

**Syllabus of  
M.Sc. (Computer Science)  
Part II (SEM-II)**

**COMPUTER SCIENCE BOARD**

**Prepared by Dr. S.B. Kishor  
Chairman, Computer Science Board**



**GONDWANA UNIVERSITY,  
GADCHIROLI**

**SESSION 2013-2014**

## **M.Sc. (C/S)- II (Semester – II)**

**Paper-1** : Android Application Development

**Paper-2:** Digital and Cyber Forensics

**Paper-3:** Elective

3.1 ASP .NET using C#.NET

3.2 Neutral Network

3.3 Cyber Security

**Paper-4** : Project

**Paper- 5** : Practical-I based on Theory Paper-1 to 2

**Paper 6** : Practical-II based on Theory Paper-3

**M.Sc. (Computer Science)-II**  
**SEMESTER - II**  
**PAPER-1: ANDROID APPLICATION DEVELOPMENT**  
**(4MSc1) (Marks-80)**

**Unit-I: Introduction to Android**

The Android Platform, Understanding Android Market, Layers of Android, Intent of Android Development, Types of Android Components, Mapping Applications to Processes, Creating an Android Application.

**Android's Development Environment:** Introduction to Android SDK, Exploring Android Development Environment and Building Android Application in Eclipse, Android Emulator and User Interfaces, Working with Views, Using Resources, and Understanding and Exploring Android Manifest File.

**Unit-II: Intents and Services**

Serving up Restaurant finder with Intent, Checking Weather with a Custom URI and Broadcast Receivers, Building a Background Weather Services, Communicating Weather alert service From Other Apps.

**Storing and Retrieving Data:** Using Preferences, Using the File System, Persisting Data to a Database, Working with Content provider Classes.

**Networking and Web Services:** An Overview of Networking and Web Services, Checking The Network Status, Communicating with a Server Socket, Working with HTTP and Web Services, Introducing Toast, Introducing Notifications, Introducing Alarms.

**Unit-III: Graphics, Animation and Multimedia**

Drawing Graphics in Android, Creating Animations with Android's Graphics API, Introducing Openly for Embedded Systems, Introduction to Multimedia and Open core, Playing Audio, Playing Video, Capturing Media, Recording Video, Simulating Your Location within The Emulator, Using Location manager and Location provider, Working with Maps, Converting Places and Addresses with Decoder.

**Unit-IV: Platform Maturity with Android Applications**

Using Android to Work in a Field Service Application, Building Android Applications in C, Bluetooth and Sensors, Integration, Android Web Development, Appwidgets, Localization, Android Native Development Kit

**Books:**

- 1) W. Frank Ableson, RobiSen, Chris King, "Android in Action", 2<sup>nd</sup> Edition, Manning Publications Co., 2011, ISBN 978-1-935182-72-6
- 2) Damon Oehlman, Sebastien Blanc, "Pro Android Web Apps - Develop for Android Using HTML5, CSS3 and Javascript", Apress Publications, 2011, ISBN-13: 978-1-4302-3276-6
- 3) Chris Haseman, "Android Essentials", Apress Pub., 2008, ISBN-13: 978-1-4302-1064-1
- 4) James Steele, Nelson to, "The Android Developer's Cookbook-Building Applications with The Android SDK", Wesley Publications, 2011, ISBN-13: 978-0-321-74123-3

**References:**

- 1) Lucas Jordan, Pieter Greyling, "Practical Android Projects", Apress Publications, 2011, ISBN-13: 978-1-4302-3243-8
- 2) ZigurdMednieks, Laird Dornin, G. Blake Meike and Masumi Nakamura, "Programming Android", O'reilly Publications, 2011,

**M.Sc. (Computer Science) - II**  
**SEMESTER - II**  
**PAPER-2: DIGITAL AND CYBER FORENSICS**  
**(4MSc2)**

**(Marks-80)**

**Unit I: Introduction to Networking**

**Introduction to Networking:** Networking Hardware, Networking Software, Internet, Web Phishing.

**History and Future of Cybercrime:** Old and New Crimes, The Internet Spawns Crime, Worms Verses Viruses, Broadband, Wireless.

**Introduction to Computer forensics:** Computer forensics Definitions , Computers' Roles in Crimes, Computer forensics Tasks, Prepare for an Investigation, Collect Evidence, Preserve Evidence, Recover Evidence, Document Evidence, Challenges Associated with Making "Cybercrime" Laws, Jurisdictional Issues, Introduction to Computer Hardware

**Unit II: Computer Crimes and Criminals**

**Computer Crimes and Criminals:** Crimes, Violent Crimes: Computers Included in Terrorism, Assault Threat, Stalking, Child Pornography, Nonviolent Crimes, Trespass, Theft, Fraud, Vandalism, Address Books, Chat Logs, E-Mail, Images, Movies, Internet Browser History, Etc. Crime Timeline, Modify Access Create (Mac) Dates Associated with Files, Criminals and Crime Fighter, Understanding "Cyber , Criminals" and Their Victims, "Cyber Investigators" , Protecting Yourself on The Internet, Anti-Virus and Firewall Software.

**Unit III: Collecting and Preserving Digital Evidence**

**Collecting and Preserving Digital Evidence:** Admissibility of Evidence, Must Be Legally Obtained, (Obeying The 4th Amendment and Other Federal and State Laws), Must Be Competent, Relevant, and Material, Types of Evidence, Physical, Direct, Circumstantial, Demonstrative, Documentary, Documenting Evidence with Tags and Logs, Maintaining The Chain of Custody, Processes for Collecting Computer Evidence.

**Building a Cybercrime Case:** Bodies of Law, Constitutional Law, Criminal Law, Civil Law, Administrative Regulations, Levels of Law, Local Laws, State Laws, Federal Laws, International Laws , Levels of Culpability, Intent, Knowledge, Recklessness, Negligence, Level and Burden of Proof, Criminal Versus Civil Cases , Vicarious Liability, Laws Related to Computers, CFAA, DMCA, Can Spam.

**Unit IV: Computer Hardware, Software**

**Computer Hardware:** Computer Architectures, Components, Power Supply, Motherboard, Ethernet, Com, Parallel Port, Modem Etc.

**Computer Software: Operating:** Systems, Types of Operating Systems, Working

**Preserving and Recovering Digital Evidence:** Disk Imaging, Creating a Message Digest or Hash Code for a Disk, Where Data Hides; Deleted and Erased Data, File Systems, Files, Modify Access Create (Mac) Dates to Establish Time Line, File Headers - Info About File Type.

**Books:**

- 1) Micheal Cross, Debra Littlejohn Shiner, "Scene of the Cybercrime", Syngress Pub, 2<sup>nd</sup> Edition
- 2) Vakul Sharma, "Handbook of Cyber Laws", McMillan

**M.Sc. (Computer Science) - II**  
**SEMESTER - II**  
**PAPER-3.1(ELECTIVE-I): ASP .NET using C#.NET**  
**(4MSc3.1) (Marks-80)**

**Unit-I: Web Development and Asp .Net**

Introduction to .Net framework, .NET languages, The .NET class library, About ASP.NET, Basic difference between C# and VB.NET, Data types, Comparison of Asp and Asp .Net, Features of Asp .Net, Benefits of Asp .Net, Web forms and their Components, Overview of Web Services. **Web Application Basics:** Web forms Model, Web forms Internals, Asp.Net Core Server Controls, Working with Page.

**Unit-II: Creating Web forms Application**

Upgrading HTML Pages to Asp.Net, Asp Pages to Asp.Net, **Adding Data in an Asp.Net Site:** ADO.Net, Paging Through Data Sources, **Creating Web forms Application:** Creating an Asp.Net Web Application Project, Responding to Events, Namespace Fundamentals Maintaining State Information.

**Unit-III: Creating a User Interface**

Using Web Controls, Using Visual Studio.Net, Validation and Rich Control, Validating Data, Navigating Between forms, Navigation between Pages, **Data Binding:** Bind Data to The UI, Transform and Filter Data Storing and Retrieving Data with ADO.Net, Accessing Data with ADO.Net, Using Data Sets on Web forms, Processing Transactions, Catching and Correcting Errors: Using Exception Handling, Using Error Pages, Logging Exceptions.

**Unit-IV: Web Services**

Creating Web Services, Discovering Web Services, Instantiating and Invoking Web Services, Testing Web Applications: Creating Tests, Running Tests. Debugging, Building and Deploying Web Applications, Creating an Installation Program, Maintaining Security: Authenticating and Authorizing Users, Using Windows Authentication, Using forms Authentication.

**Books:**

- 1) Russel, "Mastering Asp.Net", BPB Publication,
- 2) MatThew Macdonald, "Asp.Net the Complete References", TMH.
- 3) ShirishChavan, "Visual Basic.NET", 1<sup>st</sup> Edition, 2007, Pearson Publication". ISBN 81-317-1391-1.

**References:**

- 1) Mitchell and Atkinson, "Active Server Pages 3.0 (in 21 Days)" Techmedia"
- 2) David Buser, John Kauffman, Juan T. Llibre, Brian Francis, Dave Sussman, Chris Ullman, Jon Duckett, "Beginning Active Server Pages 3.0", Wrox Press.

**M.Sc. (Computer Science) - II**  
**SEMESTER - II**  
**PAPER-3.2 (ELECTIVE-II): Neural Network**  
**(4MSc3.2) (Marks-80)**

**Unit-I: Introduction: Feed forward Neural Networks**

**Artificial Neurons, Neural Networks and Architectures:** Neuron Abstraction, Neuron Signal Functions, Mathematical Preliminaries, Neural Networks Defined, Architectures: Feed forward and Feedback, Salient Properties and Application Domains of Neural Network Geometry of Binary Threshold Neurons and Their Network: Patterns Recognition and Data Classification, Convex Sets, Convex Hulls and Linear Separability, Space of Boolean Functions, Binary Neurons are pattern Dichotomizes, Non-linearly separable Problems, Capacity of a simple Threshold Logic Neuron, Revisiting the XOR Problem, Multilayer Networks.

**Unit-II: Supervised Learning I**

**Perceptrons and LMS: Learning and Memory, From Synapses to Behavior:** The Case of Aplysia, Learning Algorithms, Error Correction and Gradient Descent Rules, The Learning Objective for TLNs, Pattern space and Weight Space, Perceptron Learning Algorithm, Perceptron Convergence Theorem, Perceptron learning and Non-separable Sets, Handling Linearly Non-Separable sets,  $\alpha$ -Least Mean Square Learning, MSE Error Surface and its Geometry, Steepest Descent Search with Exact Gradient Information,  $\mu$ -LMS: Approximate Gradient Descent, Application of LMS to Noise Cancellation

**Unit-III: Supervised Learning II**

**Backpropagation and Beyond:** Multilayered Network Architectures, Back propagation Learning Algorithm, Structure Growing Algorithms, Fast Relatives of Backpropagation, Universal Function Approximation and Neural Networks, Applications of Feedforward Neural Networks, Reinforcement Learning

**Unit-IV: Neural Networks**

**A Statistical Pattern Recognition Perspective:** Introduction, Bayes Theorem, Classification Decisions With Bayes Theorem, Probabilistic Interpretation of A Neuron Discriminant Function, Interpreting Neuron Signals As Probabilities, Multilayered Networks, Error Functions And Posterior Probabilities, Error Functions For Classification Problems  
Generalization: Support Vector Machines and Radial Basis Function Networks: Learning from Examples and Generalization, Statistical Learning Theory Briefer, Support Vector Machines, Radial Basis Function Networks, Regularization Theory Route to RBFNs, Generalized Radial Basis Function Network,

**Books:**

1. Neural Network-A Classroom Approach, Satish Kumar, Tata McGraw Hill
2. Introduction to neural networks using MATLAB 6.0 by Sivanandam, S Sumathi, TMH

**References:**

1. Neural networks A comprehensive foundations, Simon Hhaykin, Pearson Education 2<sup>nd</sup> ed. 2004
2. Artificial neural networks -B.Yegnanarayana, Prentice Hall of India P Ltd 2005.
3. Neural networks in Computer intelligence, Li Min Fu, TMH 2003.
4. Neural networks James A Freeman David M S kapura, Pearson education 2004.
5. C++ Neural Network and Fuzzy Logic 2nd Edition, Valluru B. Rao, Hayagriva V. Rao, Henry Holt and Co.

**M.Sc. (Computer Science) - II**  
**SEMESTER - II**  
**PAPER-3.3 (ELECTIVE-III): CYBER SECURITY**  
**(4MSc3.3) (Marks-80)**

**Unit-I: Introduction to Internet Security**

Need for Internet Security, Adopting Security Policies, Strategies for a Secure Network, Ethics of Computer Security, Security Threats and Levels, Security Plan (RFC 2196).

Classes of Attacks: Stealing Passwords, Social Engineering, Bugs and Backdoors, Authentication Failures, Protocol Failures, Information Leakage, Exponential Attacks – Virus and Worms, Denial-of-Service-Attacks, Botnets, Active Attacks.

**Unit-II: Computer Security**

Introduction to Virus, Trojan Horses, Worms, Bombs, Protection against Virus, Structure of Virus. Firewalls: Introduction to Firewalls, Kinds of Firewalls: Packet Filters, Application-Level Filtering, Circuit-Level Gateways, Dynamic Packet Filters, Distributed Firewalls, Firewall Engineering: Rule sets, Proxies, Building a Firewall from Scratch, Firewall Problems and Testing Firewalls.

**Unit-III: Safer Tools and Services**

Authentication: Passwords, Smart Cards, Biometrics, RADIUS, SASL, Host-To-Host Authentication, PKI. Some Tools and Services: Inet-Network Services, Ssh-Terminal And File Access, Syslog, Network Administration Tools, Chroot-Caging Suspect Software, Jailing The Apache Web Server, Aftpd-A Simple Anonymous FTP Daemon, Mail Transfer Agents, POP3 And IMAP, Samba: An SMB Implementation, Taming Named, Adding SSL Support with Sslwrap.

**Unit-IV: Cryptography and VPNs**

Introduction to Cryptography, Notation, Secret-Key Cryptography, Modes of Operation, Public Key Cryptography, Exponential Key Exchange, Digital Signatures, Secure Hash Functions, Timestamps, Basic Encryption and Decryption. Introduction to VPNs, Advantages, Disadvantages of VPN, VPN Authentication and Authorization, VPN Threats and Exploits, Personal and Network VPNs, Hardware and Software VPNs, Differences between Layer2 and Layer3 VPNs

**Books:**

- 5) W. R. Cheswick, S. M. Bellovin, A. D. Rubin, “Firewalls and Internet Security-Repelling the Wily Hacker”, Addison-Wesley Publication, “2<sup>nd</sup> Edition”, Year- 2003, ISBN No- 0-201-63466-X
- 6) J. Michael Stewart, “Network Security, Firewalls, and VPNs”, Jones & Bartlett Publication, Year- 2011, ISBN N- 978-0-7637-9130-8

**References:**

- 1) Kenneth EinarHimma, “Internet Security: Hacking, Counter Hacking and Society”, Jones & Bartlett Publication, “1<sup>st</sup> Edition”, Year- 2007, ISBN No– 978-0-7637-3536-4
- 2) Man Young Rhee, “Internet Security: Cryptographic Principles, Algorithms and Protocols”, J. Wiley Publication, Year- 2003, ISBN No- 978-0-4708-5285-9



## M.Sc. (C/S) - II

### SEMESTER-II

#### PROJECT

(4MSc4)

(Marks-100)

#### Instruction:

Towards the end of the second semester of study, a student will be examined in the course

“Project Work”.

- a. Project Work may be done individually or in groups (**Maximum 2 students**) in case of bigger projects. However if project is done in groups, each student must be given a responsibility for a distinct module and care should be taken to monitor the progress of individual student.
- b. The Project Work should be done using the tools covered in Master of Computer Application
- c. The Project Work should be of such a nature that it could prove useful or be relevant from the System-oriented/Application/commercial / management angle.
- d. The project work will carry 100 marks.
- e. The external viva-voce examination for Project Work would be held as per the Examination Time Table of the second year of study, by a panel of one external and one Internal examiner.
- f. Head/Co-ordinator of Computer Dept. must reject any project title which was already carried out in any computer course in the college. He must maintain a Record that lists the projects along with other detail (like Guide, Session, and Number of students working on project etc) that was carried out so far and must be shown to external examiner at the time of examination.

#### Types of Project

As majority of the students are expected to work out a project in some industry/research and development laboratories/educational institutions/software export companies, it is suggested that the project is to be chosen which should have some direct relevance in day-today activities of the candidates in his/her institution. The Applications Areas of project - Financial/Marketing/Database Management System/ Relational Database Management System/E-Commerce /Internet/ Manufacturing/ web Designing/Hardware and Software interaction based etc.

#### Project Proposal (Synopsis)

The project proposal should be prepared in consultation with the guide. The project guide must be a person having minimum Qualification M.Sc. (Computer)/ MCA/ M.Sc. (Maths/Electronics/Statistics/Physics + Post B.Sc. Dip. In Comp. Sc. & Appl.) The project proposal should clearly state the objectives and environment of the proposed project to be undertaken. It should have full details in the following form:

1. Title of the project
2. Objectives and Hypothesis of the Project
3. Project Category (DBMS/RDBMS/OOPS/Web Designing/Internet etc.)
4. Tools/Platform, Languages to be used



5. A complete Structure of the program:
  - i. Analysis.
  - ii. Numbers of Modules.
  - iii. Data Structures or Tables
  - iv. Process Logic.
  - v. Types of Report Generation.
6. Scope of future Application.

**Project Report Formulation.**

1. Title Page.
2. Certificate Page.
3. Declaration Page.
4. Acknowledgment Page.
5. Index or Content Page.
6. Documentation.
  - i. Introduction/Objectives.
  - ii. Preliminary System Analysis.
    - Identification of Need.
    - Preliminary Investigation.
    - Feasibility Study.
    - Need of New System.
    - Flaws in Present System.
  - iii. Project Category.
  - iv. Software Requirement Specification.
  - v. Detailed System Analysis.
    - Data Flow Diagram.
    - Numbers of Modules and Process Logic. Data Structures and Tables.
    - Entity-Relationship Diagram.
  - vi. System Design.
    - Source Code.
    - Input screen & Output Screen.
  - vii. Validation Checks.
  - viii. Implementation, Evaluation and Maintenance.
  - ix. Security Measures taken.
  - x. Future Scope of the project.
  - xi. Bibliography

Appendix

- o Survey Questionnaire

**M.Sc. (C/S) - II**  
**SEMESTER-II**  
**PRACTICAL - I**  
**(4MSc5)**

**(Marks-100)**

**Practical I Based on Android Application.**

1. Testing your android development environment perform following operations.
  - a. Add the sample application to a project in your eclipse workspace.
  - b. Create an Android Virtual Device (AVD) for your sample project.
  - c. Create a launch configuration for your sample project.
  - d. Run your sample application in Android Emulator.
2. Write a program to build your first Android Application “Hello World” with common activity.
3. Write a program which will implement Sub menu in android application.
4. Write a program which will implement Context menu (Floating List of Menu Items) in android application.
5. Write a program to displays the use of Relative Layout Views with different attributes.
6. Write a program to displays the use of Linear Layout Views with different attributes.
7. Write a program to implement a menu which uses check-able items in Menu.
8. Write a program to implement a Custom Button and handle the displayed message on button press.
9. Write a program to implement the Table layout in View Group that displays child View elements in rows and columns.
10. Write a program to implement the List View in your android application.
11. Write a program to implement tween animation and rotate the text in your android application.
12. Write a sample program to create a progress bar for your android applications.
13. Write a program to show how to use Date picker control of ADK in your android applications.
14. Write a program which enables you to draw an image using bitmap class object.
15. Write a program which shows you how to handle any type of interruption in your android application.
16. Write a program which allows you to set an image as wallpaper.
17. Write a program which allows you to get image from web and displayed them using the Image View.
18. Write a program which shows you how to create a scrollview when text is not visible on one page.
19. Write a program which will shows you how to run any video file.

**M.Sc. (C/S) - II**  
**SEMESTER-II**  
**PRACTICAL - II**  
**(4MSc6)**

**(Marks-100)**

**Practical II: Based on Web designing using ASP.NET**

**List of Practical**

1. Design simple web application using ASP.NET.
2. Design web application with different validations.
3. Design on line database application.
4. Design data report application.
5. Design web application for uploading files on web.
6. Design AJAX application.
7. Design localized web application.
8. Design WPF browser application.
9. Authentication and authorization in asp..
10. Deployment and publishing web sites.