Tulsiramji Gaikwad-Patil College of Engineering and Technology
Wardha Road, Nagpur-441 108
NAAC A+ Accredited
Approved by AICTE ,New Delhi, Govt .of Maharashtra
(An Autonomous Institute Affiliated to RTM Nagpur University, Nagpur)

Department of Master in Computer Application

Structure & Curriculum

From

Academic Year 2021-22

Vision of Institute

To emerge as a learning Center of Excellence in the National Ethos in domains of Science, Technology and Management.

Mission of Institute

M1- To strive for rearing standard and stature of the students by practicing high standards of professional ethics, transparency and accountability.

M2- To provide facilities and services to meet the challenges of Industry and Society

M3- To facilitate socially responsive research, innovation and entrepreneurship

M4- To ascertain holistic development of the students and staff members by inculcating knowledge and profession as work practices.

Vision of the Department

The department of Master in Computer Applications aims to generate groomed, technically competent and skilled intellectual professionals specifically from the rural area to meet the current challenges of the modern computing industry.

Mission of the Department

- To stimulate students to learn effectively and apply the knowledge in the field of Engineering and Technology.
- To undertake industry academic collaboration to enhance competency in graduates.
- To foster innovative ideas amongst students for becoming leaders.
- To create an environment of research culture.
- To impart social and ethical values for inculcating the culture of lifelong learning.

Program Educational Objectives (PEO)

- Providing a strong theoretical and practical background across the computer science discipline with an emphasis on software development.
- To provide technical solutions in the field of information technology to the local society.
- To provide need-based quality training in the field of information technology.
- Empowering the youth in rural communities with computer education.
- To provide students with the tools to become productive, participating global citizens and life-long learners.

Program Outcomes (PO)

PO – 1 Computational Knowledge: Apply knowledge of computing fundamentals, computing specialisation, mathematics, and domain knowledge appropriate for the computing specialisation to the abstraction and conceptualisation of computing models from defined problems and requirements.

PO – 2 Problem Analysis: Identify, formulate, research literature, and solve *complex* computing problems reaching substantiated conclusions using fundamental principles of mathematics, computing sciences, and relevant domain disciplines.

PO – 3 Design /Development of Solutions: Design and evaluate solutions for *complex* computing problems, and design and evaluate systems, components, or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.

PO – 4 Conduct investigations of complex Computing problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO – 5 Modern Tool Usage: Create, select, adapt and apply appropriate techniques, resources, and modern computing tools to *complex* computing activities, with an understanding of the limitations.

PO – 6 Professional Ethics: Understand and commit to professional ethics and cyber regulations, responsibilities, and norms of professional computing practices.

PO – 7 Life-long Learning: Recognise the need, and have the ability, to engage in independent learning for continual development as a computing professional.

PO – 8 Project management and finance: Demonstrate knowledge and understanding of the computing and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO – 9 Communication Efficacy: Communicate effectively with the computing community, and with society at large, about *complex* computing activities by being able to comprehend and write effective reports, design documentation, make effective presentations, and give and understand clear instructions.

PO – 10 Societal and Environmental Concern: Understand and assess societal, environmental, health, safety, legal, and cultural issues within local and global contexts, and the consequential responsibilities relevant to professional computing practices.

PO – 11 Individual and Team Work: Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary environments.

PO – 12 Innovation and Entrepreneurship: Identify a timely opportunity and using innovation to pursue that opportunity to create value and wealth for the betterment of the individual and society at large.

CURRICULUM FRAMEWORK

The MCA Program is the based on the following type of course:

Sr. No.	Type of Course	Abbreviation's
1	Professional Core Course	PCC
2	Professional Elective Course	PEC
3	Open Elective Course	OEC
4	Project	PROJ
5	Audit Course	Audit

The Course and Credit Distribution is as under

Sr. No.	*Type of Course*	*Number of Courses*	*Total Credit*	
			No.	*(%)*
1	Professional Core Course	**26**	**67**	***67.00%***
2	Professional Elective Course	**04**	**12**	***12.00%***
3	Open Elective Course	**01**	**03**	***03.00%***
4	Project	**02**	**18**	***18.00%***
5	Audit Course	**03**	**-**	**-**
	Total	**36**	**100**	**100%**

Tulsiramji Gaikwad-Patil College of Engineering & Technology, Nagpur

(An Autonomous Institute Affiliated to RTM Nagpur University, Nagpur)

Scheme of Instructions

Scheme of Instructions for First Year Master in Computer Application

MCA Semester – I (w.e.f.: AY 2021-22)

Sr.	Course Category	CourseCode	Course Title	L	T	P	Cont act Hrs / week	Credits	Exam Scheme				
									CT - 1	CT - 2	TA / CA	ESE	TOTAL
1.	PCC	MCA1101	Object Oriented Programming Using Java	3	-	-	3	3	15	15	10	60	100
2.	PCC	MCA1102	Computer Hardware & Network	3	-	-	3	3	15	15	10	60	100
3.	PCC	MCA1103	Software Engineering & Project Management	3	-	-	3	3	15	15	10	60	100
4.	PCC	MCA1104	Advance DBMS	3	-	-	3	3	15	15	10	60	100
5.	PCC	MCA1105	Distributed Operating System	3	-	-	3	3	15	15	10	60	100
6.	PEC	MCA1106-09*	Professional Elective – I	3	-	-	3	3	15	15	10	60	100
7.	PCC	MCA1110	OOP'S programming based on Java language Lab	-	-	4	4	2	-	-	25	25	50
8.	PCC	MCA1111	Computer Hardware & Network Lab	-	-	4	4	2	-	-	25	25	50
9.	PCC	MCA1112	Software Engineering & Project Management Lab	-	-	4	4	2	-	-	25	25	50
10	PCC	MCA1113	DBA Lab using Open-Source Database	-	-	4	4	2	-	-	25	25	50
11	MCC	MAU1101	Pedagogy Study	2	-	-	2	Audit Course	-	-	-	-	-
			Total	**20**	**00**	**16**	**36**	**26**	**90**	**90**	**160**	**460**	**800**

L- Lecture T-Tutorial P-Practical CT1- Class Test 1 CT2- Class Test 2 TA/CA- Teacher Assessment / Continuous Assessment

ESE- End Semester Examination (For Laboratory: End Semester Performance)

***Indicates out of the four course codes each student has to select any one PEC from the list provided at the end of structure.**

HOD[MCA]
HOD
MCA DEPARTMENT
TULSIRAMJI GAIKWAD-PATIL COLLEGE
OF ENGINEERING AND TECHNOLOGY, NAGPUR

Dean Academics
Dean Academics
Tulsiramji Gaikwad-Patil
College Of Engineering
and Technology, Nagpur

Principal
Principal
Tulsiramji Gaikwad Patil College Of
Engineering and Technology, Nagpur

Tulsiramji Gaikwad-Patil College of Engineering & Technology, Nagpur

(An Autonomous Institute Affiliated to RTM Nagpur University, Nagpur)

Scheme of Instructions

Scheme of Instructions for First Year Master in Computer Application

MCA Semester – II (w.e.f.: AY 2021-22)

Sr.	Course Category	CourseCode	Course Title	L	T	P	Contact Hrs / week	Credits	Exam Scheme				
									CT - 1	CT - 2	TA / CA	ESE	TOTAL
1.	PCC	MCA1201	Mobile Application	3	-	-	3	3	15	15	10	60	100
2.	PCC	MCA1202	Python Programming	3	-	-	3	3	15	15	10	60	100
3.	PCC	MCA1203	Data Warehouse and Mining	3	-	-	3	3	15	15	10	60	100
4.	PCC	MCA1204	Internet Programming	3	-	-	3	3	15	15	10	60	100
5.	PCC	MCA1205	Artificial Intelligence & Machine Learning	3	-	-	3	3	15	15	10	60	100
6.	PEC	MCA1206-09*	Professional Elective - II	3	-	-	3	3	15	15	10	60	100
7.	PCC	MCA1210	Mobile Application Based on Android & IOS Programming Lab	-	-	4	4	2	-	-	25	25	50
8	PCC	MCA1211	Python Programming Lab	-	-	4	4	2	-	-	25	25	50
.9	PCC	MCA1212	Data Warehouse and Mining Lab	-	-	4	4	2	-	-	25	25	50
10	PCC	MCA1213	Internet Programming Lab using Advance Java	-	-	4	4	2	-	-	25	25	50
11	MCC	MAU1202	Research Paper Writing	2	-	-	2	Audit Course	-	-	-	-	-
			Total	**20**	-	**16**	**36**	**26**	**90**	**90**	**160**	**460**	**800**

L- Lecture T-Tutorial P-Practical CT1- Class Test 1 CT2- Class Test 2 TA/CA- Teacher Assessment / Continuous Assessment

ESE- End Semester Examination (For Laboratory: End Semester Performance)

***Indicates out of the four course codes each student has to select any one PEC from the list provided at the end of structure.**

HoD[MCA]
HOD
MCA DEPARTMENT
TULSIRAMJI GAIKWAD-PATIL COLLEGE
OF ENGINEERING AND TECHNOLOGY, NAGPUR

Dean Academics
Dean Academics
Tulsiramji Gaikwad-Patil
College Of Engineering
and Technology, Nagpur

Principal
Principal
Tulsiramji Gaikwad Patil College of
Engineering and Technology, Nagpur

Tulsiramji Gaikwad-Patil College of Engineering & Technology, Nagpur

(An Autonomous Institute Affiliated to RTM Nagpur University, Nagpur)

Scheme of Instructions

Scheme of Instructions for Second Year Master in Computer Application

List of Professional Elective Courses

Semester - I		Semester – II		Semester - IV	
Course Code	**Professional Elective-I**	**Course Code**	**Professional Elective-II**	**Course Code**	**Professional Elective-III**
MCA1106	Management Information System	MCA1206	Enterprise Resource Planning	MCA2402	Business Process Domain
MCA1107	Big Data Analytics	MCA1207	Natural Language Processing	MCA2403	Soft Computing
MCA1108	Network Security	MCA1208	Social Network Analysis & Digital Marketing	MCA2404	Cyber Forensic
MCA1109	Parallel Programming	MCA1209	Digital Image Processing	MCA2405	Block Chain Technology

List of Open Electives Course

Semester III	
Course Code	**Open Elective-I**
MCSXX01	Business Analytics
MSEXX02	Cost Management of Engineering Projects
MSEXX03	Composite Materials
MIPXX04	Waste to Energy
MIPXX05	Industrial Safety
MMBXX06	Operation Research

Credits Distribution Semester-wise

Sem – I	Sem – II	Sem – III	Sem – IV	Total Credits
26	26	26	22	100

HOD[MCA]
HOD
MCA DEPARTMENT
TULSIRAMJI GAIKWAD-PATIL COLLEGE
OF ENGINEERING AND TECHNOLOGY, NAGPUR

Dean Academics
Dean Academics
Tulsiramji Gaikwad-Patil
College Of Engineering
and Technology, Nagpur

Principal
Principal
Tulsiramji Gaikwad Patil College Of
Engineering and Technology, Nagpur

Tulsiramji Gaikwad-Patil College of Engineering and Technology
Wardha Road, Nagpur-441 108
NAAC Accredited (A+ Grade)
(An Autonomous Institute Affiliated to RTM Nagpur University, Nagpur)

Program: Master in Computer Application

Semester	Course Code	Name of Course	L	T	P	Credits
II	MCA1201	Mobile Application	3	0	-	3

Pre-Requisites: Object Oriented Programming, Digital Communication Network

Course Objectives:

1.	It explores emerging technologies and tools used to design and implement feature-rich mobile applications for smart phones and tablets
2.	Identify the target platform and users and be able to define and sketch a mobile application
3.	Understand the fundamentals, frameworks, and development lifecycle of mobile application platforms including iOS, Android.
4.	Design and develop a mobile application prototype in one of the platforms
5.	Describe those aspects of mobile programming that make it unique from programming for other platforms
6.	Program mobile applications for the Android operating system that use basic and advanced phone features

Course Contents

Unit I	Introduction to Mobile application Development Environment, Characteristics of Mobile Applications, Factors in Developing Mobile Applications, Mobile Software Engineering, Frameworks and Tools, Generic UI Development, VUIs and Mobile Apps, Text-to-Speech Techniques, Designing the Right UI, Multichannel and Multimodal UIs
Unit II	Intents and Services, Storing and Retrieving Data, Synchronization and Replication of Mobile Data, Getting the Model Right Storing and Retrieving Data, Working with a Content Provider, Communications Via Network and the Web, State Machine, Correct Communications Model, Wireless Connectivity and Mobile Apps
Unit III	Notifications and Alarms, Performance and Memory Management, Graphics Performance and Multithreading, Graphics and UI Performance, Graphics & Multimedia, Mobile Agents and Peer-to-Peer Architecture, Location Mobility and Location Based Services
Unit IV	Introduction to Android: The Android Platform, Android SDK, Android Installation, Android Activity Development, using widgets, building you First Android application, Understanding Anatomy of Android Application, Android Manifest file.
Unit V	Overview of iOS and X-CODE: Installation, Create and manage project using XCode, Introduction to iPhone Architecture, Introduction to SWIFT, Developer Technology Overview: The Apple Developer Tool, Swift, Cocoa Touch, Model-View-Controller, Interface Builder, and Overview of latest iOS features.

Text Books	
T.1	Reto Meier, “Professional Android Application Development”, Wrox Edition
T.2	Applications with UML and XML, Reza Behravanfar, 2nd Edition, Cambridge University Press
T.3	David Mark, Jack Nutting and Jeff LaMarche, “Beginning iOS 5 Development”, Apress Edition.
Reference Books	
R.1	Baijian Yang, Pei Zheng, Lionel M. Ni, “Professional Microsoft Smartphone Programming”, Wrox Edition.
R.2	Applications with UML and XML, Reza Behravanfar, 3rd Edition, Cambridge University Press
Useful Links	
1	https://nptel.ac.in/courses/106/106/106106147/

	Course Outcomes	PO/PSO	CL	Class Sessions
MCA1201.1	Use of tools for mobile application at various sectors and its functionality.	PO1, PO2, PO3, PO8, PO9, PO10, PO12	3	9
MCA1201.2	Demonstrate technical constraints relative to storage capacity, processing capacity, display screen, communication interfaces.	PO1, PO2, PO3, PO5,PO8, PO9, PO10, PO12	3	9
MCA1201.3	Analyze and implement feature-rich mobile applications for smart phones.	PO1, PO2, PO3, PO5, PO8, PO9, PO10, PO12	4	9
MCA1201.4	Analyze various Android applications with standard tools and mechanism.	PO1, PO2, PO3, PO4,PO5, PO8, PO9, PO10, PO11, PO12	4	9
MCA1201.5	Determine the Application for mobile computing and installation using iOS.	PO1, PO2, PO3, PO5, PO8, PO9, PO10, PO11, PO12	5	9

Tulsiramji Gaikwad-Patil College of Engineering and Technology
Wardha Road, Nagpur-441 108
NAAC Accredited (A+ Grade)
(An Autonomous Institute Affiliated to RTM Nagpur University, Nagpur)

Program: Master in Computer Application

Semester	Course Code	Name of Course	L	T	P	Credits
II	**MCA1202**	Python Programming	3	0	-	3

Pre-Requisites: Programming logic and Techniques, Object Oriented Programming concepts.

Course Objectives:

1.	Demonstrate significant experience with the Python program development environment.
2.	To develop the ability to write database applications in Python
3.	Solve problems requiring the writing of well-documented programs in the Python language, including use of the logical constructs of that language
4.	To develop the skill of designing Graphical user Interfaces in Python
5.	Demonstrate the principles of object-oriented programming and the interplay of algorithms and data structures in well-written modular code;

Course Contents

Unit I	**Introducing Python:**What is Python? Python History, Similar Languages **Python Fundamentals: Extending Python programs:** Interactively, From a File, Other Methods, Script, program or module? **Components of a python programming: Built – In-Object types:** Python objects and other Languages, Operator's basics, Numbers, Strings, Lists, Tuples, Working with Sequences, Dictionaries, Files, object storage, type conversion, type comparisons **Statements:** statement format, comments, assignments, print, control statements, common traps. **Functions:** Function definition and execution, **scoping:** making objects global, the LGB Rule, scope traps, **Arguments:** Arguments are Objects, argument calling by Keywords, default arguments, argument tuples, argument dictionaries, function Rules, Return values,
Unit II	**Advanced Function calling:** The apply statement, the Map Statement, indirect function calls, anonymous functions, **Modules:** Importing a module, Packages. **Object orientation:** Creating a Class **Exceptions and error trapping:** Exception handling, Built in exceptions. **Python's Built-In Functions:** _import_(name[globals[locals[fromlist]]]), apply (function, args, [keywords]), getattr(object, name[,default]), hash(object), id(object), Isinstance (object, class), list(sequence),setattr (object , name , value) , str (object) , type(object).
Unit III	**Interfacing to the OS:** Working with the system (sy module), Working with the Operating system (os module), and Multithreading. **Processing Information:** Manipulating numbers, Text Manipulation, Time, Data types and Operator, Unicode strings. **Working with Files:** File processing: Reading, writing to file, changing position, Controlling File I/O:File Control, IO Control, File Locking, Basic File/Directory Management, Access and Ownership: Checking Access, Getting File information, Setting File Permissions, Manipulating File Paths**.**
Unit IV	**Communicating over a network:** Creating a network server, client modules, Handling internet data. **Using Python for multimedia**: Audio modules, Graphic Modules **Using Python as RAD Tool:** What RAD relay is, Why Python **Application development with Python:** Integrated Development Environment**,** Python standard Library. **Web Development Basics:** Writing HTML, Uniform Resource Locators, Dynamic Websites using CGI, Cookies, **and Security Standard Markup Language Processing**: Processing

	SGML, Processing HTML, Processing XML.
Unit V	**The Python Architecture**: **Namespaces, Code blocks and Frames**: Code Blocks, Frames, Namespaces, Trace backs, putting it together, **Built-in-types**: Callable object types, Modules, Classes, Class Instances, Internal Types, **Byte Code**: Python bytecode, bytecode disassembly, byte code instructions(opcodes)
Text Books	
T.1	The Complete Reference Python, Martin C.Brown , 2nd Edition,Tata McGraw Hill Publication
T.2	Programming in Python3, 2nd Edition, Mark Summerfield
T.3	Beginning Python From Novice to Professional, 1st Edition, Magnus Lie Hetland(Apress)
Reference Books	
R.1	Taming Python by Programming, 3rd Edition, Jeeva Jose, KhannaPubli.
R.2	Introduction to Computing and Problem Solving with Python, 3rd Edition, Jeeva Jose, Khanna Publi.
Useful Links	
1	https://nptel.ac.in/courses/106/106/106106145/
2	https://nptel.ac.in/courses/106/105/106105031/
3	https://nptel.ac.in/courses/106/106/106106178/

	Course Outcomes	**PO**	**CL**	**Class Sessions**
MCA1202.1	Discover how to work with lists and sequence data.	PO1,PO2,PO3, PO5, PO6, PO8, PO10,PO11,PO12,	3	9
MCA1202.2	Use Python to read and write files.	PO1,PO2,PO3, PO4, PO6,PO8, PO10,PO11,PO12,	3	9
MCA1202.3	Preparation of core Python scripting elements such as variables and flow control structures.	PO1,PO2,PO3, PO5, PO6, PO10, PO11, PO12,	4	9
MCA1202.4	Implementation of Python functions to facilitate code reuse.	PO1,PO2,PO3, PO6,PO12, PO10,PO11,PO4	5	9
MCA1202.5	Demonstrate Python to read and write files.	PO1,PO2,PO3, PO4, PO5, PO6,PO8, PO10,PO11,PO12	5	9

Tulsiramji Gaikwad-Patil College of Engineering and Technology
Wardha Road, Nagpur-441 108
NAAC Accredited (A+ Grade)

(An Autonomous Institute Affiliated to RTM Nagpur University, Nagpur)

Program: Master in Computer Application

Semester	Course Code	Name of Course	L	T	P	Credits
II	MCA1203	Data Warehousing and Data Mining	3	-	-	3

Pre-Requisites: Database Management System.

Course Objectives:

1.	This course gives an introduction to methods and theory for development of data warehouses and data analysis using data mining.
2.	Data quality and methods and techniques for preprocessing of data.
3.	Algorithms for classification, clustering and association rule analysis. Practical use of software for data analysis.
4.	Master data mining techniques in various applications like social, scientific and environmental context.
5.	To understand skill in selecting the appropriate data mining algorithm for solving practical problems.

Course Contents

Unit I	**Introduction:** Fundamentals of data mining, Data Mining Functionalities, Major issues in Data Mining Data Preprocessing: Needs Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Data Warehouse and OLAP Technology for Data Mining Data Warehouse, Multi-dimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation.
Unit II	**Clustering**: Similarity and Distance Measures, Hierarchical Algorithms, Clustering Large Databases, Clustering with Categorical Attributes Applications and other Data mining techniques Data Mining Applications, Mining Event Sequences, Mining, Web Mining, The WEKA data mining Workbench Visual DM, Text
Unit III	**Mining** Frequent Patterns, Associations and Correlations: Basic Concepts, Efficient and Scalable Frequent Item set Mining Methods, Mining various kinds of Association Rules, From Association Mining to Correlation Analysis, Constraint-Based Association Mining.
Unit IV	**Decision Tree Induction** – Bayesian Classification – Rule Based Classification – Classification by Back Propagation – Support Vector Machines — Lazy Learners – Model Evaluation and Selection-Techniques to improve Classification Accuracy.
Unit V	**Business Intelligence**: Introduction, Business Intelligence, Business Intelligence tools, Business Intelligence Infrastructure, Business Intelligence Applications, BI versus Data Warehouse, BI versus Data Mining, Future of BI.

Text Books	
T.1	Data Mining- Concepts and Techniques- Jiawei Han, Micheline Kamber, Morgan Kaufmann Publishers Elsevier, 2nd Editions, 2006.
T.2	Introduction to Data Mining, Pang-Ning Tan, Vipin Kumar, Michael Steinbanch, Pearson Education, 2nd Edition.
Reference Books	
R.1	Data Mining Techniques, Arun K Pujari, 3rd Edition, Universities Press.
R.2	Data Ware Housing Fundamentals, PualrajPonnaiah, Wiley Student Edition
Useful Links	
1	http://nptel.ac.in/courses/106106093/35
2	http://nptel.ac.in/syllabus/syllabus_pdf/106106105

	Course Outcomes	PO/PSO	CL	Class Sessions
MCA1203.1	Apply the functionality of the various data mining and data warehousing component	PO1, PO2, PO3, PO4, PO7, PO8, PO9, PO11, PO12	3	9
MCA1203.2	Analyze the strengths and limitations of various data mining and data warehousing models.	PO1, PO2, PO3, PO4, PO7, PO8, PO9, PO11, PO12	4	9
MCA1203.3	Explain the analyzing techniques of various data	PO1, PO2, PO3, PO4, PO7, PO8, PO9, PO11, PO12	4	9
MCA1203.4	Apply appropriate classification and clustering techniques for data analysis.	PO1, PO2, PO3, PO4, PO7, PO8, PO9, PO11, PO12	3	9
MCA1203.5	Assess different approaches of data ware housing and data mining with Business Intelligence	PO1, PO2, PO3, PO4, PO7, PO8, PO9, PO11, PO12	5	9

Tulsiramji Gaikwad-Patil College of Engineering and Technology
Wardha Road, Nagpur-441 108

NAAC Accredited (A+ Grade)
(An Autonomous Institute Affiliated to RTM Nagpur University, Nagpur)

Program: Master in Computer Application

Semester	Course Code	Name of Course	L	T	P	Credits
II	MCA1204	Internet Programming	3	-	-	3

Pre-Requisites: Object Oriented Programming Using Java

Course Objectives:

1.	Learn the concepts of java network programming. Develop front end, back end applications using Java Database Connectivity techniques.
2.	To become adept at developing Remote Method Invocation based applications.
3.	To develop web based applications by using Servlets. Also develop applications by using Cookies, Session.
4.	To analyze tag library and implicit objects to develop applications by using Java Server Pages.
5.	To analyse applications of servlets. To utilize logic in Java Server Pages libraries, implicit objects.
6.	To analyze functionalities of java Frameworks. Develop applications by using struts, hibernate frameworks.

Course Contents

Unit I	JDBC - Introduction, SQL Syntax, Environment, Sample Code, Driver Types, Connections, Statements, Result Sets, Data Types, Transactions, Exceptions, Batch Processing, Stored Procedure, Streaming Data, Networking : Socket, Reserve socket, Internet Addressing, InetAddress, TCP/IP client socket, TCP/IP server socket, URL, URL Connection, Datagram,
Unit II	RMI : Introduction, Architecture, Remote Interface, java.RMIServer package, class naming, creating RMIServer and RMIClient,transmitting files using RMI, clientside callback, RMISecurity Manager.
Unit III	Servlet: Basics of Web, Servlet API, Servlet Interface GenericServlet, HttpServlet, Servlet Life Cycle, servlet in ServletRequest, ServletRequestmethods, RequestDispatcher, sendRedirect, ServletConfig, ServletConfig methods, ServletContext, ServletContext methods, Session Tracking
Unit IV	Session Tracking, Hidden Form Field, URL Rewriting, Cookies, HttpSession. Java Server Pages: Introduction to JSP, Comparison with Servlet, JSP Architecture,JSP Life Cycle, JSP Scripting Elements, JSP Directives, JSP Action, JSP Implicit Objects, JSP Expression Language, JSP Standard Tag Libraries, JSP Custom Tag, JSP Session Management, JSP Exception Handling, JSP CRUD Application.
Unit V	Hibernate: Introduction to Hibernate, Exploring Architecture of Hibernate, O/R Mapping with Hibernate, Hibernate Annotation, Hibernate Query Language, CRUD Operation using Hibernate API. Java Web Frameworks: Spring MVC Spring Introduction, Spring

	Architecture, Spring MVC Module, Life Cycle of Bean Factory, Explore: Constructor Injection, Dependency
Text Books	
1	J2EE: The complete Reference by Jim Keogh McGraw Hill 3rd Edition
2	Java Server Programming Java EE 7 (J2EE 1.7), Black Book by Kogent Learning So. Dream Tech publication 3rd Edition
Reference Books	
1	J2EE Made Easy By Das, Rashmi Kant. Vikas publication 2nd Edition
2	Core J2EE Patterns by Martin Fowler, Chief Scientist. Published by Prentice Hall. 2nd Edition
Useful Links	
1	https://nptel.ac.in/courses/106/105/106105153/
2	https://nptel.ac.in/courses/106/105/106105191/

	Course Outcomes	PO/PSO	CL	Class Sessions
MCA1204.1	Apply concepts of Server Socket, Socket, Datagram Socket, Datagram Packet. Also apply Java Database Connectivity techniques.	PO1, PO2, PO3, PO6, PO12	3	9
MCA1204.2	Apply RMI to create methods remotely & create stub, skeleton layers.	PO1, PO2, PO3, PO4, P05, PO6, PO7, PO12	3	9
MCA1204.3	Analyze & Apply Servlet concept Create Servlet based web applications by using GenericServlet, HttpServlet. Use cookies, session tracking mechanism to maintain information of client.	PO1, PO2, PO3, PO4, PO5, PO6, P07, PO11, PO12	4	9
MCA1204.4	Evaluate the process of Web Servers and Web based applications by using Java Server Pages.	PO1, PO2, PO3, PO4, PO5, PO6, P07, PO11, PO12	5	9
MCA1204.5	Create framework-based applications by using spring, Hibernate.	PO1, PO2, PO3, PO4, PO5, P06, P07, PO11, PO12	6	9

Tulsiramji Gaikwad-Patil College of Engineering and Technology
Wardha Road, Nagpur-441 108
NAAC Accredited (A+ Grade)

Program: Master in Computer Application

Semester	Course Code	Name of Course	L	T	P	Credits
II	MCA1205	Artificial Intelligence & Machine Learning	3	-	-	3

Pre-Requisites: Computer science, Basic Math, C++

Course Objectives:

1.	The goal is to acquire knowledge on intelligent systems and agents, formalization of knowledge, reasoning with and without uncertainty, machine learning and applications at a basic level.
2.	The purpose of machine learning is to discover patterns in your data and then make predictions based on often complex patterns to answer business questions, detect and analyze trends and help solve problems.
3.	A strong foundation of fundamental concepts in Artificial Intelligence
4.	A basic exposition to the goals and methods of Artificial Intelligence
5.	Apply these techniques in applications which involve perception, reasoning and learning

Course Contents

Unit I	**Introduction:** History and Definition of AI, Foundations Intelligent Agents - Agents and environments-Good behavior- the nature of environments, Structure of agents-Problem Solving agents, Example problems-Searching for solutions.
Unit II	**Searching Techniques:** Informed search and exploration- Informed search strategies, greedy best-first, A* Algorithm, Memory-bounded heuristic search, heuristic functions, Local search algorithms and optimization problems, searching in continuous space, CSP – backtracking search for CSPs, Backtracking search for CSPs, Local search for CSP-structure of problems.
Unit III	**Knowledge:** Representation Introduction to Logic, Syntax and semantics of first order logic, Using first order logic, assertions and queries in first-order logic, kinship domain, Wumpus world problem, Knowledge engineering in first order logic, Inference in first order logic- Propositional vs. first-order inference, Unification and lifting, Storage and retrieval, Forward chaining, Backward chaining, Resolution
Unit IV	**Learning:** Introduction, Learning from observations, Inductive learning, Learning decision trees, Ensemble learning, logical formulation of learning, Knowledge in learning, explanation based learning, Learning using relevance information, inductive logic programming, Statistics learning methods, learning with complete data
Unit V	**Applications:** Communication - Communication as action, A formal grammar for a fragment of English, Syntactic analysis Augmented grammars, Semantic interpretation, Ambiguity and disambiguation

Text Books

T.1	Stewart Russell and Peter Norvig. " Artificial Intelligence-A Modern Approach ", 2nd Edition, Pearson Education/ Prentice Hall of India, 2004

Reference Books

R.1	Elaine Rich and Kevin Knight, “Artificial Intelligence”, 2nd Edition, Tata McGraw-Hill, 2003
R.2	Stuart Russell & Peter Norvig, Artificial Intelligence: A Modern Approach, Prentice-Hall, Third Edition (2009) .
Useful Links	
1	https://onlinecourses.nptel.ac.in/noc21
2	https://nptel.ac.in/courses/106/106/106106126/

	Course Outcomes	PO/PSO	CL	Class Sessions
MCA2104.1	Apply these techniques in applications which involve perception, reasoning and learning.	PO1,POO2,PO3,PO4,PO9,PO11	3	9
MCA2104.2	Analyze the role of agents and how it is related to environment and the way of evaluating it and how agents can act by establishing goals.	PO1,PO2,PO4,PO7,PO8,PO9,PO11	4	9
MCA2104.3	Analyze and design a real-world problem for implementation and understand the dynamic behavior of a system.	PO1,PO3,PO4,PO9,PO12	4	9
MCA2104.4	Apply different machine learning techniques to design AI machine and enveloping applications for real world problems.	PO1,PO2,PO3,PO4,PO5,PO7,PO11,PO12	3	9
MCA2104.5	Evaluate the various searching techniques, constraint satisfaction problem and example problems- game playing techniques.	PO1,PO3,PO4,PO5,PO8,PO9,PO11,PO12	5	9

Tulsiramji Gaikwad-Patil College of Engineering and Technology
Wardha Road, Nagpur-441 108
NAAC Accredited (A+ Grade)
(An Autonomous Institute Affiliated to RTM Nagpur University, Nagpur)

Program: Master in Computer Application

Semester	Course Code	Name of Course	L	T	P	Credits
II	MCA1206	Enterprise Resourcing Planning	3	-	-	3

Pre-Requisites: HR Management and E-Business

Course Objectives:

1.	Describe the concept of ERP and the ERP model; define key terms; explain the transition from MRP to ERP; identify the levels of ERP maturity.
2.	Explain how ERP is used to integrate business processes; define and analyze a process
3.	Create a process map and improve and/or simplify the process; apply the result to an ERP implementation
4.	Explain the effect of a new product launch on the three core business processes.
5.	Describe the elements of a value chain, and explain how core processes relate; identify how the organizational infrastructure supports core business processes

Course Contents

Unit I	**ERP Introduction:** Benefits, Origin, Evolution and Structure: Conceptual Model of ERP, the Evolution of ERP, And the Structure of ERP. Supply chain and resource management, Integrated data model scope, Technology and benefits of ERP & the modern enterprise.
Unit II	**Business Process Reengineering:** Data ware Housing, Data Mining, Online Analytic Processing (OLAP), Product Life Cycle Management (PLM), LAP, Supply chain Management. Core process in a manufacturing company, Entities for data model in a manufacturing company, Extended ERP.
Unit III	**ERP Marketplace and Marketplace Dynamics:** Market Overview, Marketplace Dynamics, the Changing ERP Market. ERP- Functional Modules: Introduction, Functional Modules of ERP Software, Integration of ERP, Supply chain and Customer Relationship Applications.
Unit IV	**ERP Implementation Basics:** ERP Implementation Life Cycle, Role of SDLC/SSAD, Object Oriented Architecture, Consultants, Vendors and Employees. Barriers to successful SFA, SFA functionality, technological aspect of SFA: data synchronization, flexibility & performance, Reporting tools.
Unit V	**ERP & E-Commerce:** Future Directives- in ERP, ERP and Internet, Critical success and failure factors, Integrating ERP into or-generational culture. Using ERP tool: either SAP or ORACLE format to case study.

Text Books

T.1	Vinod Kumar Garg and Venkitakrishnan N K, "Enterprise Resource Planning Concepts and Practice", PHI.2nd Edition
T.2	Joseph A Brady, Ellen F Monk, Bret Wagner, "Concepts in Enterprise Resource Planning", Thompson Course Technology. 1st Edition

Reference Books	
R.1	Rahul V. Altekar "Enterprise Resource Planning", Tata McGraw Hill, 2nd Edition
R.2	Vinod Kumar Garg and Venkitakrishnan N K, "Enterprise Resource Planning – A Concepts and Practice", PHI 4th Edition
Useful Links	
1	http://www.digimat.in/nptel/courses/video/110105083/L10.html
2	http://www.digimat.in/nptel/courses/video/110105057/L01.html

	Course Outcomes	PO/PSO	CL	Class Sessions
MCA1206.1	Apply a working knowledge of how data and transactions are integrated in an ERP system to manage the sales order process, production process, and procurement process.	PO1, PO2, PO3, PO4, PO5, PO7, PO8, PO9, PO11	3	9
MCA1206.2	Analyze the technical aspect of telecommunication systems, internet and their roles in business environment.	PO1, PO2, PO3, PO4, PO5, PO7, PO8, PO10,PO11	4	9
MCA1206.3	Analyze the strategic options for ERP identification and adoption.	PO1, PO3, PO4, PO7, PO9, PO12	4	9
MCA1206.4	Evaluate organizational opportunities and challenges in the design system within a business scenario.	PO1, PO2, PO3, PO4, PO5, PO7, PO9, PO10, PO11	5	9
MCA1206.5	Develop skills necessary for building and managing relationships with customers, and stakeholders.	PO1, PO4, PO5, PO6, PO8, PO9, PO11, PO12	6	9

Tulsiramji Gaikwad-Patil College of Engineering and Technology
Wardha Road, Nagpur-441 108
NAAC Accredited (A+ Grade)
(An Autonomous Institute Affiliated to RTM Nagpur University, Nagpur)

Program: Master in Computer Application

Semester	Course Code	Name of Course	L	T	P	Credits
II	MCA1207	Natural Language Processing	3	-	-	3

Pre-Requisites: Basic Knowledge of Probability and Python Programming

Course Objectives:

1.	To learn the fundamentals of natural language processing
2.	To understand the use of CFG and PCFG in NLP
3.	To understand the role of semantics of sentences and pragmatics
4.	To apply the NLP techniques to IR applications

Course Contents

Unit I	**Introduction:** -Origins and challenges of NLP, Language Modeling: Grammar-based LM, Statistical LM, Regular Expressions, Finite-State Automata, English Morphology, Transducers for lexicon and rules, Tokenization, Detecting and Correcting Spelling Errors, Minimum Edit Distance
Unit II	**Word level analysis:** -Unsmoothed N-grams, Evaluating N-grams, Smoothing, Interpolation and Back off, Word Classes, Part-of-Speech Tagging, Rule-based, Stochastic and Transformation-based tagging, Issues in PoS tagging, Hidden Markov and Maximum Entropy models.
Unit III	**Syntactic analysis:** -Context-Free Grammars, Grammar rules for English, Treebanks, Normal Forms for grammar, Dependency Grammar, Syntactic Parsing, Ambiguity, Dynamic Programming parsing, Shallow parsing, Probabilistic CFG, Probabilistic CYK, Probabilistic Lexicalized CFGs, Feature structures, Unification of feature structures.
Unit IV	**Semantics and pragmatics:** -Requirements for representation, First-Order Logic, Description Logics, Syntax-Driven Semantic analysis, Semantic attachments, Word Senses, Relations between Senses, Thematic Roles, selection restrictions, Word Sense Disambiguation, WSD using Supervised, Dictionary & Thesaurus, Bootstrapping methods, Word Similarity using Thesaurus and Distributional methods.
Unit V	**Discourse analysis and lexical resources:-** Discourse segmentation, Coherence, Reference Phenomena, Anaphora Resolution using Hobbs and Centering Algorithm, Coreference Resolution, Resources: Porter Stemmer, Lemmatizer, Penn Treebank, Brill's Tagger, WordNet, PropBank, FrameNet, Brown Corpus, British National Corpus (BNC).

Text Books

1	Daniel Jurafsky, James H. Martin—Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics and Speech, Pearson Publication, 2014, 2nd Edition.
2	Steven Bird, Ewan Klein and Edward Loper, ―Natural Language Processing with Python‖, First Edition, OReilly Media, 2009, 1st Edition.

Reference Books	
1	Breck Baldwin, ―Language Processing with Java and Ling Pipe Cookbook, Atlantic Publisher, 2015, 2nd Edition.
2	Richard M Reese, ―Natural Language Processing with Java‖, OReilly Media, 2015, 2nd Edition.
Useful Links	
1	https://nptel.ac.in/courses/106/101/106101007/
2	https://onlinecourses.nptel.ac.in/noc19_cs56/

	Course Outcomes	PO	CL	Class Sessions
MCA1207.1	Apply a given text with basic Language features	PO1, PO2, PO3, PO5, PO7, PO11, PO12	3	9
MCA1207.2	Design an innovative application using NLP components	PO1, PO2, PO3, PO4, PO5, PO7, PO8, PO9, PO11, PO12	6	9
MCA1207.3	Evaluate a rule-based system to tackle morphology/syntax of a language	PO1, PO2, PO3, PO4, PO5, PO7, PO8, PO9, PO11, PO12	5	9
MCA1207.4	Design a tag set to be used for statistical processing for real-time applications	PO1, PO2, PO3, PO4, PO5, PO7, PO8, PO9, PO11, PO12	6	9
MCA1207.5	Compare and contrast the use of different statistical approaches for different types of NLP applications.	PO1, PO2, PO3, PO4, PO5, PO7, PO8, PO9, PO11, PO12	4	9

Tulsiramji Gaikwad-Patil College of Engineering and Technology
Wardha Road, Nagpur-441 108
NAAC Accredited (A+ Grade)
(An Autonomous Institute Affiliated to RTM Nagpur University, Nagpur)

Program: Master in Computer Application

Semester	Course Code	Name of Course	L	T	P	Credits
II	**MCA1208**	Social Network Analysis & Digital Marketing	3	0	-	3

Pre-Requisites: E-Commerce, Computer Graphics, Digital Communication Network

Course Objectives:

1.	To Introduce current and core practices of Digital and Social Media Marketing that will allow learners to analyze, plan, execute and evaluate a digital marketing strategy.
2.	To understand the concepts of Network Security, Ethical Hacking Forensic detection image processing, pattern recognition, and natural language processing.
3.	To Develop an understanding of Search Engine Optimization (SEO), Social Media Optimization, Affiliate and other relevant communication channels for engagement of digital communities.
4.	To develop online learning material in the areas of Enterprise Cultural and regional innovation policy practice.
5.	to core concepts of digital and social media marketing

Course Contents

Unit I	Introduction to Digital Marketing and its Significance, Traditional Marketing Vs Digital Marketing, Digital Marketing Process, Website Planning and Development: Types of websites, Website Planning and Development, Keywords Understanding Domain and Webhosting, Building Website/Blog using CMS WordPress, Using WordPress Plug-ins
Unit II	Introduction to Search Engine Optimization, Keyword P lanner Tools, On Page SEO Techniques-Indexing and Key Word PlacementSEO Techniques-Indexing and Key Word Placement On Page SEO Techniques- Content Optimization, On Page SEO : Yoast SEO Plug-in, Off –Page SEO Techniques, Email Marketing- Introduction and Significance, Designing e-mail marketing campaigns using Mail Chimp Building E-mail List and Signup Forms, Email Marketing Strategy and Monitoring, Email –Atomization
Unit III	Pay Per Click Advertising, Google Adword, Types of Bidding strategies, Designing and Monitoring search campaigns, Designing and Monitoring Display campaigns, Designing and Monitoring Video campaigns, Designing and Monitoring Universal App Campaigns, Developing digital marketing strategy in Integration form, Advertising Account.
Unit IV	Marketing: Introduction and Significance, Understanding Audience and its Types, Analytics Interface and Setup, Understanding Goals and Conversions, Monitoring Traffic Behavior and preparing Reports, Social Media Marketing: Introduction and Significance, Social Network Analysis & Marketing: Basics, Designing SocialNetwork AdvertisingCampaigns, Types of Various Ad Formats

Unit V	Case Study: Facebook Linkdin, Twitter (Marketing, Designing Advertising, Campaigns, Analysis Audience behavior).

Text Books

T.1	V.K. Jain, "Cryptography and Network Security",2ndEdition, Khanna Publishing House.
T.2	Atul Kahate, "Cryptography and Network Security",2ndEdition, McGraw Hill.
T.3	Bothra Harsh, "Hacking", Khanna Publishing House, 3rd Edition, Delhi

Reference Books

R.1	William Stallings, "Cryptography and Network Security", 2nd Edition, Pearson Education/PHI, 2006.

Useful Links

1	https://nptel.ac.in/courses/106/105/106105162/
2	https://nptel.ac.in/courses/106/105/106105031/
3	https://nptel.ac.in/courses/106/106/106106178/

	Course Outcomes	PO	CL	Class Sessions
MCA1208.1	Examine various types of alternatives for digital marketing	PO1,PO2,PO3, PO5, PO6, PO8, PO10,PO11,PO12,	3	9
MCA1208.2	preparation of various tools for and services for digital marketing	PO1,PO2,PO3, PO4, PO6,PO8, PO10,PO11,PO12,	4	9
MCA1208.3	preparation About Google search engine and its analysis	PO1,PO2,PO3, PO5, PO6, PO10, PO11, PO12,	4	9
MCA1208.4	Implementation of analysis tools and marketing material at various platform of social media	PO1,PO2,PO3, PO6,PO12, PO10,PO11,PO4	5	9
MCA1208.5	Demonstrate digital marketing approach at face book platform	PO1,PO2,PO3, PO4, PO5, PO6,PO8, PO10,PO11,PO12	5	9

Tulsiramji Gaikwad-Patil College of Engineering and Technology
Wardha Road, Nagpur-441 108
NAAC Accredited (A+ Grade)
(An Autonomous Institute Affiliated to RTM Nagpur University, Nagpur)

Program: Master in Computer Application

Semester	Course Code	Name of Course	L	T	P	Credits
II	MCA1209	Digital Image Processing	3	-	-	3

Pre-Requisites: Mathematics, C/C++ programming skills

Course Objectives:

1.	The image fundamentals and mathematical transforms necessary for image processing.
2.	Implement algorithms that perform basic image processing.
3.	Implement algorithms for advanced image analysis
4.	Assess the performance of image processing algorithms and systems.
5.	Experience and practical techniques to write programs using MATLAB language for digital manipulation of images

Course Contents

Unit I	**Introduction:** Light, Brightness adaption and discrimination, Pixels, coordinate conventions, Imaging Geometry, Perspective Projection, Spatial Domain Filtering, sampling and quantization
Unit II	**Image Restoration:** Basic Framework, Interactive Restoration, Image deformation and geometric transformations, image morphing, Restoration techniques, Noise characterization, Noise restoration filters, Adaptive filters, Linear, Position invariant degradations, Estimation of Degradation functions, Restoration from projections.
Unit III	**Morphological Image Processing:** Basics, SE, Erosion, Dilation, Opening, Closing, Hit-or-Miss Transform, Boundary Detection, Hole filling, connected components, convex hull, thinning, thickening, skeletons, pruning, Geodesic Dilation, Erosion, Reconstruction by dilation and erosion.
Unit IV	**Image Segmentation:** Boundary detection-based techniques, Point, line detection, Edge detection, Edge linking, local processing, regional processing, Hough transform, Thresholding, Iterative thresholding, Otsu's method, moving averages, Multivariable thresholding, Region based segmentation, Watershed algorithm, Use of motion in segmentation
Unit V	**Spatial Domain Filtering:** Intensity transformations, contrast stretching, histogram equalization, Correlation and convolution, smoothing filters, sharpening filters, gradient and Laplacian.

Text Books

T.1	R.C.Gonzalas and R.E.Woods, Digital Image Processing, Prentice Hall, 3rd Ed
T.2	Al Bovik (ed.), “Handbook of Image and Video Processing”, Academic Press, 2000.

Reference Books	
R.1	Digital Image Processing, 3rd Edition, by Rafael C Gonzalez and Richard E Woods. Publisher: Pearson Education.
R.2	A.K.Jain, Fundamentals of Digital Image Processing, Prentice Hall.
Useful Links	
1	https://onlinecourses.nptel.ac.in/noc19_ee55/preview
2	https://www.digimat.in/nptel/courses/video/117105135/L01.html

	Course Outcomes	PO/PSO	CL	Class Sessions
MCA1209.1	Apply image processing algorithms in practical applications.	PO1, PO2, PO3, PO4, PO7, PO8, PO9, PO11, PO12	3	9
MCA1209.2	Analyze general terminology of digital image processing.	PO1, PO3, PO4, PO7, PO8, PO10, PO11	4	9
MCA1209.3	Analyze images in the frequency domain using various transforms.	PO1, PO2, PO3, PO4, PO8, PO9, PO12	4	9
MCA1209.4	Evaluate the techniques for image enhancement and image restoration.	PO1, PO2, PO3, PO4, PO5, PO7, PO9, PO10, PO11	5	9
MCA1209.5	Develop Fourier transform for image processing in frequency domain.	PO1, PO4, PO5, PO8, PO9, PO11, PO12	6	9

Tulsiramji Gaikwad-Patil College of Engineering and Technology
Wardha Road, Nagpur-441 108
NAAC Accredited (A+ Grade)
(An Autonomous Institute Affiliated to RTM Nagpur University, Nagpur)

Program: Master in Computer Application

Semester	Course Code	Name of Course	L	T	P	Credits
II	MCA1210	Mobile Application Lab Based on Android and IOS programming	0	0	4	2

Pre-Requisites: Java programming, Understanding of XML, IDE platforms, Mathematical aptitude, Object Oriented Programming

Course Objectives:

1.	It explores emerging technologies and tools used to design and implement feature-rich mobile applications for smartphones and tablets
2.	Identify the target platform and users and be able to define and sketch a mobile application
3.	Understand the fundamentals, frameworks, and development lifecycle of mobile application platforms including iOS, Android.
4.	Design and develop a mobile application prototype in one of the platforms
5.	Describe those aspects of mobile programming that make it unique from programming for other platforms
6.	Program mobile applications for the Android operating system that use basic and advanced phone features

	Course Contents	CO
1	Input checking Create an application which examine, that a phone number.	CO1
2	Create an application of Quiz interface.	CO1
3	Create an application by taking input and show a massage on screen.	CO2
4	Create a screen user information window.	CO2
5	Design an android application to create page using Intent and one Button and pass the Values from one Activity to second Activity	CO3
6	Design an android application Send SMS	CO3
7	Create an android application with Fragments	CO4
8	Design an android application Using various objects	CO4
9	Design an android application for menu.	CO5
10	Create a user registration application that stores the user details in a database table.	CO5

Text Books

T.1	Mobile Computing, Raj Kamal, 2nd Edition, Oxford University Press
T.2	Applications with UML and XML, Reza Behravanfar, 2nd Edition, Cambridge University Press

T.3	Mobile Computing , Talukdar, 2nd Edition, TMH
Reference Books	
R.1	Handbook of Wireless Networks and Mobile Computing, 2nd Edition, Stojmenovic and Cacute, Wiley
R.2	Applications with UML and XML, Reza Behravanfar, 3rd Edition, Cambridge University Press
Useful Links	
1	https://nptel.ac.in/courses/106/106/106106212/
2	https://nptel.ac.in/courses/106/107/106107220/
3	https://nptel.ac.in/courses/106/105/106105186/

	Course Outcomes	**PO/PSO**	**CL**	**Lab Sessions**
MCA1210.1	Use of tools for mobile application at various sectors and its functionality.	PO1,PO2,PO3, PO8, PO9, PO10, PO12	3	3
MCA1210.2	Demonstrate technical constraints relative to storage capacity, processing capacity, display screen, communication interfaces.	PO1,PO2,PO3, PO5,PO8, PO9, PO10, PO12	3	4
MCA1210.3	Design and implement feature-rich mobile applications for smart phones.	PO1,PO2,PO3, PO5, PO8, PO9, PO10, PO12	6	3
MCA1210.4	Create various Android applications with standard tools and mechanism.	PO1,PO2,PO3, PO4,PO5, PO8, PO9, PO10, PO11, PO12	6	4
MCA1210.5	Determine the Application for mobile computing and installation using iOS.	PO1,PO2,PO3, PO5, PO8, PO9, PO10, PO11, PO12	5	5

Tulsiramji Gaikwad-Patil College of Engineering and Technology

Wardha Road, Nagpur-441 108

NAAC Accredited (A+ Grade)

(An Autonomous Institute Affiliated to RTM Nagpur University, Nagpur)

Program: Master in Computer Application

Semester	Course Code	Name of Course	L	T	P	Credits
II	MCA1211	Python Programming Lab	-	-	4	2

Pre-Requisites: Conditional & control structures, loops, arrays, functions & Object oriented concepts.

Course Objectives:

1.	Learn the fundamental concept of Python Programming. Learn the functions & its parameters
2.	To become adept at using built in functions & multithreading.
3.	To become expert in using file handling techniques & tools of Python.
4.	To analyze web development concepts by using HTML, CSS concepts.
5.	Utilize Object oriented concepts to develop logic in Python Programming. Also create functions in Python programming by using exception handling mechanism.

Course Contents

Sr. No.	List of Experiment	CO Mapping
1	Develop application using user defined functions.	CO1
2	Develop application using Exception handling.	CO1
3	Develop application using built in functions.	CO2
4	Develop application using manipulation concepts.	CO2
5	Develop application using file handling techniques.	CO3
6	Develop application using communication over network.	CO3
7	Develop application using RAD Tool.	CO4
8	Develop application using dynamic web tools.	CO4
9	Develop application using cross platform development.	CO5
10	Develop application using blocks & frames.	CO5

Text Books

1	The Complete Reference Python by Martin C. Brown MC Graw Hill 2nd Edition
2	Core Python programming by Dr. R. NageswaraRao Dream Press India 2nd Edition

Reference Books

1	Learning Python Design Patterns by ZlobinGennadiyPackt publishing 2nd Edition
2	Programming & Problem solving with Python by Ashok NamdevKamthane MC Graw Hill 2nd Edition

Useful Links

1	https://nptel.ac.in/courses/106/106/106106212/

2	https://nptel.ac.in/courses/106/106/106106212/

	Course Outcomes	PO/PSO	CL	Lab Sessions
MCA1211.1	Apply fundamental concepts to develop applications.	PO1, PO2, PO3, PO4, P05, PO11, PO12	3	2
MCA1211.2	Analyze functions and built in tools to develop Python applications.	PO1, PO2, PO3, PO4, P05, PO7, PO11, PO12	4	4
MCA1211.3	Evaluate input, output functions in file handling techniques to develop to maintain data back end.	PO1, PO2, PO3, PO4, P05, P07, PO11, PO12	5	5
MCA1211.4	Analyze HTML, CSS concepts to develop web based applications using Python.	PO1, PO2, PO3, PO4, P05, P07, PO10,PO11, PO12	4	6
MCA1211.5	Create Python Programming based applications using object orientation.	PO1, PO2, PO3, PO4, P05, P07, PO10,PO11, PO12	6	6

Tulsiramji Gaikwad-Patil College of Engineering and Technology
Wardha Road, Nagpur-441 108
NAAC Accredited (A+ Grade)
(An Autonomous Institute Affiliated to RTM Nagpur University, Nagpur)

First Year (Semester-I) Master in Computer Application

Semester	Course Code	Name of Course	L	T	P	Credits
II	MCA1212	Data Warehouse and Mining Lab	-	-	4	2

Pre-Requisites: Database Management System, Structured Query Language

Course Objectives:

1.	This course gives an introduction to methods and theory for development of data warehouses and data analysis using data mining.
2.	Data quality and methods and techniques for preprocessing of data.
3.	Algorithms for classification, clustering and association rule analysis. Practical use of software for data analysis.
4.	Master data mining techniques in various applications like social, scientific and environmental context.

Course Contents

Sr. No.	List of Experiment	CO
1	Implementation of Varying Arrays	CO1
2	Implementation of Nested Tables	CO1
3	OLAP operations	CO1, CO2
4	Implement Apriori algorithm for association rule.	CO2
5	Write a program of cluster analysis using simple k-means algorithm using any programming language	CO2, CO3
6	Demonstration of preprocessing on dataset student.arff	CO3
7	Demonstration of preprocessing on dataset labor.arff	CO3
8	Demonstration of Association rule process on dataset contactlenses.arff using apriori algorithm	CO4
9	Demonstration of classification rule process on dataset student.arff using j48 algorithm	CO5
10	Demonstration of clustering rule process on data-set iris.arff using simple k-means.	CO5

Text Books

1	Data Mining-Concepts and Techniques- Jiawei Han, Micheline Kamber, Morgan Kaufmann Publishers, Elsevier, 2 Edition, 2006.
2	Introduction to Data Mining, Pang-Ning Tan, Vipin Kumar, Michael Steinbanch, Pearson Education, 2nd Edition

Reference Books

1	Data Mining Techniques, Arun K Pujari, 3rd Edition, Universities Press.
2	Data Ware Housing Fundamentals, PualrajPonnaiah, Wiley Student Edition, 2nd Edition.

Useful Links

1	https://nptel.ac.in/courses/106/105/106105150

2	https://nptel.ac.in/courses/106/105/106105174/

	Course Outcomes	PO/PSO	CL	Class Sessions	Lab Sessions
MCA1212.1	Apply the functionality of the various data mining and data warehousing component	PO1,PO2,PO3, PO4,PO7,PO8, PO9,PO11,PO12	3	9	2
MCA1212.2	Analyze the strengths and limitations of various data mining and data warehousing models.	PO1,PO2,PO3, PO4,PO7,PO8, PO9,PO11,PO12	4	9	4
MCA1212.3	Explain the analyzing techniques of various data	PO1,PO2,PO3, PO4,PO7,PO8, PO9,PO11,PO12	4	9	2
MCA1212.4	Evaluate appropriate classification and clustering techniques for data analysis.	PO1,PO2,PO3, PO4,PO7,PO8, PO9,PO11,PO12	5	9	2
MCA1212.5	Create different approaches of data ware housing and data mining with Business Intelligence	PO1,PO2,PO3, PO4,PO7,PO8, PO9,PO11,PO12	6	9	4

Tulsiramji Gaikwad-Patil College of Engineering and Technology

Wardha Road, Nagpur-441 108

NAAC Accredited (A+ Grade)

(An Autonomous Institute Affiliated to RTM Nagpur University, Nagpur)

Program: Master in Computer Application

Semester	Course Code	Name of Course	L	T	P	Credits
II	MCA1213	Internet Programming Lab using Advance Java	-	-	4	2

Pre-Requisites: Core Java Programming

Course Objectives:

1.	Learn the concepts of java network programming. Develop front end, back-end applications using Java Database Connectivity techniques.
2.	To become adept at developing Remote Method Invocation based applications.
3.	To develop web-based applications by using Servlets. Also develop applications by using Cookies, Session.
4.	To analyze tag library and implicit objects to develop applications by using Java Server Pages.
5.	To analyze applications of servlets. To utilize logic in Java Server Pages tag libraries, implicit objects.
6.	To analyze functionalities of java Frameworks. Develop applications by using spring, hibernate frameworks.

Sr. No.	List of Experiment	CO Mapping
1	Develop application by using JDBC.	CO1
2	Develop application by using Socket.	CO1
3	Develop application by using RMI.	CO2
4	Develop application by using RMI.	CO2
5	Develop application by using Servlet.	CO3
6	Develop application by using session tracking.	CO3
7	Develop application by using Java Server Pages.	CO4
8	Develop application by using Java Jserver Pages, JDBC.	CO4
9	Develop application by using Hibernate.	CO5
10	Develop application by using Spring.	CO5

Text Books

1	Complete Reference ,HerbertSchildt, TMH
2	Programming with Java , C Muthu ,McGraw Hill

Reference Books

1	Black Book on java
2	Head First JAVA by Kathy Sierra and Bert Bates
Useful Links	
1	https://nptel.ac.in/courses/106/105/106105191

	Course Outcomes	PO/PSO	CL	Lab Sessions
MCA1213.1	Apply concepts of Server Socket, Socket, Datagram Socket, and Datagram Packet along with JDBC.	PO1, PO2, PO3, PO4, P05, PO11, PO12	3	2
MCA1213.2	Apply RMI to create methods remotely & create stub, skeleton layers.	PO1, PO2, PO3, PO4, P05, PO7, PO11, PO12	3	3
MCA1213.3	Create web-based applications by using Servlet concepts.	PO1, PO2, PO3, PO4, P05, P07, PO11, PO12	6	4
MCA1213.4	Evaluate the process of Web Servers and Web based applications by using Java Server Pages.	PO1, PO2, PO3, PO4, P05, P07, PO10,PO11, PO12	5	5
MCA1213.5	Create framework-based applications by using spring, Hibernate.	PO1, PO2, PO3, PO4, P05, P07, PO10,PO11, PO12	6	5

HoD[MCA]

HOD
MCA DEPARTMENT
TULSIRAMJI GAIKWAD-PATIL COLLEGE
OF ENGINEERING AND TECHNOLOGY, NA

Dean Academics

Dean Academics
Tulsiramji Gaikwad-Patil
College Of Engineering
and Technology, Na

Principal

Principal
Tulsiramji Gaikwad Patil College O
Engineering and Technology, Nagpu

Tulsiramji Gaikwad-Patil College Of Engg. & Technology
SEAL
Nagpur