



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 AcademicYear 2024-25 (NEP Compliant)

Vision of Institute

To emerge as a learning Center of Excellence in theNational Ethos in domains of Science, Technologyand Management.

2

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.

3

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 | PRJ |
| 5 | Co-curricular Courses (CC) | CCC |
| 6 | Vocational and SkillEnhancement Course (VSEC) | VSE |
| 7 | Internship/ On Job Training | INT/OJT |

The Course and Credit Distribution is as under

| 6 N | | Number of | Total | Credit |
|---------|--|-----------|-------|--------|
| Sr. No. | Type of Course | Courses | No. | (%) |
| 1 | Professional Core Course | 20 | 50 | 56.82% |
| 2 | Professional Elective Course | 04 | 12 | 13.64% |
| 3 | Open Elective Course | 00 | 00 | 00.00% |
| 4 | Project | 01 | 2 | 2.27% |
| 5 | Co-curricular Courses (CC) | 01 | 2 | 2.27% |
| 6 | Vocational and Skill Enhancement Course (VSEC) | 03 | 6 | 6.82% |
| 7 | Internship/ On Job Training | 01 | 16 | 18.18% |
| 125 | Total | 30 | 88 | 100% |

1: (4)

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

SchemeofInstructions

Scheme of Instructions for First Year Master in Computer Application

| MCA | Scme | ster I (1 | w.c.f.: | 2024-25) | |
|-----|--------|--------------|---------|----------|---|
| | 112121 | I Contractor | 1.000 | | 1 |

| Sr. | Course | CourseCode | CourseTitle | L | Т | P | Cont | Credits | | | Exa | mŚchen | ne |
|-----|--------------|------------------|--|--------|--------|------|-----------------|---------|------|-------|-------|--------|-------|
| | Categor y | | | 1415-1 | N DICH | thet | actHrs/ week | | CT-1 | CT- 2 | TA/CA | ESE | TOTAL |
| 1. | PCC | MCA31101 | Object Oriented Programming Using Java | 3 | - | - | 3 | 3 | 15 | 15 | 10 | 60 | 100 |
| 2. | PCC | MCA31102 | Advance DBMS | 3 | ~ | - | 3 | 3 | 15 | 15 | 10 | 60 | 100 |
| 3. | PCC | MCA31103 | Software Engineering & Project Management | 3 | | | 3 | 3 | 15 | 15 | 10 | 60 | 100 |
| 4. | PCC | MCA31104 | Computer Hardware & Network | 3 | - | - | 3 | 3 | 15 | 15 | 10 | 60 | 100 |
| 5. | PEC | MCA31105- 08* | ProfessionalElective-I | 3 | | - | 3 | 3 | 15 | 15 | 10 | 60 | 100 |
| 6. | PCC | MCA31109 | OOP'S programming based on Java language Lab | 2 | - | 4 | 4 | 2 | - | - | 25 | 25 | 50 |
| 7. | PCC | MCA31110 | DBA Lab using Open-Source Database | - | | 4 | 4 | 2 | - | - | 25 | 25 | 50 |
| 8. | PCC | MÇA31111 | Software Engineering & Project Management Lab | - | | 2 | 2 | 1 | - | - | 25 | 25 | 50 |
| 9. | VSE | MCA31112- 15* | Vocational Skill Enhancement – I (Lab) | 2 | - | 4 | 4 | 2 | - | - | 25 | 25 | . 50 |
| | | | Total | 15 | - | 14 | 29 | 22 | 75 | 75 | 150 | - 400 | 700 |

T-Tutorial P-Practical L-Lecture End SemesterExamination (For Laboratory:End SemesterPerformance)

CT1-Class Test 1 CT2- ClassTest2 TA/CA- Teacher Assessment / Continuous Assessment ESE-

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

0

HODIMO ATOD

IUI-HISAM. GAIKWAD-PATIL COLLEGE WERE AND ALL TECHNOLOGY, NAGPUP

a Dean Academics

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

Principal

Tulsiramji Gaikwad-Patil College Of Engineering & Technology, Nagpur

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

SchemeofInstructions

Scheme of Instructions for First Year Master in Computer Application MCA Semester II (w.e.f.: 2024-25)

| Sr. | Course | CourseCode | CourseTitle | L | Т | P | ContactH | Credits | Exams | | ExamSchem | e | |
|-----|----------|------------------|--|----|---|----|----------|---------|-------|-------|-----------|------|-------|
| | Category | | | | | | rs/week | | CT-1 | CT- 2 | TA/CA | ESE | TOTAL |
| 1. | PCC | MCA31201 | Artificial Intelligence | 3 | - | | 3 | 3 | 15 | 15 | 10 | 60 | 100 |
| 2. | PCC | MCA31202 | Internet Programming | 3 | - | - | 3 | 3 | 15 | 15 | 10 | 60 | 100 |
| 3. | PCC | MCA31203 | Machine Learning | 3 | - | | 3 | 3 | 15 | 15 | 10 | 60 | 100 |
| 4. | PEC | MCA31204-07* | ProfessionalElective-II | 3 | - | - | 3 | 3 | 15 | 15 | 10 | 60 | 100 |
| 5. | PCC * | MCA31208 | Salesforce Lab | - | - | 4 | 4 | 2 | - | - | 25 | · 25 | 50 |
| 6. | PCC | MCA31209 | Machine Learning Labusing Python | - | - | 4 | 4 | 2 | - | - | 25 | 25 | 50 |
| 7 | PRJ | MCA31210 | Mini Project | - | | 4 | 4 | 2 | | ()=) | 25 | 25 | 50 |
| .8 | PCC | MCA31211 | Internet Programming Lab using Advance Java | - | • | 4 | 4 | 2 | - | - | 25 . | 25 | 50 |
| 9 | VSE | MCA31212- 15* | Vocational Skill Enhancement – II (Lab) | 5 | | 4 | 4 | 2 | | 8.00 | 25 | 25 | 50 |
| | | | Total | 12 | - | 20 | 32 | 22 | 60 | 60 | 165 | 365 | 650 |

L-Lecture T-Tutorial P-Practical CT1-Class Test 1 CT2- ClassTest2 End SemesterExamination (For Laboratory:End SemesterPerformance) TA/CA- TeacherAssessment / ContinuousAssessmentESE-

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

HoDUICA] HOD

35 211

MCA DEPARTMENT

6 Lacu Dean Academics Dean Academics

Tulsiramji Gaikwad-Patil College Of Engineering and Technology. Nagpur Principal Principal Tulsiramji Gaikwad-Patil College Of Engineering % Technology, Nagpur 7

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

SchemeofInstructions

Scheme of Instructions for Second Year Master in Computer Application MCA Semester III (w.e.f.: 2024-25)

| Sr. | Course | CourseCod | CourseTitle | L | Т | P | Conta | Credits | | | Exa | nSchem | e |
|-----|----------|------------------|--|----|---|----|----------------|---------|------|-------|-----------|--------|-------|
| | Category | e • • | | | | | ctHrs/w eek | | CT-1 | CT- 2 | TA/C A | ESE | TOTAL |
| 1. | PCC | MCA32301 | Software Testing and Quality Assurance | 3 | | - | 3 | 3 | 15 | 15 | 10 | 60 | 100 |
| 2. | PCC | MCA32302 | Data Science | 3 | - | - | 3 | 3 | 15 | 15 | 10 | 60 | 100 |
| 3. | PCC | MCA32303 | Cloud Computing | 3 | - | - | 3 | 3 | 15 | 15 | 10 | 60 | 100 |
| 4. | PCC | MCA32304 | Natural Language Processing | 3 | - | - | 3 | 3 | 15 | 15 | 10 | 60 | 100 |
| 5. | CC | MCA32305 | Communication & Inter- Personal Development | 2 | - | - | 2 | 2 | 15 | 15 | 10 | 60 | 100 |
| 6. | PCC | MCA32306 | Software Testing and Quality Assurance Lab | - | - | 4 | 4 | 2 | • | - | 25 | 25 | 50 |
| 7 | PCC | MCA32307 | ASP.NET Lab | - | - | 4 | 4 | 2 | - | - | 25 | 25 | 50 |
| 8 | PCC | MCA32308 | Tableau Lab based on Data Science | - | - | 4 | 4 | 2 | - | | 25 | 25 | 50 |
| 9 | VSE | MCA32310- 03* | Vocational Skill Enhancement – III (Lab) | 2 | • | 4 | 4 | 2 | - | - | 25 | 25 | 50 |
| | | | Total | 14 | - | 16 | 30 | 22 | 75 | 75 | 150 | 400 | 700 |

L-Lecture T-Tutorial P-Practical CT1-Class Test 1 CT2- ClassTest2 ESE- End SemesterExamination (For Laboratory:End SemesterPerformance) TA/CA- TeacherAssessment / ContinuousAssessment

#:Indicates out of the six course codes each student has to select any one OEC from the list provided at the end of structure.

G

HOD HODINICA DEPARTMENT ING AND TECHNOLO

demics Tutsiramii Gatwad-Patil Covene Rtalenieseering

Principal Tusirardu Gaikwad-Patil College OTENgideering & Technopagy. Nagpur

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

SchemeofInstructions

Scheme of Instructions for Second Year Master in Computer Application

MCA Semester IV (w.e.f.: 2024-25)

| Sr. | Course | CourseCode | CourseTitle | L | Т | Р | Contact | Credits | | I | ExamSchen | ne | |
|-----|----------|--------------|-----------------------------------|---|---|----|----------|---------|------|------|-----------|-----|-------|
| | Category | · · · · · | | | | | Hrs/week | | CT-1 | CT-2 | TA/CA | ESE | TOTAL |
| 1. | PROJ . | MCA32401 | Internship/ On Job Training | - | - | 32 | 32 | 16 | - | - | 300 | 300 | 600 |
| 2. | PEC | MCA32402-05* | Program Elective- III | 3 | - | - | 3 | 3 | 15 | 15 | 10 | 60 | 100 |
| 3. | PEC | MCA32406 | MOOCs Course | - | ~ | | - | 3 | - | - | - | - | - |
| | | | Total | 3 | - | 32 | 35 | 22 | 15 | 15 | 310 | 360 | 700 |

L- Lecture T-Tutorial P-Practical CT1-Class Test 1 CT2- ClassTest2 TA/CA- TeacherAssessment / ContinuousAssessment ESE- End SemesterExamination (For Laboratory:End SemesterPerformance)

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

#: Indicates at least one NPTEL/MOOCS Course is to add for which direct credit transfer scheme will be applicable. Student should register for the course during 3rd semester and earn the credits which will be credited in his/her 4th semester.



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

Principal

Tulsiramji Gaikwad-Pati College Of Engineering & Technology, Nagpur

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

Scheme of Instructions for Second Year Master in Computer Application

Vocational Skill Enhancement (Lab) Courses

| S | emester–I | | Semester-II | Semester- III | |
|-------------|--|----------|---|------------------|---|
| Course Code | e Vocational Skill Course Code Enhancement – I (Lab) | | Vocational Skill Enhancement – II (Lab) | Course Code | Vocational Skill Enhancement – II (Lab) |
| MCA31112 | PHP | MCA31212 | React-JS | MCA32310 | DevOps |
| MCA31113 | Angular | MCA31213 | DJango | MCA32311 | Power BI |
| MCA31114 | Computer Assembly & Troubleshooting | MCA31214 | Node.js | MCA32312 | Google Cloud for NLP |
| MCA31115 | Java Script | MCA31215 | Gen AI | MCA32313 | AWS |

132 144

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

10

(V Principal Tulsiramji Gaikwad⊧Bätii College Of Engineering & Technology, Nagpur

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

SchemeofInstructions

Scheme of Instructions for Second Year Master in Computer Application ListofProfessional ElectiveCourses

| 5 | Semester-I | | Semester-II | Semester- IV | | |
|-------------|--------------------------|-------------|--|--------------|-------------------------|--|
| Course Code | Professional Elective-I | Course Code | Professional Elective-II | Course Code | Professional Elective- | |
| MCA31105 | Internet of Things (IoT) | MCA31204 | Enterprise Resource Planning | MCA32402 | Business Process Domain | |
| MCA31106 | Big Data Analytics | MCA31205 | Computer Ethics | MCA32403 | Soft Computing | |
| MCA31107 | Network Security | MCA31206 | Social Network Analysis & Digital Marketing | MCA32404 | Cyber Forensic | |
| MCA31108 | Parallel Programming | MCA31207 | Digital Image Processing | MCA32405 | Block Chain Technology | |

Credits Distribution Semester-wise

| Sem – I | Sem – II | Sem – III | Sem – IV | Total Credits |
|---------|----------|-----------|----------|---------------|
| 22 | 22 | 22 | 22 | 88 |

HolpMCA]

MCA DEPARTMENT IULSIRAMJI GAIKWAD-PATIL COLLEGE OF ENGINEERING AND TECHNOLOGY, NAGPUS

Dean Academics Dean Academics Tuisiramji Gaikwad-Patil College Of Engineering and Technology. Nagpur

Principal Principal Tulsframji Gaikwad-Patil College Of Engineering & Technology, Nagpur

ş



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, G

Nagpur

| | | | Hugpui | | | | |
|-----|---------|--|---|---|----------------------------------|--------------------------------|--|
| | | Pr | ogram: Master in Computer Appli | cation | l | | |
| Sei | nester | Course Code | Name of Course | L | Т | Р | Credits |
| | Ι | MCA31101 | Object Oriented Programming Using Java | 3 | - | - | 3 |
| Pr | e-Requ | isites: Basic conce | pts of C Programming | | | | |
| Co | urse O | bjectives: | | | | | |
| 1. | Learn | the fundamental pr | inciples of class, object. | | | | |
| 2. | To be | come adept at using | g various methods of inheritance, Polymor | hism. | | | |
| 3. | To be | come expert in usir | g java classes, interfaces, Exception handl | ng, Mu | ltithrea | ding. | |
| 4. | To ana | alyze Collection Fr | amework & Swing controls | | | | |
| 5. | Utilize | e Object oriented co | oncepts to develop swing handling applicat | ions. | | | |
| | | | Course Contents | | | | |
| Ŭ | nit I | Java and Internet variables, comm class, Access cor non-static membe | r, Features of java: security, portability, and line argument, super keyword, Basic atrol of members of a class, new operator rs, Keyboard input. Garbage Collection, fine | nultithr Conce , instar alize(). | eading, pt of C atiating | , etc , OOP: C a class | Data types, Concept of a s, static and |
| U | nit II | Constructor:Empt Inheritance: Sing Polymorphism: F | y Constructor, Parameterized constru e, multiple, multi level, hierarchical, hybrid unction overloading, Function overriding. | ctor, (1 inheri Packages | Constru tance. | ctor o | overloading. |
| Uı | nit III | Exception handlin finally, bulit-in ar Multithreading: I join(), Thread Price | ng: Overview, try -catch block, multiple ad user-defined exception. Life Cycle, Thread class and Runnable I prities, sleep(), wait(), notify(), notifyAll(), | catch, m nterface deadlo | nested e, start(pck(), sy | try, thr), run(ynchroi | row, throws,), isAlive(), nization. |
| U | nit IV | Collection Frame Map, HashTable, Swing handling JComboBox, JTe | work: List, ArrayList, LinkedList, Vector Enumeration, Assertion, Autoboxing. : Overview, JFrame, JLabel, JButto xtField. | , Iterato n, JC | or. Set, heckBo | HashS x, JR | et, TreeSet. RadioButton, |

| Unit V | Swing Controls | : JMenuBar, JMenu, JMenuItem, JTable | e, JTree. | | | | | | | | |
|-----------|---|---|-----------|--------------------------|-----------------|--|--|--|--|--|--|
| Chit V | Event Handling | : ActionListener, ItemListener, KeyListe | ener, M | ouseListener | | | | | | | |
| | | | | | | | | | | | |
| Text Boo | t Books | | | | | | | | | | |
| 1 | Programming Wi | th Java: A Primer- E Balgurusamy 3rd Ed | lition, T | ata MCGraw | Hill | | | | | | |
| 2 | The Complete Re | ference of Java Herbert Schildt, 7th Edition | on, Tata | McGraw Hill | l Publication | | | | | | |
| 3 | Effective JAVA, | 3rd Edition Joshua Bloch, Addison-Wesl | ey publi | ication | | | | | | | |
| Reference | e Books | | | | | | | | | | |
| 1 | An Introduction t Hill | o Object Oriented Programming with JAV | /A - Th | omas Wu, 5 th | Edition, MCGraw | | | | | | |
| 2 | Programming wit | h Java, C Muthu, 2 nd Edition McGraw H | [ill | | | | | | | | |
| 3 | Programming in J | Java, Dr. S. B. Kishor 1st Edition, publish | ed by D | as Ganu Prak | ashan | | | | | | |
| Useful L | inks | | | | | | | | | | |
| 1 | https://nptel.ac.in | n/courses/106/105/106105153/ | | | | | | | | | |
| 2 | https://nptel.ac.in | n/courses/106/105/106105191/ | | | | | | | | | |
| | | Course Outcomes CL Class Sessions | | | | | | | | | |
| | MCA31101.1Apply object oriented concepts to get the clarity in class implementation.39 | | | | | | | | | | |

| MCA51101.1 | the clarity in class implementation. | 2 | 9 |
|------------|--|---|---|
| MCA31101.2 | Classify inheritance, polymorphism to develop Object Oriented applications. | 4 | 9 |
| MCA31101.3 | Evaluate Exception handling, Threading concepts to create. | 5 | 9 |
| MCA31101.4 | Analyze Collection Framework, swing handling concepts to create window based GUI applications. | 4 | 9 |
| MCA31101.5 | Analyze event handling to develop interactive swing applications. | 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 | SemesterCourse CodeName of CourseLTPCree | | | | | | | |
| Ι | MCA31102 | Advanced DBMS | 3 | - | - | 3 | | |
| Pre-Requ | isites: Basic of Dat | abase Management Systems, Normalization's, D | atabas | se co | ncepts, | Data | | |
| models and Relational model. | | | | | | | | |
| Course Contents Relational Database design: Functional dependencies and Normalization Normal form | | | | | | | | |
| Relational Database design: Functional dependencies and Normalization Normal | | | | | | hal forms | | |
| | INF, 2NF, 3NF | , BCNF, 4NF based on primary keys an | d dej | bend | ency p | reserving | | |
| Unit I | Equivalence of Ex | Query Processing: Query Processing Stage | es, Q Evoqu | tion | Dian E | pretation, | | |
| | of Overy Process | sing Cost Multiple Index Access Index on | Execu Multir | | Plail, E | stimation | | |
| | Joining Tables (N | ested Loon Multiple Join) Structure of a Query (| Ontim | izer | xey, wie | lilous ioi | | |
| | Transaction Processing Concepts & Concurrency Control Techniques-Introduc | | | | | | | |
| | Transaction Proce | ssing, ACID properties, Serializability, Prioritiz | ation. | state | es of tra | ansaction. | | |
| ¥7 4 | Types of failure, desirable properties of transaction schedules and recoverability, serial | | | | | | | |
| Unit II | usability of schedules, levels of transaction consistency, deadlocks, long duration | | | | | | | |
| | transactions, transaction performance. Crash Recovery: failure classification, recovery | | | | | | | |
| | concepts, database backup, recovery concepts based on deferred update and on immediate | | | | | | | |
| | update. Shadow paging, check points, crash recovery techniques. | | | | | | | |
| | Oracle SQL and | PL/SQL | | | | | | |
| | Basic SQL and PL/SQL concepts terminology and programming, Enhancements SQL, | | | | | | | |
| Unit III | Enhancement to Globalization, writing queries, Using procedure builders, Data Manipulation | | | | | | | |
| | language (DML), Data definition language (DDL), Multi table query join, sub queries and | | | | | | | |
| | query expression. | | | | | | | |
| | Creation Manage | ment of Oracle Databases and related database | abase | arch | Data F | , Design, | | |
| | views and standar | d package Maintaining the control Redo Log fi | les M | anao | ing Tak | ole snaces | | |
| | and Data Files | storage structure and relationships, managing | rollba | ck se | egment. | Indexes | | |
| Unit IV | Managing data I | ntegrity, Managing password security and re | esourc | es, l | Managi | ng users. | | |
| | Privileges, roles. | Oracle Backup and Recovery Strategie | s: Ba | ickuj | p and | recovery | | |
| | considerations, C | racle recovery structure and processes, Ora | icle b | acku | p and | recovery | | |
| | configuration, Phy | vsical backup, Complete recovery of an Oracle | e datał | oase, | Oracle | Export / | | |
| | Import utilities, O | racle standby database. | | | | | | |
| | Oracle Tuning an | nd Troubleshooting: Oracle performance tuning | g meth | odol | ogy, Oı | racle alert | | |
| | and trace files, | Tuning the shared pool, Buffer Cache, Re | do L | og l | ouffer, | Database | | |
| Unit V | configuration and | I/O issues, Using Oracle Blocks efficiently, | optimi | zing | sort o | perations, | | |
| | Rollback segment | tuning, Monitoring and detecting lock content | ion, S | QL i | ssues a | nd tuning | | |
| | considerations for | different application. Integrity, Security: Ne | eed fo | r Da | itabase | Integrity, | | |

| | Integrity Constraints, Introduction to Database, Security issues. |
|-----------|--|
| | |
| | |
| Text Boo | ks |
| 1 | Fundamental of Database Systems, R. ElmasriS. Navathe Benjamin Cummings, 2 nd Edition |
| 2 | Database system concept, Henry Korth, 7 th Edition |
| 3 | Oracle 9i Performance Tuning, Joseph C. Johnson, 2 nd Edition |
| Reference | e Books |
| 1 | DBA Handbook oracle press, Loney, 2 nd Edition. |
| 2 | The Complete Reference SQL - Groff Weinberg (Tata McGraw Hill Publication), 2 nd Edition. |
| 3 | Oracle (SQL and PL/SQL Programming), Dr. S. B. Kishor 2 nd Edition, Das Ganu Prakashan |
| Useful Li | nks |
| 1 | https://nptel.ac.in/courses/106/105/106105175/ |
| 2 | https://nptel.ac.in/courses/106/106/106106093/ |

| | Course Outcomes | CL | Class Sessions | Lab Sessions |
|------------|---|----|-------------------|-----------------|
| MCA31102.1 | Apply the knowledge of Normal forms and Query processing for handling multiple types of data. | 3 | 9 | 2 |
| MCA31102.2 | Identify and understand a detailed view of handling paralleland distributed database. | 3 | 9 | 2 |
| MCA31102.3 | Apply and write SQL and PL SQL queries for Data Manipulation and Data Definition languages. | 3 | 9 | 6 |
| MCA31102.4 | Analyze the internal data structure and analyze backup and recovery procedures. | 4 | 9 | 4 |
| MCA31102.5 | Analyze deep visualization of realistic data into physical structure | 4 | 9 | 4 |

| Tulsiramji Gaikwad-Patil College of Engineering and Technology | | | | | | | |
|--|--|--|---|----------|-----------|----------|-------------|
| E | | | Wardha Road, Nagpur-441 108 | | | | |
| | | An Auton | NAAU Accredited (A+ Grade) | our Un | iversit | W | |
| | | | Nagpur | Jui on | | .y.) | |
| | | Pr | ogram: Master in Computer Appli | cation | l | | |
| Sei | nester | Course Code | Name of Course | L | Т | Р | Credits |
| | Ι | MCA31103 | Software Engineering & Project Management | 3 | - | - | 3 |
| Pro | Pre-Requisites: Basic Concepts of System Analysis and Design | | | | | | |
| Со | urse O | bjectives: | | | | | |
| 1. | To un | derstand the need o | f software engineering . | | | | |
| 2. | To kn | ow the phases of S | oftware Development | | | | |
| 3. | To un | derstand requireme | nt analysis and specifications | | | | |
| 4. | To un | derstand software c | oding guidelines | | | | |
| 5. | To kn | ow Software Projec | et Management, to understand CMMI level | s. | | | |
| | | | Course Contents | | | | |
| | | Introduction to S | Software Engineering: The evolving role of | of softw | vare, Ch | anging | Nature of |
| | | Software, Software myths. | | | | | |
| _ | | A Generic view of process: Software engineering- A layered technology, a process | | | | | |
| U | nit I | framework, The Capability Maturity Model Integration (CMMI), Process patterns, process | | | | | |
| | | Assessment .Software Process Models: | | | | | |
| | | personal and team process models, Iterative, prototyping, Spiral, and Agile. | | | | | |
| | | Requirement En | gineering: Functional and non-functional r | equirer | nents, U | Jser rec | quirements, |
| | | System requirements, Interface specification, the software requirements document. | | | | | |
| T | nit II | Requirements en | gineering process: Feasibility studies, Red | quireme | ent's eli | citatior | and |
| U | IIIU 11 | analysis, Requirement's validation, Requirements management. | | | | | |
| | | System models: (structured method | Context Models, Behavioral models, Data ls. Modeling with UML . | models | , Object | model | s, |
| | | Design Engineer | ing: Design process and Design quality, De | esign co | oncepts, | the dea | sign model. |
| Ur | nit III | Creating an arch | itectural design: Software architecture, D | ata desi | ign, Arc | hitectu | ral styles |
| | | | | | | | |

| | and natterns. Architectural Design |
|----------|--|
| | |
| | Object-Oriented Design: Objects and object classes, An Object-Oriented design process, |
| | Design evolution. |
| | Performing User interface design: Golden rules, User interface analysis |
| | and design, interface analysis, interface design steps, Design evaluation. |
| | Testing Strategies: A strategic approach to software testing, test strategies for conventional |
| | software, Black-Box and White-Box testing, Validation testing, System testing, the art of |
| Unit IV | Debugging. Product metrics: Software Quality, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance. |
| | Metrics for Process and Projects: Software Measurement, Metrics for software quality. |
| | Risk management: Reactive vs. Proactive Risk strategies, software risks, Risk identification, |
| | Risk projection, Risk refinement, RMMM, RMMM Plan. |
| | Quality Management: Quality concepts, Software quality assurance, Software Reviews, |
| | Formal technical reviews, Statistical Software quality Assurance, Software reliability, The |
| Unit V | ISO 9000 quality standards. Software Project Planning – Project planning objectives, Project estimation, Decomposition techniques, Empirical estimation models, System Engineering, Software contract |
| | management, Procurement Management. |
| Text Boo | ks |
| 1 | Software Engineering, A practitioner's Approach, Roger S. Pressman, McGrawHill, 8 th Edition |
| 2 | Software Engineering, Sommerville, Pearson education, 9th Edition. |
| Referenc | e Books |
| 1 | Software Engineering principles and practice, Waman S Jawadekar, McGraw-Hill, 2nd Edition. |
| 2 | Fundamentals of Software Engineering, Rajib Mall, PHI, 2005, 4th Edition |
| I | |
| 1 | An Introduction to Object Oriented Programming with JAVA - Thomas Wu, 5 th Edition, MCGraw Hill |
| 2 | Programming with Java, C Muthu, 2 nd Edition McGraw Hill |
| 3 | Programming in Java, Dr. S. B. Kishor 1st Edition, published by Das Ganu Prakashan |

L

| Useful Links | | | | | |
|--------------|--|--|--|--|--|
| 1 | https://nptel.ac.in/courses/106/105/106105153/ | | | | |
| 2 | https://nptel.ac.in/courses/106/105/106105191/ | | | | |

| | Course Outcomes | CL | Class Sessions |
|------------|--|----|-------------------|
| MCA31103.1 | Apply detailed knowledge of role of software in daily basis and identified different models for software engineering. | 3 | 9 |
| MCA31103.2 | Select a detailed view of Requirement Engineering and system models | 4 | 9 |
| MCA31103.3 | Use architectural design and object- oriented design for performance and maintainability. | 5 | 9 |
| MCA31103.4 | Assess to test the developed software and perform product metrices. | 4 | 9 |
| MCA31103.5 | Evaluate the software measure parameters for software quality. | 4 | 9 |



Wardha Road, Nagpur-441 108 NAAC Accredited (A+ Grade)



| Program: Master in Computer Application (MCA) | | | | | | | | |
|--|--|--|------------------------------|--------------------------------------|------------------------------|--|--|--|
| Semeste | r Course Code | Name of Course | L | Т | Р | Credits | | |
| Ι | MCA31104 | Computer Hardware and Network | 3 | - | - | 3 | | |
| Pre-Requ | isites: Knowledge o | f networking, components of computer, Internet | | | | | | |
| Course C | bjectives: | | | | | | | |
| 1. To ide | entify computer comp | onents and network configurations. | | | | | | |
| 2. To and | alyse how data transn | int within the network | | | | | | |
| 4. To lea | rn different application | on protocols and attacks within security reasons | | | | | | |
| 5. To tro | troubleshoot improper activity within network as well as computer system | | | | | | | |
| | * * | Course Contents | | | | | | |
| Unit I | Computer Hardwar ports, connectors & Dual booting syste methods & standard | re :- Motherboard with hardware components, cable and their identification, Introduction and I ms Hardware Device Drivers & Application So ls | famil Installa oftware | iarizatio ation of 6 e, Serial | n with Operati data tr | I/O cards, ng System, ansmission | | |
| Unit II | TII Internetworking:- OSI model and its benefits, function and benefits of OSI, MAC (Media Access Control), Interconnection devices : Switch and Hub with Ethernet cables, IP addressing and Subnetting, Routers and its principles, Network Protocols, TCP/IP, UDP | | | | | | | |
| Unit III | III Network structure and architectures, Network topologies, client server networks and its OS, planning and Cabling Network, interconnection of LANs; repeaters, bridges, routers, access points, Wireless network | | | | | | | |
| Unit IV | Security :- Comp Technology and F Security and Truste | ater Security, Intrusion Detection, Threats ar rinciples, User Identification, Authentication d Systems, cryptography | nd Att and A | acks, C Access | compute Control | er Security , Software | | |
| Unit V | Jnit VNetwork Troubleshooting :- Network Troubleshooting techniques: Command-Line Tools, Network Troubleshooting Applications, Hardware Tools, Wireless Issues, Authentication and Association Errors, Internet Configuration, Check Firewall Settings | | | | | s, Network Association | | |
| Text Boo | ks | | | | | | | |
| T.1 | Dieter Gollman, "Co | mputer Security", 3rd edition, 2011 | | | | | | |
| Reference | Books | | | | | | | |
| R.1 | William Stallings, La edition | wrie Brown, "Computer Security: Principles and | Practio | ce", Prer | ntice Ha | ıll, 3rd | | |
| R.2 | Fundamental of Con | nputer Systems, R. ElmasriS. Navathe Benjamin | Cumm | ings, 2n | d Editio | 'n | | |
| Useful Li | nks | | | | | | | |
| 1 | | | | | | | | |
| 2 | | | | | | | | |

| | Course Outcomes | CL | Class Sessions |
|--------------------|---|----|-------------------|
| MCA31104.1 | Construct the terminology of communication network and network functionality | 3 | 9 |
| MCA31104.2 | Classify wired and wireless technology implementation for data communication | 4 | 9 |
| MCA31104 .3 | Differentiate Communication network model data flow and its protocol | 5 | 9 |
| MCA31104 .4 | Analyze the network security management and various methodology | 4 | 9 |
| MCA31104.5 | Evaluate the application management of communication channels and hacking technology and security | 4 | 9 |



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



| | Program: Master in Computer Application (MCA) | | | | | | | | |
|---|---|--|---|---|---|--|--|--|--|
| Se | emeste | r Course Code | Name of Course | L | Т | Р | Credits | | |
| | Ι | MCA31105 | Internet of Things (IoT) | 3 | - | - | 3 | | |
| Pro | e- Req u | isites:Knowledge of | networking, Application programming using C / | ' Pytho | n, Data | Analyti | ics | | |
| Со | urse O | bjectives: | | , i i i i i i i i i i i i i i i i i i i | | | | | |
| 1. | To und | lerstand the concept | s of IoT and IoT based application architectures | | | | | | |
| 2. | To lea | rn about the IoT devi | ces and different communicationprotocols | | | | | | |
| 3. 1 | To con | nprehend the progra | mming environment and skills to implement IoI | based | applica | tions | | | |
| 4. 5 | To real | | | | | | | | |
| 5. | TOSLU | uy real life applicatio | Course Contents | | | | | | |
| U | nit I | Introduction: De applications,Techno Devices: Sensorsar stack, Sensors and Layer. IoT Challeng | efinition of Internet of Things (IoT), Moto ologies behind IoT: Cloud Computing, Fog Co Id Actuators. IoT architecture:Simplified IoT Ar Actuators Layer, Communications Network La es: Reliability, safety and security, and performan | tivatio mputir chitect yer, A nce iss | n and ng, Edge cure, Co pplication ues. | benef e Comp ore Fun ons and | it of IoT outing. IoT ctional IoT d Analytics | | |
| U | nit II | IoT Hardware and Networks, UAV N Things. IoT Gatewa Wi-fi, LPWAN, Web | Connectivity Technologies : Type of IoT Sectors, Machine-to-Machine Communication, ays, IoT Transport and Dataprotocols: IEEE 802. Socket, CoAP, etc. Connectivity protocols: 6-Low | ensors , Inter 15.4, 2 /pan, B | and A operab Zigbee, acNet, | ctuato ility in LoRa, N ModBu | rs. Sensor Internetof AQTT, BLE, s, etc. | | |
| Ur | nit III | IoT Application protocols – Cons Data Managemen Introduction to Da | Layer Protocols - Generic Web Based F trained Application Protocol, Message Que nt and Compute Stack: Hierarchy of Fog, ata Analytics for IoT - Edge Streaming Analyt | Protoc ue Te Edge ics. | ols vs lemetr and C | loT a y Tran Cloud [| pplication sport, IoT Data - An | | |
| Uı | nit IV | Programming in Environment for Programming using get values from se | IoT: Introduction to Arduino Board, I Arduino Boards and Raspbery Pi. Interfacin ng Arduino. Python programming for Raspl ensors. Sample program to activate actuator | Raspb g Sen: bery P s. | erry P sors an Pi. Sam | i, Prog d Actu ple pro | gramming lators. C - ograms to | | |
| U | nit V | Case Studies : Ap Smart Grid, etc. | plication in Agriculture, Healthcare, Conne | cted v | vehicles | s, Smai | rt Homes, | | |
| Te | xt Boo | ks | | | | | | | |
| | Г.1 | Introduction to IoT: | S. Misra, A. Mukherjee, and A. Roy, 2020. Cambr | idge U | niversit | y Press | | | |
| Ref | Reference Books | | | | | | | | |
| F | R.1 | INTERNET OF THINGS(IoT): Technologies, Applications, Challenges, and Solutions, B. K. Tripathy, J. Anuradha, CRC Press | | | pathy, J. | | | | |
| R.2 Internet-of-Things (IoT) Systems Architectures, Algorithms, Methodologies -Dimitrios Serpano Marilyn Wolf, Springer International Publishing, 2018 | | | banos, | | | | | | |
| Us | eful Li | nks | | | | | | | |
| | 1 | | | | | | | | |
| | 2 | | | | | | | | |

| | Course Outcomes | PO/PSO | CL | Class Sessions |
|------------|---|--------|----|-------------------|
| MCA31105.1 | Understand the concept and the layered architecture of IoT. Benefits and challenges of IoT based applications. | | 3 | 9 |
| MCA31105.2 | Analyse various communication technologies and application protocols for IoT. | | 4 | 9 |
| MCA31105.3 | Understand IoT programming environment. Understand data acquisition and action using programs using different sensors and actuators | | 5 | 9 |
| MCA31105.4 | Understand different IoT databases. Learn to analyse the sensor data using various data analytics methods | | 4 | 9 |
| MCA31105.5 | Study of IoT based solutions for simple real world problems. | | 4 | 9 |

| · · · · · · · · · · · · · · · · · · · |
|---------------------------------------|
| 1 •1 |
| |



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 Т Р Credits 3 3 Ι MCA31106 **Big Data Analytics** 0 Pre-Requisites: Database Management System, Distributed Database Management System, Relational model of Database **Course Contents** Overview of Big Data: What is Big Data, History of Data management, Structuring Big data, Elements of Big data, Big data Analytics, Advantages of Big data Analytics Exploring The Use of Big data. Understanding Hadoop Ecosystem: Physical organization of Compute Nodes, Unit I Large scale File System Organization, Limitations of existing distributing systems, Hadoop Approach, Internals of Hadoop, Hadoop Architecture: Core Components, Ecosystem, HDFS and GPFS, Hadoop Limitations, Yarn, Spark. Data **Foundation:**Exploring The Big data Stack, Data Big Technology SourceLayer, Ingestion Layer, Storage Layer, Physical Infrastructure Layer, Platform ManagementLayer, Security Layer, Monitoring Layer, Visualization Layer, Big Data Applications, Virtualization and Big Data, VirtualizationApproachesStoring Data In Unit II Data Bases andDataWarehouses: RDBMS and BigData,CAP Theorem,Issues with Relational Model, Non-Relational Database, Issues with Non-Relational Model, Integrating Big Data with TraditionalData Warehouses. Exploring R:Exploring Basic Features of R, Statistical Features, Packages, Graphical UserInterfaces, R Console, Developing a Program, Exploring R Studio, Basic Arithmetic inR, Variables and Functions in R, Handling Data in R Workspace Reading DataSets Unit III and Exporting Data from R: Using c() Command, Using scan() Command, Reading Multiple Datavalues from Large Files, Reading Data from RStudio, Exporting Data from R. Manipulating andProcessing Data In R: Creating Data Subsets, Merging Data Sets in R,Sorting Data, ManagingData in R using Matrices,Managing Data in R using Data Frames. Unit IV Data Visualization: ofRepresentingVisualData,Techniques,Types,Applications,Visualizing Ways Big Data, Tools used in Data Visualization Social Media Analytics and Text Mining: Introducing Social Media, Introducing Text Mining, Understanding Text Mining Processes, Sentiment Analysis Mobile Analytics: Unit V IntroducingMobile Analytics, Define Mobile Analytics, Introducing Mobile Analytics Tools, Performing Mobile Analytics, Challenges of Mobile Analytics.

Tulsiramji Gaikwad-Patil College of Engineering and Technology

| Text Bo | oks |
|----------|--|
| T.1 | Big Data (Covers Hadoop 2, MapReduce, Hive, YARN, Pig, R and Data Visualization) |
| T.2 | Black Book, DT Editorial Services, Dreamtech Press. |
| Т.3 | Data Science & Big Data Analytics Discovering, Analyzing, Visualizing and PresentingData |
| | EMC Education Services, WILEY Publication |
| Referen | ce Books |
| R.1 | Data Analytics, Maheshwari, McGraw |
| R.2 | Hands-On Programming with R by Grolemund and Garrett |
| Useful L | inks |
| 1 | https://nptel.ac.in/courses/106/104/106104189/ |
| 2 | https://nptel.ac.in/courses/124/144/372604123/ |
| 3 | https://nptel.ac.in/courses/125/128/139837364/ |

| | Course Outcomes | CL | Class Sessions |
|------------|---|----|-------------------|
| MCA31106.1 | The use of terminology of data cycle and its functionality using Hadoop platform | 3 | 9 |
| MCA31106.2 | Examine data warehouse and its mechanism with corresponding database | 4 | 9 |
| MCA31106.3 | Design various statistical vide for analyzing basic database that creates logical practice. | 5 | 9 |
| MCA31106.4 | Creating and exploring the basic database which is use to design virtualization of the database. | 5 | 9 |
| MCA31106.5 | Justification about social media and mobile analytics which creates various data structures. | 5 | 9 |



Wardha Road, Nagpur-441 108

NAAC Accredited (A+ Grade)

(An Autonomous Institute Affiliated to RTM Nagpur University,

G

Nagpur)

| Program: Master in Computer Application | | | | | | | | | |
|--|---|---|----------------|---------------------|---------------------|-----------------------------|--|--|--|
| Semester | Course Code | Name of Course | L | Т | Р | Credits | | | |
| Ι | MCA31107 | Network Security | 3 | 0 | - | 3 | | | |
| Pre-Requ | isites: Digital Elect | ronics and Microprocessor, Digital Commun | nicatio | n Netw | orking | | | | |
| | 1 | Course Contents | | | | | | | |
| Unit I | Internet Security & Encryption : Basics of Cryptography, Encryption of static data, Key Exchange algorithm DSS, RSA, IPSec, AH, ESP, IKE, ISAKMP/Oakley, Tunnel mode, Transport mode, Virtual Private Networks (VPNs), SSH Tunneling, IP6 issues, Cloud Security Issues. | | | | | | | | |
| Unit II | Firewalls: Packet Gateway, SOCK Translation (NAT | Firewalls: Packet Filters, Stateful, Stateless, Bastion Host, Circuit Level, Application Gateway, SOCKS, DMZ, Host-Based Firewall, Egress Filtering, Network Address Translation (NAT), Multi-homing, IPTables/NetFilter, implementing NAT | | | | | | | |
| Unit III | Sniffers And Packet Crafting: Libpcap, dSniff, Wireshark, tcpdump, Mitigation of Sniffer Attacks, ARP Cache Poisoning, Port Stealing, Switch flooding, DNS and IP Spoofing, Session Hijacking, Sequence Numbers, Ettercap, idle host scanning, Default TTLs, Countermeasures, Packet Crafting using eghping, scapy | | | | | | | | |
| Unit IV | Wireless Securit wireless network wellenreiter, WEI | y:wireless local area networks (WLANs)II s), netstumbler(802.11b, 802.11a, 802.11 P, WPA, cowpatty. | EEE 8 g WI | 02.11, LAN st | wardriv andard | ving (Wi-Fi s.), kismet, | | | |
| Unit V | Intrusion Detect Anomaly based I NIDS implementa | ion & Prevention: Focus on NIDS, snort, Detection, Signature based Detection, Evasion ation using eg snort, Data Loss Prevention | Types on Te | s of IDS chnique | Ss, Net s, Fals | work IDSs, e Positives, | | | |
| Text Boo | ks | | | | | | | | |
| T.1 | Eric Cole, Ronald [ISBN: 076457397 | L. Krutz, James Conley, "Network Secu 77], 2005 | rity B | ible", 2 | nd Editi | on, Wiley | | | |
| T.2 | John R. Vacca, ' 0387954252], 200 | Guide to Wireless Network Security", S 6. | Spring | er, 3rd | Editio | on [ISBN: | | | |
| Т.3 | Johnny Long, Chr. Open Source Tool | is Hurley, SensePost, Mark Wolfgang, Mike kit", Syngress [ISBN: 1597490210] 2005 | e Petru | ızzi, "P | enetrati | ion Tester's | | | |
| Referenc | Reference Books | | | | | | | | |
| R.1 | Barrie Dempster, Open Source", Pac | James Eaton-Lee, "Configuring IPCop Finket Publishing [ISBN: 1-904811-36-1], 2004 | ewalls 6. | s: Closi | ing Bo | rders with | | | |
| Useful Li | nks | | | | | | | | |

| 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 | CL | Class Sessions |
|------------|---|----|-------------------|
| MCA31107.1 | Examine various encryption algorithms and authentication services | 3 | 9 |
| MCA31107.2 | Planning and apply tools and mechanism for network security | 4 | 9 |
| MCA31107.3 | preparation About implementation and working tools for network design and management | 4 | 9 |
| MCA31107.4 | Implementation of wireless tools and create secure network mechanism for network | 5 | 9 |
| MCA31107.5 | Demonstrate the use of standards and cyber laws to enhance information security in the development process and infrastructure protection. | 5 | 9 |



Tulsiramji Gaikwad-Patil College of Engineering and Technology



Wardha Road, Nagpur-441 108 <u>NAAC Accredited (A+ Grade)</u> Program: Master in Computer Application

| Semester | Course Code | Name of Course | L | Т | Р | Credits | | |
|--|--|---|----------------|---------------|-----------------|-----------------------|--|--|
| Ι | MCA31108 | Parallel Programming | 3 | - | - | 3 | | |
| Pre-Requi | Pre-Requisites: Students are expected to know the C language, algorithms and data structures, and know basics on computer architecture. | | | | | | | |
| Course Ol | ojectives: | 11 1' ' | | | | | | |
| 1. 10 ide | entify the scope for | parallelism in a program. | | volvod | linno | mollol | | |
| 2. Under | stand the various p | arallel programming models and the challeng | ges inv | orved | i in pa | rallel | | |
| 3 Learn | the basics of OpenN | AP and MPI and programming with Parallel Pro | oram | ning | | | | |
| 3.Learn4.Learn | the programming of | f heterogeneous systems using CUDA and Open | CL. | <u>8</u> . | | | | |
| | <u> </u> | Course Contents | | | | | | |
| | FUNDAMENTAL | S OF PARALLEL COMPUTING | | | | | | |
| Unit I | Need for Parallel Computing, Parallel Computer Models, ILP, TLP and Data Parallelism, Parallel Programming Overview, Processes, Tasks and Threads, Parallel ProgrammingModels, Shared Memory Programming, Message Passing Paradigm, Interaction andCommunication, Interconnection Networks. | | | | | | | |
| | CHALLENGES O | F PARALLEL PROGRAMMING | | | | | | |
| Unit II | II Identifying Potential Parallelism, Techniques for Parallelizing Programs, Issues CacheCoherence issues, Memory Consistency Models, Maintaining Memory Consistency, Synchronization Issues, and Performance Considerations. | | | | | | | |
| | SHARED MEM | ORY MODELS AND OPENMP PROGRA | MM | ING | | | | |
| Unit III | OpenMP Executi TimeLibrary Ro Considerations. | on Model, Memory Model and Consistency, outines, Handling Data and Functional | Open Parall | MP I elism | Direct , Per | ives, Run formance | | |
| | MPI PROGRAM | IMING | | | | | | |
| Unit IV | Init IV The MPI Programming Model, MPI Basics, Circuit Satisfyability, Global Operation Asynchronous Communication, Collective Communication, Other MPI Feature Performance Issues, Combining OpenMP and MPI. | | | | | | | |
| | PROGRAMMIN | IG HETEROGENEOUS PROCESSORS | | | | | | |
| Unit V GPU Architecture, Basics of CUDA, CUDA Threads, Memories,SynchronizationHandling, Performance Issues, Application Deve Introduction to OpenCL. | | | | | | CUDA clopment. | | |
| Text Book | S | | | | | | | |
| 1 John L Morga | . Hennessey and Da n Kaufmann / Elsev Bacheco, "An Inter- | avid A. Patterson, "Computer Architecture – A vier Publishers, 5th. Edition, 2012. | quanti | tative | appro | ach", | | |

| Reference | ee Books |
|-----------|--|
| 1 | Michael J Quinn, "Parallel programming in C with MPI and OpenMP", Tata McGraw Hill, 6 th Edition, 2003. |
| 2 | David B. Kirk and Wen-mei W. Hwu, "Programming Massively Parallel Processors", Morgan Kaufmann, 2 nd Edition, 2010. |
| Useful L | inks |
| 1 | https://nptel.ac.in/courses/106/102/106102114/ |
| 2 | https://nptel.ac.in/courses/106/102/106102163/ |

| | Course Outcomes | CL | Class Sessions |
|------------|---|----|-----------------------|
| MCA31108.1 | Apply the fundamental of Parallel computing for shared memory and interconnection networks. | 3 | 9 |
| MCA31108.2 | Analyze the challenges of Parallel Programming in support of memory consistency. | 4 | 9 |
| MCA31108.3 | MCA31108.3 Analyze to shared memory models and OPENMP programming. | | 9 |
| MCA31108.4 | Evaluate the MPI programming and features of performance issues. | 5 | 9 |
| MCA31108.5 | Apply for programming heterogeneous processors for performance issues. | 3 | 9 |

| | Tulsiramji Gaikwad-Patil College of Engineering and Technology Wardha Road, Nagpur-441 108 NAAC Accredited (A+ Grade) | | | | | G |
|--|---|--|----------|---------------|----------|-----------|
| | An Autonomous Institute Affiliated to RTM Nagpur University, Nagpur | | | | | |
| | | | | | | |
| | Pr | ogram: Master in Computer Appl | catior | 1 | - | 1 |
| Semeste | r Course Code | Name of Course | L | Τ | Р | Credits |
| Ι | MCA31109 | OOP'S programming based on Java language Lab | - | - | 4 | 2 |
| Pre-Req | uisites:C Language | | | | | |
| Course | Objectives: | | | | | |
| 1. Lear | n the fundamental pr | inciples of class, object. | 1. | | | |
| 2. To b | ecome adept at using | g various methods of inheritance, Polymor | blism. | - 14 14 1 | | |
| $\begin{array}{c c} 3. & 100 \\ \hline 4 & To a \end{array}$ | ecome expert in usin | g java classes, interfaces, Exception handl | ing, Mi | lititnrea | ading. | |
| 4. 10 a | ze Object oriented co | oncepts to develop swing handling application | ions | | | |
| <i>J.</i> 0 till | | sheepts to develop swing handling apprear | .10115. | | | |
| Sr. No. List of Experiment | | | | CO Mapping | | |
| 1 | Develop applicati | on by using class & object concept | | | | CO1 |
| 2 | Develop applicati | on by using this, super keywords. | | | | CO1 |
| 3 | Study and Implen | nent application by using constructor overl | oading. | | | CO2 |
| 4 | Develop applicati | on by using inheritance. | | | | CO2 |
| 5 | Study and Implen | nent application by using multiple catches | | | | CO3 |
| 6 | Develop applicati | on by using thread concept. | | | | CO3 |
| 7 | Develop applicati | on by using collection framework class. | | | | CO4 |
| ð | Develop applicati | on by using JFrame, JLabel, JTextField, JI | Sutton. | | | C04 |
| 9 10 | Develop applicati | on by using IFrame, IMenubar, IMenu, IN | laving | III. | | C05 |
| 10 | | on by using frame, free Control for disp | nayiiig | noues. | | |
| Text Bo | oks | | | | | |
| 1 | The Complete Ref | erence of Java Herbert Schildt, 7th Edition, | Tata N | IcGraw | Hill Pu | blication |
| 2 | Effective IAVA 2 | rd Edition Joshua Bloch | | | | |
| Referen | ce Books | Lation Joshua Dioch | | | | |
| 1 | Java 6 Black Book S | teven Holzner 2 nd Edition Coriolis Group | | | | |
| 2 | PROGRAMMING | IN IAVA Dr S B Kishor 1st Edition public | ished b | v Das C | anııPrak | ashan |
| | inke | a, artari, bi. S. b. Monor 1st Edition, publ | isincu U | J Dus C | | |
| Useful Links | | | | | | |
| 1 | https://pptel.ac.in/c | ourses/106/105/106105153/ | | | | |

| | Course Outcomes | PO/PSO | CL | Lab Sessions |
|------------|--|---|----|-----------------|
| MCA31109.1 | Apply object oriented concepts to get the clarity in class implementation. | PO1, PO2, PO3, PO7, PO11 | 3 | 9 |
| MCA31109.2 | Classify inheritance, polymorphism to develop Object Oriented applications. | PO1, PO2, PO3, P05, PO7, PO11 | 4 | 9 |
| MCA31109.3 | Evaluate Exception handling, Threading concepts to create. | PO1, PO2, PO3, P07, , PO11, PO11 | 5 | 9 |
| MCA31109.4 | Analyze Collection Framework, swing handling concepts to create window based GUI applications. | PO1, PO2, PO3, P07, , PO11, PO11 | 4 | 9 |
| MCA31109.5 | Analyze event handling to develop interactive swing applications. | PO1, PO2, PO3, PO5, P07, PO11, PO11 | 4 | 9 |



Wardha Road, Nagpur-441 108 NAAC Accredited (A+ Grade)



| Program: Master in Computer Application | | | | | | | | | | |
|--|--|-----------------------------------|--|--------------------------|---------|---------------|--------------------|----------|--|--|
| Teaching Scheme:-Lectures- 06 Tutorial-00 Total Credit- 03 | | | | | | | | | | |
| Se | meste | Course Code | Name of | Course | L | Т | Р | Credits | | |
| | Ι | MCA31110 | DBA Lab usin | g ORACLE | - | - | 3 | 2 | | |
| Pre | Pre-Requisites: Basic of Database Management Systems, Normalization's, Database concepts, Data | | | | | | | | | |
| mo | models and Relational model. | | | | | | | | | |
| Co | Course Objectives: | | | | | | | | | |
| 1. | Stude | nts will learn a stron | g foundation in advanced | database concepts from | n an ir | <u>idustr</u> | y pers | pective. | | |
| 2. | To lea | arn query processing | and transaction manager | nent concepts for Datab | ase M | lanage | ment | System. | | |
| 3. | To ut | llize SQL and PLSQ | L queries for industry per | rspective. | | | | | | |
| 4. | To an | alyses the database $\frac{1}{2}$ | ystem architecture, datab | base recovery techniques | s, data | ibase s | ecurit | ty and | | |
| 5 | autho | rization | and as a surgery strate size | | | | | | | |
| э. б | To an | alyze Oracle Backuj | and recovery strategies. | of databasa | | | | | | |
| 0 | 10 al | | Course Contor | of ualabase. | | | | CO | | |
| Course Contents | | | | | | | | | | |
| BI | 1 Implement the Normalization (1NE_2NE_3NE) | | | | CO1 | | | | | |
| | • | | | NI) | | | | C01 | | |
| | 2 | Implementation of | Nested loop and recover | y of transaction. | | | | CO2 | | |
| | 3 | SQL: DDL, DML, | set operation, sub querie | S. | | | | CO3 | | |
| | 4 | Intermediate SQL: | Joins, Views, Abstract I | Data type, Advanced SQ | QL: | | | CO1, | | |
| | - | Functions, Procedu | res, PL-SQL. | | | | | CO3 | | |
| | 5 | SOL: Backup and | Recovery. Indexes | | | | | CO3, | | |
| | - | | , | | | | | CO4 | | |
| | 6 | SQL Tunning, roll | oack database, lock conte | ention. | | | | CO3, | | |
| | (D | | | | | | | CO5 | | |
| Te | xt Boo | KS | | | | • • | | | | |
| | 1 | Fundamental of Da | abase Systems, R. Elmas | ris. Navatne Benjamin (| Lumm | lings, . | 2 nd Ed | lition | | |
| D | 2 | Database system co | ncept, Henry Korth, 7 th E | dition | | | | | | |
| Ke | terenc | e Books | | | | | | | | |
| | 1 | DBA Handbook ora | cie press, Loney, 2 ¹¹⁴ Editi | on. | | | | | | |
| | 2 | The Complete Refe | ence SQL - Groff Weinbe | erg (Tata McGraw Hill Pu | ublica | tion), | 2 nd Ec | lition. | | |
| Us | eful Li | nks | | | | | | | | |
| | 1 | https://nptel.ac.in/cou | rses/106/105/106105175/ | | | | | | | |
| | 2 https://nptel.ac.in/courses/106/106/106106093/ | | | | | | | | | |

| | Course Outcomes | CL | Class Sessions | Lab Sessions |
|------------|--|----|-------------------|-----------------|
| MCA31110.1 | Apply the knowledge of Normal forms and Query processing for handling multiple types of data. | 3 | 9 | 2 |
| MCA31110.2 | Identify and understand a detailed view of handling paralleland distributed database. | 3 | 9 | 3 |
| MCA31110.3 | To apply and write SQL and PL SQL queries for Data Manipulation and Data Definition languages. | 4 | 9 | 4 |
| MCA31110.4 | Evaluate the internal data structure and demonstrate backup and recovery procedures. | 5 | 9 | 4 |
| MCA31110.5 | Develop deep visualization of realistic data into physical structure | 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 | | | | | | | |
|---|--|--|------------------------|-------|----------|---------|---------|--|
| | | | 5941 | | | | | |
| | Pr | ogram: Master in (| Computer Applic | atio | 1 | | | |
| Semester | Course Code | Name of Course | | L | Т | Р | Credits | |
| Ι | MCA31111 | Software Engineering | & Project | - | _ | 4 | 2 | |
| | | Management Lab | | | | | | |
| Pre-Requ | isites:Software Er | ngineering , System An | alysis and Design | | | | | |
| Course C | Objectives: | <u><u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u></u></u> | | | | | | |
| $\begin{array}{c c} 1. & 10 \text{ ur} \\ \hline 2 & To \text{ kr} \end{array}$ | derstand the need of Solowy the phases of Solowy th | of software engineering . | | | | | | |
| 2. TO KI | derstand requireme | ent analysis and specific | ations | | | | | |
| 4. To ur | derstand software c | coding guidelines . | | | | | | |
| 5. To kr | now Software Project | ct Management, to unde | erstand CMMI levels. | • | | | | |
| | | | | | | | | |
| Sr. No. | List of Experiment | | | | | | | |
| 1 | Write the complete | Write the complete problem statement for software engineering | | | | | CO1 | |
| 2 | Write the softwar | e requirement specificat | ion documents. | | | | CO1 | |
| 3 | Study and Implen | nent application by usin | g constructor overloa | ding. | | | CO2 | |
| 4 | Draw the data flow | w diagram at level 0 and | d level 1. | | | | CO2 | |
| 5 | Draw use case dia | agram. | | | | | CO3 | |
| 6 | Draw activity diag | gram of all use cases. | | | | | CO3 | |
| 7 | Draw state chart of | liagram of all use cases | | | | | CO4 | |
| 8 | Draw sequence di | iagram of all use cases. | | | | | C04 | |
| 9 | Draw collaboration | on diagram of all use cas | ses. | | | | C05 | |
| 10 | Assign objects in | sequence diagram to cla | asses and make class | diagr | am. | | C05 | |
| Text Boo | ks | | | | | | I | |
| | Software Engineerin | ng, A practitioner's Approa | ach, Roger S. Pressmar | n, Mc | GrawHill | Interna | tional | |
| 1 | Edition . | | | | | | | |
| 2 | Software Engineerin | ng, Sommerville, Pearson | education. | | | | | |

| Reference | e Books |
|-----------|---|
| 1 | Software Engineering principles and practice, Waman S Jawadekar, McGraw-Hill. |
| 2 | Fundamentals of Software Engineering, Rajib Mall, PHI, 2005 |
| Useful L | inks |
| 1 | https://nptel.ac.in/courses/106/101/106101061/ |
| 2 | https://nptel.ac.in/courses/106/105/106105182/ |

| | Course Outcomes | PO/PSO | CL | Lab Sessions |
|------------|---|---|----|-----------------|
| MCA31111.1 | Analyse and implement software development models using UML through open-source tools. | PO1, PO2, PO3, PO6, PO12 | 3 | 2 |
| MCA31111.2 | Analyse and design software system using various UML constructs. | PO1, PO2, PO3, P05, PO6, PO7, PO12 | 4 | 3 |
| MCA31111.3 | Use architectural design and object- oriented design for performance and maintainability. | PO1, PO2, PO3, PO6, P07, , PO11, PO12 | 5 | 4 |
| MCA31111.4 | Assess to test the developed software and perform product metrics. | PO1, PO2, PO3, PO6, P07, , PO11, PO12 | 6 | 5 |
| MCA31111.5 | Evaluate the software measure parameters for software quality | PO1, PO2, PO3, PO5, P06, P07, PO11, PO12 | 6 | 5 |



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

NAAC Accredited (A+ Grade)



| Program | n: Master in Co | mputer Application | | | | | |
|-----------|---|--|---------|--------|-------|-----|--|
| Semester | ·Course CodeName of CourseLTPO | | | | | | |
| Ι | MCA31112 | PHP Lab(Vocational Skill Enhancement I | - | - | 4 | 2 | |
| | | LAB) | | | | | |
| Pre-Requ | isites:HTML, CSS | 5 | | | | | |
| | | | | | | _ | |
| Sr. No. | | List of Experiment | | | | CO | |
| 1 | Write a program i | n PHP to find factorial of a number. | | | | CO1 | |
| 2 | Write a program i class & object. | n PHP to check whether entered number is p | rime | or Not | using | CO1 | |
| 3 | Write a program i | n PHP to give demo of any 5 String function | | | | CO2 | |
| 4 | Write a program i | n PHP to find amstrong number. | | | | CO2 | |
| 5 | Write a program in PHP to give demo of get request. | | | | | | |
| 6 | Write a program i | n PHP to find sum of 1 st n even numbers. | | | | CO3 | |
| 7 | Write a program i | n PHP to find biggest of 3 numbers. | | | | CO4 | |
| 8 | Write a program i | n PHP to create & use cookie. | | | | CO4 | |
| 9 | Write a program i | n PHP to create session. | | | | CO5 | |
| 10 | Write a program i | n PHP to insert record in MYSQL database t | able. | | | CO5 | |
| | | | | | | | |
| Text Boo | ks | | | | | | |
| 1 | PHP5 for beginner | s, Evan Bayross and Sharman Shah, SPD Publ | icatio | ns | | | |
| 2 | Programming PHP, | Rasmus Lerdorf and Kevin Tatroe, Orilly Pub | licatio | ons | | | |
| Referenc | e Books | | | | | | |
| 1 | Head First PHP & | MySQL ,Lynn Beighley& Michael Morrison | | | | | |
| Useful Li | nks | | | | | | |
| 1 | http://www.nptelvi | deos.com/php/php_video_tutorials.php | | | | | |
| 2 | https://nptel.ac.in/c | ourses/106/105/106105084/ | | | | | |





| Program: Master in Computer Application | | | | | | | | | | | |
|--|--|--------------------|--|-----------|--|--|-----|-----|--|--|--|
| Seme | nester Course Code Name of Course L T P Cr | | | | | | | | | | |
| | I MCA31113 Angular Lab 4 | | | | | | | | | | |
| Pre-Requisites:HTML, CSS, Basic Concepts of JavaScript,OOPs Concepts | | | | | | | | | | | |
| Cour | se Obje | ectives: | | | | | | | | | |
| 1. | To lear | rn Angular expres | sions | | | | | | | | |
| 2. | To lear | rn the application | of filters, controllers, modules and d | irectives | | | | | | | |
| 3. 4 | To lease | rn how to useform | is and event handling | | | | | | | | |
| 4. 5 | To lear | rn animations and | SPA (Single page application) | | | | | | | | |
| 5. | 10104 | in animations and | Si A (Single page appreation) | | | | | | | | |
| Sr. | | | | | | | | | | | |
| No. | | | List of Experiment | | | | | CO | | | |
| 1 | Using Angular Expressions: Create an Angular Expression for Amount = (Qty * Rate). Display the value of the expression on the page for different values of 'Qty' and 'Rate' | | | | | | | CO1 | | | |
| 2 | Using Angular Filters: (Built-in Filters and Custom Filters) Demonstrate the use of the following filters with appropriate examples: Uppercase and Lowercase Filters Currency filter Number Formatting Filters, OrderBy Filter Date Filter JSON Filter | | | | | | | CO2 | | | |
| 3 | Using Controllers and Modules: Create a module bythe name "myApp". Create a controller ng-controller="myCtrl" as an AngularJS directive. Define the myCtrl function as a JavaScript function, which creates two properties (variables) in the scopefirstName and lastName.Invoke the controller with a \$scope object and display the values. Explain how the input fields are moved to the controller properties firstName and lastName. | | | | | | | CO2 | | | |
| 4 | Using Directives: Demonstrate the use of following directives in a web page. The ng-app directive: to initialize an AngularJS application. The ng-init directive: to initialize application data. The ng-model directive: to bind the value of HTML controls (input, select, textarea) to application data. | | | | | | CO2 | | | | |
| 5 | Using Angular Forms: Create a form for student data with the following controls and bind them to a model input elements (Student Name) select elements (Branch) button elements (Submit and Reset) | | | | | | | CO3 | | | |

| | textarea elements (Remarks) | | | | | | | |
|------|---|-------------|--|--|--|--|--|--|
| | checkbox and (Hobbies: Sports, Writing, Reading) | | | | | | | |
| | Radio buttons (Type: UG, PG) | | | | | | | |
| | Handling Events: Demonstrate handling the following mouse events on a hyperlink | | | | | | | |
| 6 | element using <u>event listeners</u> . | | | | | | | |
| 0 | ng-mouseover, ng-mouseenter, ng-mousemove, ng-mouseleave | 003 | | | | | | |
| | Or when a mouse button is clicked on atext element, in this order: | | | | | | | |
| | ng-mousedown, ng-mouseup, ng-click | | | | | | | |
| | Using Services: Demonstrate using \$http Service for reading data from a remote server. (You can choose any simple website) Use the (get) method to read the following information from | | | | | | | |
| | the response received from the website | | | | | | | |
| _ | • | 2 01 | | | | | | |
| 1 | .headers to get header information. | CO4 | | | | | | |
| | .status a number defining the HTTP status. | | | | | | | |
| | .statusText is a string defining the HTTP status. | | | | | | | |
| | | | | | | | | |
| | Custom Filter :Create a custom filter called "myFormat", which will uppercase every other | | | | | | | |
| 8 | character of a given string.Demonstrate using this filter on a page. For example: | CO4 | | | | | | |
| | Input: 'Monday'Output: 'MoNdAy' | | | | | | | |
| | Animations (CSS Transforms and Transitions): | | | | | | | |
| 9 | Include the AngularJS animate library | COS | | | | | | |
| | • Write "Hello" inside a div tag | 005 | | | | | | |
| | • Hide and Show the div on selecting a check box | | | | | | | |
| | Single Page Application(SPA):Create a single page application.Develop a shopping | | | | | | | |
| 10 | cart to add and remove items from a shopping list to the cart. Do error handling for | CO5 | | | | | | |
| | exception cases. | | | | | | | |
| | | | | | | | | |
| Text | Books | | | | | | | |
| 1 | Angular: Up and Running, Learning Angular, Step by Step- Shyam Seshadri, O-Reilly Publication, 2018 | | | | | | | |
| 2 | 2 Angular in Action, JEREMY WILKEN, Manning publication, 2018 | | | | | | | |
| Refe | rence Books | | | | | | | |
| 1 | 1 Angular 5 Projects, Mark Clow, Apress, 2018 | | | | | | | |
| Usef | ul Links | | | | | | | |
| 1 | | | | | | | | |
| 2 | | | | | | | | |

| | Course Outcomes | PO/PSO | CL | Lab Sessions |
|------------|---|--------|----|-----------------|
| MCA31113.1 | Will learn to applyAngular expressions | | 3 | 2 |
| MCA31113.2 | Will learn the application of filters, controllers, modules, and directives | | 4 | 3 |
| MCA31113.3 | Will learn how to use forms and event handling | | 5 | 4 |
| MCA31113.4 | Will learn how to use services and create a custom filter | | 4 | 4 |
| MCA31113.5 | Will learn animations and developing a SPA (Single page application) | | 6 | 6 |





| | Program: Master in Computer Application | | | | | | | | | |
|-------------------|---|--|--|---------------------|------------|----------|---------------|--|--|--|
| Sen | nester | ter Course Code Name of Course L T P Credi | | | | | | | | |
| | I MCA31114 Computer Assembly & Troubleshooting 3 | | | | | | | | | |
| | | | | 1 | 1 | 1 | | | | |
| Pre Eng | Pre-Requisites: : Computer hardware Interfacing, Digital communication & networking, Software Engineering | | | | | | | | | |
| Co | urse O | bjectives: | | | | | | | | |
| 1. | Know | ledge in computer | hardware and peripherals for installation, PC | assen | nbly. | | | | | |
| 2. | A basi | c knowledge of TC | P/IP networks work group, internet and intr | anet. | | | | | | |
| 3. | To exa | amine the Network | ing is the field of computer application that a | allows | compu | ters to | exchange | | | |
| | data o | r information. | | | | <u> </u> | | | | |
| 4. | To exa | amines the interaction | on between information and methods of cor | nmuni | cation t | echnol | ogy. | | | |
| 5. | Stude | nts will exhibit prof | iciency with software applications and demo | onstrat | te know | ledge o | of computer | | | |
| | techno | ology and compone | nts to aide in their understanding of data and | infor | mation. | | | | | |
| | | | Course Contents | | | | 00 | | | |
| Sr | Sr. No. List of Experiment | | | | | | CU Manning | | | |
| | | Analyzed different types of Network cables and Practically implement the | | | | | mapping | | | |
| | 1 | cross-wired cab | | CO1 | | | | | | |
| | • | Make case stud | ly on OS and installation OS into the co | mpute | r syster | n | GO1 | | | |
| | 2 | using modern to | ool(Virtual box/VMware) | - | • | | COI | | | |
| | 3 | Analyzed Netw | ork Devices in Detail. | | | | CO2 | | | |
| | 4 | Demonstrate ne | twork IP. | | | | CO2 | | | |
| | 5 | Connect the con | nputers in Local Area Network. | | | | CO3 | | | |
| | 6 | Observer basic | network command and Network configuration | on con | nmands | | CO3 | | | |
| | 7 | Configuration o | f IP addresses, Subnet Mask and Default Ga | teway | ' • | | CO4 | | | |
| | 8 | Installation and | introduction to CCNA student version 6.0.1 | | | | CO4 | | | |
| | 9 | Detecting Netw version 6.0.1 | ork Attacks to Network Analysis Using | CCNA | studer | nt | CO5 | | | |
| | 10 | To Calculate the | e message digest of a text using the SHA-1 a | lgorit | hm | | CO5 | | | |
| | | | | | | | | | | |
| Tex | <mark>ct Boo</mark> l | KS | | | | | | | | |
| | 1 Inside the IBM PC Peter Norton, 3 rd Edition | | | | | | | | | |
| | 2 | Data communication | on and Network by Forouzan, 2 nd Edition, T | ata Mo | cGraw I | Hill Pu | blication | | | |
| Ref | erence | Books | | | | | | | | |
| | 1 | Network Security Pearson | and Essentials: Application and standers | , 3 rd] | Edition, | Willa | um Stalling, | | | |
| | | | | | | | | | | |

| Useful Links | | | | | |
|--------------|---|--|--|--|--|
| 1 | https://nptel.ac.in/courses/106/105/106105167 | | | | |
| 2 | https://nptel.ac.in/courses/106/104/106104182 | | | | |

| | Course Outcomes | CL | Lab Sessions |
|------------|--|----|-----------------|
| MCA31114.1 | construct the terminology of communication network and network functionality | 3 | 9 |
| MCA31114.2 | Practice on Wired and wireless technology implementation for data communication | 3 | 9 |
| MCA31114.3 | Differentiate Communication network model data flow and its protocol | 4 | 9 |
| MCA31114.4 | Analyze the network security management and various methodology using algorithms | 4 | 9 |
| MCA31114.5 | Evaluate the Application management of communication channels and hacking technology | 5 | 9 |





| Program: Master in Computer Application | | | | | | | | | | | |
|--|-----------------|--|---|---|---|---|---|--|----------------------|----|--|
| SemesterCourse CodeName of CourseLTPCreation | | | | | | | | Credits | } | | |
| | Ι | MCA31115 | | JavaScript | t Lab | - | - | 4 | 2 | | |
| Pro | e-Requ | isites: DOM Conce | pts, Functio | ning of a Bro | owser, OOPs l | Programm | ing Con | cepts,H | ΓML | | |
| Co | urse C |)bjectives: | | | | | | | | | |
| 1. | To un stater | To understand Browser components and the function of the JavaScript Engine. Learn JavaScript data types, | | | | | | | | | |
| 2. | To un | understand JS objects and JS functions. Learn to manipulate JS objects and DoM objects using JavaScript | | | | | | | | | |
| 3. | To lea | irn Java events progra | mming to ma | nipulate DON | /I and JavaScrip | t Objects u | sing eve | nt handle | ers | | |
| 4. | To un | derstand and apply th | e built-in HTI | ML Web APIs | on a browser | | | | | | |
| 5. | To un | derstand and apply Ja | vaScript adva | nced features | s like closure, p | romises, er | ror han | dling, and | creation of | of | |
| | SVG u | sing JavaScript. | | | | | | | | | |
| | | | | | | | | | | | |
| S | Sr. Jo. | | | List of Exj | periment | | | | CC | С | |
| | 1 | Basic JavaScript Programming: a) Build an HTML page with an input for text and a submit button. Write a JavaScript to find if the input is a Number or a String. Use an external JavaScript file. Basic JavaScript Programming: | | | | | | | ipt CO |)1 | |
| | 2 | a) Write a JavaS the original a to JavaScript. DataArray = [b) Sort the array | cript to find t rray and the I Use a button 10, 5, 27, 45, r and display f | ne Min, the M Min and Max to display the 77, 78, 3, 5, 2 the sorted arr | values on an H ⁻ values on an H ⁻ e results. 1, 53] ray on the HTM | an Array of TML page tl L page. | nat inter | gers. Disp nally refe | CO |)1 | |
| | 3 | Understanding DC a) Build an HTML Confirm Password Verify the follow messages accord Wrong User Wrong Pass UserId is bla Password is Password sh numeric, the one numeric else the mes Confirm Pass | PM (Access) page for reg ord. It should ving for Use lingly using Id – "UserId word – "UserId blank – "Pas ould have at re should be , and there s sage should sword: Both | DoM attribu gistration with also have a rId, Password JavaScript. /Password is rId/Password d is required ssword is required ssword is required at least one hould be at least be "Invalid p Password at | utes): th inputs 'User 'Submit' butte rd, and Confirm s wrong" d is wrong" d is wrong" ." juired." acters, The Fin special charace east one upper bassword." nd Confirm Pa | rst character rst character rcase and c | word', Reset' b rd and d er shoul should l one low | and utton. isplay th d not be be at lease ercase – the sam | e CO st e – |)2 | |

| | else "Confirm password does not match with the entered password" | |
|---|--|-----|
| 4 | Understanding JavaScript Objects: Given a JSON object of student data, find the number of students and count of students in different departments, using different functions of JS to manipulate Objects. Given JSON Objectas "Student": [{name: "A", dept: "MCA"}, {name: "B", dept: "MCA"}, {name: "C", dept: "MBA"}] | CO2 |
| 5 | Event ProgrammingTo Manipulate Style: a) Build an HTML page with a small paragraph of Text (any) and the following buttons. a) A 'Red' button – On-clicking should change the style of the paragraph to 'Red' b) A 'Blue' button – On-clicking should change the style of the paragraph to 'Blue' c) A 'Green' button – On-clicking should change the style of the paragraph to 'Green' | CO3 |
| 6 | Event Programming to Perform Logic: Build an HTML page with Textbox (Multiline). Users can enter up to 100 characters.On the keypress event calculate the number of characters. Display the number of characters below the textbox. Disable typing except 'backspace' when it is greater than 100 characters and display an alert message (Number of characters > 100) in Red. | CO3 |
| 7 | Using Built-in JavaScript Web APIs: Demonstrate Geolocation web API to find out the current Latitude and Longitude of the Device. Display Latitude and Longitude values. Build a web page. Use a web worker, that increments a counter every 30 sec. Find the value of the web worker on clicking a button on the page labeled "Get Counter Value.". | CO4 |
| 8 | Using Built-in JavaScript Web APIs: Build a web page using client-side storage API (sessionStorage and localStorage). Keep the value of "Number of times the web page is accessed" in localStorage and UserIDentered in a Login page in sessionStorage). Display the values on loading the web page. Create a board of 4 x 4 squares. The values in the first row are (W1, W2, W3, W4) and those in the last row are (B1, B2, B3, B4). Demonstrate drag-and-drop web API using these values. | CO4 |

| 9 | Advanced features of JavaScript: Demonstration of Promises, Closure, and Error handling. 1. Write javaScript to demonstrate Error handling 2. Write javaScript to demonstrate Promises 3. Write javaScript to demonstrate Closure | CO5 | | | | |
|-----------------|---|-----|--|--|--|--|
| 10 | Advanced Features of JavaScript: Demonstration of JS Graphics (SVG), Create different shapes of SVG graphics using JavaScript and display them on the web page. Change their attributes (style, size, etc) by clickingrespective buttons alongside the graphics. | CO5 | | | | |
| | | | | | | |
| Text Books | | | | | | |
| 1 | JavaScript: JavaScript Programming for Absolute Beginner's:Ultimate Guide to JavaScript1Coding, JavaScript Programs and JavaScriptLanguage, William Sullivan, 2017, Pragmatic Solutions | | | | | |
| 2 | Rediscovering JavaScript, Venkat Subramaniam, The Pragmatic Bookshelf, 2018 | | | | | |
| Reference Books | | | | | | |
| 1 | JavaScript: The Definitive Guide:David Flanagan, O`Reilly Publications | | | | | |
| Useful Links | | | | | | |
| 1 | W3Schools.com/javascript | | | | | |
| 2 | www.geeksforgeeks.org | | | | | |

| | Course Outcomes | PO/PSO | CL | Lab Sessions |
|--------------------|--|--------|----|-----------------|
| MCA31115.1 | To understand andapply the knowledge to develop JS programs. | | 3 | 2 |
| MCA31115.2 | To understand and apply manipulating JS objects and JS functionsusing JavaScript | | 4 | 2 |
| MCA31115 .3 | To learn JavaScript events programming to manipulate DOM and JavaScript Objects using event handlers | | 5 | 4 |
| MCA31115.4 | To understand and apply the built-in HTML Web APIs on a browser | | 4 | 4 |
| MCA31115.5 | To understand and apply JavaScript advanced features like closure, promises, error handling, and creation of SVG using JavaScript. | | 6 | 6 |