Course Code: MCA301	**Title: Software Testing & Quality Assurance**
Teaching Scheme:	**Examination Scheme:**
Lectures: 3 hrs/week	Theory Paper: 80 marks [3 Hrs]
Tutorial: 1 hr/week	Class Test: 20 Marks
Credits: 4	

Course Objectives:
- To understand the basics of software testing.
- Introduction to software testing life cycle.
- To train student to create good test case is one that has a high probability of finding an as yet undiscovered error.
- To get familiar with Software Testing Tools.
- To identify correctness, completeness and quality of developed Software.

Course Outcomes:
- Understand the importance of software testing in software development process.
- Generate test cases from software requirements.
- Identify the inputs and deliverables of the testing process.
- Understand the importance of automated software testing tools.

CONTENTS

SECTION-A

Unit 1- Introduction: **10 Hrs**
Quality Concepts, Quality Control, SQA: need, SQA activities, SQA planning & standards, what is testing? Why is testing necessary? Objectives of testing? Importance of testing in software production cycle, Manual Testing, Automated testing, Manual testing Vs Automated testing, Software quality metrics, Software development & Testing Life Cycle, Testing Standards:-IEEE, CMM, ANSI, Six-Sigma, ISO. Object – oriented testing, Web testing, GUI testing.
Case study on: GUI testing, Web testing.

Unit 2- Levels of Testing: **10 Hrs**
Verification and Validation Model, Techniques of Verification: Peer Review, Walkthrough, Inspection. Types of testing, Unit testing, Integration testing, Function Testing System testing**,** Installation Testing, Usability Testing, Regression testing, **Performance testing:** Load Testing**,** Stress Testing**.** Security testing**,** Volume testing Acceptance **testing:** Alpha testing, Beta testing, Gamma testing. Positive & negative testing. Static testing Vs Dynamic testing.

SECTION-B

Unit 3- Testing methods and Automated Testing tools: **10 Hrs**
Black Box methods: Random testing**,** Equivalence partitioning**,** Boundary-value analysis**,** Error guessing. **White Box methods:** basis path testing**,** Statement coverage**,** Branch

coverage, Decision coverage, Condition coverage. Black box testing: advantages & disadvantages, White box testing: advantages & disadvantages, Black box testing Vs White box testing. Challenges in case of white box testing. **Automated Testing Tools**: study of Win Runner & Load Runner testing tool.

Unit 4- Test Planning, Test Documentation, Defect Management & Test Reporting: 10 Hrs

Testing Strategy: type of project, type of software**.** Test Plans, Test Case, Test Data, Risk Analysis. Defect, Causes of defect, Defect analysis & prevention, Defect Reporting, Defect types, Defect Severity, Defect Tracking Workflow, Test reporting, Defect rates and schedules.

Case study on: Test plan, Test case.

Text Books/ Reference Books:

1. Dr. K.V. K. K. Prasad, "*Software testing tools*", Dreamtech Publications
2. Rex Black, "*Software testing*", Wrox Publications
3. Roger Pressman, "Software *Engineering- a practitioner's approach*", McGraw Hill
4. Boris Bezier, "*Software testing techniques*", Dreamtech Publications
5. Ron Patton, "*Software testing* ", Tech Publications
6. Cem Kener, "*Testing Computer Software*", Van Nostrand Publications

Reference Website:

1. www.onestoptesting.com
2. www.wikipedia.org

The Pattern of Question Paper:

The units in the syllabus shall be divided in two equal sections. Question paper shall be set having two sections A and B. Section A questions shall be set on first two units (1 and 2) and Section B questions on remaining two units (3 and 4). Question paper should cover the entire syllabus.

For 80 marks Paper:
1. Minimum eight questions.
2. Four questions in each section.
3. Question no 1 and 5 be made compulsory having weightage of 8 marks.
4. Two questions from remaining questions from each section be asked to solve having weightage of 16 marks.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad
Faculty of Engineering and Technology
Third Year M.C.A.

Course Code: MCA302	**Title: Cyber Security**
Teaching Scheme:	**Examination Scheme:**
Lectures: 4 hrs/week	**Theory Paper: 80 marks [3 Hrs]**
Credits: 4	**Class Test: 20 Marks**

Course Objectives:

The student will be able to

- Understand the basic concept of cyber security
- Study the process of implementing cyber security
- Understand the software, hardware and network related security issues and its solutions.
- Become familiar with web service security technologies.

Course Outcomes:

Students will be able to

- Identify System, Application and network vulnerabilities and its countermeasures to overcome it.
- Implement intrusion prevention and detection techniques to avoid intrusion in real time
- securely handle E-Passport and online transaction
- Identify web services security technologies.

CONTENTS

SECTION-A

Unit 1   **10 Hrs**

Introduction: Cyber Security Myths, Information Security versus Cyber security, Business Continuity and Risk Management. Steps for setting up Cyber Security in organization.
Principles of Security, Symmetric and Asymmetric Key Encryption, Hash , Message Authentication Code, Vulnerabilities, Types of attack , Digital Signature, Digital Certificate, Public key Infrastructure.

Unit 2   **10 Hrs**

Vulnerabilities: Denial of Service (DOS), Distributed DOS (DDOS), Session   Hijacking and spoofing, Pharming attack, Wireless LAN vulnerabilities.   Phishing, Buffer overflow, format string attacks, Cross site Scripting(XSS), SQL injection
Malwares: Virus and worm features, Internet scanning worms, Topological worms, web worms, Mobile malware, Botnet.

SECTION-B

Unit 3   **10 Hrs**

Software Security: Access Control in operating system: Discretionary Access Control, Mandatory Access Control, Role Based Access Control

Firewall: Firewall Functionality and Access Control List, Firewall Type, Placement of Firewall.

Intrusion Prevention and Detection: Prevention versus detection, Types of Intrusion detection system, DDOS attack prevention/Detection, Malware detection.

Unit 4   **10 Hrs**
Hardware Security: RFIDs and E-Passport: RFID Basics, Applications, Addressing RFID Privacy Issues, Electronic Passport.
Electronic Payment: Introduction, Enabling Technologies, Cardholder Present E-Transaction, Payment Over the Internet, Mobile Payment, Electronic Cash.
Web Services Security: Entities involved, Technologies for web services- XML, SOAP, WSDL and UDDI, WS-Security, SAML,WS-Trust.

Text Books/ Reference Books:
1.   Bernard Menezes, Network Security and Cryptography, Cengage Learning India Pvt Ltd, 2011
1. Dejan Kosutic, 9 Steps to Cyber Security The Manager's Information Security Strategy Manual, EPPS Services Ltd, Zagreb, 2012
2. William Stallings, Cryptography and Network Security: principles and practice, Prentice Hall, 2010.
3. Atul Kahate, Cryptography and Network Security, Second Edition, Tata McGraw Hill,2008.

The Pattern of Question Paper:
The units in the syllabus shall be divided in two equal sections. Question paper shall be set having two sections A and B. Section A questions shall be set on first two units (1 and 2) and Section B questions on remaining two units (3 and 4). Question paper should cover the entire syllabus.

For 80 marks Paper:
1. Minimum eight questions.
2. Four questions in each section.
3. Question no 1 and 5 be made compulsory having weightage of 8 marks.
4.   Two questions from remaining questions from each section be asked to solve having weightage of 16 marks.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad
Faculty of Engineering and Technology
Third Year M.C.A.

Course Code: MCA303	**Title: Enterprise Resource Planning**
Teaching Scheme:	**Examination Scheme:**
Lectures: 4 hrs/week	**Theory Paper: 80 marks [3 Hrs]**
Credits: 4	**Class Test: 20 Marks**

Course Objectives:
- To understand the role of Enterprise Resource Planning in business planning activities.
- Students will learn fundamentals of enterprise resource planning (ERP) systems concepts, and the importance of integrated information systems in an organization.
- This course will enable the student to learn the conceptual basis for enterprise-wide information system by illustrating procurement, production, and sales business processes using ERP software.

Course Outcomes:
Students will be able to:

- Understand the basic concepts, technologies, processes of developing and implementing ERP systems;
- To comprehend the technical aspects of ERP systems;
- To understand concepts of reengineering and how they relate to ERP system implementations and ERP life cycle;
- To obtain practical hands-on experience with some of the ERP Software e.g. SAP, Oracle

Prerequisite Knowledge: - Fundamentals of Business Process, Software Project Management.

CONTENTS
SECTION-A

Unit 1   **10 Hrs**
Introduction to ERP: Introduction, Common ERP Myths, Reasons for growth of ERP, Advantages of ERP, Risks of ERP, Benefits of ERP
ERP and Related Technologies: Business Process Reengineering (BPR), Data Mining, Data Warehousing, On-line Analytical Processing (OLAP), Customer Relationship Management (CRM)

Unit 2   **10 Hrs**
ERP Implementation: Implementation Challenges, ERP Transition Strategies, ERP Implementation Life Cycle, Pre-implementation Tasks—Getting Ready, Implementation Methodologies, ERP Project Teams, Vendors and Consultants, Employees and Employee Resistance

SECTION-B

Unit 3   **10 Hrs**
ERP Modules: Finance, Production Planning, Material Management, Sales & Distribution, Human Resource Management (HRM), Inventory Control System, Quality Management, Marketing

Unit 4   **10 Hrs**
ERP Market, ERP Present and Future: ERP Venders: - SAP, BAAN, Oracle, PeopleSoft, Microsoft dynamics, ERP and Total Quality Management, Some Real-world cases studies - Rolls Royce's ERP Implementation, WIPRO and MBH, HP SAP Implementation, NIKE ERP Implementation, Walt Disney CRM Strategy, Nestle ERP Implementation, Hershey's Enterprise 21 Project

Text Books/ Reference Books:

1. ERP Demystified by Alexix Leon, MC Graw Hill Publication
2. Enterprise systems for Management, Luvai F Motiwalla, Jeff Thompson, Pearson
3. Enterprise Resource Planning, Mary Summer, Pearson

The Pattern of Question Paper:
The units in the syllabus shall be divided in two equal sections. Question paper shall be set having two sections A and B. Section A questions shall be set on first two units (1 and 2) and Section B questions on remaining two units (3 and 4). Question paper should cover the entire syllabus.

For 80 marks Paper:
1. Minimum eight questions.
2. Four questions in each section.
3. Question no 1 and 5 be made compulsory having weightage of 8 marks.
4.   Two questions from remaining questions from each section be asked to solve having weightage of 16 marks.

Course Code: MCA304	**Title: Cloud Computing**
Teaching Scheme:	**Examination Scheme:**
Lectures: 3 hrs/week	**Theory Paper: 80 marks [3 Hrs]**
Tutorial: 1 hr/week	**Class Test: 20 Marks**
Credits: 4	

Course Objectives:
- To introduce cloud computing technology through its various aspects.
- To understand virtualization technology and its functionality in cloud computing.
- To get familiar with Mobile Cloud Computing Concept.
- To Aware of different service and privacy aspects of cloud computing.
- To study various service differences between variety of Cloud Computing Service Providers.

Course Outcomes:
After completion of the course the learner should be able to:
- Understand Cloud computing technologies with their functional aspects.
- Grab the importance of virtualization technologies in cloud computing.
- Identifies significance of Mobile device in Cloud Computing.
- Understand Security and Issues involved in cloud computing.
- Decide which service providers can make better Cloud Implementation and Administration.

CONTENTS

SECTION-A

Unit 1   **10 Hrs**
Cloud Introduction:
Definitions, Components, Characteristics / Properties / Features, Cloud Computing Vs On-Premise System, Evolutions of Cloud Computing, CC Opportunities and Challenges, Advantages and Disadvantages of Cloud Comp, Benefits and Risks in Cloud Computing, Cloud Computing Architecture, Service Oriented Architecture (SOA) and Cloud Computing Reference Architecture by IBM

Unit 2   **10 Hrs**
Virtualization:
Introduction, Types of Virtualization, I/O Virtualization, Storage Virtualization, Network Virtualization, Memory Virtualization, Virtualization and Cloud Computing

SECTION-B

Unit 3   **10 Hrs**
Mobile Cloud and Cloud Security
Mobile Cloud: Mobile Computing, Architecture, Need, Characteristics, Advantages and

Disadvantages, Mobile cloud Applications, Issues or CSF for Mobile Cloud Computing.
Cloud Security: Cloud Security Fundamentals, Cloud Security Challenges, Cloud Security and Privacy, Vulnerability Assessment tools for Cloud computing, Virtualization Security Management, Security and Privacy in Mobile Cloud, Virtualization Security and Challenges, Cloud Computing and Data Security Risk. Cloud Computing and Identity, The Cloud, Digital Identity, and Data Security

Unit 4   **10 Hrs**
Case Study
Amazon Web Services: Compute, Database, Networking, Storage, Management
Open-Stack Services: Compute, Database, Networking, Storage, Management

Text Books/ Reference Books:
1. "Distributed and Cloud Computing" From Parallel Processing to the internet of Things By Kai Hwang, Geoffrey C. Fox, Morgen Kaufmann Publication.
2. Fundamentals of Computers and information system, Harendra nath Tiwari, Dr. Hemchand Jain, International Boo House Pvt. Ltd.
3. Cloud Computing, Implementation, Management, and Security, Jhon W. Rittinghouse, James F. Ransome, CRC Press.
4. Cloud Securit and Privacy, Tim Mather, Subra Kumarswamy, Shahad Latif, O'REILLY, Shroff Publication and Distribution.
5. Cloud Computing A Practical Approach, Anthony T. Velte, Toby J. Velte, Robert Elsenpeterm, McGraw Hill Education (India)
6. Enterprise Cloud Computing, Technology, Architecture, Applications, Gautam Shroff, Cambridge University Press.
7. Cloud Computing Bible. Barrie Sosinsky, Willy Publication
8. Mastering Cloud Computing, Rajkumar Buyya, Chritian Vecchiola, S Thamarai, McGraw Hill Education (India)

The Pattern of Question Paper:
The units in the syllabus shall be divided in two equal sections. Question paper shall be set having two sections A and B. Section A questions shall be set on first two units (1 and 2) and Section B questions on remaining two units (3 and 4). Question paper should cover the entire syllabus.

For 80 marks Paper:
1. Minimum eight questions.
2. Four questions in each section.
3. Question no 1 and 5 be made compulsory having weightage of 8 marks.
4.   Two questions from remaining questions from each section be asked to solve having weightage of 16 marks.

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Third Year M.C.A.

Course Code: MCA341   **Title: Elective – III Human Computer Interaction**
Teaching Scheme: **Examination Scheme:**
Lectures: 4 hrs/week   **Theory Paper: 80 marks [3 Hrs]**
Credits: 4   **Class Test: 20 Marks**

Course Objectives:
The student should be made to:
- Learn the foundations of Human Computer Interaction
- Be familiar with the design technologies for individuals and persons with disabilities.
- Be aware of mobile HCI
- Learn the guidelines for user interface.
- Acquire the knowledge and skills needed to create highly usable software systems.

Course Outcomes:
- Understand fundamental design and evaluation methodologies of human computer interaction.
- Demonstrate knowledge of human computer interaction design concepts and related methodologies.
- Apply theories and concepts associated with effective work design to real-world application.

Prerequisite: Knowledge of Computer Organization, Web development techniques

CONTENTS

SECTION-A

Unit 1   **10 Hrs**
Foundations of HCI
Course Overview: Design for Usability. Historical Perspective: machinery, the PC, the GUI, the Web, Possible Futures
The Human: I/O channels – Memory – Reasoning and problem solving;
The Computer: Devices – Memory – processing and networks; Interaction: Models – frameworks – Ergonomics – styles – elements – interactivity Paradigms.

Unit 2   **10 Hrs**
Design & Software Process
Interactive Design basics – process – scenarios – navigation – screen design – Iteration and prototyping. HCI in software process – software life cycle – usability engineering – Prototyping in practice – design rationale. Design rules – principles, standards, guidelines, rules. Evaluation Techniques – Universal Design.
The Human Body and Device Design
Input Devices and Ergonomics, Virtual Reality, A Time and Motion study of GUI Use, Perception, gestalt perception, typography, Color, Graphic design, Displays, Paper and other Output Devices, Information Visualization.

SECTION-B

Unit 3   **10 Hrs**
Models and Theories
Cognitive models Socio Organizational issues and stake holder requirements –
Communication and collaboration models Hypertext, Multimedia and WWW.
Error Handling, Error Prevention, Cognitive Walkthroughs, Heuristic Evaluation, Usability
Guidelines, Choosing Among Usability Methods, Timescales and the Illusion of
Multitasking, GOMS Keystroke Level Modelling, Hypothesis Testing and Statistical
Significance

Unit 4   **10 Hrs**
Mobile HCI
Mobile Ecosystem: Platforms, Application frameworks Types of Mobile Applications:
Widgets, Applications, Games Mobile Information Architecture, Mobile 2.0, Mobile Design:
Elements of Mobile Design, Tools.
Web Interface Design
Designing Web Interfaces – Forms Design, Interface Design Patterns, Development Tools,
Events and Handlers, MVC, Responsiveness Issues, Drag & Drop, Direct Selection,
Contextual Tools, Overlays, Inlays and Virtual Pages, Process Flow. Content Analysis,
Information Architecture, Supporting Navigation, Implementation: html, CSS, JavaScript,
Browser and Device (In)Dependence, Assigning Functions to Client and Server Case Studies.

Text Books/ Reference Books:

- Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale, "Human Computer
  Interaction", 3rd Edition, Pearson Education, 2004
- Brian Fling, "Mobile Design and Development", First Edition, O"Reilly Media Inc.,
- 2009
- Bill Scott and Theresa Neil, "Designing Web Interfaces", First Edition, O"Reilly,
  2009.
- Designing the User Interface, 5 th Edition. Ben Shneiderman and Catherine Plaisant
  Addison Wesley, 2010

The Pattern of Question Paper:
The units in the syllabus shall be divided in two equal sections. Question paper shall be set
having two sections A and B. Section A questions shall be set on first two units (1 and 2) and
Section B questions on remaining two units (3 and 4). Question paper should cover the entire
syllabus.

For 80 marks Paper:
1. Minimum eight questions.
2. Four questions in each section.
3. Question no 1 and 5 be made compulsory having weightage of 8 marks.
4.   Two questions from remaining questions from each section be asked to solve having
   weightage of 16 marks.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad
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Third Year M.C.A.

Course Code: MCA342	**Title: Elective – III Agile Methodology**
Teaching Scheme:	**Examination Scheme:**
Lectures: 4 hrs/week	**Theory Paper: 80 marks [3 Hrs]**
Credits: 4	**Class Test: 20 Marks**

Course Objectives:
- To understand the basic and driving forces for taking an agile approach to software development
- To understand the business value of adapting agile approaches.
- To understand the agile development practices.
- To drive development with unit tests using Test Driven development
- To apply design principles and refactoring to achieve agility
- To deploy automated build tools, version control and continues integration.

Course Outcomes:
- To apply critical thinking in analyzing a software engineering method.
- To analyze the tradeoffs in selecting a software engineering method.
- To understand the practices and philosophies of agile methods.
- To understand and apply Scrum.
- To understand and apply Extreme Programming.
- To tailor an agile method to the needs of the project.

CONTENTS

SECTION-A

Unit 1   **10 Hrs**
Fundamentals of Agile: The Genesis of Agile, Introduction and background, Agile Manifesto and Principles, Overview of Scrum, Extreme Programming, Feature Driven development, Lean Software Development, Agile project management, Design and development practices in Agile projects, Test Driven Development, Continuous Integration, Refactoring, Pair Programming, Simple Design, User Stories, Agile Testing, Agile Tools.

Unit 2   **10 Hrs**
Agile Scrum Framework: Introduction to Scrum, Project phases, Agile Estimation, Planning game, Product backlog, Sprint backlog, Iteration planning, User story definition, Characteristics and content of user stories, Acceptance tests and Verifying stories, Project velocity, Burn down chart, Sprint planning and retrospective, Daily scrum, Scrum roles – Product Owner, Scrum Master, Scrum Team, Scrum case study, Tools for Agile project management.

SECTION-B

Unit 3   **10 Hrs**
Agile Testing the Agile lifecycle and its impact on testing, Test-Driven Development (TDD),

x Unit framework and tools for TDD, Testing user stories - acceptance tests and scenarios, Planning and managing testing cycle, Exploratory testing, Risk based testing, Regression tests, Test Automation, Tools to support the Agile tester.

Unit 4   **10 Hrs**
Agile Software Design and Development: Agile design practices, Role of design Principles including Single Responsibility Principle, Open Closed Principle, Liskov Substitution Principle, Interface Segregation Principles
Agile Software Design Principle: Dependency Inversion Principle in Agile Design, Need and significance of Refactoring, Refactoring Techniques, Continuous Integration, Automated build tools, Version control, Challenges in Agile, Risks and Mitigation, Balancing Agility with Discipline

Text Books/ Reference Books:
1. Agile Software Development with Scrum by Ken Schawber, Mike Beedle Publisher: Pearson
Published: 21 Mar 2008.
2. Agile Testing: A Practical Guide for Testers and Agile Teams by Lisa Crispin, Janet Gregory
Publisher: Addison Wesley Published: 30 Dec 2008.
3. Essential Scrum: A Practical guide to the most popular agile process by Kenneth S. Rubin
4. Agile Software Development, Principles, Patterns and Practices by Robert C. Martin
Publisher: Prentice Hall Published: 25 Oct 2002.

The Pattern of Question Paper:
The units in the syllabus shall be divided in two equal sections. Question paper shall be set having two sections A and B. Section A questions shall be set on first two units (1 and 2) and Section B questions on remaining two units (3 and 4). Question paper should cover the entire syllabus.

For 80 marks Paper:
1. Minimum eight questions.
2. Four questions in each section.
3. Question no 1 and 5 be made compulsory having weightage of 8 marks.
4.   Two questions from remaining questions from each section be asked to solve having weightage of 16 marks.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad
Faculty of Engineering and Technology
Third Year M.C.A.

Course Code: MCA343   **Title: Elective – III Digital Image Processing**
Teaching Scheme: **Examination Scheme:**
Lectures: 4 hrs/week   **Theory Paper: 80 marks [3 Hrs]**
Credits: 4   **Class Test: 20 Marks**

Course Objectives:
- Introduce Fundamentals of Digital Image Processing and algorithms that are used
- Understand how digital images are represented, manipulated, encoded and processed, with emphasis on algorithm design, implementation and performance evaluation

Course Outcomes:
Student will be able to-
- Understand the basic concepts and algorithms used for Digital Image Processing
- Study and program advanced techniques for image enhancement, segmentation morphological operations etc.

CONTENTS

SECTION-A

Unit 1   Introduction to digital Image Processing: 10 Hrs
Introduction: Digital Image Processing, Applications, Fundamental steps in digital image processing, Components of an image processing system
Digital Image Fundamentals: Elements of Visual Perception, Light and the Electromagnetic Spectrum, Image sensing and acquisition, Image sampling and quantization, Relationship between pixels, Mathematical tools for image processing.

Unit 2   Intensity Transformation and Spatial Filtering: 10 Hrs
Introduction, Basic intensity transformation functions, Histogram processing, Fundamentals of spatial filtering, Smoothing Spatial filters, Sharpening Spatial filters

SECTION-B

Unit 3   Morphological Image Processing: 10 Hrs
Introduction**,** Erosion and Dilation, Opening and Closing, Hit or miss Transformation Basic Morphological Algorithms**:** Boundary Extraction, Hole Filling, Extraction of Connected components, Thinning, Thickening, Skeleton and Pruning Gray Scale Morphology

Unit 4   Image Segmentation and Color Image Processing: 10 Hrs
Image Segmentation: Fundamentals, Point, Line and Edge Detection, Region Based segmentation, Segmentation using morphological watersheds
Color Image Processing: Color fundamentals, Color Models, Image Segmentation based on color

Text Books/ Reference Books:

1. 'Digital Image Processing', Rafael C. Gonzalez, Richard E. Woods, Pearson, Third Edition
2. 'Fundamentals of Digital Image Processing', Anil K. Jain, Pearson, 2008.
3. 'Digital Image Processing', W.K. Pratt, Third Edition, John Wiley & sons, Inc. 2006

The Pattern of Question Paper:

The units in the syllabus shall be divided in two equal sections. Question paper shall be set having two sections A and B. Section A questions shall be set on first two units (1 and 2) and Section B questions on remaining two units (3 and 4). Question paper should cover the entire syllabus.

For 80 marks Paper:

1. Minimum eight questions.
2. Four questions in each section.
3. Question no 1 and 5 be made compulsory having weightage of 8 marks.
4. Two questions from remaining questions from each section be asked to solve having weightage of 16 marks.

Course Code: MCA321	**Title: Lab – I Cyber Security**
Teaching Scheme:	**Examination Scheme:**
Practical: 2 hrs/week	Practical Exam: 50 Marks
Credits: 1	

Course Objectives:

Student will be able to

1. Understand Encryption and decryption process, hashing and digital signatures
2. Understand the methods to control access in operating system
3. Analyse the packets at run time for vulnerabilities
4. Identify Software vulnerabilities

Course Outcomes:

Student will be able to

1. Apply cryptography to secure data in real time
2. Handle with the SQL Injection, Cross Site Scripting and buffer overflow vulnerabilities
3. Secure Operating System from unauthorized access.
4. Implement firewalls to secure network access

Suggestive List of Experiments:

1. Networking and   Communication Commands

2. Symmetric and Asymmetric Encryption using Open SSL command line tool

3. Hash and Digital Signature using Open SSL command line tool, PKI using Open SSL Command Line Tool

4. Access Control in Operating System(Linux)

5. Study Manual for Wire Shark and perform the following using Wireshark
   - Identify the first 2 packets (i.e. their packet numbers) containing HTTP GET request.
   - What webpage was visited in the above 2 packets?
   - What version of HTTP was used?
   - What is the destination IP address in the above packets?
   - List the source and destination ports of the packets travelling from the client to the server in the above packets?
   - In the HTTP server's response, look at the information sent about the server. What server software was used?
   - What are the IP addresses of the server?
   - What are the MAC addresses of the client and server?
   - How many WebPages (not websites) have been opened?

- What is the time difference between first HTTP GET and the first HTTP response (OK)?
- Count the total number of HTTP GET requests.
- What is the time difference between the first and last HTTP GET requests? Hint: Follow a similar procedure as mentioned previously.
- How may packets were exchanged between the server (corresponding to the both IP ad- dresses) and the client? (Note: Their sum must be equal to the total no. of packets)
- Find the total no. of HTTP requests sent by the host spongebob.wikia.com.

6. SQL Injection
7. Cross Site Scripting
8. Buffer Overflow Vulnerability and its remedies
9. Network Based IDS Tool OSSEC
10. Software Firewalls (IPTABLES)
11. Case Study on any three Cyber Security Tools

References:
1. Unix Concepts and Applications by Sumitabha Das
2. http://www.ossec.net/
3. www.linuxmanpages.com/man1/pflogsumm.1.php
4. www.webalizer.org/
5. http://www.computersecuritystudent.com/SECURITY_TOOLS/DVWA/
6. https://www.wireshark.org/#learnWS
7. https://wiki.openssl.org

Practical Examination:
Practical Examination should be conducted by internal examiner for three hours under the supervision of external examiner. External examiner should evaluate student by checking practical performance and conducting viva.

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Faculty of Engineering and Technology
Third Year M.C.A.

Course Code: MCA322   **Title: Lab – II Android Programming**
Teaching Scheme: **Examination Scheme:**
Practical: 2 hrs/week   **Practical Exam: 50 Marks**
Credits: 1   **Term Work: 50 Marks**

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Course Objectives:
- To create basic Android applications using open-source platform
- To enhance ability of students for developing Android apps and publish onto the physical devices like tablets, Smartphone's etc.

Course Outcomes: Students will be able to:
- Design, develop and build useful Android applications with compelling user interfaces.
- Take advantage of Android's APIs for data storage, user preferences, files, databases, and content providers for App Development

Perquisite: Core Java, Advance Java & SQL

Unit 1:

Introduction: Introduction to Hybrid Vs. Native application. Introduction to Emulator – AVD (Android Virtual Device), usage of LOGCAT and DDMS, Android API levels (Versions & Its Name), Views & Views group: Text View, List View, Grid View, WebView, Scroll View, Image View. Layouts: Linear Layout (Horizontal & Vertical orientation), Relative Layout, Grid Layout, Table Layout. Toast, Fragments, Alert Dialogues, Form Widgets with Validation control

Unit 2:
Fundamental & Advance UI Component: Intents, Threads, Session Management (Shared Preferences and Preferences using XML).
Introduction to Material Design – Coordinator Layout, SnackBar, Toolbar, Card View, Navigation Menu, android motion(Animation).

Unit 3:
SQLite & Content Providers: Introducing SQLite, SQLiteOpenHelper and creating database, Working with databases, Working with cursors Inserts, updates, and deletes, Accessing built in content providers, Adding, changing, removing and Searching content

Unit 4:
REST Webservices & Application Deployment: Consuming Webservices, Receiving HTTP Response (XML & JSON), Using Web View, Android Application Deployment on

device with Linux or Windows, Android Application Deployment on Android Market.

Text Books/ Reference Books:
- Beginning Android Application Development, Lee, Wei-Meng Publisher: Wrox
- Android Application Development for Dummies (2nd Edition), Felker, Donn, Publisher: Wiley
- Beginning Android Tablet Application Development, Lee, Wei-Meng, Publisher: Wrox
- Android 4: New Features for Application Development, Aydin, Murat ,Publisher: Packt Publishing Ltd.

Reference websites:
- http://www.beginandroid.com
- http://www.tutorialspoint.com

Suggestive Tools –
   JDK 1.7 onwards, Android Studio, Eclipse 3.x

Suggestive List of Experiments:

- Setup environment and demonstrate Hello world application with different sizes and color on same activity/page.

- Create application to display college information minimum on 4 activities with switching between activities using intents

- Create application for making splash screen where your collage logo displayed and after 5sec it goes to home activity of your collage information.

- Create application using Web View where animated slider (HTML) displayed.

- Create application to display List of courses using ListView and GridView using its adapter.

- Create application using form control widgets with validation control.

- Create application to connect database and retrieve login credentials and maintain keep sign in option using Shared Preferences.

- Make CRUD application using database for student information.

- Create application to read media files (Images) from internal storage and display it on screen.

- Create application to read Rest API JSON string using JSON parsing and update and delete data in same way.

Term Work:

The term work shall consist of at least 10 experiments/ assignments based on the syllabus above. Assessment of term work should be done which will consider the points below and the marks should be awarded accordingly.

- o Continuous lab assessment
- o Actually, performing practical's in the laboratory during the semester.

Practical Examination:

Practical Examination should be conducted by internal examiner for three hours under the supervision of external examiner. External examiner should evaluate student by checking practical performance and conducting viva.

Course Code: MCA323   **Title: Lab – III Python Programming**
Teaching Scheme: **Examination Scheme:**
Practical: 2 hrs/week   **Practical Exam: 50 Marks**
Credits: 1

Course Objective:
- To understand why Python is a useful scripting language for developers.
- To learn how to design and program in Python applications.
- To learn how to use lists, tuples, and dictionaries in Python programs.
- To learn how to write functions and packages in Python.
- To learn how to design object oriented programs with Python classes.
- To understand database connectivity

Course Outcome:
Students will be able to,
- Write a basic program in python
- Use lists, tuples and dictionaries in python programs
- Implements functions and packages to achieve code reusability
- Use of python classes for object oriented programs
- implements database connectivity programs for dynamic application

Unit 1
Introduction to Python
What is Python? history of Python, Python Features, Python Applications, Getting Python, Installation, Setting path at Unix/Linux, Windows, Environment setup

Unit 2
Python Fundamentals
Python Identifiers, Keywords, Lines and Indentation, Comments, Quotation, Blank Lines, Multi-Line Statements, Command Line Arguments, Variable and Data Types, Python Numbers, Lists, Tuples, Dictionary, Multiple Assignments, Input Function, Operators, Operator precedence

Unit 3
Control Structures
If Statement, If…else Statement, The *elif* Statement, While Loop, The Infinite Loop, For Loops, Iterating by Sequence Index, Nested Loops, Loop Control Statements, Break Statement, Continue Statement, Pass Statement, single statement suites, arrays in python

Unit 4
Functions and Modules
Defining a function, Calling a Function, Function Arguments, Passing by Reference, Passing

by Value, Function Arguments, Modules, The *import* Statement, The *from...import* * Statement, Locating Modules, Packages in Python, Commonly used Python modules

Unit 5
Files, Classes and Database Connectivity
The open Function, Opening and Closing Files, Reading and Writing Files, The close() Method, What is Exception?, Handling an Exception, Overview of OOP Terminology, Creating Classes, Creating Instance Objects, Database connection, Insert, Read, Update, Delete Operation.

Text Books/ Reference Books
1) Mark Lutz, Learning Python ,5th Edition, O'Reilly publication
2) John Zelle, Python Programming: An introduction to Computer Science
3) Programming in python 3 by Developers Library
4) Tony Gaddis, Starting out with Python, Pearson publication
5) Kenneth A.Lambert ,Fundamentals of Python : First Program
6) Mark Lutz, Python pocket reference ,5th edition, O'Reilly publication

Digital References
1) https://www.tutorialspoint.com/python/
2) https://docs.python.org/3/tutorial/
3) https://www.programiz.com/python-programming

Suggestive List of Experiments:

1) Program to demonstrate basic data type in python
2) Program to demonstrate operators in python
3) A cashier has currency notes of denominations 10, 50, and 100.If the amount to be withdrawn is input through the keyboard using input() function in hundreds ,find the total number of currency notes of each denomination the cashier will have to give to the withdrawer
4) Program to demonstrate list and tuple in python
5) Write a program in Python, A library charges a fine for every book returned late. For first 5 days the fine is 50 paisa, for 6-10 days fine is one rupee and above 10 days fine is 5 rupees. If you return the book after 30 days your membership will be cancelled. Write a program to accept the number of days the member is late to return the book and display the fine or the appropriate message
6) Write a program to calculate overtime pay of 10 employees. Overtime is paid at the rate of Rs.12.00 per hour for every hour worked above 40 hours. Assume that employee do not work for fractional part of an hour
7) Two numbers are entered through the keyboard, write a program to find the value of one number raised to the power of another
8) Write a function that receives marks received by a student in 3 subjects and returns the average and percentage of these marks. Call this function from main() and print the result in main

9) Write a program to read a file and display its contents
10) Write a program to demonstrate database connectivity in python

Practical Examination:
The Practical work shall consist of at least 10 experiments/ assignments based on the syllabus above.

Practical Examination should be conducted by internal examiner for three hours under the supervision of external examiner. External examiner should evaluate student by checking practical performance and conducting viva.

Course Code: MCA324   **Title: Lab – IV Research Methodology**
Teaching Scheme: **Examination Scheme:**
Practical: 2 Hrs/Week   **Term Work: 50 Marks**
Credits: 1

Course Objectives:
        The students should be able to:
- Understand some basic concepts of research and its methodologies
- Identify appropriate research topics
- Select and define appropriate research problem and parameters
- Prepare a project proposal
- Organize and conduct research (advanced project) in a more appropriate manner
- Write a research paper, report and thesis
- Write a research proposal

Course Outcomes:
Students will be able to:
- Design a qualitative and a quantitative research study.
- Use public information and research-based knowledge of issues and trends to develop a
  Research plan.
- Analyze a set of data, using standard procedures of qualitative and qualitative research.
- Use standard technology tools to develop instruments, organize and store data, conduct data
  analysis, and prepare research reports.
- Critique published educational research.
- Design an action research project.

Unit 1:

Introduction to Research Methodology

Motivation and objectives – Research methods vs Methodology. Types of research – Descriptive vs. Analytical, Applied vs. Fundamental, Quantitative vs. Qualitative, Conceptual vs. Empirical.
Defining Research problem and basics of principles of experimental design.
Defining and formulating the research problem -Selecting the problem - Necessity of defining the
problem - Importance of literature review in defining a problem
Guidelines for reading Research papers
The student will be given sample papers and guided how to read research papers.

Unit 2:

Guidelines on writing literature review

Primary and secondary sources – reviews, treatise, monographs-patents – web as a source – searching the web - Critical literature review – Id entifying gap areas from literature review

Methods of data collection

Collection of primary data, Observation method, Interview method, Collection of data through questionnaire and schedules, Collection of secondary data, Selection of appropriate method for data collection.

Unit 3:

Statistic in Research methodology, Hypothesis testing, Report and Thesis writing

Structure and components of scientific reports -Types of report – Technical reports and thesis – Significance – Different steps in the preparation – Layout, structure and Language of typical reports – Illustrations and tables - Bibliography, referencing and footnotes.

Presentation Skills

Oral presentation – Planning – Preparation – Practice – Making presentation – Use of visual

aids - Importance of effective communication –.

Unit 4:

Application of results and ethics

Environmental impacts - Ethical issues -ethical committees - Commercialisation – Copy right – royalty - Intellectual property rights and patent law – Trade Related aspects of Intellectual Property Rights – Reproduction of published material – Plagiarism - Citation and acknowledgement - Reproducibility and accountability.

Text Books/ Reference Books:

- Garg, B.L., Karadia, R., Agarwal, F. and Agarwal, U.K., 2002 An introduction to Research Methodology, RBSA Publishers.
- Kothari, C.R., 1990. Research Methodology: Methods and Techniques. New Age International.
- Sinha, S.C. and Dhiman, A.K., 2002. Research Methodology, Ess Ess Publications. 2 volumes
- Trochim, W.M.K., 2005. Research Methods: the concise knowledge base, Atomic Dog Publishing. 270p.
- Wadehra, B.L. 2000. Law relating to patents, trademarks, copyright designs and geographical indications. Universal Law Publishing.

Suggestive List of Experiments:

1. Formulate the Research Idea/ Problem.
2. Conduct a literature Review
3. Identify and define the key concepts
4. Formulate Research questions, Objectives and Hypothesis
5. Collect your data
6. Analyse and Discuss your data
7. Draw appropriate conclusion(s)
8. Write the Research Report.

Term Work:

The term work shall consist of assignments based on the syllabus above. Assessment of term work should be done which will consider the points below and the marks should be awarded accordingly.

- o Continuous lab assessment
- o At least one research paper should be presented /published in reputed conference/ Journal by the students.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad
Faculty of Engineering and Technology
Third Year M.C.A.

Course Code: MCA371	**Title: Dissertation**
	Examination Scheme:
Credits: 16	**Practical Exam: 150 Marks**
	Term Work: 50 Marks

Course Objectives:

- To understand methodologies and professional way of documentation.
- To get industrial exposure for real time projects.
- To demonstrate a systematic understanding of project.
- To understand established techniques of project report development.

Course Outcomes:

- Opportunity to specialize in specific areas of computer science and applications.
- Future employers will most likely ask you about your project at interview.
- Opportunity to demonstrate a wide range of skills and knowledge learned.
- Encourages integration of knowledge gained in the previous course units.

Guidelines for Students:

- The candidate should complete the project work individually.

- The project can be done within the institute or it can be sponsored and performed in an industry.

Guidelines for Project Assessment:

- The faculty (Internal Guide) to student ratio for the dissertation work must be 1:5.

- The final examination will consist of the demonstration of work which will be assessed by two Examiners (one internal and one external).

- Evaluation of dissertation and oral examination will be jointly given by internal and external examiner.

General Instruction Regarding Preparation of Project Report:

Typing:

- The typing shall be standard 12 pts in double spaced using black ink only.

- Margins must be Left 2 inches Right 1.5 inches Top 1.5 inches Bottom 1.5 inches

- Paper A4 size Bond Paper. (Both side printing)

Copies:

Two hard-bound copies (Black Rexine with Golden Embossing as per format displayed herewith) One original and one clean Xerox Copy.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

College
Logo

A

PROJECT REPORT

ON

\<Project Title>

\<Company Name>

Submitted By

\<Student Name>

Under the Guidance

\<Internal Guide Name>

Department of Master of Computer Applications

\<College Name>

\<Place>

\<Academic Year>

The **suggestive format** of the report contents are as follows:

Sr. No.		Contents	Page Number
1.		**INTRODUCTION**	
	1.1	Company profile	
	1.2	Existing System and Need for System	
	1.3	Scope of Work	
	1.4	Operating Environment at Server Side – Hardware and Software	
	1.5	Operating Environment at Client Side – Hardware and Software	
	1.6	Detailed Description of Technology Used	
2.		**PROPOSED SYSTEM**	
	2.1	Proposed System	
	2.2	Objectives of System	
	2.3	User Requirements	
3		**ANALYSIS & DESIGN**	
	3.1	Data Flow Diagram (DFD)	
	3.2	Entity Relationship Diagram (ERD)	
	3.3	UML Diagrams (Use Case, Activity, Sequence, Class Diagrams)	
	3.4	Table Design	
	3.5	Menu Tree Diagram (Site Map in case of Web Application)	
	3.5	Menu Screens	
	3.6	Test Procedures and Implementation- With a Test Case	
4.		**USER MANUAL**	
	4.1	User Manual	
	4.2	Operations Manual / Menu Explanation	
	4.3	Forms and Report Specifications	
5		**Drawbacks and Limitations**	
6		**Proposed Enhancements**	
7		**Conclusion**	
8		**Bibliography**	
9		**ANNEXURES**	
	9.1	Input Forms With Data	
	9.2	Output Reports with data (If applicable)	
	9.3	Sample Code	

Course Code: MCA372   **Title: Seminar**
                                                           Examination Scheme:
Credits: 2   **Term Work: 50 Marks**

Guidelines for Seminar

1. Seminar is to be independently delivered by each candidate.

2. The topic selected should be associated with current trends in Computer field.

3. A report is to be submitted before the presentation.

4. Presentation must be done using power point presentation using 1-6-6 rules

5. The seminar presentation and the report is to be evaluated by internal examiner of the

Department.