

## MGM University

### Vision

- To ensure sustainable human development which encourages self-reliant and self-content society.
- To promote activities related to community services, social welfare and also Indian heritage and culture.
- To inculcate the culture of non-violence and truthfulness through vipassanna meditation and Gandhian Philosophy.
- To develop the culture of simple living and high thinking

### Mission

- To impart state of art education and technical expertise to students and give necessary training to teachers to create self-reliant society for future.
- To encourage students to participate in Indian and International activities in sports, literature, etc. so that future generation becomes base for free and liberal society
- To educate students in areas like Management, Finance, Human relations to inculcate philosophy of simple living and high thinking value of simple economic society.
- To inculcate culture of non-violence and truthfulness through Vipassana.

To sustain activities of Indian culture (viz. classical dance, music and fine arts) through establishing institutes like Mahagami, Naturopathy, etc.

## विद्यापीठ गीत

अत्त दिप भव भव प्रदिप भव,

स्वरूप रूप भव हो

ज्ञान सब्ब विज्ञान सब्ब भव ,

सब्ब दिप भव हो

अत्ताहि अत्त नो नाथो ,

अत्ताहि अत्त नो गति

अत्त मार्गपर अप्रमादसे है तुझे चलना

सब्ब का कल्याण हो ,

वो कार्यकुशल करना

सब्ब का उत्तम मंगल , पथप्रदर्शक हो

अत्त दिप भव भव प्रदिप भव ,

स्वरूप रूप भव हो

ज्ञान सब्ब विज्ञान सब्ब भव ,

सब्ब दिप भव हो

बुद्धमं शरनं गच्छामि :

धम्मं शरनं गच्छामि :

संघं शरनं गच्छामि :

## **Dr. G. Y. Pathrikar College of Computer Science & Information Technology**

MGM college of Computer Science and Information Technology was established in 2001 offering undergraduate and postgraduate degree program in Computer Science and Information Technology. College was renamed as Dr.G.Y.Pathrikar College of Computer Science and Information Technology in 2003 in memory of great educationalist, one of the founder member and Ex-Secretary MGM, Dr.G.Y.Pathrikar Sir.

It is first self-financed ISO certified institution offering program dedicated to Computer science and Information technology in Maharashtra and has achieved status of 2f/12b. Ours was the only and first college to be re-accredited as A+ grade with NAAC in the year 2017. Experienced and qualified faculty with Ph.D is strength of our college. Starting with 77 student's College has crossed total students strength of 10,000 passing out. Student are doing well in various MNCs like Infosys, Tech-Mahindra, Wipro, Capgemini, Cognizant etc. Many have their own Startups. Some of the students have completed their Masters and Ph.D. program from foreign countries like US, UK, Australia. Now we are constituent college of MGM University, Chhatrapati Sambhajanagar.

### **Vision**

To be an academic institution in dynamic equilibrium in social, ecological and economical environment striving continuously for excellence in total quality education, research and technological service to the nation.

### **Mission**

- To create and sustain a community of learning in which students acquire knowledge and learn to apply it professionally with due consideration for ethical, and economical issues.
- To upgrade our students in all respect with the help of latest infrastructure in the area of Computer Science and Information Technology in order to build the National Capabilities.
- To understand the culture of Non-violance, truth, peace through Gandhian Philosophy.

**Programs offered at Dr. G. Y. Pathrikar College of Computer Science & Information Technology**

<b>Undergraduate Programmes</b>	<b>Postgraduate Programmes</b>	<b>PhD Programmes</b>
B.Sc(Computer Science) Honours / Honours with Research	M.Sc(Computer Science)	Ph.D. in Computer Science and Information Technology
B.Sc(Information Technology) Honours/ Honours with Research	M.Sc(Information Technology)	
BCA(Science) Honours / Honours with Research	M.Sc(Data Science)	
B.Sc(Animation) Honours / Honours with Research	M.Sc(Animation)	
Integrated M.Sc. Data Science		
BCA(Digital Marketing) Honours		
B.Sc(Robotics) Honours		

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**Name of Program – M.Sc. (Information Technology)**

**Duration – Two Years**

**Eligibility -**

- Any Bachelor's Degree in Science or graduate of engineering and technology of this University or any other recognized university as equivalent with minimum 50% marks (45% for reserved category) can apply.

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**Name of Faculty:** Basic and Applied Sciences

**Name of the College/Institute/Department/School:** Dr. G. Y. Pathrikar College of CS & IT

**Name of the Programme:** M. Sc. (Information Technology)

**Programme Type (UG/PG):** PG

**Duration:** 2 Years

First Year - Semester I												
Course Category	Course Code	Course Title	Nature of Course	No. of Credits	Teaching (Contact hrs/ week)		Evaluation Scheme (Marks)			Minimum Passing (Marks)		
					L	P	Internal	External	Total	Internal	External	Total
MM	MIT41MML501	Python Programming	Major	3	3	-	60	40	100	--	16	40
MM	MIT41MML502	Network System	Major	3	3	-	60	40	100	--	16	40
MM	MIT41MML503	Web Development and Java script	Major	3	3	-	60	40	100	-	16	40
RM	MIT41RML501	Research Methodology	Compulsory	4	4	-	60	40	100	-	16	40
ME		Elective - I	Elective	3	3	-	60	40	100	-	16	40
MM	MIT41MMP501	Practical Based on Python Programming	Major	1	-	2	30	20	50	-	08	20
MM	MIT41MMP502	Practical Based on Network System	Major	1	-	2	30	20	50	-	08	20
MM	MIT41MMP503	Practical Based on Web Development and Java script	Major	1	-	2	30	20	50	-	08	20
ME		Practical Based on Elective - I	Elective	1	-	2	30	20	50	-	08	20
<b>Total</b>				<b>20</b>	<b>16</b>	<b>08</b>	<b>420</b>	<b>280</b>	<b>700</b>			

**Note:**

**Nature of Course :** L- Lecture, P-Practical, S-Seminar, J-Project, I-Internship, D-Dissertation,

**Course Category:** MM-Major Mandatory, ME-Major Elective, MI-Minor, OE-Generic / Open electives, VSC-Vocational skill course, SEC-Skill Enhancement course, AEC-Ability Enhancement course, IKS-Indian Knowledge system, VEC-Value Education course, OJT-On Job Training / Internship / Apprenticeship, FP-Field project, CEP-Community engagement and service, CC-Co – curricular course, RM-Research methodology, RP-Research project

First Year- Semester II												
Course Category	Course Code	Course Title	Nature of Course	No. of Credits	Teaching (Contact hrs/ week)		Evaluation Scheme (Marks)			Minimum Passing (Marks)		
					L	P	Internal	External	Total	Internal	External	Total
MM	MIT41MML504	Android Application Development	Major	3	3	-	60	40	100	--	16	40
MM	MIT41MML505	Network Security	Major	3	3	-	60	40	100	--	16	40
MM	MIT41MML506	Java Application Development	Major	3	3	-	60	40	100	--	16	40
ME		Elective - II	Elective	3	3	-	60	40	100	--	16	40
ME	MIT41MMP504	Practical Based on Android Application Development	Major	1	-	2	30	20	50	--	08	40
MM	MIT41MMP505	Practical Based on Network Security	Major	1	-	2	30	20	50	--	08	20
MM	MIT41MMP506	Practical Based on Python Programming	Major	1	-	2	30	20	50	--	08	20
Me		Practical Based on Elective - II	Elective	1	-	2	30	20	50	--	08	20
OJT	MIT41OJTJ501	On Job Training / Internship	Project	4		8	60	40	100	--	--	40
<b>Total</b>				<b>20</b>	<b>12</b>	<b>16</b>	<b>420</b>	<b>280</b>	<b>700</b>			

**Note:**

**Nature of Course :** L- Lecture, P-Practical, S-Seminar, J-Project, I-Internship, D-Dissertation,

**Course Category:** MM-Major Mandatory, ME-Major Elective, MI-Minor, OE-Generic / Open electives, VSC-Vocational skill course, SEC-Skill Enhancement course, AEC-Ability Enhancement course, IKS-Indian Knowledge system, VEC-Value Education course, OJT-On Job Training / Internship / Apprenticeship, FP-Field project, CEP-Community engagement and service, CC-Co – curricular course, RM-Research methodology, RP-Research project

**Elective - I**

<b>Code</b>	<b>Title</b>
MIT41MEL501	Data Management Tools
MIT41MEL502	Java Script
MIT41MEL503	Sentiment Analysis
MIT41MEP501	Practical Based on Data Management Tools
MIT41MEP502	Practical Based on Java Script
MIT41MEP503	Practical Based on Sentiment Analysis

**Elective – II**

<b>Code</b>	<b>Title</b>
MIT41MEL504	Intellectual Property Rights
MIT41MEL505	Big Data Analytics
MIT41MEL506	Data Warehousing
MIT41MEP504	Practical Based on Intellectual Property Rights
MIT41MEP505	Practical Based on Big Data Analytics
MIT41MEP506	Practical Based on Data Warehousing

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## **Syllabus** **Semester-I**

**Course code:** MIT41MML501

**Course name:** Python Programming

**Course category:** Major Mandatory

**Credits:** 3

**Pre-requisites:** Basics of Programming Language.

**Course Objectives:**

1. Building robust applications using Python programming language's features.
2. To Understanding the usage of Python libraries.

**Course Outcomes:** At the end of the course, the students will be able to -

**CO1:** Understand python programs that solve simple business problems.

**CO2:** Error handling in python, pandas, Jupyter, Notebook.

**CO3:** Plot and data visualization.

**CO4:** Missing Data Identification and understanding.

**Contents –**

Unit	Content	Teaching hours
1	<p><b>Introduction to Python:</b> Getting Started: Introduction to Python- an interpreted high level language, interactive mode and script mode. Variables, Expressions and Statements. Variables and Types-mutable and Immutable variable and Keywords. Operators and Operands in Python. (Arithmetic, relational and logical operators), Operator precedence, Expressions and Statements (Assignment statement) Taking input (using raw input() and input()) and displaying output - print statement, Comments in Python.</p>	10
2	<p><b>Conditional and Looping Construct</b> if - else statement and nested if – else while, for, use of range function in for, Nested loops break, continue, pass statement Use of compound expression in conditional constructs.</p> <p><b>Functions:</b> Built-In Function, invoking built in functions Module(Importing entire module or selected objects using from statement) Functions from math, random, time &amp; date module.</p> <p><b>Composition User Define Function:</b> Defining , invoking functions, passing parameters (default parameter values, keyword arguments) Scope of variables, void functions and functions returning values</p>	10
3	<p><b>String :</b> Creating, initializing and accessing the elements, String operators: +, *, in, not in, range, slice [n:m] String built in functions &amp; methods: len, capitalize, find, isalnum, isalpha, isdigit, lower, islower, isupper, upper, lstrip, rstrip, isspace, istitle, partition, replace, join, split, count, decode, encode, swapcase Strings constants defined in string module.</p> <p><b>Errors and Exceptions:</b> Syntax Errors, Exceptions, Handling Exceptions, Raising Exceptions, User-defined Exceptions, Defining Clean-up Actions(try - finally), Predefined Clean-up Actions</p>	10

4	<p><b>Concept of mutable list:</b> creating, initializing and accessing the elements of list List operations (Concatenation, Repetation, Membership, list slices), List comprehensions List functions &amp; methods: len, insert, append, extend, sort, remove, reverse, pop, Tuples, Immutable concept, creating, initializing and accessing the elements in a tuple, Tuple functions: cmp(), len(), max(), min(), tuple(),</p> <p><b>Sets , Concept of Sets:</b> creating, initializing and accessing the elements of Sets operation(Membership, union, intersection, difference, and symmetric difference,</p> <p><b>Dictionaries:</b> Concept of key-value pair, creating, initializing and accessing the elements in a dictionary, Traversing, appending, updating and deleting elements Dictionary functions &amp; Methods: cmp, len, clear(), get(), has_key(), items(), keys(), update(), values()</p>	10
5	<p><b>Introduction to Object Oriented concepts in Python:</b> Object Oriented concepts, Classes &amp; Objects, Python Scopes and Namespaces Class Objects, Instance Objects, Method Objects, Class and Instances Variables, Concept of self Constructors, Inheritance</p>	5

<p><b>Text Books:</b></p> <ol style="list-style-type: none"> <li>1. Python Data Science Handbook Essential Tools for Working with Data Jake VanderPlas O'Reilly.</li> <li>2. Introduction to Python Programming, Gowrishankar S, Veena A, CRC Press/Taylor.</li> </ol>
<p><b>Reference Books:</b></p> <ol style="list-style-type: none"> <li>1. Hands-On Machine Learning with Scikit-Learn and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems AurelienGeron O'Reilly.</li> <li>2. Core Python Applications Programming, Wesley J Chun, Pearson.</li> </ol>
<p><b>Online Resources:</b> 1. NPTEL / SWAYAM lectures.</p>

**Syllabus****Semester-I****Course code:** MIT41MML502**Course name:** Network System**Course category:** Major Mandatory**Credits:** 3**Pre-requisites:** Basics of Computer Network.**Course Objectives:**

1. To build an understanding of the fundamental concepts of computer networking.
2. To learn and understand Network Performance parameters.
3. To Analyze Modern networks

**Course Outcomes:** At the end of the course, the students will be able to -**CO1:** To build an understanding of the fundamental concepts of computer networking.**CO2:** To learn and understand Network Performance parameters.**CO3:** To Analyze Modern networks.**Contents –**

Unit	Content	Teaching hours
1	<p><b>Introduction to Computer Networks</b></p> <ul style="list-style-type: none"> <li>○ Computer network, Characteristic &amp; advantages of networking, types of network, LAN, MAN, WAN.</li> </ul> <p><b>Transmission media &amp; Network Topologies:</b></p> <ul style="list-style-type: none"> <li>○ Guided &amp; Unguided media, Twisted pair, coaxial cable, Fiber optics, Radio. VHF and microwaves, Satellite link.</li> </ul> <p><b>Network topology:</b></p> <ul style="list-style-type: none"> <li>○ Bus, star, ring, tree, mesh &amp; hybrid topology. Advantages, disadvantages of each.</li> </ul> <p><b>Introduction to Network Hardware Components:</b></p> <ul style="list-style-type: none"> <li>○ Network Connectivity Devices, Repeater, Hub, Bridges, Switch, Routers.</li> </ul>	10
2	<p><b>OSI Reference Model:</b></p> <ul style="list-style-type: none"> <li>○ The OSI reference Model, The Physical Layer, The Data Link Layer, The Network Layer, The Transport Layer, The Session Layer, Presentation Layer, Application Layer.</li> </ul> <p><b>The TCP/IP Reference Model:</b></p> <ul style="list-style-type: none"> <li>○ Comparison of the OSI and TCP/IP Reference Model, Critique of the OSI Model and Protocol, A Critique of the TCP/IP Reference Model.</li> </ul>	10
3	<p><b>The Data Link Layer</b></p> <ul style="list-style-type: none"> <li>○ Data Link Layer Design Issues, Services Provided to the Network Layer, Framing, Error Control, Flow Control, Error Detection and Correction, Elementary Data Link Layer Protocols,</li> </ul> <p><b>The Network Layer:</b></p> <ul style="list-style-type: none"> <li>○ Network Layer Design Issues, Introduction to Routing Algorithms, The Network Layer in the Internet, The IP Protocol, IP Address,</li> </ul>	10

4	<p><b>The Transport Layer:</b></p> <ul style="list-style-type: none"> <li>○ Transport Layer Service, Services Provided to the Upper Layer, Elementary of Transport Layer Protocol, Addressing, Connection Establishment, Connection Release.</li> </ul> <p><b>The Internet Transport Protocol:</b></p> <ul style="list-style-type: none"> <li>○ Introduction to UDP, Remote Procedure Call, Introduction to TCP, TCP Service Model, TCP Segment Header,</li> </ul> <p><b>The Application Layer:</b></p> <ul style="list-style-type: none"> <li>○ The Domain Name System, The DNS Name Space, Electronic Mail, The Word Wide Web.</li> </ul>	10
5	<p><b>Modern Networks</b></p> <ul style="list-style-type: none"> <li>○ Next Generation Networks, Data Centers, Cloud Computing, Bluetooth Technology, Green Networking, GSM, GIS.</li> </ul>	5

<b>Text Books:</b>
<ol style="list-style-type: none"> <li>1. Computer Networks Tanenbaum A., PHI, 4th Edition.</li> <li>2. Data Communications and Networking Fourauzan B. TataMcGraw-HillPublications 3rd edition.</li> </ol>
<b>Reference Books:</b>
<ol style="list-style-type: none"> <li>1. An Engineering Approach to Computer Networking , Keshav S., PearsonEducation.</li> <li>2. High Performance TCP/IP: Networking Concepts, Issues, and Solutions, Mahbub Hassan and Raj Jain, IST Edition, 2009.</li> </ol>
<b>Online Resources:</b> 1. NPTEL / SWAYAM lectures.

**Syllabus****Semester-I****Course code:** MIT41MML503**Course name:** Web Development and JavaScript**Course category:** Major Mandatory**Credit:** 3**Pre-requisites:** Basics of HTML.**Course Objectives:**

1. To provide the general mechanism and design of Automatic system
2. Create highly responsive interfaces that improve the user experience and provide dynamic functionality

**Course Outcomes:** At the end of the course, the students will be able to -**CO1:** Know variable naming rules and JavaScript data types.**CO2:** Identify expressions and operators**CO3:** Handling Web Page**Contents –**

Unit	Content	Teaching hours
1	<b>Introduction</b> Introduction to HTML, First HTML Page , Paragraph Elements, Heading Elements, List Elements, Tags, Images, Entity codes, introduction to semantic makeup, Tables, Buttons, Checkboxes, Radio buttons, Common input Types, Text Area, Range	10
2	<b>Working with CSS</b> What is CSS? , Background color, Color Properties, Color System:RGB, Named Colors, Hexadecimal, Common text Properties. Font size, basics with pixels, Selectors, Pseudo classes and Elements, The CSS Cascade Box Model : Width and Height, Border and Padding, Margin, The display Property Responsive CSS and Flexbox, CSS Frame Work: Intro. To Boot Strap, Buttons, Typography and Utilities, Button Groups, Grid Utilities, Bootstrap and Forms	10
3	<b>JavaScript Basics and Strings</b> Why JavaScript Awesome? Primitives and the console, JavaScript Numbers, Increment Operator, Constant and Variables, Booleans <b>Strings</b> : Introduction , Indices and Length, String Methods with argument, String Template, Literals and Null	10
4	<b>JavaScript decision making</b> Decision Making with code, Comparison Operators, Equality,: Triple Vs Double Equals, Console Alert and Prompt, IF Statement, Else-if, Else, Nesting Conditionals, Truth-y and False-y Values, Logical AND, Logical OR, Logical NOT, Switch Statement, Nested Loop, The Break Keyword	10
5	<b>JavaScript Arrays</b> Introduction, Array Random Access, Push & POP, Shift and Unshift, Concat, indexOf, Slice and Splice, Reference Types, Equality Testing, Multidimensional Arrays	5

**Text Books:** 1. Learning Web Design: A Beginner's Guide to HTML CSS, Jennifer Niederst Robbins.**Reference Books:** 1. JavaScript: The Good Part, Douglas Crockford.**Online Resources:** 1. NPTEL / SWAYAM lectures.

**Syllabus****Semester-I****Course code:** MIT41RML501**Course name:** Research Methodology**Course category:** Research methodology**Credit:** 4**Pre-requisites:** Pre-university mathematics.**Course Objectives:**

1. To understand the state-of-the-art in research methodology.
2. Survey the currently available systems.

**Course Outcomes:** At the end of the course, the students will be able to -**CO1:** Demonstrate knowledge of research methodology**CO2:** Understand the Research Problem**CO3:** Understand the Research Design**CO4:** Understand Sampling Design, Measurement and Scaling Techniques**CO5:** Understand Methods of Data Collection, Processing and Analysis of Data**Contents –**

Unit	Content	Teaching hours
1	<b>UNIT I:</b> <b>Introduction:</b> Meaning of Research, Objectives of Research, Motivation in Research, Types of Research, Research Approaches, Significance of Research, Research Methods Verses Methodology, Research and Scientific Method, Importance of Knowing How Research is Done, Research Process, Criteria of Good Research, Problems Encountered by Research in India.	10
2	<b>Unit II:</b> <b>Defining the Research Problem:</b> What is Research Problem? Selecting the Problem, Necessity of Defining the Problem, Techniques Involved in Defining a Problem	10
3	<b>Unit III:</b> <b>Research Design:</b> Meaning of Research Design, Need of Research Design, Features of Good Design, Important Concepts Relating to Research Design, Different Research Design, Basic Principles of Experimental Designs.	10
4	<b>Unit IV:</b> <b>Sampling Design, Measurement and Scaling Techniques:</b> Implications of a Sample Design, Steps in Sampling Design, Criteria of Selecting a Sampling Procedure, Characteristics of a Good Sample Design. Measurement in Research, Sources of Error in Measurement, Meaning and Scaling.	10
5	<b>Unit V:</b> <b>Methods of Data Collection, Processing and Analysis of Data:</b> Collection of Primary Data, Observation Method, Interview Method, Collection of Data through Questionnaires, Collection of Data through Questionnaires Schedules, Processing Operations, Some Problems in Processing, Statistics in Research, Simple Regression Analysis.	5

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<b>Text Books:</b> .
1. Research Methodology Methods and Techniques, C. R. Kothari, New Age International Publishers
<b>Reference Books:</b>
1. Research Methodology, P. Sam Daniel, Aroma G. Sam
<b>Online Resources:</b>
• NPTEL / SWAYAM lectures.

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**Syllabus****Semester-I****Course code:** MIT41MEL501**Course name:** Data Management Tools**Course category:** Major Elective**Credit:** 3**Pre-requisites:** Basics of Database.**Course Objectives:**

1. Students can design new database and modify existing ones for new or existing applications

**Course Outcomes:** At the end of the course, the students will be able to -**CO1:**To know the different issues involved in the design and implementation of a database system.**CO2:**Can use data manipulation language to query, update, and manage a database.**CO3:**Essential DBMS concepts such as: database security, integrity, concurrency, etc.**CO4:**To analyze data, choose relevant models and algorithms for respective applications.**Contents –**

Unit	Content	Teaching hours
1	<p><b>Unit-I:</b>  <b>Overview of Database Concepts:</b></p> <ul style="list-style-type: none"> <li>Database and Need for DBMS, Characteristics of DBMS, Database Users, 3-tier architecture,(its advantages over 2-tier), Database Components: Users, facilities &amp; Structure, Abstraction &amp; Data Integration,</li> </ul> <p>Entity-Relationship Data model:</p> <ul style="list-style-type: none"> <li>Entity, Entity set, Types of Entities, Attributes, Types of Attributes, Relationship, Types of Relationship, Representation of Entity, Attributes &amp; Relationship, Keys, Types of keys Mapping Cardinality.</li> </ul> <p>Introduction to SQL–</p> <ul style="list-style-type: none"> <li>create, insert, update, delete, drop, alter, SELECT (distinct, where, and, or, not, like, between, like, order by, group by, having etc.), inner (nested) queries, aggregate functions, numeric functions, string functions, date functions, create user/role, grant/revoke privileges, views.</li> </ul>	10
2	<p><b>Unit-II:</b>  Relational Database design:</p> <ul style="list-style-type: none"> <li>Anomalies, Types of Anomalies, Functional dependencies, Integrity Rules: Rule 1 &amp; 2</li> </ul> <p>Normalization:</p> <ul style="list-style-type: none"> <li>Normal forms (1 NF, 2 NF, 3 NF, BCNF, 4 NF), Conversion From Universal to 1NF, 1NF to 2NF, 2NF to 3NF.</li> </ul> <p>Relational Algebra:</p> <ul style="list-style-type: none"> <li>Union, Intersection, difference, Cartesian Product, Selection, Projection, Join(Inner &amp; Outer) , Division with examples</li> </ul>	10
3	<p><b>Unit-III:</b>  Introduction: -</p> <ul style="list-style-type: none"> <li>What is data mining, DBMS Vs Data Mining, DM Techniques, Challenges, Other issues, Understanding Data, DM Applications-Case Studies, Current Trends Affecting DM, Basic Data Mining Task. Relations to Database, Statistics, Machine Learning</li> </ul>	10



	<b>Association Rule :-</b> <ul style="list-style-type: none"> <li>○ What is an Association rule?, Mining, Level-wise Method, FP-Tree Method, Other Variants, A Priori Algorithm, Partition Algorithm.</li> </ul>	
4	Unit-IV: <b>Classification: -</b> <ul style="list-style-type: none"> <li>○ Decision Tree Algorithm, CART, PUBLIC, Pruning Classification Tree, and Decision Tree, What is a decision tree? Tree Construction Principle, Best Split, Splitting indices, Splitting Criteria</li> </ul> <b>Web Mining:</b> <ul style="list-style-type: none"> <li>○ Introduction, Web Content Mining, Web Structure Mining, and Web Usage Mining.</li> </ul>	10
5	Unit-V: <b>Clustering Techniques:</b> <ul style="list-style-type: none"> <li>○ Clustering Paradigm, Partitioning Algorithm, Similarity and Distance Measure, Hierarchical Algorithm, Rough Set Theory and its Application to Data Mining</li> </ul> <b>ROC Analysis:-</b> <ul style="list-style-type: none"> <li>○ Data Mining Trends, Big Data, Data Analytics</li> </ul>	5

<b>Text Books:</b> 1. Database System Concepts, Silberschatz, Korth and Sudarshan-.
2. Fundamental of Database Systems R. Elmasri; S. Navate; Benjamin Cummings;.
<b>Reference Books:</b> 1. Database Management Systems, Bipin Desai.
<b>Online Resources:</b> 1. NPTEL / SWAYAM lectures.



# Semester: Second

**Syllabus****Semester-II****Course code:** MIT41MML504**Course name:** Android Application Development**Course category:** Major Mandatory**Credits:** 3**Pre-requisites:** Basics of Programming Language.**Course Objectives:**

1. Describe Android platform, Architecture and features.
2. Design User Interface and develop activity for Android App

**Course Outcomes:** At the end of the course, the students will be able to -**CO1:** To introduce Android platform and its architecture.**CO2:** To learn activity creation and Android UI designing.**CO3:** To be familiarized with Intent, Broadcast receivers and Internet services.**Contents –**

Unit	Content	Teaching hours
1	<b>Environment Setup:</b> <ul style="list-style-type: none"> <li>○ Setup Java Development Kit (JDK), Android SDK, Eclipse IDE, Android Development Tools (ADT) Plugin, Create Android Virtual Device. Architecture: Linux kernel, Libraries, Android Runtime, Application Framework.</li> </ul> <b>Application Components:</b> <ul style="list-style-type: none"> <li>○ Application Components Activities, Services, Broadcast Receivers, Content Providers, Additional Components, Create Android Application, Anatomy of Android Application, The Main Activity File, The Manifest File, The Strings File, The R File, The Layout File, Running the Application.</li> </ul>	10
2	<b>Resources Organizing &amp; Accessing:</b> <ul style="list-style-type: none"> <li>○ Alternative Resources, Accessing Resources</li> </ul> <b>Intents and Filters:</b> <ul style="list-style-type: none"> <li>○ Intent Objects, Action, Android Intent Standard Actions, Data, Category, Extras, Flags, Component Name, Types of Intents: Explicit Intents, Implicit Intents.</li> </ul> <b>UI Layouts:</b> <ul style="list-style-type: none"> <li>○ Android Layout Types, Relative Layout Attributes, Grid View Attributes, Sub-Activity, Layout Attributes, View Identification, UI Controls, Android UI Controls, Text View Attributes, Auto Complete Text View Attributes, Button Attributes, Image Button Attributes, Check Box Attributes, Toggle Button Attributes, Radio Button Attributes, Radio Group Attributes.</li> </ul>	10
3	<b>Event Handling:</b> <ul style="list-style-type: none"> <li>○ Event Listeners &amp; Event Handlers, Event Listeners Registration, Styles and Themes, Defining Styles, Using Styles, Style Inheritance, Android Themes, Default Styles &amp; Themes, Custom Components, Creating a Simple Custom Component.</li> </ul>	10
4	<b>Applications and Activities:</b>	10

	<ul style="list-style-type: none"> <li>○ Application Manifest, Manifest Editor, Android Application Life Cycle, Understanding Application Priority and Process States, Externalizing Resources, Fundamental Android UI Design: The Android Widget Toolbox, Layouts, Compound Controls, Custom Widgets and Controls, Android Menu System, Activity Menu, Intents, Broadcast Receivers, Adapters, and the Internet: Intents to Launch Activities, Intent Filters to Service Implicit Intents, Intent Filters for Plug-ins and Extensibility, Intents to Broadcast Events, Android-Supplied Adapters, Internet Resource.</li> </ul> <p><b>Data Storage, Retrieval, and Sharing:</b></p> <ul style="list-style-type: none"> <li>○ Creating and Saving Preferences, Retrieving Shared Preferences, Saving the Activity State, File Management Tools, Databases in Android: SQLite, Cursors and Content Values, Content Providers. Maps, Geocoding, and Location-Based Services: Location Providers, Geocoder, Map- Based Activities.</li> </ul>	
5	<p><b>Advanced Development in Android:</b></p> <ul style="list-style-type: none"> <li>○ Controlling Services, Threads, Customizing Toasts, Toasts in Worker Threads, Notification Manager, Triggering Notifications.</li> </ul> <p><b>Peer-to-Peer Communication:</b></p> <ul style="list-style-type: none"> <li>○ Android Instant Messaging, Sending &amp; Listening, SMS.</li> </ul> <p><b>Accessing Android Hardware:</b></p> <ul style="list-style-type: none"> <li>○ Media APIs, Controlling Camera Settings, Sensor Manager, Accelerometer and Compass, Android Telephony, Bluetooth, Managing</li> </ul> <p><b>Network and Wi-Fi Connections.</b></p> <p><b>Advanced Android Development:</b></p> <ul style="list-style-type: none"> <li>○ Paranoid Android, AIDL to Support IPC for Services, Internet Services, Rich User Interfaces.</li> </ul>	5

<b>Text Books:</b>	1. Professional Andriod 4 Application Development : Retomeier, Wrox publication
<b>Reference Books:</b>	1. Andriod Apps for Absolute beginners, Wallace Jadson, Apress. 2. The Complete Andriod Guide, Kevin Purdy.
Online Resources: 1. NPTEL / SWAYAM lectures.	

**Syllabus****Semester-II****Course code:** MIT41MML505**Course name:** Network Security**Course category:** Major Mandatory**Credits:** 3**Pre-requisites:** Basics of Computer Network.**Course Objectives:**

1. To understand Cryptography Theories, Algorithms and Systems.
2. To introduce advanced networking and network security
3. To understand the concepts of Cyber Security, Ethical Hacking

**Course Outcomes:** At the end of the course, the students will be able to -**CO1:** To understand Cryptography Theories, Algorithms and Systems.**CO2:** To understand necessary Approaches and Techniques to build protection mechanisms in order to secure computer networks.**CO3:** To introduce advanced networking and network security concepts.**Contents –**

Unit	Content	Teaching hours
1	UNIT I Foundations of Network Security <ul style="list-style-type: none"> <li>○ CIA, Risks, Breaches, Threats, Attacks, Exploits. Introduction to the Concepts of Security: The need for security, Security Approaches, Principles of Security. Network Security Terminologies, Network Security and Data Availability, Threats and Risks.</li> </ul> Attacks – <ul style="list-style-type: none"> <li>○ Passive and Active, Security Services, Confidentiality, Authentication, Non- Repudiation, Integrity, Access Control, Availability, Model for Internetwork Security.</li> </ul>	10
2	UNIT II Classical Encryption Technique: <ul style="list-style-type: none"> <li>○ Introduction to Cryptographic Techniques: Plain Text and Cipher Text. Substitution Techniques, Caesar cipher, monoalphabetic cipher, Playfair cipher, Transposition Techniques, Encryption and Decryption, Steganography, Key Range and Key Size, Possible Types of Attacks.</li> </ul> Cryptography and Cryptanalysis <ul style="list-style-type: none"> <li>○ Introduction to Cryptography, Symmetric key Cryptography, Asymmetric key Cryptography, Message Authentication, Digital Signatures, Applications of Cryptography.</li> </ul>	10
3	UNIT III Ethical Hacking: <ul style="list-style-type: none"> <li>○ Introduction, What is hacking, Hackers, types of hackers, why hackers hack? Prevention from hacker, steps performed by hackers, working of ethical hacker</li> <li>○ Email Hacking:- How email works? Email service protocol's, Email Security, email spoofing, Methods to send fake Emails, email spamming, phishing, prevention from phishing, email tracing</li> </ul>	10

4	<p>UNIT IV Trojans &amp; Malware</p> <ul style="list-style-type: none"> <li>○ Explanation of Malware, Types of Malware: Rootkits, Robots, Adware's, Spywares, Ransom wares, Zombies, keystroke loggers.</li> <li>○ Trojans:- Introduction, types of Trojans, components of Trojan, mode of Transmission for Trojans, detection and Removal, Counter measures.</li> <li>○ Virus &amp; Worms, Proxy &amp; Packet Filtering, Denial of Service, Sniffer, Social Engineering,</li> <li>○ Overview of Firewalls- Types of Firewalls, User Management,</li> </ul>	10
5	<p>UNIT V Penetration Testing</p> <ul style="list-style-type: none"> <li>○ What is Penetration Testing, Types of Penetration Testing, Black Box, Grey Box, White Box, External Penetration Testing.</li> <li>● Introduction, Setting the Stage, Introduction to Kali and Backtrack Linux: Tools. Lots of Tools, Working with Your Attack Machine: Starting the Engine, The Use and Creation of a Hacking Lab, Phases of a Penetration Test</li> </ul>	5

**Text Books:** 1 Network Security Essentials, William Stallings, Prentice-Hall..

**Reference Books:** 1. Fundamentals of Computer Security Technology, Edward Amoroso, Prentice-Hall.  
2. Cryptography: Theory and Practice, Douglas R. Stinson, CRC Press.

**Online Resources:** 1. NPTEL / SWAYAM lectures.

**Syllabus****Semester-II****Course code:** MIT41MML506**Course name:** Java Application Development**Course category:** Major Mandatory**Credits:** 3**Pre-requisites:** Basics of Programming Language.**Course Objectives:**

1. Develop error-free Java programs
2. Learn how to write, test, and debug advanced-level of OOP using Java

**Course Outcomes:** At the end of the course, the students will be able to -**CO1:** Students will design and implement programs in the Java programming language that make strong use of classes and objects.**CO2:** Develop component-based Java Program**CO3:** Update and retrieve the data from the databases**Contents –**

Unit	Content	Teaching hours
1	<p><b>Unit I:</b></p> <p><b>Introduction to Java:</b></p> <ul style="list-style-type: none"> <li>○ Overview of Java Environment, History of java, Features of java,</li> <li>○ Java Class and Object, writing a Java Program, Obtaining the Java Environment, Setting up Java Environment,</li> <li>○ Creating a Class that Can Run as a Program, Using the Java Documentation</li> </ul> <p><b>Java Basics:</b></p> <ul style="list-style-type: none"> <li>○ Basic Java Syntax, Identifier, Rules for Declaring Identifier, Identifier Coding guidelines,</li> <li>○ Java Keywords, Java Literals, Data Types, Variables, Operators, Creating and Using Methods</li> </ul> <p><b>Java Objects:</b></p> <ul style="list-style-type: none"> <li>○ Objects, Object-Oriented Languages, Object-Oriented Programs,</li> <li>○ Encapsulation, Creating and Using an Instance of an Object, References,</li> <li>○ Defining a Class, Constructors, Method Overloading,</li> <li>○ The this Keyword, static Elements, Garbage Collection, Java Packages, Dealing with Keyboard Input</li> </ul>	10
2	<p><b>Unit II:</b></p> <p><b>Flow Control Structures:</b></p> <ul style="list-style-type: none"> <li>○ Controlling Program Flow, Boolean-Valued Expressions, Complex Boolean Expressions,</li> <li>○ Simple Branching, Two Mutually Exclusive Branches, Nested if... else Statements,</li> <li>○ The switch Statement, Comparing Objects,</li> <li>○ Conditional Expression, while and do. .while Loops, for Loops,</li> <li>○ Additional Loop Control: break and continue,</li> <li>○ Classpath, Code Libraries, and Jar files</li> </ul>	10

	<p><b>Arrays and Vectors:</b></p> <ul style="list-style-type: none"> <li>• Arrays, Array Variables, Copying Arrays, Arrays of Objects, Enhanced for Loops, Multi-Dimensional Arrays, Multidimensional Arrays in Memory, Typecasting with Arrays of Primitives, Vectors</li> </ul>	
3	<p><b>Unit III: Inheritance:</b></p> <ul style="list-style-type: none"> <li>• Inheritance, Polymorphism, creating a Derived Class, Typecasting with Object References, Other Inheritance-Related, Keywords, and Methods Inherited from Object.</li> </ul> <p><b>Packages and Interfaces:</b></p> <ul style="list-style-type: none"> <li>○ Packages, Interfaces, Implementing Interfaces, Interfaces and Inheritance, Interfaces and Event</li> <li>○ Handling, Interfaces and Pluggable Components.</li> </ul> <p><b>Exception handling and Multithreading:</b></p> <ul style="list-style-type: none"> <li>○ Exceptions, syntax of exception handling code, multiple catch statements, throw: throwing own exceptions, throws and finally,</li> <li>○ Introduction to multithreading, creating threads by extending the Thread class and by implementing Runnable interface, implementing the run() method, Life cycle of a thread, Thread methods and thread priority.</li> </ul>	10
4	<p><b>Unit-IV</b></p> <p><b>Event Handling:</b></p> <ul style="list-style-type: none"> <li>○ Two Event Handling Mechanisms, The Delegation Event Model, Event Classes, Sources of Events, Event Listener Interfaces, Using the Delegation Event Model, Adapter Classes, Inner Classes.</li> </ul> <p><b>Working with Windows Graphics:</b></p> <ul style="list-style-type: none"> <li>○ AWT Classes, Window Fundamentals, Working with Frame, Windows, Creating a Frame Window in an Applet, Creating a WindowedProgram, Displaying Information within a Window, Working with Graphics, color, Fonts, Setting the Paint Mode, Managing Text Output Using FontMetrics.</li> </ul> <p><b>AWT Controls, Layout, Menus:</b></p> <ul style="list-style-type: none"> <li>○ Control Fundamentals, Labels, Using Buttons, Applying Check Boxes, CheckboxGroup, Choice Controls, Using Lists, Managing Scroll Bars, Using a TextField, Using a TextArea, Layout Managers, Menu Bars and Menus, Dialog Boxes, FileDialog, Handling Events by Extending AWT Components.</li> </ul>	10
5	<p><b>Java Database Connectivity (JDBC):</b></p> <ul style="list-style-type: none"> <li>○ Design of JDBC, JDBC configuration, Executing SQL Statement, QueryExecution, Scrollable and updatable resultsets, row sets, metadata, Transaction Processing.</li> </ul>	5

<b>Text Books:</b> 1. Java 2 Complete Reference by Herbert Schildt, Sixth Edition.
3.
<b>Reference Books:</b> 1. Core Java Vol 1:, Sun Press.
2. Java: The Complete Reference, Herbert Schildt, McGraw-Hill.
<b>Online Resources:</b> 1. NPTEL / SWAYAM lectures.



**Syllabus****Semester-II****Course code:** MIT41MEL504**Course name:** Intellectual Property Right**Course category:** Major Mandatory**Credits:** 3**Pre-requisites:** Basic knowledge of documentation and law.**Course Objectives:**

1. To make patent copyright, trademark application process known

**Course Outcomes:** At the end of the course, the students will be able to -**CO1:** Understand Indian Patent Law**CO2:** To understand Patent Data basis and Patent Information System**CO3:** To Understand Preparation of Patent Documents**Contents –**

Unit	Content	Teaching hours
1	<b>Unit I</b> <b>Indian Patent Law:</b> Concept of Patent, Product / Process Patents & Terminology, The Patents Act, Amendments to the Patents Act, Patent Rules, Patentable Subject Matter and Patentability Criteria, Duration of Patents - Law and Policy Consideration, Elements of Patentability - Novelty and Non Obviousness, Procedure for Filing of Patent Application and Types of Applications, Procedure for Opposition, Revocation of Patents, Ownership and Maintenance of Patents, Assignment and Licensing of Patents, Assignments of Patents, Working of Patents- Compulsory Licensing, Revocation of Patents by the Controller for Non-Working, Procedure in Respect of Compulsory License, International Applications, Patent Agent-Qualification and Registration Procedure.	10
2	<b>Unit II</b> <b>Patent Data basis and Patent Information System:</b> Patent Offices in India, Patent Information, What is Patent Information, Reasons for Using Patent Information, Patent Search & Patent Databases, Databases on CD-Rom, On-line Databases, Various Types of Searches using Patent Documentation, Pre-Application Searches (PAS), State-of-the-Art Searches, Novelty Searches, Patentability or Validity Searches, Name Searches, Technological Activity Searches, Infringement Searches, Patent Family Searches, Legal Status Searches.	10
3	<b>Unit III</b> <b>Preparation of Patent Documents:</b> Lab Notebooks/Log Books/Record Books, Methods of Invention Disclosure, Provisional Specification, Complete Specification, Patent Application and its Contents, Contents of Patent Application, Writing of Patent Document, Preparing Patent Applications, Obtaining Invention Disclosures from Inventors, Identifying Patentable Inventions, Understanding the Invention, Typical Parts of the Patent Application, Claims, Detailed Description or Specification, Detailed Description or Specification, Detailed Description or Specification, Abstract, Summary.	10

4	<p><b>Unit IV</b>  <b>Process of Examination of Patent Application:</b>          Publication of Patent Application, Request for Examination, Request for Examination, Allocation of Application to examiner for examination, Examination of Patent Application: Regulatory Regime, Formal examination, Substantive Examination, Understanding the invention, Sufficiency of Disclosure: Technical or Specialized Terms, Scope of Claims, Scope of Claims, Scope of Claims, Single Inventive Concept, Patentability Criterion novelty, inventive step, industrial applicability, Prior Public Use, Prior Claiming, Industrial Applicability, Re-Issue and Re-Examination.</p>	10
5	<p><b>Unit V</b>  <b>Patent Infringement:</b>          What Amounts to Patent Infringement, Types of Patent Infringement, Damages and Accounts for Profits.          Trade Mark: Registration of Trade Marks, Registration Procedure.  <b>Copyright:</b> Nature of Copyright Protection, Copyright Pertaining to Software, Term of Copyright, Registration of Copyright.  <b>Industrial Designs:</b> What is a Design? Application and Registration of Design, Priority Document, Representation Sheet.          Geographical Indications, Lay-Out Designs of Integrated Circuits, The Protection of Plant Varieties and Farmers Rights.</p>	5

<p><b>Text Books:</b> 1. Intellectual property property property rights- rights-laws and practice, The institute of company secretaries of india, Module 3 elective paper 9.3.</p>
<p>4. A textbook of intellectual property rights. Chintakunta, Ramakrishna &amp; Meka, Geethavani, 2022.</p>
<p><b>Reference Books:</b> 1. Intellectual property rights, Niraj Panday, K D, PHI learning Pvt ltd, 2014.</p>
<p>2.</p>
<p><b>Online Resources:</b> 1. NPTEL / SWAYAM lectures.</p>