sensor networks 5.5. TCP over wireless networks, Wireless Congestion Control.	8	8	CO4
6	Emerging industry standards 6.1. 4G Cellular 6.2. IEEE 802.11p, 6.3. WPAN protocols 6.4. WSN network architecture, protocols	12	12	CO4
	TOTAL	64	70	



7. LIST OF PRACTICALS/ASSIGNMENTS

Term Work consists of Journal containing minimum 10 experiments/assignments with approx. no of hours required and corresponding CO attained are specified here:

Sr. No.	Title of Experiment	Approx. Hrs required	COs
1	Installation of UBUNTU	2	CO1
2	Installation of NS2 – i) Download & Extract ns2, Building dependencies	2	CO1
	ii) NS2 – Installation, Setting the environment	2	CO1
	iii) Running ns2, Testing ns2	2	CO1
3	Using NAM commands to simulate wired network and wireless network.	2	CO1
4	Using i) Trace files ii) X-GRAPH	2	CO3
5	To study various radio propagation models	2	CO2
6	To create nodes and simulate them	2	CO1
7	To Simulate mobile ad-hoc network	2	CO1
8	To Simulate routing protocol	2	CO3
9	To implement wireless sensor network	2	CO1
10	To implement TCP in sensor network	2	CO1
11	Study & Comparison of network simulators based on type of simulation, scalability, no. of nodes support, parallelism, module	2	CO1
12	Wireless sensor network security simulation	2	CO4
13	Mini project on NS2 – i) Implementation of selected project	2	CO4
	ii) Creating trace files, energy models	2	CO4
	TOTAL	32	

8. IMPLEMENTATION STRATEGY (PLANNING)

1. Teaching Plan/Tutorials
2. Guest/Expert lectures
3. Demonstrations/Simulations
4. Slides
5. Case Study

9. LEARNING RESOURCES

Sr. No.	Title Of Book	Author	Publication
1.	Wireless Communications and Networks	William Stallings	Pearson Prentice Hall
2.	Wireless Networking Absolute Beginner's Guide	Michael Miller	Que Publishing
3.	Wireless Communication	T L Singhal	Tata Mcgraw Hill Education
4.	Data communication	Behrouz A. Forouzan	McGraw Hill Education



10. WEB REFERENCES

- 1 Wireless LAN Association, <http://www.wlana.org/>
2. Personal Communications Industry Association (PCIA), <http://www.pcia.com/>
3. Global mobile Suppliers Association (GSA), <http://www.gsacom.com/>
4. Institute For Wireless Education, <http://www.iwe.org/>


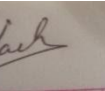
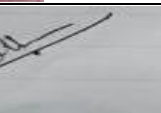

11. SPECIFICATION TABLE

Sr No	TOPIC	Distribution of Theory marks			
		R Level	U Level	A Level	Total Marks
1	Introduction to wireless network architectures	4	6	-	10
2	Radio propagation models	-	4	6	10
3	Multiple radio access protocols and division techniques	5	4	6	15
4	Introduction to wireless network routing.	5	4	6	15
5	Wireless technologies	-	4	4	8
6	Emerging industry standards	-	6	6	12
	TOTAL	14	28	28	70

R Remembering, U Understanding, A Applying, (Bloom's revised taxonomy levels)

NOTE: This specification table provides general guidelines to assist students for their learning and to teachers to teach and assess students with respect to attainment of Cos. The actual distribution of marks at different taxonomy levels (R, U, A) in the question paper may vary from above table.

12. COURSE EXPERT COMMITTEE MEMBERS

Sr. No.	Faculty Type	NAME	SIGNATURE
1	Internal	Mrs. Neeta Kadukar	
2	Internal	Mrs. Swapna Naik	
3	Internal	Mrs. Radhika Patwardhan	
4	External	Dr Nandini Chaudhary Principal, J T Mahajan College of Engineering.	



1. COURSE DETAILS

Programme: Information Technology	Semester: VI
Course: #E-Commerce	Group: A*
Course Code: ECO190917	Duration: 16 Weeks

2. TEACHING AND EXAMINATION SCHEME

Scheme of Instructions and Periods per Week					Examination Scheme and Maximum Marks								
Theory Hrs L	Practical Hrs P	Drawing Hrs D	Tutorial Hrs T	Credits (L+P+D+T)	Theory Paper Duration and marks (ESE)		SSL	TA	TH	TW	PR	OR	TOTAL
					Hours	Marks							
4	2	-	-	6	3	70	20	10	70	50	-	50	200

3. COURSE OBJECTIVE

This course provides an overview of how commerce is conducted on the Internet, infrastructural technology to enable E-Commerce, Business Models and marketing strategies. In addition, some of the major issues associated with e-commerce—security, privacy, intellectual property rights, authentication, encryption and legal liabilities will be explored.

4. SKILL COMPETENCY

The aim of this course is to help the students to attain the following industry identified competency through various teaching learning experiences:

- **Apply processes implemented in E-Commerce arena.**
- **Develop an E-Commerce Website.**

5. COURSE OUTCOMES (COs) at the end of the semester student will be able to: -

CO No.	COURSE OUTCOME	Bloom's LEVEL
CO1	Design and develop various types of E-Commerce websites using different revenue models and marketing strategies	Remember, Understand, Apply
CO2	Use the tools and technologies for developing an E commerce website.	Remember, Understand, Apply
CO3	Implement various payment methods with security measures in E-commerce websites.	Remember, Understand, Apply
CO4	Demonstrate issues related to legality and ethics in E-Commerce.	Remember, Understand



6. COURSE CONTENTS

Sr. No.	TOPIC/Sub-Topics	Hours	Marks	CO
1	Introduction to E-Commerce: 1.1. What is E-Commerce? 1.2. Comparison of E-Commerce and Traditional Commerce 1.3. Features of an E-Commerce Site 1.4. E-Commerce Business Models 1.4.1 B2C (Business-to-Consumer) 1.4.2 B2B (Business-to-Business) 1.4.3 C2C (Consumer-to-Consumer) 1.4.4 C2B (Consumer-to-Business) 1.4.5 P2P (Peer-to-Peer) 1.5 Merits and Demerits of E-Commerce	4	7	CO1
2	Technology Infrastructure for E-Commerce 2.1. The Internet: 2.1.1 Technology and Background 2.1.2 Internet Protocols: HTTP, TCP/IP, SMTP, POP, IMAP, FTP, etc. 2.2. The World Wide Web (WWW) 2.2.1. Hypertext Markup Languages: SGML, HTML, DHTML, XML 2.2.2. Web Servers and Clients 2.2.3. Web Browsers 2.3 Intranets and Extranets 2.3.1 Public and Private Networks 2.3.2 Virtual Private Networks (VPN) 2.4 Internet Connection Options 2.4.1 Connectivity Overview 2.4.2 Broadband Connections 2.4.3 Leased-Line Connections 2.4.4 Wireless Connections	10	10	CO2
3	Selling on the Web: Revenue Models and Consumer Behaviour 3.1. Revenue Models 3.1.1 Web Catalogue Revenue Models 3.1.2 Digital Content Revenue Models 3.1.3 Advertising Supported Revenue Models 3.1.4 Advertising Subscription Mixed Revenue Models 3.1.5 Fee-for-Transaction Revenue Models 3.2. Online Consumer Behaviour 3.2.1 Consumer Behaviour Models 3.2.2 Psychographic Profiles of Online Consumers 3.2.3 Shoppers: Browsers and Buyers 3.3 Customer Retention 3.3.1 Customer Relationship Management (CRM)	8	8	CO1
4	Marketing on the Web 4.1. Web Marketing Strategies 4.1.1. Product based Marketing Strategies 4.1.2. Customer based Marketing Strategies 4.2. Types of Marketing 4.2.1. Permission Marketing 4.2.2. Affiliate Marketing 4.2.3. Viral Marketing 4.3 Creating and Maintaining Brands on the Web 4.3.1 Elements of Branding 4.3.2 Emotional vs. Rational Branding 4.3.3 Cost of Branding 4.3.4 Leveraging Branding Strategies	10	10	CO1



5	E-Commerce Payment Systems 5.1. Online Payment Basics 5.2. Online Payment Modes 5.2.1 Electronic Cash 5.2.2 Electronic Cheque 5.2.3 Electronic Payment Cards 5.2.4 Digital Wallets 5.2.5 Stored Value Payment 5.3 Security Protocols 5.3.1 Secure Socket Layer (SSL) 5.3.2 Secure Electronic Transaction Protocol (SET)	8	10	CO3
6	E-Commerce Security 6.1 Need of Security in E-Commerce 6.2 Security for the Clients 6.2.1 Cookies 6.2.2 Viruses, Worms, and Antivirus Software 6.2.3 Digital Certificates 6.2.4 Steganography 6.2.5 Physical Security for Clients 6.3 Security for the Servers 6.3.1 Web Server Threats 6.3.2 Database Threats 6.3.3 Access Control and Authentication 6.3.4 Firewall 6.3.5 Physical Security of Web Servers	12	13	CO3
7	Legal, Ethical and Tax Issues in E-Commerce 7.1. The Legal Environment of Electronic Commerce 7.1.1 Borders and Jurisdiction on the Internet 7.1.2 Conflict of Laws 7.1.3 Web Site Content Issues 7.1.4 Domain Names, Cyber Squatting, and Name Stealing 7.1.5 Protecting Intellectual Property Online 7.1.6 Advertising Regulation 7.1.7 Online Crime 7.2. Ethical Issues 7.2.1 Ethics and Web Business Policies 7.2.2 Privacy Rights and Obligations 7.2.3 Communications with Children 7.2.4 E-Commerce laws & Regulations in India 7.3. Taxation and Electronic Commerce 7.3.1 Taxes on the Internet 7.3.2 U.S. Income Taxes 7.3.3 U.S. State Sales Taxes 7.3.4 European Union Value Added Taxes 7.3.5 Taxes in India	12	12	CO4
TOTAL		64	70	



7. LIST OF PRACTICALS/ASSIGNMENTS/EXERCISES/TUTORIALS/DRAWINGS

Term Work consists of Journal containing minimum 10 experiments/assignments with approx. no of hours required and corresponding CO attained are specified here:

Sr. No.	Title/Aim	Approx. Hrs required	COs
01	To exemplify the process of development of an E-Commerce website.	2	CO1
02	To install an IDE and an application server for the Website Development.	2	CO2
03	To design and develop a login and registration form for the customer.	2	CO1
04	To design a web page to display Catalog of products/services with provision of search button.	4	CO1
05	To implement a shopping cart for an E-Commerce website.	4	CO1
06	To design and develop an order entry form for the product/service.	2	CO1
07	To develop a Transaction (Payment) Processing web page for the checkout of orders.	4	CO3
08	To send emails to the prospective/regular customers (Email Marketing)	2	CO1
09	To provide security protection against SQL Injection on a web page.	2	CO3
10	To explain the taxation issues for Indian E-Commerce arena.	2	CO4
11	Mini Project	6	All COs
	Total	32	

8. IMPLEMENTATION STRATEGY (PLANNING)

1. Teaching Plan/Tutorials
2. Minimum no of practical/assignments/drawings etc.
3. Guest/Expert lectures
4. Demonstrations/Simulations
5. Slides
6. Group discussions
7. Self-Learning Online Resources

9. LEARNING RESOURCES

Sr. No.	Title Of Book	Author	Publication
1.	E-commerce: Business, Technology and Society	Kenneth C. Laudon, Carol Guercio Traver	Pearson Prentice Hall
2.	Electronic Commerce	Gary P. Schneider	CENGAGE Learning
3.	E-Commerce concepts, Models, Strategies	C S V Moorthy	Himalaya Publications
4.	Frontiers Of Electronic Commerce,	Kalakota	Pearson Education India




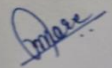


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3. <https://www.datasunrise.com/blog/potential-db-threats/database-security-threats-and-countermeasures/>
4. <https://cleartax.in/s/gst-applicable-on-ecommerce-sale>
5. <https://www.mondaq.com/india/corporate-and-company-law/801358/a-structured-guide-to-start-an-e-commerce-company-in-india>
6. <https://vakilsearch.com/advice/e-commerce-laws-and-regulations-in-india>

11. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Sr. No.	TOPIC	Distribution of Theory Marks			
		R Level	U Level	A Level	Total Marks
1.	Introduction to E-Commerce	2	2	3	07
2.	Technology Infrastructure for E-Commerce	3	2	5	10
3.	Selling on the Web: Revenue Models and Consumer Behaviour	2	2	4	08
4.	Marketing on the Web	2	3	5	10
5.	E-Commerce Payment Systems	4	2	4	10
6.	E-Commerce Security	5	6	2	13
7.	Legal, Ethical and Tax Issues in E-Commerce	6	6	-	12
TOTAL		24	23	23	70

12. COURSE EXPERT COMMITTEE MEMBERS

Sr. No.	FACULTY TYPE	NAME	SIGNATURE
1	Internal	Mr. Manish R. Solanki	
2	Internal	Ms. Abhilasha V. More	
3	Internal	Mr Priti P. Bokariya	
4	External	Mr. Vinod More Sr. Manager, Zee Entertainment Enterprises Ltd.	



1. COURSE DETAIL

Programme: Information Technology	Semester: VI
Course: Cloud Application Development	Group: A*
Course Code: CLD198924	Duration:16 Weeks

2. TEACHING AND EXAMINATION SCHEME

Scheme of Instructions and Periods per Week					Examination Scheme and Maximum Marks								
Theory Hrs L	Practical Hrs P	Drawing Hrs D	Tutorial Hrs T	Credits (L+P+D+T)	Theory Paper Duration and marks (ESE)		SSL	TA	TH	TW	PR	OR	TOTAL
					Hours	Marks							
4	2	-	-	6	3	70	20	10	70	50	-	50	200

3. COURSE OBJECTIVE

Cloud computing is perhaps the most flamboyant technological innovation of the 21st century. Cloud computing offers pooled computing resources to entrepreneurs, organizations and society at large. It is a proven platform to resolve issues in emerging technologies such as cyber security.

4. SKILL COMPETENCY

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences.

- **Write Cloud Application and Deploy cloud environment**

5. COURSE OUTCOMES (COs) at the end of the semester student will be able to: -

CO No.	COURSE OUTCOME	Bloom's LEVEL
CO1	Implement Virtualization	Remember, Understand Apply
CO2	Create CLI for cloud and write application for various cloud services	Remember, Understand Apply
CO3	Implement containerization	Remember, Understand Apply
CO4	Describe recent trends in cloud computing	Remember, Understand



6. COURSE CONTENTS

Sr. No.	TOPIC/ Sub-Topics	Hours	Marks	COs
1	Virtualization 1.1 Introduction, Characteristics of virtualized environment Hypervisor types 1 and 2 1.2 Types : Vmware, Oracle Virtual Box ,Microsoft Hyper-V, 1.3 KVM , Xen , Advantages VM Migration VM consolidation VM Management disadvantages of virtualization	10	10	CO1
2	Introduction to Cloud computing 2.1 On premise – virtual – Cloud 2.2 NIST cloud Computing definition, Model, Essential characteristics of cloud computing, 2.3 Cloud Deployment Model: Public cloud, Private cloud, Community cloud, Hybrid cloud , Open Source, closed clouds 2.4 Cloud Service Models: IaaS, PaaS, SaaS Cloud Economics and Benefits Architecture of Cloud computing, Cloud Computing Infrastructure	12	14	CO2
3	Cloud Platform 3.1 Key Amazon offerings: EC2, SimpleDB, S3, Simple Queue, Simple Relational Database, Elastic MapReduce, Virtual Amazon Cloud. S3 Command Line tool Bundling Amazon instances: create and manipulate Amazon instances with command line tools, transfer application software to instances and bundle them into new AMI-s that could be offered to the public. 3.2 Amazon's AWS Identity Management and Security in the Cloud Amazon's Virtual Private Cloud (VPC) and Directory Service Amazon's RESTful WebServices 3.3 AWS APIs interaction with AWS service. establish connectivity between own modules in the Cloud use RESTful Web Services Elastic load balancing (ELB)	24	26	CO2
4	Containerization 4.1 Container platform, Container Vs Virtualization, function as a service, event based processing, serverless Docker container	6	8	CO3
5	Recent trends and development 5.1 Cloud trends in supporting Ubiquitous Computing, Enabling Technologies with the Internet of Things (RFID, Sensor Networks and ZigBee Technologies, GPS) , Innovative Applications with the Internet of Things (Ex: Smart Buildings and SmartPower Grid) 5.2 Future of Cloud-Based smart Devices, Faster time to Market for Software Applications, Home Based Cloud Computing, Energy Aware Cloud	12	12	CO4
	TOTAL	64	70	



7. LIST OF PRACTICALS/ASSIGNMENTS/EXERCISES/TUTORIALS/DRAWINGS

Term Work consists of Journal containing minimum 10 Experiments/Assignment with approx.no of hours required and corresponding CO attained should be specified here.

Sr. No.	Title of Experiment/Assignment/Exercise/Tutorial/Drawings	Approx. Hrs required	COs
1	To implement virtual machine	2	CO1
2	To install and configure AWS CLI	2	CO2
3	To implement cloud networking and use AWS VPC	4	CO2
4	Host a word press application using EC2	4	CO2
5	Host a word press high available application using EC2 and ELB	4	CO2
6	Host a static website using S3with Cloud Front CDN	4	CO2
7	Use AWS Lambda to create A server less function	4	CO3
8	Build a near real Time Event log System using Dockers Amazon SNS and SQS	4	CO3
9	Write an application to log the data using Open Cloud platform	4	CO4
10	Assignment on Public Clouds and Business model	-	CO2
11	Assignment on Cloud services and component offered by Google	-	CO2
12	Assignment on Cloud services and component offered by Azure	-	CO2
	Total	32	

8. IMPLEMENTATION STRATEGY (PLANNING)

1. Teaching Plan/Tutorials
2. Minimum no of practical.
3. Guest/Expert lectures
4. Demonstrations/Simulations
5. Slides
6. Self-Learning Online Resources

9. LEARNING RESOURCES

Sr. No.	Title Of Book	Author	Publication
1.	Virtualization for Dummies, Wiley Publication	Bernard Golden	Wiley publication
2.	Cloud Computing Principles and Paradigms	Rajkumar Buyya	Wiley publication
3.	Programming Amazon EC2	Flavia Paganelli and Jurg van Vliet	O'reilly Publication
4.	Cloud computing Black Book	Barrie Sosinsky	Dreamtech Publication

10. WEB REFERENCES

1. www.aws.amazon.com
2. <http://www.nist.gov>
3. <https://www.ibm.com/cloud>
4. <http://www.Tutorialpoint.com>



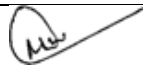



11. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Sr. No.	TOPIC	Distribution of Theory Marks			
		R Level	U Level	A Level	Total Marks
1	Virtualization	4	2	4	10
2	Introduction to Cloud computing	4	4	6	14
3	Cloud Platform	4	8	14	26
4	Containerization	2	2	4	8
5	Recent trends and development	6	6	-	12
TOTAL		20	22	28	70

R Remembering, U Understanding, A Applying, (Bloom's revised taxonomy levels)

NOTE: This specification table provides general guidelines to assist students for their learning and to teachers to teach and assess students with respect to attainment of COs. The actual distribution of marks at different taxonomy levels (R, U, A) in the question paper may vary from above table

12. COURSE EXPERT COMMITTEE MEMBERS

Sr. No.	FACULTY	NAME	SIGNATURE
1	Internal	Mrs N. G. Kadukar	
2	Internal	Mr J. S. Kulkarni	
3	Internal	Mr. Pratik H. Shah	
4	External	Mr. Tejas J Shah Practice Manager – Talent Transformation , Wipro Limited	



1. COURSE DETAILS

Programme: CSE/IT	Semester: VI/VI
Course: Entrepreneurship Development	Group: M/M
Course Code: EDC198928	Duration:16 Weeks

2. TEACHING AND EXAMINATION SCHEME

Scheme of Instructions and Periods per Week					Examination Scheme and Maximum Marks								
Theory Hrs L	Practical Hrs P	Drawing Hrs D	Tutorial Hrs T	Credits (L+P+D+T)	Theory Paper Duration and marks (ESE)		SSL	TA	TH	TW	PR	OR	TOTAL
					Hours	Marks							
03	-	--	--	03		-	-	-	-	50	--	50	100

3. COURSE OBJECTIVE

With wide use of World Wide Web and mobile application, ample opportunity created for diploma engineers to start enterprises in the sector marking and IT services. This course aims to develop Entrepreneur skill in order to start small enterprise.

4. SKILL COMPETENCY

The aim of this course is to help the students to attain industry identified competencies: create Business idea and important aspects of the business through various teaching learning experiences

- **Develop Entrepreneurship traits**

5. COURSE OUTCOMES (COs) at the end of the semester student will be able to:

CO No.	COURSE OUTCOME	Bloom's LEVEL
CO1	Identify Entrepreneurial traits and business opportunity	Remember
CO2	Develop Comprehensive business plan	Understand
CO3	Use the information to prepare project report for business venture	Understand, Apply
CO4	Prepare Plan to manage Enterprise	Apply
CO5	Use an appropriate marketing strategy	Apply



6. COURSE CONTENTS

Sr. No.	Topics/Sub-Topics	Hours	COs
1	Venture Development: 1.1 Introduction of entrepreneurship 1.2 Small Scale industries 1.3 Traits of successful Entrepreneur 1.4 SWOT analysis 1.5 Business structure 1.6 Scope for Entrepreneur Local and Global market 1.7 Internet based Business	8	CO1
2	Finance For Enterprise & Financial Statement 2.1 Source of finance 2.2 Fixed capital & working capital 2.3 Short term and long term source 2.4 Balance sheet Profit & Loss Account 2.5 Financial ratio 2.6 Concept of audit	10	CO2
3	Product/ service Development 3.1 Selection of product /services 3.2 Innovation management 3.3 Process Selection 3.4 Market Study procedures 3.5 Getting the information from Stake holders /Govt agency / Other agencies 3.6 Making the project proposal	8	CO2
4	Support System 4.1 Support system – Government agencies: MCED, NI –MSME, 4.2 Support agencies for entrepreneurship guidance, Training, Registration, Technology and Quality control 4.3 Breakeven point, Return on Investment and return on sales. 4.4 Goods and Services Tax.	8	CO3
5	Managing Enterprises 5.1 Unique Selling Proposition (USP) 5.2 Preparing strategies of handling business 5.3 Quality assurance 5.4 Risk Management 5.5 Incubation Centre	6	CO4
6	Marketing Strategy 6.1 Importance of marketing 6.2 marketing management 6.3 soft skill 6.4 pricing and costing 6.5 marketing mix 6.6 Distribution channel	8	CO5
	TOTAL	48	



7. LIST OF PRACTICALS/ASSIGNMENTS/EXERCISES/TUTORIALS/DRAWINGS

Term Work consists of 7 assignments and corresponding CO attained are specified here:

Sr. No.	Title of Assignments	COs
1	TO submit the profile summary of a successful entrepreneur	CO1
2	To identify entrepreneur trait and Generate business ideas which suits to traits	CO1
3	TO survey on ecommerce business and turn over and revenue model and prepare a report	CO1 to CO5
4	Study of Balance Sheet	CO4
5	Selection of Product/ Services	CO2
6	Preparation of Detailed Project Report	CO3
7	Preparation of Business plan for a small enterprise	CO1 to CO5

8. IMPLEMENTATION STRATEGY (PLANNING)

1. Minimum no of practical/assignments/drawings etc.
2. Industry visit
3. Guest/Expert lectures
4. Case study

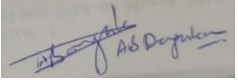


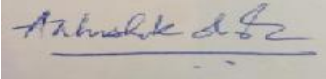
9. LEARNING RESOURCES

Sr. No.	Title Of Book	Author	Publication
1.	Dynamics of Entrepreneurial Development and Management	Shri Vasant Desai	Himalaya Publication Mumbai
2.	Entrepreneurship Development	Shri S S Khanna	S. Chand And Company
3.	Small Scale Industries and Entrepreneurship	Shri Vasant Desai	Himalaya Publication Mumbai
4.	Entrepreneurship	Shri J. Saboo	Himalaya Publication Mumbai

10. WEB REFERENCES

- <https://www.toppr.com/guides/business-studies/entrepreneurship-development/process-of-entrepreneurship-development/>
- <https://my.msme.gov.in/MyMsmeMob/MsmeProjectProfile/Home.htm>
- <https://www.ediindia.org/>

11. COURSE EXPERT COMMITTEE MEMBERS

Sr. No.		NAME	SIGNATURE
1	Internal	Mr Abhijeet Dongaonkar	
2	Internal	Mr Janardan S. Kulkarni	
3	Internal	Mrs Neeta Kadukar	
4	External	Mr. Abhishek Chande, Business Development Manager Organization Raheja Hospitality	



1. COURSE DETAILS

Programme: Information Technology	Semester: VI
Course: Advanced Web Technology	Group: A
Course Code: AWT190918	Duration:16 Weeks

2. TEACHING AND EXAMINATION SCHEME

Scheme of Instructions and Periods per Week					Examination Scheme and Maximum Marks								
Theory Hrs L	Practical Hrs P	Drawing Hrs D	Tutorial Hrs T	Credits (L+P+D+T)	Theory Paper Duration and marks (ESE)		SSL	TA	TH	TW	PR	OR	TOTAL
					Hours	Marks							
3	2	-	-	5	3	70	20	10	70	25	50	-	175

3. COURSE OBJECTIVE:

This course helps students in developing dynamic Web pages & server side programming. It provides overview of C# .net, ASP.net and ADO.net. Programming based on object oriented concepts can be used to develop GUI based applications. This course will give the students necessary skills to use programming techniques to develop GUI applications and deploy the same.

4. SKILL COMPETENCY:

The aim of this course is to help the students to attain the following industry identified competency through various teaching learning experiences:

- **Develop user friendly graphical interfaces for windows and web applications.**
- **Design Console, Windows and Web based programs using visual development tools.**

5. COURSE OUTCOMES (COs) at the end of the semester student will be able to:

CO No.	COURSE OUTCOME	Bloom's LEVEL
CO1	Use various tools used in dynamic web page designing & hosting of Web sites	Remember, Understand, Apply
CO2	Use GUI tools of .net framework.	Remember, Understand, Apply
CO3	Use basic and advance .net controls.	Remember, Understand, Apply
CO4	Build applications integrated with .net Framework.	Remember, Understand, Apply
CO5	Apply Database Controls to establish database connectivity.	Remember, Understand, Apply



6. COURSE CONTENTS:

Sr No	Topic/ Sub-Topics	Hours	Marks	CO's
1	Introduction: 1.1. Why dot Net 1.2. Introduction to Microsoft .Net Framework. 1.3. Building blocks in .Net 1.4. Drawback of previous languages. 1.5. Understand what is .Net 1.6. VB.Net 1.7. VB.Net overview. 1.8. Difference between VB and VB.Net 1.9. Introduction to .Net 1.10. Types of application architecture. 1.11. Dot.Net initiative. 1.12. Dot.Net framework: components of .Net framework, 1.13. Advantages, requirement of .Net.	5	10	CO1
2	From C++ to C# 2.1. Introduction to Console Application, A simple hello User program. 2.2. Primitive data type. 2.3. Member accessibility. 2.4. Field Initialization. 2.5. Type constructor. 2.6. Reference and value types. 2.7. Events. 2.8. Method parameters. 2.9. Implementation Inheritance. 2.10. Arrays and Collections 2.11. Client –server Programming. 2.12. Interface Based programming 2.13. Error handling.	10	10	CO4
3	C# Windows Forms Application 3.1 Introduction to Windows Form, Events, Properties 3.2 Form Controls 3.3 User defined Controls 3.4 Graphical Objects 3.5 MenuStrip, ContextMenuStrip, ToolStrip And StatusStrip 3.6. Multiple Document Interface 3.7. Form Inheritance	08	10	CO2
4	Introduction to ASP.Net 4.1. The features of ASP.NET 4.2. Code structure of ASP.NET , Web Sites, Applications, and Virtual Directories in IIS 4.3. Difference between ASP and ASP.Net 4.4. Introducing web forms 4.5. Types of Server Controls a. HTML controls. b. Web Server Controls. 4.6. Validation controls 4.7. Data List Controls 4.8. Applying Themes and Styles to Controls 4.9. Creating a Layout Using Master Pages 4.10. Compilation in ASP.NET	10	15	CO3



5	ASP.Net objects and components 5.1. Page directives 5.2. Page life cycle events 5.3. Tracing of Page Life Cycle 5.4. Importance of Global.asax file, web.config file 5.5. FORM submission, AutoPostBack 5.6. Page Navigation Options: Response. Redirect, Server. Transfer, CrossPagePostBack property of Button 5.7. State Management: View State, Hidden Field, Query String, HttpCookie, HttpSessionState, HttpApplicationState 5.8. Creating session, Enabling disabling session 5.9. Manipulating XML data. 5.10. Features of DOT NET Framework Class Library. 5.11. Handling File Input/ Output and directories. 5.12. Object Creation. 5.13. Authentication & Authorization	05	10	CO3
6.	Introduction to ADO.Net and data manipulation in ADO.Net: 6.1. Introduction to database. 6.2. Overview of data access on the web. 6.3. Overview of Basic SQL statements 6.4. Working with ADO.NET. 6.5. Accessing data using ADO.NET 6.6. Overview of ADO.NET Objects 6.7. Connected Architecture, Disconnected Architecture 6.8. Dataset, Data adapter and data reader. 6.9. Data table and Data row. 6.10. Data Binding like Repeater. 6.11. Data List and Data Grid Controls. 6.12. Web .config introduction, SQLdatasource.	10	15	CO5
	TOTAL	48	70	

7. LIST OF PRACTICALS/ASSIGNMENTS/EXERCISES/TUTORIALS/DRAWINGS

Term Work consists of Journal containing minimum 10 Experiments/Assignment with approx.no of hours required and corresponding CO attained should be specified here.

Sr. No.	Title of Experiments/Assignments	Approx. Hrs required	COs
1.	Installation of Visual Studio IDE and IIS	2	CO1
2.	Implement a program using conditional logic (if then, select case statement,) and various loops (for, do loop etc.).	2	CO4
3.	Implement a program to use access modifiers in class using c#.	2	CO4
4.	Implement a program using class Libraries in c#	2	CO4
5.	Implement a program using string manipulation(trim method instr method)	2	CO4
6.	Implement a program to open a text file , write student records, save and edit using C# windows form	2	CO2
7.	Implementation of the program with asp.net HTML controls.	2	CO3
8.	Implementation of the program with asp.net Web controls.	2	CO3
9.	Create a web page using ASP.NET with proper validation on each components	2	CO3
10.	Implement a program to show Form based Authentication	2	CO3
11.	Show the use of mail messaging with the help of ASP.net	2	CO3
12.	Create a web page using ASP.NET and show the use of session in it.	2	CO3
13.	Write a program to show Form based Authentication.	2	CO3



14.	Implement a program to establish a connection between dataset and front end for SQL/Oracle using ADO.net	4	CO5
15.	Implementation of program with asp.net data binding controls, Grid view control.	2	CO5
TOTAL		32	

8. IMPLEMENTATION STRATEGY (PLANNING)

1. Conducting lectures as per teaching plan/ scheme
2. Minimum no of practical/assignments etc.
3. Guest/Expert Lecture
4. Self-Learning Online Resources

9. LEARNING RESOURCES

Sr. No.	Title Of Book	Author	Publication
1.	The complete reference ASP.NET	Matthew Macdonald	McGraw-Hill
2.	C# 3.0 The complete Reference	Herbert Schildt	McGraw-Hill
3.	Object-oriented programming languages and event-driven programming	Yeager, Dorian P	Mercury publication.

10. WEB REFERENCES

1. <http://www.onlinewebtutorials.com>
2. <http://www.w3school.com>.
3. <https://docs.microsoft.com/en-us/dotnet/visual-basic/>
4. <https://visualstudio.microsoft.com/vs/features/net-development/>

11. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN



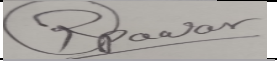
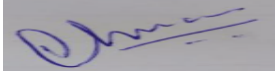
Sr. No.	TOPIC	Distribution of Theory Marks			
		R Level	U Level	A Level	Total Marks
1	Introduction	4	4	2	10
2	From C++ to C#	3	3	4	10
3	C# Windows Forms Application	3	3	4	10
4	Introduction to ASP.Net	5	5	5	15
5	ASP.Net objects and components	3	3	4	10
6	Introduction to ADO.Net and data manipulation in ADO.Net	5	5	5	15
TOTAL		23	23	24	70

R Remembering, U Understanding, A Applying, (Bloom's revised taxonomy levels)

NOTE: This specification table provides general guidelines to assist students for their learning and to teachers to teach and assess students with respect to attainment of Cos. The actual distribution of marks at different taxonomy levels (R, U, A) in the question paper may vary from above table.



12. COURSE EXPERT COMMITTEE MEMBERS

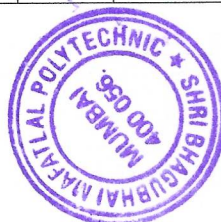
Sr. No.	Faculty Type	NAME	SIGNATURE
1	Internal	Mrs. Radhika Patwardhan	
2	Internal	Mrs. Abhilasha More	
3	Internal	Mrs. Rupali Pawar	
4	External	Mr. Vinod More Sr. Manager, Zee Entertainment Enterprises Ltd.	



Committees

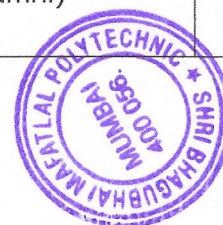
I.1 Managing Council (MC)

Representatives of Shri Vile Parle Kelavani Mandal		Shri Amit Balwant Sheth, Chairman Shri Nayan Patel Shri Hiten V.Parekh Shri Asoke Basak Dr.Madhav N.Welling Dr.Sharad Mhaiskar Dr.D.J.Shah
Member,Industry Representative		Mr, Hemant Minocha ,MD,Rajiv Plastics,Mumbai
Representatives of Government		
Representative of the State Government		Dr.Abhay Wagh Director, Directorate of Technical Education, Maharashtra State,
Representative of the Maharashtra State Board of Technical Education		Dr.Vinod Mohitkar Director, Maharashtra State Board of Tech.Education
Representative of Central Government		Shri P.N.Jumle Director, Board of Apprenticeship Training (W.R.)
Representative of the All India Council for Technical Education		Dr. Ajeet Singh, Regional Officer& Assistant Director,All India Council for Technical Education (WesternRegion)
Expert Members nominated by the State Government/AICTE		-----
Ex-Officio –Secretary-Principal		Dr.M.Z.Shaikh

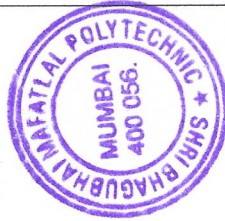


I.2 Board of Studies (BOS)

Sr. No.	Name	Designation & Organisation	BOS Designation
1.	Dr.(Mrs) Shubha Pandit	Principal, K.J. Somaiya Engg. College, Mumbai	Chairman
2.	Dr.Vinod Mohitkar	Director, MSBTE	Member
3.	Dr. M.Z. Shaikh	Principal, S.B.M. Polytechnic	Member
4.	Mrs. Neeta Kadukar	Vice Principal and Head, Information Technology Department, SBM Polytechnic	Member
5.	Shri Dhirajkumar Pandirkar	Chief Engineer, MHADA, Mumbai	Member
6.	Shri B.R. Patel,	Director, Procem Consultant (Alumni), Mumbai	Member
7.	Dr. A.V. Bhonsale	Rtd. Principal, Vidyavardhini College of Engineering, Vasai	Member
8.	Shri Sunil Kangane,	Director, Invotech, (Alumni), Mumbai	Member
9.	Shri Ricky Uchil,	Vice President, Adani Electricity Mumbai	Member
10.	Shri Apurva Patel	Director, Exult Industries Ltd. Mumbai	Member
11.	Shri V.M. Joshi,	Adjunct Faculty. Swami Vivekananda Institute of Technology, Mumbai	Member
12.	Shri Paresh Haria,	General Manager PCS Technology, Mumbai	Member
13.	Shri Hemant Minocha	Managing Director, Rajiv Plastics, Mumbai	Member
14.	Prof. E. Narayanan	Ex-Faculty DJSCOE, Mumbai	Member
15.	Shri Ramesh Vulavala	Rtd, HOD DJSCOE, Mumbai	Member
16.	Dr. D.J. Shah	Ex-Principal SBMP	Member
17.	Shri Milind Kamat	General Manager, Toyo Engg. Ltd., Mumbai	Member
18.	Shri Harinder Salwan	Managing Director, Tircom Multimedia Pvt. Ltd. Mumbai	Member
19.	Shi Ashih Tapiawala	Trainer, Vibrant Bootcamp, (Alumni) Mumbai	Member



20.	Shri Ashok Mehta	Ex-Principal SBM Polytechnic	Invitee
21.	Shri Vinod B. Vanvari,	Head, Civil Engg. Dept. SBM Polytechnic	Member
22.	ShriA.K. Chore	Head, Mechanical Engg. Deptt. SBM Polytechnic	Member
23.	Shri N.D. Adate	I/c. Head, Electrical Engg. Deptt. SBM Polytechnic	Member
24.	Mrs.A.A. Kulkarni	Head, Electronics Deptt. SBM Polytechnic	Member
25.	Shri D.M. Karad	Head, Plastics Engg. Deptt. SBM Polytechnic	Member
26.	Shri R.D. Shimpi	Head, Chemical Engg. Deptt. SBM Polytechnic	Member
27.	Shri J.S. Kulkarni	Head, Computer Engg. Deptt. SBM Polytechnic	Member
28.	Shri Abhijit Dongaonkar	Lecturer, IT SBM Polytechnic	Member
29.	Shri S.T. Khelkar	Controller of Exam. SBM Polytechnic	Member
30.	Shri Gajanan Badwe	Lecturer, Mechanical (TPO) SBM Polytechnic	Member
31.	Shri L.B.Deshpnade	Lecturer, Electronics SBM Polytechnic	Convenor



I.3 Programme wise committee (PBOS)

Sr. No.	Name & Office address	PBOS Designation
1	Mr. Harinder Salwan Tricom Multimedia Pvt Ltd., Mumbai Business Phone / Fax: +91 22 2891 7099 / 2893 2737 / 2893 6622 / 2893 8483 Email - md@tricom.in	Managing Director
2	Mr. Ashish Tapiawala Vibrant e-Technologies Pvt. Ltd., Mumbai. Mobile - 09867297260 Email - ashisht@yahoo.com	Director
3	Mr. Milind Ugale Infinite IT Solutions Pvt. Ltd., Mumbai Mobile - 09820121654 Email - milind.ugaley@gmail.com	Director
4	Mr. Rahul Kashyap RISK Advisory Services, Mumbai Mobile -09619261911 Email -rahulkashyap0201@gmail.com	Analyst
5	Mr. Devang Parekh Accenture India, Mumbai Mobile - 09820891487 Email - devang0704@gmail.com	Senior Analytics Advisory
6	Mr. Jay Mehta BlackCurrant Apps LLP, Mumbai Mobile - 09699818273 Email - jay@blackcurrantapps.com	Chief Executive Officer
7	Dr. Subhash Shinde LT College of Engineering, Navi Mumbai. Mobile – 09594170066 Email – skshinde@rediffmail.com	Professor, LT College of Engineering, Navi Mumbai. Member, Board of Studies, University of Mumbai.



I.4 PROGRAMME CURRICULUM DEVELOPMENT COMMITTEE

Institute Level Curriculum Development Cell

Sr. No.	Name of the Faculty	Designation
1	Dr. M.Z.Shaikh,Principal	Chairman
2	Mrs. Neeta Kadukar, Vice-Principal and Head, IT Dept.	Member
3	Shri V.B.Vanvari, Head, Civil Engg.Dept.	Member
4	Shri A.K.Chore, Head, Mechanical Engg.Dept.	Member
5	Shri N.D.Adate,I/C Head, Electrical Engg.Dept.	Member
6	Mrs. A.A.Kulkarni, Head, Industrial and Digital Elex.Dept.	Member
7	Shri D.M.Karad, Head, Plastics Engg.Dept.	Member
8	Shri R.D.Shimpi, Head, Chemical Engg.Dept.	Member
9	Shri J.S.Kulkarni, Head, Computer Engg.Dept.	Member
10	Shri A.B.Dongaonkar, Lecturer, IT Dept.	Member
11	Mrs.K.P.Bhave,Lecturer,Chemistry Dept.	Member
12	Shri G.J.Badwe,Training and Placement Officer	Member
13	Shri S.T.Khelkar,Controller of Examinations	Member
14	Shri L.B.Deshpande,Lecturer,Electronics Dept.	Member Secretary

Department Level Committee (Department CO-Ordinators)

Sr. No.	Name of the Faculty	Designation
1	Shri S. N. Ranshur	Lecturer, Civil Engineering
2	Shri A. S. Shukla	Lecturer, Mechanical Engineering
3	Shri D. G. Rajmandai	Lecturer, Electrical Engineering
4	Ms. P. J. Nikhade	Lecturer, Industrial/Digital Electronics
6	Shri S. A. Kamble	Lecturer, Plastics Engineering
5	Shri M. M. Belwalkar	Lecturer, Chemical Engineering
7	Shri P. H. Shah	Lecturer, Computer Engineering
8	Shri P. D. Rathod	Lecturer, Information Technology



Course-wise Curriculum Development Committee - SCHEME 2019

Department of Information Technology

SEMESTER I

Sr. No	Course Code	Course Name	Course Expert Committee Member Internal			Course Expert External
1	EMT198901	Engineering Mathematics	Mr. Pratik Shah	Ms. Priti Bokariya		Mr. Umang Patel
2	EVS198909	Environmental Studies	Mrs. Swapna Naik	Mrs. Radhika Patwardhan	Ms. Sharyu Kadam	Mr. Vivek S. Dhadam
3	CMS198903	Communication Skills	Mrs. Radhika Patwardhan	Mrs. Prachi Arora	Mrs. Geetha S.	Ms. Shweta Salian
4	BEX198911	Basic Electronics	Mr. A.B. Dongaonkar	Mrs. Prachi Arora	Mr. Pankaj Rathod	Mr. Umang Patel
5	FCS198905	Fundamentals of Computing System	Mrs. Radhika Patwardhan	Mrs. Rupali Pawar	Mrs. Abhilasha More	Mr. Vaibhav M. Palve
6	PRC198912	Programming in C	Mrs. Radhika Patwardhan	Ms. Priti Bokariya	Mr. Manish Solanki	Mr. Chirag Desai
7	ENG198904	Engineering Graphics	Ms. Neha More	Mr. Pankaj Rathod	Mrs. Rupali Pawar	Dr. Rajesh Patil

SEMESTER II

Sr. No	Course Code	Course Name	Course Expert Committee Member Internal			Course Expert External
1	AMT198908	Applied Mathematics	Mr. Pratik Shah	Ms. Priti Bokariya		Mr. Umang Patel
2	APH198902	Applied Physics	Mrs. Swapna Naik	Ms. Priti Bokariya	Mrs. Abhilasha More	Mr. Manoj Jaiswar
3	DLS198910	Development of Life Skills	Mrs. Geetha S.	Mrs. Prachi Arora	Mrs. Radhika Patwardhan	Ms. Shweta Salian
4	DEX198913	Digital Electronics	Mrs. Prachi Arora	Mr. Pankaj Rathod	Mr. A.B. Dongaonkar	Mr. Umang Patel
5	WSD198907	Website Designing	Mr. Manish Solanki	Mrs. Abhilasha More	Ms. Neha More	Mr. Harinder Salwan
6	CWP198906	Workshop & Practice (CSE/IT)	Mr. J.S. Kulkarni	Mr. A.B. Dongaonkar	Mr. Siddhesh Masurkar	Mr. Anil Gurav
7	CPP198914	Programming in C++	Mr. Manish Solanki	Mr. Pratik Shah	Ms. Priti Bokariya	Mr. Siddhesh Vaidya Mr. Harinder Salwan

SEMESTER III

Sr. No	Course Code	Course Name	Course Expert Committee Member Internal			Course Expert External
1	PRJ190901	Programming in Java	Mrs. Geetha S.	Mr. Manish Solanki	Ms. Priti Bokariya	Mr. Mihir Nanavati
2	DST198915	Data Structure	Mrs. Radhika Patwardhan	Ms. Preeti Bokariya	Mr. Pankaj Rathod	Ms. Ekta Shah
3	DBS198917	Database Management System	Mrs. Swapna Naik	Mr. Manish Solanki	Mr. A.B. Dongaonkar	Dr. Nandini Chaudhary



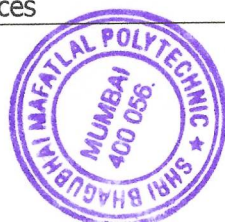
4	DCN190902	Data Communication & Networking	Mrs. Prachi Arora	Mrs. Krishna Bhatt	Mrs. Rupali Pawar	Mr. Pratik Kanani
5	CGR198920	Computer Graphics	Mrs. Radhika Patwardhan	Ms. Priti Bokariya	Mr. Pankaj Rathod	Mr. Manish Salve
6	MSA190903	Multimedia & Animation	Mr. Pratik Shah	Mrs. Neeta Kadukar	Ms. Sharyu Kadam	Mrs. Vaishali Rane
7	OST190904	Open Source Technology	Mrs. Swapna Naik	Mrs. Geetha S.	Mr. Manish Solanki	Mr. Siddhesh Vaidya

SEMESTER IV

Sr. No	Course Code	Course Name	Course Expert Committee Member Internal			Course Expert External
1	SWE190905	Software Engineering	Mrs. Krishna Bhatt	Mrs. Geetha S.	Ms. Sharyu Kadam	Ms. Ekta Shah
2	FOS198916	Fundamentals of Operating System	Mr. J.S. Kulkarni	Mrs. Radhika Patwardhan	Mrs. Swapna Naik	Mr. Sanjay Deshmukh
3	PRP198918	Programming in Python	Mr. A.B. Dongaonkar	Mr. Manish Solanki	Ms. Priti Bokariya	Ms. Ekta Shah
4	OOD190906	Object Oriented Modelling And Design	Mrs. Neeta Kadukar	Mrs. Radhika Patwardhan	Mrs. Abhilasha More	Mrs. Asawari Arote
5	DWM198925	Data ware Housing & Mining	Mr. A.B. Dongaonkar	Mrs. Geetha S.	Mr. Pankaj Rathod	Mr. Vaibhav Vasani
6	HCI198919	Human Computer interface	Mr. J.S. Kulkarni	Mrs. Radhika Patwardhan	Mrs. Swapna Naik	Mr. M. Dhangar
7	GDD198926	Game Design & Development	Mrs. Swapna Naik	Mr. Manish Solanki	Mr. A.B. Dongaonkar	Dr. Nandini Chaudhary
8	SPT190919	Summer Inplant Training/Internship ¥	Mrs. Neeta Kadukar	Mr. J.S. Kulkarni	Mr. A.B. Dongaonkar	Mr. Harinder Salwan


SEMESTER V

Sr. No	Course Code	Course Name	Course Expert Committee Member Internal			Course Expert External
1	PHP198922	Web Development using PHP	Mr. Manish Solanki	Ms. Priti Bokariya	Mr. Pratik Shah	Mr. Sandeepraj Bhandari
2	FOC190907	# Fibre Optic Communication	Mr. A.B. Dongaonkar	Mrs. Prachi Arora	Mr. Siddhesh Masurkar	Mrs Kaveri Sawant
3	ITC190908	Information Theory & Coding	Mrs. Neeta Kadukar	Mrs. Prachi Arora	Mrs. Krishna Bhatt	Mrs. Vaishali Rane
4	MOB190909	# Mobile application Development	Mr. A.B. Dongaonkar	Mr. Manish Solanki	Mrs. Prachi Arora	Mr. Suraj Singh
5	NWA198921	Network Administration	Mrs. Swapna Naik	Mrs. Krishna Bhatt	Mrs. Prachi Arora	Mr. Pratik Kanani
6	MLP190910	Python Programming (ML)	Mr. A.B. Dongaonkar	Mr. Manish Solanki	Ms. Priti Bokariya	Ms. Ekta Shah
7	IOT198927	IOT & Applications	Mr. J.S. Kulkarni	Mr. Siddhesh Masurkar	Ms. Sharyu Kadam	Mr. Dev Savla
8	MIT190911	Middleware Technology	Mr. Manish Solanki	Mrs. Radhika Patwardhan	Mr. A.B. Dongaonkar	Mr. Het Shah
9	IPP198923	IT Innovative Project & Practices	Mrs. Neeta Kadukar	Mr. J.S. Kulkarni	Mr. A.B. Dongaonkar	Dr M. M. Chandane

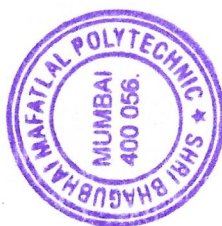


SEMESTER VI

Sr. No	Course Code	Course Name	Course Expert Committee Member Internal			Course Expert External
1	EIT190912	# Emerging trends in Information Technology	Mr. A.B. Dongaonkar	Mrs. Neeta Kadukar	Mr. Manish Solanki	Mr. Het Shah
2	PRO190913	# Project	Mr. A.B. Dongaonkar	Mr. J.S. Kulkarni	Mrs. Neeta Kadukar	Dr. Bhavesh Patel
3	MIS190914	# Management Information System	Mrs. Neeta Kadukar	Mrs. Radhika Patwardhan	Mrs Rupali Pawar	Mr Milind Ugale
4	ISS190915	#Internet Security	Mrs. Neeta Kadukar	Mrs. Swapna Naik	Mr. Manish Solanki	Dr. Nandini Chaudhary
5	WLN190916	Wireless Network	Mrs. Neeta Kadukar	Mrs. Swapna Naik	Mrs. Radhika Patwardhan	Dr. Nandini Chaudhary
6	ECO190917	E-Commerce	Mr. Manish Solanki	Mrs. Abhilasha More	Ms. Priti Bokariya	Mr. Vinod More
7	CLD198924	Cloud Application Development	Mrs. Neeta Kadukar	Mr. J.S. Kulkarni	Mr. Pratik Shah	Mr. Tejas J Shah
8	EDC198928	Entrepreneurship Development	Mr. A.B. Dongaonkar	Mr. J.S. Kulkarni	Mrs. Neeta Kadukar	Mr. Abhishek Chande
9	AWT190918	Advanced Web Technology	Mrs. Radhika Patwardhan	Mrs. Abhilasha More	Mrs Rupali Pawar	Mr. Vinod More


 CDC Co-Ordinator
 (Department)


 Head of the Department



Certificate

The curriculum of the programme has been modified in the year 2019, as per the provision made in curriculum development process of Shri Bhagubhai Mafatlal Polytechnic, Mumbai. This is the **outcome based Curriculum of Diploma in Information Technology programme**, which shall be implemented from academic year 2019-20.

Verified by



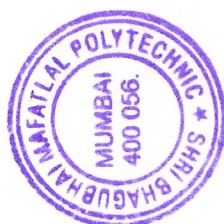
Department Level CDC Representative
S.B.M.Polytechnic, Mumbai.



Head of Department
Information Technology
S.B.M.Polytechnic, Mumbai.



Incharge, Curriculum Development
Cell S.B.M.Polytechnic, Mumbai.



Principal
S.B.M.Polytechnic, Mumbai.

APPENDIX – I

CERTIFICATE OF BENCHMARKING OF CURRICULUM

vibrant  technologies pvt. ltd.

Certificate of Benchmarking of Curriculum

Is hereby granted to

Diploma in Information Technology Department

SHRI BHAGUBHAI MAFATLAL POLYTECHNIC

The curriculum of Diploma in Information Technology is covering various thrust areas such as Systems, Applications, Network, Management, Programming, Embedded Systems, Emerging Trends & Technologies in Computing, Web Technology, Cloud Technology, Project Development & Soft Skills which fulfill industry requirements. The program qualifies the student to be absorbed as a Database Administrator, Programmer, System Network Administrator, Web Application Developer & Customer Support as per curriculum objectives (w.e.f. 2020 designed syllabus onwards) & state government guidelines for academic autonomous Diploma Courses of S.B.M. Polytechnic.

Therefore, the curriculum is as per industry standards.

For Vibrant eTechnologies Pvt. Ltd.



Ashish Tapiawala
Managing Director



1A, Sukhmani Building, Above Archie's Gallery, V.P. Road, Andheri (W), Mumbai-400058
Tel.: 91-22-26286701/5066

Email : info@vibrantetech.com Website : www.vibrantetech.com



TRICOM MULTIMEDIA PRIVATE LIMITED

Regd. Off. 1: 5, Jay Maheshwar, Bapu Bagwe Road, Dahisar West, Mumbai - 400 068.
Tel / Fax : 2893 2737 / 2893 8622 / 2891 7099 * CIN : U72300MH2010PTC189113
Email : sales@tricom.in * Web : www.tricom.in

*Certificate for Benchmarking of Curriculum
Is hereby granted to
Diploma in Information Technology Department*

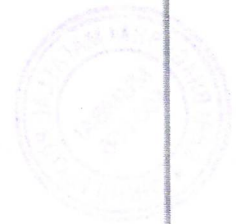
SHRI BHAGUBHAI MAFATALAL POLYTECHNIC

The curriculum of Diploma in Information Technology is covering various thrust areas such as Systems, Applications, Network, Management, Programming, Embedded Systems, Emerging Trends & Technologies in Computing, Web Technology, Project Development & Soft Skills which fulfill industry requirements. The programme qualifies the student to be absorbed as a Database Administrator, Programmer, System Network Administrator, Web Application Developer & Customer Support as per curriculum objectives (w.e.f 2020 designed syllabus onwards & state government guidelines for academic autonomous Diploma Courses of S.B.M. Polytechnic.

Therefore the curriculum is as per industry standards.

For Tricom Multimedia Private Limited

**Harinder Salwan
Managing Director**



Your single point destination for getting Software Compliant.

THE MULTIMEDIA TRENDSETTERS

DATE: 26th
December 2020



Blackcurrant Labs Pvt Ltd.

www.blackcurrantapps.com

**Acknowledgement for Benchmarking of Curriculum of Diploma in Information
Technology offered by Shri Bhagubhai Mafatlal Polytechnic**

The curriculum of Diploma in Information Technology is updated and at-par with various practiced technologies in the industry that foster skills of Software Development, Project Management and other soft skills that fulfill industry requirements.

The syllabus qualifies the student to be absorbed as a Service Technician Programmer as per curriculum objectives (w.e.f 2020 designed syllabus onwards & state government guidelines for academic autonomous Diploma Courses of S.B.M. Polytechnic. Therefore the curriculum is as per industry standards.

Jay Mehta,
Managing Director & CEO,
Blackcurrant Labs Pvt. Ltd.

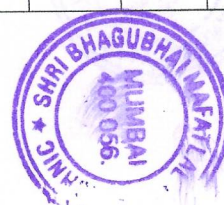


Blackcurrant Labs Pvt. Ltd.
203, Techno IT Park, New Link Rd, near Eskay Resort, Borivali West, Mumbai, Maharashtra
400091. - contact@blackcurrantapps.com - +91 9699818273

APPENDIX-II

**PROGRAMME - Information Technology
MAPPING MATRIX OF PO'S, PSO's AND CO'S:
Semester – I**

Course Code	Course Name		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
SEM I		Year 1									
EMT198901	Engg. Mathematics	C101.1	3	2					1	1	1
		C101.2	3	2					1	1	1
		C101.3	3	2					1	1	1
		C101.4	3	2					1	1	1
		Avg. of C101	3	2					1	1	1
EVS198909	environmental studies	C102.1	2				3		1	1	
		C102.2	2				3		1	1	
		C102.3	2				3		1	1	
		C102.4	2				3		1	1	
		C102.5	2				3		1	1	
		Avg. of C102	2				3		1	1	
CMS198903	Communication skill	C103.1	3					1	2	1	1
		C103.2	3	1				1	2	1	1
		C103.3	2					1	2	1	1
		C103.4	3			1		1	1	1	1
		C103.5	3	1				2	2	1	1
		Avg. of C103	2.8	1		1		1.2	1.8	1	1
BEX198911	Basic electronics	C104.1	3								1
		C104.2	3						1		1
		C104.3	3						1		1
		C104.4	3								1
		Avg. of C104	3						1		1
FCS198905	fundamentals of computing systems	C105.1	3						1	1	1
		C105.2	3	1		1			1	2	1
		C105.3	3						1	1	1
		C105.4	1			1			1	1	
		Avg. of C105	2.5	1		1			1	1.25	1
PRC198912	Programming in C	C106.1	3	1	1	1			1	3	
		C106.2	3	1	1	1			1	3	
		C106.3	3	1	1	1			1	3	



		C106.4	3	1	2	1			1	3	
		Avg. of C106	3	1	1.25	1			1	3	
ENG198904	Engineering Graphics	C107.1	3			1			1	1	
		C107.2	3		1	1			1	1	
		C107.3	2		1				1	1	
		C107.4	2		1				1	1	
		Avg. of C107	2.5		1	1			1	1	

H: 3, High Relationship, M: 2, Medium Relationship, L: 1, Low Relationship.

Semester – II

SEM II			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
AMT198908	Applied Mathematics	C108.1	3	2					1	1	1
		C108.2	3	2					1	1	1
		C108.3	3	2					1	1	1
		C108.4	3	2					1	1	1
		C108.5	3	2					1	1	1
		Avg. of C108	3	2					1	1	1
APH198902	Applied Physics	C109.1	3			1				1	
		C109.2	3	2		2				1	
		C109.3	3							1	
		C109.4	3	1		2				1	
		C109.5	3	3		2				1	
		C109.6	3	2		2				1	
		Avg. of C109	3	2		1.8				1	
DLS198910	Development of life skills	C110.1	2	1				2	2	1	1
		C110.2	2	1				2	2	1	1
		C110.3	2	1				3	2	1	1
		C110.4	2	1					2	1	1
		Avg. of C110	2	1				2.33	2	1	1
DEX198913	Digital Electromics	C111.1	3								2
		C111.2	2	1		1					2
		C111.3	2	1							2
		C111.4	3		1				1		3
		Avg. of C111	2.5	1	1	1			1		2.25
WSD168907	Website designing	C112.1	3					1	1	3	
		C112.2	3		3			1	1	3	
		C112.3	3		3			1	1	3	
		C112.4	3	2	3			1	1	3	
		Avg. of C112	3	2	3			1	1	3	



CWP198906	Workshop and Practise	C113.1	3			1				1	
		C113.2	3			1				1	
		C113.3	3	1					1		1
		C113.4	3	1		1			1		1
		Avg. of C113	3	1		1			1		1
CPP198914	Programming in C++	C114.1	3	1	1	1		1	1	3	
		C114.2	3	1	1	1		1	1	3	
		C114.3	3					1	1	3	
		C114.4	3	1	1	1		1	1	3	
		C114.5	3					1	1	3	
		Avg. of C114	3	1	1	1		1	1	3	

H: 3, High Relationship, M: 2, Medium Relationship, L: 1, Low Relationship.

Semester – III

SEM III		Year 2	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
PRJ190901	Programming in Java	C201.1	2	1	1	1		1	1	3	
		C201.2	2	1	3	1		1	1	3	
		C201.3	3	1	1	1		1	1	3	
		C201.4	3	1	1	1		1	1	3	
		C201.5	3	1	3	1		1	1	3	
		Avg. of C201	2.6	1	1.8	1		1	1	3	
DST198915	Data Structure	C202.1	2	1					2	3	1
		C202.2	3	1	2				1	3	1
		C202.3	3	1					1	3	1
		C202.4	3	2	2				2	3	1
		Avg. of C202	2.75	1.25	2				1.5	3	1
		DBS198917	Database Management system	C203.1	3						
C203.2	2			2	3	2				3	
C203.3	2			3	1	2				3	
C203.4	3									3	
Avg. of C203	2.5			2.5	2	2				3	
DCN190902	Data Communication & Networking			C204.1	3						
		C204.2	1	1							2
		C204.3	3								2
		C204.4	3								2
		C204.5	2	1	2	2					2
		Avg. of C204	2.4	1	2	2					2
CGR198920	Computer Graphics	C205.1	2							1	
		C205.2	3	1	2					3	

		C205.3	2	1	2				2	
		C205.4	2	2	2				2	
		C205.5	2						1	
		Avg. of C205	2.2	1.33	2				1.8	
MSA190903	Multimedia & Animation	C206.1	1		2	1	1		1	
		C206.2	1		2	1	1		1	
		C206.3	1		2	1	1		1	
		C206.4	1		2	1	1		1	
		C206.5	1		2	1	1		1	
		C206.6	1		2	1	1		1	
		Avg. of C206	1		2	1	1		1	
OST190904	Open Source Technology	C207.1	2					1	3	
		C207.2	2			1		2	3	
		C207.3	2	1	1	1		2	3	
		C207.4	2	1	1	3		2	3	
		Avg. of C207	2	1	1	1.67		1.75	3	

H: 3, High Relationship, M: 2, Medium Relationship, L: 1, Low Relationship.

Semester – IV

SEM IV			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
SWE190905	Software Engineering	C208.1	3						1	3	
		C208.2	3	2	2					3	
		C208.3	2		2	2				3	
		C208.4	2							3	
		C208.5	3							3	
		Avg. of C208	2.6	2	2	2			1	3	
FOS198916	Fundamentals of OS	C209.1	3	1		1		1	1	3	
		C209.2	3	2				1	1	3	
		C209.3	3					1	1	3	
		C209.4	3					1	1	3	
		C209.5	3							3	
		Avg. of C209	3	1.5		1		1	1	3	
PRP198918	Programming in Python	C210.1	2			1		1	2	3	2
		C210.2	3	2	1	1		1	2	3	2
		C210.3	3	2	1	1		1	2	3	2
		C210.4	3	2	1	1		1	2	3	2
		C210.5	3	2	2	1		1	2	3	2
		Avg. of C210	2.8	2	1.25	1		1	2	3	2
OOD190906	OO Modelling & Design	C211.1	1					1		1	
		C211.2	2	2	3			2		2	

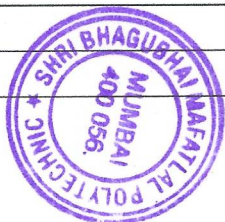


		C211.3	2	2	3			2		2	
		C211.4	2	2	3			2		2	
		Avg. of C211	1.75	2	3			1.75		1.75	
DWM198925	Data warehousing & mining	C212.1	2							1	
		C212.2	2		2	3			1	3	
		C212.3	2	2	3	2			1	3	
		C212.4	2	2					1	2	
		Avg. of C212	2	2	2.5	2.5			1	2.25	
HCI198919	Human computer Interface	C213.1	1			1				3	
		C213.2	2	1	2	1				3	
		C213.3	2	1	3	2				3	
		C213.4	2	2	3	2				3	
		Avg. of C213	1.75	1.33	2.67	1.5				3	
GDD198926	Game design & Development	C214.1	3							3	
		C214.2	3		2	2				3	
		C214.3	3		2	2				3	
		C214.4	3		1					3	
		Avg. of C214	3		1.67	2				3	
SPT190919	Summer Inplant training / Internship	C215.1		3	2	1	2			3	3
		C215.2	1					2	3	3	3
		C215.3	1	1	1	1	1	2	3	3	3
		C215.4					3	2	3	3	3
		Avg. of C215	1	2	1.5	1	2	2	3	3	3

H: 3, High Relationship, M: 2, Medium Relationship, L: 1, Low Relationship.

Semester – V

SEM V		Year 3	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
PHP198922	Web Development using PHP	C301.1	3		1	1				3	
		C301.2	3		1	3				3	
		C301.3	3		2	3		2	1	3	
		C301.4	3		3	2		2	1	3	
		Avg. of C301	3		1.75	2.25		2	1	3	
FOC190907	Fibre Optic Communication	C302.1	3			2				1	1
		C302.2	3				1				2
		C302.3	3				1		1	1	2



		C302.4	3						1		3
		Avg. of C302	3			1.33			1	1	2
ITC190908	Information Theory and Coding	C303.1	3							1	1
		C303.2		3							
		C303.3	2								
		C303.4	2						2	1	1
		C303.5	2							1	1
		Avg. of C303	2.25	3					2	1	1
MOB190909	Mobile Application Development	C304.1	3			2			1	3	
		C304.2	3	1	1	2			1	3	
		C304.3	3	1	1					3	
		C304.4	3						1	2	1
		Avg. of C304	3	1	1	2			1	2.75	1
NWA198921	Network Administration	C305.1	2		1	1					3
		C305.2	3	1			1		2		3
		C305.3	3	2	2	2		1			3
		C305.4	3		1	2			2		3
		Avg. of C305	2.75	1.5	1.33	1.67	1	1	2		3
MLP190910	Python Programming (ML)	C306.1	2						2		3
		C306.2	2	1	2	2			2		3
		C306.3	2	2	3	2			2		3
		C306.4	2	2	3	2			2		3
		Avg. of C306	2	1.67	2.67	2			2		3
IOT198927	IOT and Applications	C307.1	1	3							3
		C307.2			2	3					3
		C307.3	2		1						3
		C307.4				3					3
		Avg. of C307	1.5	3	1.5	3					3
MIT190911	Middleware Technology	C308.1	2							1	
		C308.2	2		2	1			1	3	
		C308.3	2		2	1			1	3	
		C308.4	2		2	1			1	3	
		Avg. of C308	2		2	1			1	2.5	
IPP198923	IT Innovative Project & Practices	C309.1	2	2	2		1		2	3	3



		C309.2	1		1			2	2	2	2
		C309.3		1		1		2	2	2	2
		C309.4			1		1	2	2	3	3
		Avg. of C309	1.5	1.5	1.33	1	1	2	2	2.5	2.5

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Semester – VI

SEM VI			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
EIT190912	Emerging trends in Information Technology	C310.1	1	2					1	3	
		C310.2	3	2		2				3	
		C310.3	3	2		3					2
		C310.4	3						2		1
		Avg. of C310	2.5	2		2.5			1.5	3	1.5
PRO190913	Project	C311.1	1	3			2	2	1	3	3
		C311.2		2				3	1	3	3
		C311.3		2	3	3		3	3	3	3
		C311.4				1		3	1	3	3
		Avg. of C311	1	2.33	3	2	2	2.75	1.5	3	3
MIS190914	Management Information System	C312.1	2		3					3	
		C312.2		1		3				2	
		C312.3				3				2	
		C312.4			2		3			3	
		C312.5				2	2			2	
		Avg. of C312	2	1	2.5	2.67	2.5			2.4	
ISS190915	Internet Security	C313.1	3		1	2	1		2	2	1
		C313.2	3		1	2	1		2	2	2
		C313.3	3		1	2	1		2	2	1
		C313.4	3		2	2	2		2	2	3
		Avg. of C313	3		1.25	2	1.25		2	2	1.75
WLN190916	Wireless Network	C314.1	3	1		1				3	1
		C314.2	3							3	1
		C314.3	3	2						3	1
		C314.4	3							3	1
		Avg. of C314	3	1.5		1				3	1
ECO190917	E-Commerce	C315.1	3		3				1	3	



		C315.2	2		3	3			1	3	
		C315.3	2	1	2		2	1	1	2	
		C315.4	2				2		1	2	
		Avg. of C315	2.25	1	2.67	3	2	1	1	2.5	
CLD198924	Cloud Application Development	C316.1	3	1	1	1		1	2	3	
		C316.2	3	1	3	2	1	2	2	3	
		C316.3	3	1	1	2	1		1	3	
		C316.4	3						1	3	
		Avg. of C316	3	1	1.67	1.67	1	1.5	1.5	3	
EDC198928	Entrepreneurship Development	C317.1	3	1			2	1	2	2	2
		C317.2	3	2	2		1	1	2	3	3
		C317.3	3			1			1	1	1
		C317.4	3	1		1		1	1	2	2
		C317.5	3	1	1		1		1	1	1
		Avg. of C317	3	1.25	1.5	1	1.33	1	1.4	1.8	1.8
AWT190918	Advanced Web Technology	C318.1	2	2	2	1			1	3	
		C318.2	2	2	2	2			1	3	
		C318.3	2	2	2	1			1	3	
		C318.4	2	2	3	1			1	3	
		C318.5	2	2	2	1			1	3	
		Avg. of C318	2	2	2.2	1.2			1	3	

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