

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




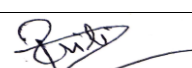


9. LEARNING RESOURCES

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.


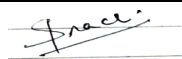


10. WEB REFERENCES

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	Semester: V/V
Course: #Network Administration	Group: A*/A*
Course Code: NWA198921	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>

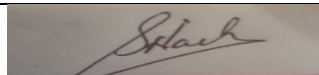
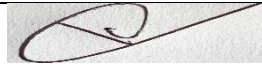
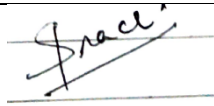
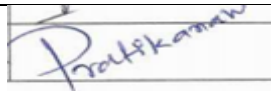
11. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

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 EXAMINATIONSCHEME:

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/>






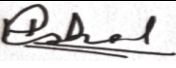
11. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

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



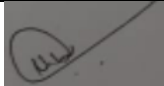


6. Implementation

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.	