Source Book
of
Certificate Course in Android Programming

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Source book for Certificate Course in Android Programming **Batch** 2015

1. **Course Objective:** The objective of this course is to provide the student with an expertise in Android Programming. This includes Core Java and Mobile and Wireless Technologies modules. After doing the course the student will be able to design, develop and maintain android applications effectively

2. **Eligibility Criteria:** Any Engineering /Science graduate with mathematics up to Senior Secondary or 10+2 level

3. **Prerequisite:** Sound knowledge of Computing Fundamentals and Fundamentals of Programming.

4. **Teaching Schema:**

Sl. No.	Modules	Hours
1	Fundamentals of Computer	20
2	Java Programming	70
3	Mobile and Wireless Technologies	20
4	Android Programming	110
5	Management Development Program	60
6	Project	40
	Total	**320**

5. **Suggested Schedule**

Week	Teaching Sessions & Academic Activity
1	Fundamentals of Computer (20/20 Hours) **and** Java Programming (10/70 Hours)
2	Java Programming (30/70 Hours)
3	Java Programming (30/70 Hours)
4	Mobile and Wireless Technologies (20/20 Hours) **and** Android Programming (10/110 Hours)
5	Android Programming 30/110 Hours)
6	Android Programming (30/110 Hours)
7	Android Programming (30/110 Hours)
8	Android Programming 10/110 Hours) **and** Management Development Program (20/60 Hours)
9	Management Development Program (30/60 Hours)
10	Management Development Program (10/60 Hours) **and** Project (20/40 Hours)
11	Project (20/40 Hours) **and** Exam Break 2 days)
12	1st Day – Exam, Two Days – Project Evaluation, 5th Day – Re-exam

Note: Course Delivery is 6 hours per day, 5 days per week (30 hours per week)

6. Session wise Breakup

Note: Each single session is of two hours duration for all subjects mentioned below.

Fundamentals of Computer (20 Hours)

Theory 10 hours + Lab 10 hours

Session 1:

- Computer Fundamental
- Types of computer
- Primary and Secondary storage
- Input-output devices
- Disks, tapes and CD-ROMs.
- VDUs, printers and other output devices
- Introduction to windows operating systems
- The desktop, The window, application window, document window, Dialog Window
- The Icons, Explore Your Computer, The Start Button and Taskbar.
- My Computer, Windows Explorer, Starting and Closing Programs,
- Installing Operating System
- Performing a New Installation for Windows
- Installing a Software other than OS
- Setting up a printer
- Uninstalling software

Session 2:

- Overview of Operating systems
- Types of Operating System
- Functions of Operating system
- What is process and thread
- Process Scheduling
- Discussion on Preemptive vs Non-Preemptive process

Session 3:

- Discussion on Deadlocks, Memory Management, File Management
- Discussion on User Interface and its requirements

Session 4:

- Need of Database
- Introduction to RDBM
- Overview of Oracle

Session 5:

- Introduction SQL*Plus
- Discussion on DDL, DML and DCL commands
- Discussion on queries, sub queries
- Making Views and use of View table

Lab Assignments

1. Getting Acquainted with the Linux Environment and Use various commands in Linux system (ls, cp, mv, lpr, sort, grep, cat, tac, more, head, tail, man, whatis,

whereis, locate, find, diff, file, rm, mkdir, rmdir, cd, pwd, ln and ln –s, gzip and gunzip, zip and unzip, tar an its variants, zcat, cal, bc and bc –l, banner date, time, wc, touch, echo, who, finger, w, whoami, who am i, alias, unalias, touch, push, pop, jobs, ps, etc.)

2. Getting confidence of the uses of Windows 7 and Creating different documents using windows application related to Programming
3. SQL Practice Questions Including:
    I) DDL Commands: Create/Alter/Drop/Grant/Revoke
    II) DML Commands: Select/Insert/Update/Delete/Truncate
    III) DCL Commands: RollBack Commit
    IV) Number Functions: -
    V) Single Value Functions: NVL,ABS,CEIL etc
    VI) Group Value Functions: AVG,COUNT,MAX etc
    VII) Uses of Group By, Having Clause,
    VIII) Correlated Queries, Sub Queries
    IX) Creating Simple andComplex Views,

Java Programming 70 Hours

Theory 34 hours + Lab 36 hours

Session 1:

- OOP Concepts
- 4 major OOPs concepts with different examples

Session 2:

- Java Language and its features
- Data types, Variables, Constants, operators, Control Statements (if, for, while, switch etc.), Classes in java
- Access Specifiers

Session 2:

- Constructors, finalize, instance data and methods, the new operator
- Methods, overloading, parameter passing, objects as parameters
- Memory management, garbage collection
- The first Java Program
- The this facility, static data and methods, block, scope, lifetime

Session 3:

- JDK and its usage (Java Compiler, Java Runtime, Java Debugger, Java doc)
- Difference between applications and applets
- Inner classes, Abstract Classes & wrapper classes.
- Interfaces, Packages
- Access Control Rules

Session 4:

- Exception Handling
- Exceptions as objects
- Exception hierarchy, Try, catch and finally
- Different exception classes

Session 5:

- The java Lang package, Object, Number, Math, System
- The String class

- The java.util Package
- Arrays, Vectors, Stack, Hash table, Property, Collections

Session 6:

- The Java Collection Framework
- Multithreaded programming in Java
- Multithreading: advantages and issues

Session 7:

- The Thread class, thread groups
- The Runnable interface
- Thread synchronization
- Inter-Thread communication

Session 8:

- The java.io Package
- Files
- Byte Streams and Unicode Character Streams
- Persistence of objects
- Object Serialization Methods

Session: 9:

- Swing
- Using Basic Swing Components
- Event handling
- Components and layout managers
- JFrame, JPanel, JOptionPane, JLabel, JButton, JList, JCheckBox, JRadioButton, JScrollBar, JMenuItem, JMenu, JmenuBar.
- Advanced swing components
- The Model-View-Controller Architecture
- JScrollPane, JTable,

Session: 10:

- The Applet class
- Applet context, paint (), repaint (), update (), get Graphics ()
- Passing parameters, embedding in HTML, Integrating into distributed application
- Inter applet communication, Communication with JavaScript
- Security Issues while running in clients desktop

Session: 11:

- Introduction to J2EE
- Distributed Multi-tiered Applications
- J2EE Container
- Packaging
- Deployment tools
- Web application life cycle
- Deploying web applications
- Web Services Support

Session: 12:

- Database Access Methods,
- ODBC, JDBC, JDBC architecture
- The java SQL package
- Driver Manager,
- Driver, Connection Statement,

- Result Set
- Writing database applications

Session: 13:

- Connector interface,
- Creating new classes, applications
- Advanced topics in JDBC
- Transactions
- Locking & Isolation

Session 14:

- Servlets: Dynamic Content Generation
- Advantages of Servlets over CGI
- The Servlet interface
- The HttpServlet,
- HttpServletRequest,
- HttpServletResponse classes

Session 15:

- Exception Handling
- Session
- Session Management
- Session Tracking with
- Cookies
- HttpSession
- Request Dispatcher

Session 16:

- JSP: Separating UI from Content generation code
- Life cycle of a JSP page
- Directives, Implicit and Explicit Objects,
- Scriptlets,
- Expressions,
- Expression Language

Session 17:

- Scope
- JSP Error Page handling
- Session Tracking
- JSP Using JavaBeans
- Custom Actions and Tag Libraries in JSP

Lab Assignments:

1. Create a class Emp, which contains details about the employee and compile and run its instance.
2. Create an inner class for a manager, which contains information about the manager. Use the appropriate interfaces. Create an anonymous inner class for Technical skills.
3. Create an appropriate data structures to store employee object and use the java.util.package properties.
4. Create a user defined exception to check whether your employee exist in your data structure and using the catch and finally block. Redeem an appropriate solution.

5. Using the collection framework define an appropriate interface to user registration application.
6. Using Multi-Threading create objects for Create a clock & synchronize application.
7. Create Employee & manager classes and make Employee, manager classes objects persistent.
8. Design the interface of the Employee, manager classes using applets.
9. Create a new array, whose size and component type are not known until runtime, and then modify the array's components
10. Write a multithreaded chat server and a GUI client.
11. Implement simple calculator using RMI.
12. Implement GUI application for ban account simulation
13. Write a method draw various simple national flags. Each method should ask the user how wide the flag is, and then draw it on the graphics pane.
14. Implement following scenario:
    Many of you are probably familiar with the electronic toy named ``Simon''. Simon is a simple solitaire memory game. The toy is composed of a plastic base with four colored plastic buttons on top. Each button has a different color and a different musical note is associated with each button. The toy ``prompts'' the player by playing a sequence of randomly each note is played, the corresponding button is illuminated. The player must then try to play the same ``tune'' by depressing the appropriate buttons in the correct order. If the player succeeds, the game plays a new sequence identical to the preceding sequence except that one additional note is added to the end. As long as the player can correctly reproduce the sequence played by the machine, the sequences keep getting longer. Once the player makes a mistake, the machine makes an unpleasant noise and restarts the game with a short sequence.
15. Develop static pages (using Only HTML) of an online Bookstore. The pages should resemble:
    www.flipkart.com
    The website should consist the following pages.
    - Home page
    - Registration and user Login
    - User Profile Page
    - Books catalog
    - Shopping Cart
    - Payment By credit card
    - Order Conformation
    - Validate the Registration, user login, user profile and payment by credit card pages using JavaScript.
16. Create and save an XML document at the server, which contains 10 users information. Write a program, which takes User Id as an input and returns the user details by taking the user information from the XML document.
17. Create a Java Bean which gives the exchange value of INR (Indian Rupees) into equivalent American/Canadian/Australian Dollar value.
18. Create a simple Bean with a label - which is the count of number of clicks. Than create a Bean Info class such that only the “count” property is visible in the Property Window.
19. Create two Beans-a) Key Pad .b) Display Pad. After that integrate the two Beans to make it work as a Calculator

20. Create two Beans Traffic Light (Implemented as a Label with only three background colors-Red, Green, Yellow) and Automobile (Implemented as a Text Box which states its state/movement). The state of the Automobile should depend on the following Light Transition Table. Light Transition Automobile State
    Red ---> Yellow Ready
    Yellow ---> Green Move
    Green --> Red Stopped
21. Install TOMCAT web server. Convert the static web pages of assignments 2 into dynamic web pages using servlets and cookies. Hint: Users information (user id, password, credit card number) would be stored in web.xml. Each user should have a separate Shopping Cart.
22. Redo the previous task using JSP by converting the static web pages of assignments 2 into dynamic web pages. Create a database with user information and books information. The books catalogue should be dynamically loaded from the database. Follow the MVC architecture while doing the website.
23. Implement the “Hello World!” program using JSP Struts Framework.
24. Write an application to create a XML document from a university employee database. The XML document should contain the following:
    i) Employee code
    ii) Employee Name
    iii) Designation
    iv) Address
    v) Department
    vi) The last twelve month performance summary
25. Assume there is a student database in Oracle with the following fields:
    I. Student enrollment No.
    II. Student Name
    III. Program
    IV. Address
    V. School of Study

    Write a code for Servelet which will display all the fields of the student database in the tabular manner.
26. Car Configuration Application

    We will build Ford's model with these options:
    Color - Fort Knox Gold Clearcoat Metallic, Liquid Grey Clearcoat Metallic, Infra-Red Clearcoat,
    Grabber Green Clearcoat Metallic, Sangria Red Clearcoat Metallic, French Blue Clearcoat Metallic, Twilight Blue Clearcoat Metallic, CD Silver Clearcoat Metallic, Pitch Black Clearcoat, Cloud 9 White Clearcoat
    Transmission - automatic or manual
    Brakes/Traction Control - Standard, ABS, or ABS with Advance Trac
    Side Impact Air Bags - present or not present
    Power Moon roof - present or not present
    Configuration options and cost data:
    Base Price: $20,000
    Color: No additional cost
    Transmission: 0 for automatic, $-815 for standard (this is a "negative option")
    Brakes/Traction Control: $0 for standard, $400 for ABS, $1625 for ABS with Advance Trac: Side Impact Air Bags $0 for none, $350 if selected
    Power Moonroof: $0 for none, $595 if selected

27. Body mass index (BMI) is a measure of body fat based on height and weight that applies to adult men and women. BMI can be used to indicate if you are overweight, obese, underweight or normal.
    Women tend to believe they look their best at BMI values between 20 & 22 and men are usually satisfied with a BMI of 23 to 25.
    If your BMI is 30 or more, that's not good. However, the simple BMI calculation tends to overestimate BMI in people who are muscular or athletic. Therefore, if your BMI score seems too high, you're not too fat, you're just too athletic.
    BMI is calculated based on a person's weight and height. The math formula for calculating BMI is shown at right
    Simple BMI categories include
    Underweight when BMI is less than 18.5
    Normal weight when BMI is between 18.5 and 25
    Overweight when BMI is between 25 and 30
    Too Muscular (Obese) when BMI is 30 or greater
28. Write a program that allows its user to play the dice game "Doubles"
    Rules of the game
    Player begins with $100.00
    - The player places a bet amount and a pair of dice are rolled
        - If the two values showing on the pair of dice are the same (they rolled doubles), the player wins twice their bet amount
        - If the two values showing on the dice are not equal, then the player loses their bet amount
    - The game ends when the player is out of money

Mobile and Wireless Technologies 20 Hours

Theory 20 hours only

Session 1:

- Basic Wireless Technologies:
- Overview of Cellular Communications:
- Basic components of a Cellular system i.e. BTS, BSC, MSC
- Protocol Stack and information flow; Call processing, MOC and MTC
- SMS Concept, Network architecture, message processing
- A Case Study: GSM

Session 2:

- Overview of CDMA:
- Concept, Network Components, Network Architecture, Digital techniques using
- Spread Spectrum
- Advantages and Disadvantages
- A Case Study

Session 3:

- Overview of 2.5 G and 3.0 G Systems:
- Need of 2.5G and 3G systems, Concepts and network architecture, Applications
- (GPRS, UMTS, 3GPP, WCDMA, HSCSD)
- Introduction to GSM and its standards,
- Services offered

Session 4:

- System architecture of GSM, Functionalities of components,

- Mobile registration process,
- Handover -- different scenarios

Session 5:

- GSM channels, traffic & control channels, Radio frequency power levels,
- Timing in advance and power control, burst structure – normal, random access,
- Frequency correction and synchronization,
- Frame structures – traffic channels, signaling frame
- Different call scenarios along with traffic and control channels,

Session 6:

- Mobile originated voice call,
- Mobile terminated voice call
- Location update procedure,
- Sending and receiving SMS
- Speech and channel coding

Session 7:

- Control channels / Logic channels
- BCCH, CCCH, FCCH, RACH, SDCCH, AGCH, PCH, SAACH, FACCH
- 2.5G / 3G systems:
- Evolution of GPRS, Core network elements, applications, architecture, QoS

Session 8 & 9:

- Mobility management, Comparison with HSCSD, Spread spectrum basics for 3G,
- Network elements, Data speeds, applications
- WLAN – various standards, a/b/g, security, applications, IAPP, Mobile IP
- Introduction, QoS aspects, integration with GPRS, Blue tooth, and 3G
- VOIP – Functionality, Shortcomings, Legal issues

Session 10:

- NFC (Near Field Communication)

Android Programming 110 hours

Theory 50 Hours + Lab 60 Hours

Session 1:

- Introduction of android
- Why develop for android
- Activities and Tasks

Session 2:

- Android SDK features
- Development Environment of Android SDK

Session 3:

- Creating android activities
- Fundamental android UI design
- Intents, adapters, dialogs

Session 4 & 5:

- Android Technique for saving data
- Data base in Androids
- Data Storage and Content Providers

Session 6:

- Maps, Geocoding, Location based services

- Toast, using alarms

Session 7:

- Instant messaging using blue tooth
- Using Telephony using blue tooth

Session 8 & 9:

- Introducing sensor manager
- Managing network and wi-fi connection
- Advanced androids development

Session10:

- Linux kernel security
- Implement AIDL Interface

Session 11 & 12:

- Play audio or video
- Playing from a Raw Resource
- Playing from a File or Stream
- Audio Capture
- Simple Graphics inside a View

Session 13 & 14:

- Gaming using Android
- Introduction to OpenGL
- Scalable 2D /3DGraphics API
- Drawables
- Shape Drawable

Session 15:

- Web Services API (JSR-172)

Session 16 & 17:

- Creating from resource images
- Creating from resource XML
- Nine-patch
- Tween Animation
- Frame Animation

Session 18:

- Activity Lifecycle
- Configuration Changes
- Starting Activities and Getting Results
- Saving Persistent State
- Permissions

Session 19 & 20:

- Process Lifecycle
- How to set Default Actions for Activities
- Passing Information between Activities

Session 21 & 22:

- Content provider basics
- Modifying data in a provider
- Creating a content provider
- Content URI summary
- Receiver Lifecycle
- Permissions

- Process Lifecycle

Session 23:

- What is a Service?
- Service Lifecycle
- Permissions
- Process Lifecycle
- Local Service Sample

Session 24:

- Remote Messenger Service Sample

Session 25:

- Case Study
- Augmented reality of application
- Integration with social networking website

Lab Assignment:

1. Hello world program on Android
2. Implement a lifecycle of an Android application using toast.
3. Assignment on updating data
4. Assignment on Inter-process communication
5. Implement a simple calculator using button action listener.
6. Create an application which implements data transfer between activities.
7. Create an application which implements multiple spinners dependent on each other.
8. Create an application which loads multiple layouts using dynamic XML.
9. Create an application which shows a list of name and images together.
10. Creating an application to run the call method
11. Audio Capture Setup and Start
12. How you would stop audio capture
13. Create an application which shows images in grid view. When you long press on image it will show you two options remove & zoom.
    - When you touch on zoom it will zoom the image on another activity.
    - When you touch on remove it will remove from grid view.
14. Creates a new animation whose parameters come from the specified context and attributes set
15. Assignment on Activity
16. Set up a system for storing the data
17. Assignment on Remote Messenger Service
18. Create an application which show you list of name and age together when you click on the add option menu the another dialog box open fill the details and when you press ok it will load in the list view.
19. Create a service that when called stores missed calls no in database.
20. Create a service that executes when there is change in location & store the location in database with following fields-: id, latitude, longitude & time.
21. Create an application which plays an audio & video file.
22. Create a service that executes every time when system boot completes and send user GPS location to a specific mobile no.
23. Develop an application that store SMS from particular number in your own database.

24. Create a service that executes every 5 min and captures the current camera picture store it in my data folder in SDCard. The picture name should be dd_mm_yy-hh_mm.jpeg.
25. Create an application which shows you a grid of images. When you click on image it will rotate for 1 second.
26. Create an application which implements shared preference.
27. Create an application which capture & save its picture on file when a user enter wrong password on mobile.
28. Create an application with the help of servlet to maintain the Employee details.

Management Development Program (60 Hours)

Theory 30 hours + Practice 30 hours

Session 1:
- Introduction to communication,
- Barriers to communication, Kind of communication,
- Confidence building Non-verbal Communication

Session 2:
- Fluency and vocabulary
- Synonyms
- Antonyms
- Grammar, Noun Pronoun,
- Verb, Adjective, Preposition, Conjunction

Session 3:
- Words of Idioms & phrases
- Sentence Construction
  Pronunciation,

Session 4:
Greeting,
Conversation practice,
Polite Conversation,

Session 5:
Resume Writing,
Covering letter,
Email,

Session 6:
Presentation Skill,
What is group discussion?
Interview skills, Mock interview

Session 7:
- Analogy, Series Completion (Number, Alphabet, Letter Series)
- Coding-Decoding for Number
- Alphabet and Letter
- Blood Relations

Session 8:
- Puzzle Test: Classification Type questions
- Compression Type questions
- Sequential order questions

- Section based on given conditions
- Questions involving family members

Session 9:

- Alphabet test
- Order of words
- Letter words problems
- Rule detection
- Alphabetical quibble
- Word formation
- Number
- Ranking
- Time Sequence Test
- Mathematical operations
- Logical sequence of words

Session 10:

- Arithmetic reasoning
- Logical reasoning
- Statement-Arguments
- Statement-Assumptions
- Statement-courses of Action
- Statement-Conclusions
- Deriving conclusion from passages

Session 11:

- General Aptitude
- Addition
- Multiplication
- Divisibility
- Squaring
- Cube
- HCF and LCM
- Fraction

Session 12:

- Number system
- Permutation & combination
- Probability
- Ratio & Preparation

Session 13:

- Partnership
- Percentage
- Average
- Problem on Ages
- Profit and loss

Session 14:

- Simple Interest
- Compound Interest
- Time and work
- Work and Wages

Session 15:

- Trains
- Streams Pronoun
- Alligation
- Clock
- Pipes and cisterns

Lab Practice:

1. Faculty needs to conduct GD, presentation for speaking, conducting mock interviews etc.
2. Faculty needs to conduct tests, Surprise tests, assignments etc.

7. List of Text/Reference Books

Name of Module	Title of the Book	Author/Publication	Edition	ISBN
Fundamentals of Computer and Database Concepts	Fundamentals of Computers	V. Rajaraman / PHI	5th Edition	9788120340114
	Computer Fundamentals (With CD)	Pradeep Sinha, Priti Sinha / BPB	6th Edition	9788176567527
	Oracle Database 11g The Complete Reference, 1st Edition	Kevin Loney / Tata McGraw - Hill	2008 Printing	9780070140790
	Mastering Database Technologies	Ivan Bayross / BPB	2005 Edition	9788183331302
Java Programming	Beginning Java 2 Jdk	Ivor Horton / Wiley	5th Edition	9788126505708
	Java : The Complete Reference	Herbert Schidt/Tata McGraw Hill	8th Edition	9781259002465
	Core JAVA : An Integrated Approach	R. Nageswara Rao / Dreamtech Press	1st Edition	9788177228366
	Head First Java	Kathy Sierra, Bert Bates / Shroff O Reilly	2nd Edition	9788173666025
	Core Java : Fundamentals - Vol 1	Gary Cornell, Cay S. Horstmann/Pearson	9th Edition	9789332514676
	Java Server Programming (J2EE) Black Book	Dreamtech Press	2010	9788177229363
	Mastering Enterprise JavaBeans 3.0	Rima Patel Sriganesh, Gerald Brose, Micah Silverman /Wiley	1st	9788126509218
	Java EE 6 Server Programming for Professionals : DVD	Ivan Bayross, Sharanam, Shah, C. Bayross, V, Shah/ Shroff Publication	2010	9788184049411
Android Programming	HELLO, ANDROID	Shroff Publishers & Distributors Pvt Ltd	2011	9789350232927
	BUILDING ANDROID APPS IN EASY STEPS	Mike McGrath/TMH	2012	9781259060977
	Android Application Development	Rick Rogers / O'reilly	2009	9788184047332
	Professional Android 4 Application Development	Meier, Reto, Reto Meier / Wiley		9781118237229
	Beginning Android 4 Application Development	Wei-Meng Lee / Wiley India Pvt Ltd	2012 Edition	9788126535576

	Professional Android 4 Application Development	Reto Meier / Wiley India Pvt. Ltd	2012 Edition	9788126536085
	Beginning NFC with Arduino, Android, and PhoneGap	Author: Don Coleman, Brian Jepson, Tom Igoe / O'Reilly Media		9781449324117
Management Development Program	High School English Grammar & Composition Revised Edition	Wren, Martin / S. Chand Publisher	2011 Edition	9788121900096
	Communication Skills Publication Year 2011	Sanjay Kumar, Pushp Lata / Oxford University Press	2011 Edition	9780198069324
	Professional Communication Skills	Praveen S R Bhatia / S.Chand Publishing	2011 Edition	9788121920926
	Quantitative Aptitude For Competitive Examinations	R. S. Aggarwal / S. Chand Publishing	17th Edition	9788121924986
	A Modern Approach To Verbal & Non-Verbal Reasoning	R. S. Aggarwal / S.Chand Publishing	Year 2012 Edition	9788121905510
	How to Prepare for GD and Interview (With CD) 3rd Edition	Hari Mohan Prasad, Rajnish Mohan/TMH	2010	9780070706347

8. Evaluation Guidelines

8.1 Evaluation

Evaluation is a necessary and essential part of conducting the C-DAC Certified Android Programming, as it provides important feedback and inputs to both the institute as well as the student. The institute gets an idea about the relative performance of each student, which also serves as feedback about the design and conduct of the programme. The student gets a clear picture of his academic standing, individually and in comparison to his fellow students.

In order to ensure timely and efficient evaluation and certification of all students, the following guidelines are being issued and should be followed religiously.

8.2 Evaluation Methodology

8.2.1 Each centre should have a Designated Responsible Member (DRM) for Evaluation.

8.2.2 The DRM Evaluation would be responsible for coordinating all activities relating to evaluation at the training centre and for communicating with CDAC ACTS, Pune.

8.2.3 Evaluation is a compulsory part of the process of obtaining Certificate Course in Android Programming. All students are required to pass in each subject of the course in order to be eligible to receive the C-DAC Certificate.

8.2.4 The faculty of every subject should outline the objectives of the evaluation to be conducted for that particular subject, so as to enable the student to prepare himself/ herself properly.

8.2.5 The performance of students is constantly evaluated through surprise quizzes, hourly examinations, assignments throughout the term, submission of term reports, presentations and final examinations at the end of the course.

8.2.6 Mode of exams will be in online / offline, but prior information will be given by C-DAC, ACTS about the mode of the exam and it will be final.

8.3 EVALUATION METHODS

8.3.1 Course End Evaluation

After completion of the all subjects, a written examination CEE (Course End Examination) will be held, which will test the knowledge of the students of each subject and it is a compulsory part of the evaluation. Conducting CEE involves performing duty with responsibility. A small mistake in the process may hamper the whole system. Everyone has to play their role in an effective manner. It is a joint effort work which has to be carried out in a combined way. Right from receiving question paper from ACTS, C-DAC to sending the OMR answer sheet (in case of offline exam) and the response file (in case of online exam) for evaluation dealt with lot of responsibility.

ACTS, C-DAC in its pursuit of excellence, believes in providing a congenial atmosphere to the students during all exams in order to get them to perform at their optimum level. However, there are certain norms which the students are expected to be aware of and observe both in letter and spirit. These norms are:

8.3.1.A Impersonation may lead to permanent expulsion from the Institute.

8.3.1.B Cell phones are strictly prohibited in the exam hall/room.

8.3.1.C Valid ID card is mandatory for entry to the exam room / hall.

8.3.1.D Punctuality is most important at all times. Students are expected to check their exam location and be seated at least 10 minutes prior to the exam time.

8.3.1.E In case of offline exam, as per ACTS, C-DAC policy all question papers are to be returned along with the answer script.

8.3.1.F Students are required to bring their own stationary as no lending or borrowing is permitted during examination.

8.3.1.G Programmable calculators or any other kind of electronic devices are strictly prohibited inside the exam area.

8.3.1.H Indiscipline in the exam hall/ room will not be tolerated.

8.3.1.I Possession of any written material related to the subject or communication with their fellow students, will result in disciplinary actions.

8.3.1.J A student must score a minimum of 40 percent marks, in order to successfully clear the course.

8.3.1.K It is recommended that the students should ensure 100% attendance for each course. 10% absences are permissible, only in case of illness, or emergencies. These have to be approved by the Centre Head. Approval is contingent upon the evidence provided.

8.3.1.L There will be 150 questions to answer in 3 hours duration in CEE as per the following distribution mentioned in Table – 1.

Table – 1

Sl. No.	Module Name	Hours	No. of Questions
1	Fundamentals of Computer	20	10
2	Java Programming	70	35
3	Mobile and Wireless Technologies	20	15
4	Android Programming	110	60
5	Management Development Program	60	30
6	Project	40	Grade
	Total	**320**	**150**

8.3.2 GENERAL GUIDELINES FOR AWARD OF GRADES:

The marks of obtained in the CEE shall be calculated to get total marks out of 100. The rounding off shall be done on the higher side. The grades shall be awarded on the basis of cut off in the absolute marks, as mentioned in Table – 2.

Table 2

Lower range of marks	Grade	Upper range of marks
91	≤ A+ <	100
81	≤ A <	90
71	≤ B+ <	80
61	≤ B <	70
51	≤ C+ <	60
41	≤ C <	50
0	≤ F <	40

8.3.3 Guidelines of CEE:

CEE will be conducted normally before the commencement of Project work of the course. The written examination should be of 180 minutes duration. It should consist of objective questions. A typical objective type exam paper should contain the following types of questions: –

- Multiple choice
- Yes or No
- True or False

Objective questions are useful in testing the recognition and recall abilities of students. They also help in keeping the exam short and easier to evaluate.
For the pure objective type question papers, there will be 150 objective type questions with 4 maximum answer options having only one correct option. The value of each objective type question is of one mark only. There will not be any negative marks for the wrong answers given by the students.

8.3.4 Guidelines for setting Question Papers:

While setting the question papers for theory Exam the following weightages should be assigned as per the difficulty level of the questions.

Levels	Requirements	Weightage
Level A – Easy	Requires elementary knowledge which may be obtained by attending all lectures and completion of mandatory lab assignments	25%
Level B – Intermediate	Requires thorough study of all course material, attendance at all lectures and completion of mandatory assignments	50%
Level C – Difficult	Requires study and lab work beyond the prescribed course material and mandatory assignments	25%

8.4 Guidelines for generating questions:

8.4.A Question paper setter has to use sample paper format provided by C-DAC, ACTS Pune
8.4.B Mention the subject name without fail.
8.4.C Language of the question should be easy to understand.
8.4.D The answers must have relevant objective type choices and “only one” correct answer.
8.4.E The questions must be prepared by referring appropriate books, reference books, reference material, and course material having good information.
8.4.F The question must be created by the domain expert afresh and should not be copied directly from any book, website, existing previous question papers etc.
8.4.G The question should be unique and should have not been published anywhere.
8.4.H Please mention the source of the question wherever possible, as it may help us in referring the same for detailing if required.
8.4.I The caliber of the question should suffice the growing need of competition.
8.4.J The question paper should have questions covering the entire syllabus.
8.4.K The questions have to be typed in MS Word with “Arial” having letter size 12 point. Do not bold any letter, word or sentence in any part of the question paper.
8.4.L It is essential to give password to the word document and send/tell the password separately.
8.4.M It is essential that utmost care is taken at your end to maintain the secrecy of the soft copy at all time.
8.4.N An expert team will review all questions. The questions will be filtered as per following:

- If the question is incomplete
- If the answer of the question is wrong
- If the question is not there in the syllabus
- If the question appears more than once
- If the question is too lengthy

- If the question is irrelevant
- If the options to the questions are irrelevant

8.4.1 Template for generation of Questions

Date:

Question generated by: Mr. /Ms.

Subject Name:

Q. No.
Question: <Text of the question>

Answer Choices
A:
B:
C:
D:

Difficulty Level: Easy / Intermediate / Difficult

Reference: (Name of books)
(If question taken from book) (Mention name of the book, author, ISBN)
Total Number of Questions Generated: _____

8.4.2 Template for Answer Key:

Module name:			
Question No.	**Answer Keys**	**Question No.**	**Answer Keys**
1		76	
2		77	
3		78	
4		79	
5		80	
6		81	
7		82	
8		83	
9		84	
10		85	
11		86	
12		87	
13		88	
14		89	
15		90	
16		91	
17		92	
18		93	
19		94	
20		95	

21		96	
22		97	
23		98	
24		99	
25		100	
26		101	
27		102	
28		103	
29		104	
30		105	
31		106	
32		107	
33		108	
34		109	
35		110	
36		111	
37		112	
38		113	
39		114	
40		115	
41		116	
42		117	
43		118	
44		119	
45		120	
46		121	
47		122	
48		123	
49		124	
50		125	
51		126	
52		127	
53		128	
54		129	
55		130	
56		131	
57		132	
58		133	
59		134	
60		135	
61		136	
62		137	
63		138	
64		139	
65		140	
66		141	
67		142	
68		143	
69		144	

70		145	
71		146	
72		147	
73		148	
74		149	
75		150	

8.4.3 Evaluation of answer papers:

For Offline mode: Use of OMR sheets will be useful for processing the result of multiple choice exams. OMR is an effective way to collect data, process for the result and also it takes less time with greater accuracy in less effort. Centres need to follow the best way for scanning the OMR sheets, process the result and publish the result. Centres which are not using OMR can user OCR to conduct the exams and evaluate the students. Centre which are not using OMR or OCR can evaluate the students manually and process the result.

For Online mode: Course end exam will be through online s/w. Evaluation will be through that Exam s/w.

If a student requests for re-evaluation then the student has to pay `150 /- and it should be routed through training centre. The Re-evaluation fee should be paid to respective C-DAC training Centres, in case of Authorized Training Centres associated to C-DAC, Pune, payment to be made in favour of "C-DAC, ACTS" and payable at Pune. (This is applicable only for theory exam)

8.5 Moderation:

Grace marks would be awarded as per the methodology below:

8.5.1. Maximum of 4% of total term end theory exam marks can be awarded to a candidate.

Sr. No.	Name of the Course	Total Marks	Maximum grace marks
1	Certificate Course in Android Programming	150	6

On completion of the moderation exercise the revised marks should be updated in the marks database.

8.6 Re-examinations:

The following conditions will be applicable for the course end re-exam:

8.6.1. Students who do not appear for an exam on the scheduled date will not have an automatic right to re-examination. Only those students who, in the opinion of the centre/course coordinator have a genuine reason for being absent may be allowed to appear for a re-exam.

8.6.2. Students who have failed an exam may be allowed to appear for a re-exam.

8.6.3. The re-exam should be conducted following the same process as the regular examination.

8.6.4. Students, who failed/remained absent in the Course End Examination conducted by C-DAC, shall be allowed to appear in the re-examination only once.

8.6.5. Students who remain absent or fail in the re-examination will not get any further chance for appearing for a third attempt or further. In such case the candidate can receive the Performance Statement and the certificate of participation without any grade.

8.6.6. On evaluation of their answer sheets 20% of the marks obtained by the students will be deducted (towards de-rating for re-examination) for arriving at the final score, i.e. in order to clear the module test the student has to score a minimum of 50% marks instead of 40%.

8.7 Project Module:

8.7.1. Project work should be start at the time of Java Programming module and database design concept should be complete by that time.

8.7.2. After that students should be ready with all mandatory documents with database design and then completion of all teaching modules they can do the project.

8.7.3. Performance in the Project module will be awarded in grade. The Project grade will be mentioned separately on the certificate & will have no effect on the overall grade obtained by a student.

8.7.4. Students may do industry-sponsored projects, but will be required to do the project work within the centre.

8.7.5. Evaluation of the Project module will take place as following:

8.7.5.1. Internal evaluation will be take place at mid of the module

8.7.5.2. External evaluation will take place at the end of the module

Based on both evaluations, final grade will be awarded & communicated to C-DAC ACTS, Pune

8.7.6. **Guidelines for Project Evaluation**

Evaluation of Project work needs to be carried out as per the following guidelines:

a. Literature study.
b. Submission of abstract for their colloquium/seminar/project work along with the references.
c. Submission of the detailed work report
d. Two presentations each for 15 minutes on the work done restricted to 15 – 20 slides followed by evaluation.
e. The evaluation for 100 marks will be splited up as follows:

i.	Literature survey	– 10
ii.	Contents of the project work	– 20
iii.	Contents Flow of Presentation	– 15
iv.	Communication and Presentation Skills	– 20
v.	Depth of Knowledge in the topic	– 15
vi.	Viva Voce	– 15
vii.	Attendance	– 5

f. Soft copy of the presentation should be submitted to C-DAC.

8.8 Ensuring Security of Evaluation data/records:

8.8.1. Ensure that all data relating to evaluation of students is stored in a secure place that cannot be accessed by unauthorized personnel.

8.8.2. All question papers must be prepared and stored in a separate area specifically designated for the purpose.

8.8.3. Whenever any external faculty sets a question paper, ensures that he should follows the guidelines given by C-DAC ACTS Pune.

8.8.4. Ensure that only one copy of any question paper is prepared in physical (printed) form for review and revision.

8.8.5. When the question paper is finalized, print out one master copy and gets it signed by the paper setter, Reviewer and DRM Evaluation.

8.8.6. Prepare required number of photocopies of the question paper and store them in a safe and secure location before the exam.

8.8.7. The data relating to evaluation of students, such as soft copies of question papers and answer keys, student marks database and performance statements etc. must be kept in a separate domain/directory which is accessible only to authorized personnel. Ensure that the data is regularly backed up.

8.8.8. The question papers for the theory as well as the laboratory examinations at all the centres will be set by CDAC, ACTS Pune. The centres according to guidelines provided by C-DAC, ACTS Pune, will conduct the evaluation of the laboratory and assignments locally.

Note: The Evaluation Guidelines, Rules and Regulations issued by C-DAC, ACTS – Pune from time to time shall be binding on all the centers and all the students. C-DAC, ACTS, Pune reserves the right to add, modifies or deletes any or entire contents of this document at any point of time without giving any notice. It's the responsibility of the centre coordinator to inform such changes to the students in form of a formal notice with a duly signed copy to C-DAC, ACTS, Pune.

9. Requirements (S/W and H/W)

Computing Facilities for Certificate Course in Android Programming		Yes/No
A. Servers		
1. Unix / Linux Server		
2. Windows Server 2008		
3. Servers configured for various modules		
Severs Configuration		
1. Processor (min 3.2 Ghz)		
2. RAM (min 4 GB)		
3 HDD (min 500 GB)		
4. Network Card		
5. 4 USB , optical mouse, us Keyboard.		
6. DVD Drive		
B. Clients Machines Configuration		
1. Processor (Min 3.2 Ghz)		
2. RAM (Min 2 GB)		
3. HDD , SATA/ IDE (min 250 GB)		
4. PCI Network Card 1Gbps, CAT 5 Ethernet		
5. Multimedia Kit		
C. Network		
1. Gigabit Switch		
2. CAT-5 Cabling with RJ-45 connectors		
3. Patch Cables		
D. Communication and Internet		
1 Internet Access		
2. DSL /fiber line		
3. Minimum required bandwidth 1Mbps		
E. Printers		
1. Laser Printer		
F. Additional Lab Equipments		
1. Amplifier Speakers, Headphones & Mikes		
2. Hi-Lumen OHP		
3. Video Projector (SVGA/HDMI/ Svideo Compatible)		
4. TWAIN Compliant Color Scanner		
G. Module Specific Software Environments, Operating Systems and Hardware		
1. Android Programming	ADT Bundle for windows	
	Android Phone with latest Android Version	
2. Java	Java SDK 7, Weblogic 12 J2EE SDK, Eclipse 4.4/ Netbeans 8.0,	
3. Fundamentals of Computer	Open Suse 13.1 / Windows 7	
H. Operating System Software Common For all Course modules		
1. For Windows platform–**Windows 7**, 2. For Linux platform–**SUSE Linux** (latest)		**Yes/No**