

## **QUALIFICATION FILE**

Application Documentation: Version 1 /01 September, 2016

**NSDA Reference**  
*To be added by NSDA*

### **CONTACT DETAILS OF SUBMITTING BODY**

**Name and address of submitting body:**

**C-DAC,ACTS**

**ACTS, Innovation Park, S. No. 34/B/1,**

**Panchvati, Pashan, Pune 411 008**

**Name and contact details of individual dealing with the submission**

**Name: Shri. Aditya Kumar Sinha**

**Position in the organisation: Joint Director**

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### **List of documents submitted in support of the Qualifications File**

1. QualificationFile
2. Course Content

# QUALIFICATION FILE

## SUMMARY

<b>Qualification Title and Code:</b>	Certificate Course in Android Programming
<b>Body/bodies which will award the qualification:</b>	Centre for Development of Advanced Computing (C-DAC) organization of the Ministry of Electronics and Information Technology (MeitY), Ministry of Communications & Information Technology
<b>Body which will accredit providers to offer the qualification:</b>	C-DAC
<b>Body/bodies which will be responsible for assessment:</b>	C-DAC
<b>Occupation(s) to which the qualification gives access:</b>	<p>The Certificate Course in Android Programming course aims to groom the students to enable them to work on mobile application development scenarios as well as prepare them to keep pace with the changing face of technology and the requirements of the growing IT industry.</p> <p>After the completion of the course, students can work as Android Developer / Web Developer/ Web Designer /IT Support staff.</p>
<b>Proposed level of the qualification in the NSQF:</b>	Level 7
<b>Anticipated volume of training/learning required to complete the qualification:</b>	320 hrs of classroom/lab learning (4Months,4 hrs 5 days in a week)
<b>Entry requirements / recommendations:</b>	Any Engineering /Science graduate with mathematics up to 10+2 level
<b>Progression from the qualification:</b>	<p>The course aims to groom the students to enable them to work on current web technology scenarios as well as prepare them to keep pace with the changing face of technology and the requirements of the growing IT industry.</p> <p>These candidates will be trained in android Programming,Java Programming andManagement skills. They can start career as software Android Developer/Web Developer/ Web Designer.</p> <p>Candidate can start from level 7 and lead to further levels.</p>
<b>Planned arrangements for RPL:</b>	NA
<b>International comparability where known:</b>	There are many courses available on Java Programming, Android Programmingbut C-DAC providing knowledge of

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management development program.			
<b>Formal structure of the qualification:</b>			
<b>Title of NOS/unit or other component</b> (include any identification code used)	<b>Mandatory/ Optional</b>  Enter M or O for each unit/ component	<b>Estimated size (learning hours)</b>  The total should be the same as the entry under “anticipated volume” above	<b>Level</b>  In the NSQF, individual units or components of qualifications can have outcomes which put them at levels which are higher or lower than the whole qualification.
Fundamentals of Computer	M	20	7
Java Programming	M	70	7
Mobile and Wireless Technologies	M	20	7
Android Programming	M	110	7
Management Development Program	M	60	7
Project	M	40	7

Please attach any document giving further detail about the structure of the qualification – eg a Curriculum or Qualification Pack.

Give details of the document here:

### SECTION 1

#### ASSESSMENT

##### **Body/Bodies which will carry out assessment:**

C-DAC's Exam, Evaluation and Certification department will carry out assessment as per evaluation guideline finalized by Academic Council/ Academic Management Committee.

##### **Will the assessment body be responsible for RPL assessment?**

- Same will be finalised when the national RPL Policy will be finalised.
- Assessment is online through our e-Pariksha system or manually (OMR Based), depending on the strength of students.
- Issuance of qualification is centralized through C-DAC.

**Describe the overall assessment strategy and specific arrangements which have been put in place to ensure that assessment is always valid, consistent and fair and show that these are in line with the requirements of the NSQF:**

Assessment is a necessary and essential part of conducting the Certificate Course in Android

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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 course. The student gets a clear picture of his academic standing, individually and in comparison to his fellow students.

- A combined evaluation process is to be conducted for the course.
- The evaluation for each module must be completed as per guidelines given below. The mid-module /surprise test evaluation is mandatory and can be taken after discussion with the concerned faculty.
- Students are evaluated on a continuous and throughout the duration of the course to make a fair assessment of the skills acquired by them. To have a very uniform and fair assessment. The evaluation process is divided into two parts:
  - Continuous Assessment - CA (150 marks)
  - Course End Examination - CCE (150 marks)

**Continuous Assessment:** This is being done primarily by the respective faculty in the form of Lab tests, assignments, quizzes, submission of term reports, presentations etc. conducted (with the help of respective course co-coordinators) at regular intervals and as and when the portions of the subjects are completed. These are basically internal exams and local to the centre. This process is further categorized into two parts.

- Lab test
- Internal test : Assignment/Case Studies /quiz and other valuation methods like case study, viva, group discussion depending on the subject and the faculty

It is recommended to conduct Management Development Program and Organisational Behaviour sessions and also conduct surprise test for the development of soft skills, logical, analytical capabilities and managerial skills for the benefit of the students and also give assignments and conduct some surprise test related to Management Development Program and Organisational Behaviour.

The figures shown below indicate the weightage of each module in the final performance statement. The examination(s) for each module must be conducted for at least that number of marks. However, the centre may conduct evaluation for a higher number of marks, in which case the marks will be scaled down. For example, if the examination for the Operating Systems Concepts module is conducted for 100 marks, the marks earned by the student will be scaled down to out of 40.

A student must score a minimum of 40 percent marks in each component of the evaluation, and also in the aggregate score, in order to successfully clear the module. If a student scores more than 40% on aggregate but has scored less than 40% in one component of the evaluation, he will not be declared as passed.

### **The weight age for each component will normally be:**

Theory examination – (CCEE) 150 marks

Laboratory examination, Internal marks 150 marks

(Internal marks: Lab Assignment Evaluation, Surprise Tests, attendance, Viva, Seminars)

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

### **Minimum Pass marks:**

The minimum marks to be obtained for declaring a student pass in any module is as follows:

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For 40 mark QP	:	16 marks
For 20 mark QP	:	8 marks
For 60 mark QP	:	24 marks

**Assessment is through e-Pariksha system.**

### **About e-PrikshaSystem:**

ePariksha is a web based application for the automation of the examination process. The system provides a great control on exams from preparing question paper to scheduling exam and from monitoring exam to generate results.

ePariksha has a strong administration which provides complete system status in one glance.

It's Results & Reports generations functionality provides system details in all standard and required formats.

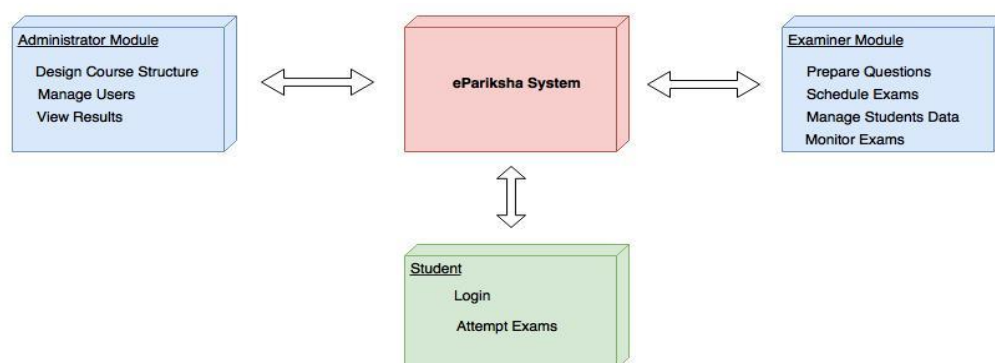
An image based, LAN based, secure, fault tolerant and scalable system through which examinations can be delivered "on demand" basis in selected examination centres spread across the country.

System Support:

- Decentralized mode of operation(LAN based)
- Question Paper approach
- Multi lingual and multi subject support
- Browser based

Components of the E-Parikhsa System Includes:

- **Administration Module**- To design course structure,Manageusers,view results.
- **eParikshaSystem** –Assessment of students through online system.
- **Examiner Module** -To manage the examination related activity and conduct- i.e Registration data and question paper uploading, conduct of examination, response generation
- **Student Login** –Allows students to login and attempt exams.



**Salient Features:**

- Exam Resume - Power Failure Handling
- Random Question Paper
- User friendly Interface
- Question Bank
- Instant Result

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- Live Monitoring of Exams & Assignment
- Time bound exams
- Multilingual support
- Handheld devices Support
- Responsive Design

**Feedback System:** C-DAC's Advanced Computing Training School (ACTS) offers various courses and training programs through its own training centres and its network of Affiliated Training Centres (ATC) spread across the country. Each year, thousands of students and professionals are trained at these centres.

The purpose of the system i.e. Online Feedback System (OFS) is to develop a web application for getting the online faculty feedback by the students studying at centres and also at the various Authorized Training Centres (ATC) affiliated to for different training programs offered by C-DAC ACTS.

This system is for conducting "The Student Survey" for quality assurance of education. Students, Faculties and administrators can all benefit from survey. This is helpful in the continual improvements in teaching programs, processes as well as infrastructure and thereby enhancing the students' learning experience at C-DAC ACTS.

The Online Feedback System make the student feedback procedure centralized for all C-DAC centres as well as various Authorized Training Centres (ATCs) located across the country through which headquarter manager can manage student feedback of faculties as well as infrastructure studying at different training centres with different reports for feedback analysis.

Please attach any documents giving further information about assessment and/or RPL.

Give details of the document(s) here:

## ASSESSMENT EVIDENCE

Each module should be evaluated as per the weightage there will be 150 questions to answer in 3 hours duration in Course End Exams per the following distribution mentioned below given below.

Sr. No.	Module	Learning Outcome	Theory	Lab& IA	Total Marks
1	Fundamentals of Computer	<ul style="list-style-type: none"><li>• Understand fundamental of computer,</li><li>• Difference between an operating system and an application program, and what each is used for in a computer.</li><li>• Exploring operating systems.</li><li>• Understanding concept of relational databases with oracle</li><li>• Hands on Unix commands and SQL queries</li></ul>	15	5	20
2	Java Programming	<ul style="list-style-type: none"><li>• Design and Develop applications using Javaprograms,XML,JSP. Organize and document program</li><li>• Apply knowledge of Java programming using for android apps.</li><li>• Learn and apply CSS</li></ul>	40	45	85

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		<ul style="list-style-type: none"> <li>• Create dynamic web pages.</li> </ul>			
<b>3</b>	Mobile and Wireless Technologies	<p>Students will be able to:</p> <ul style="list-style-type: none"> <li>○ Develop the concept of systems thinking in the context of mobile and wireless systems</li> <li>○ Understand mobile computing and networking concepts</li> <li>○ Develop knowledge of the interplay of concepts and multiple sub-disciplines in mobile and wireless systems</li> <li>○ Learn basics of wireless communication</li> <li>○ Case study of GSM,CDMA technologies</li> </ul>	15	-	<b>15</b>
<b>4</b>	Android Programming	<ul style="list-style-type: none"> <li>• Learn fundamentals of app designing</li> <li>• Design UIs that work seamlessly for range of phone and tablets</li> <li>• Create Android project with android studio</li> <li>• Share data with system and applications using providers</li> <li>• Integrate applications with enterprise web and location based services</li> </ul>	50	70	<b>120</b>
<b>5</b>	Management Development Program	<ul style="list-style-type: none"> <li>• Students will able to understand the working of internet as well as deployment of project on internet.</li> </ul>	30	30	<b>60</b>
<b>6</b>	Project	Think critically, creatively and analytically in developing technological solutions to simple and complex problems.	Grade		
<b>Total</b>			<b>150</b>	<b>150</b>	<b>300</b>

Complete a grid for each grouping of NOS, assessment unit or other component as listed in the entry on the structure of the qualification on page 1.

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Title of NOS/Unit/Component:

Assessable outcomes	Assessment criteria for the outcome
Enter the learning outcomes /elements of competence which will be assessed.	List all the criteria applying to this element/outcome.
<b>All the modules of PG-Android Programming</b>	<p><b>A+ &gt;= 85%,</b>  <b>A &gt;= 70% to &lt; 85%</b>  <b>B &gt;= 60% to &lt; 70 %</b>  <b>C &gt;= 50% to &lt; 60%</b>  <b>D &gt;= 40% to &lt; 50%</b>  <b>F &lt; 40%</b></p>
<p><b>Means of assessment 1</b></p> <p>Theory portion Assessment will be done through LAN based online system or paper mode. Paper will be Objective question based. Lab exam will be done separately as per evaluation Guidelines.</p>	
<p><b>Means of assessment 2</b></p> <p><b>Re-examinations:</b></p> <p>The following conditions will be applicable for the course end re-exam:</p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• Students who have failed an exam may be allowed to appear for a re-exam.</li> <li>• The re-exam should be conducted following the same process as the regular examination.</li> <li>• Students, who failed/remained absent in the Course End Examination conducted by , shall be allowed to appear in the re-examination only once.</li> <li>• Students who remain absent or fail in the re-examination will not get any further chance for appearing for the re-examination. In such case the candidate can receive the Performance Statement and the certificate of participation without any grade.</li> <li>• 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 48% marks instead of 40%.</li> <li>• There will be no re-exam for the re-exam</li> </ul>	
<p><b>Pass/Fail:</b></p> <p><b>If Candidate scored below 40% in any of the component like Theory, lab or Internal will be consider as FAIL.</b></p>	



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## SECTION 2

### SUMMARY EVIDENCE OF LEVEL

Level	Process Required	Professional Knowledge	Professional Skill	Core Skill	Responsibility
7	Requires a command of wide-ranging specialised theoretical and practical skills, involving variable routine and non-routine contexts.	Wide-ranging factual and theoretical knowledge in broad contexts within a field of work or study.	Wide range of cognitive and practical skills required to generate solutions to specific problems in a field of work of study.	Good logical and mathematical skill understanding of social political and natural environment and organising information, communication and presentation skill.	Full responsibility for output of group and development

Assessed outcome	Process Required	Professional Knowledge	Professional Skill	Core Skill	Responsibility
1. Fundamentals of Computer	Person may carry out a job as Android Developer, web developer and Web designer.  This job demands a command of wide-ranging specialised theoretical and practical skills, involving variable routine and non-routine contexts.	Learning Java ,Web programming concepts will help the learner to get employment as Android Developer, Web developer or Web designer.	<ul style="list-style-type: none"> <li>• Candidate can develop android application based on practical knowledge.</li> <li>• Candidates can design and develop websites.</li> </ul>	Candidate will be learning management Program and Organisational behaviour to communicate written and oral. Aptitude, basic understanding of social political and natural environment with good analytical and managerial skills	Candidate can perform well and responsible for output of group and development
2. Java Programming					
3. Database Concepts					
4. Mobile and Wireless Technologies					
5. Android Programming					
6. Management Development Program					
7. Project					

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## SECTION 3

### EVIDENCE OF NEED

**What evidence is there that the qualification is needed?**

Set up the Advanced Computing Training School (ACTS) in 1993 to meet the ever-increasing skilled manpower requirements of the Information Communication Technologies (ICT) industry as well as supplement its intellectual resource base for cutting-edge research and development. Over the years has designed and delivered various postgraduate and undergraduate degree and diploma programmes. In addition, imparts ICT training to state and national governments and agencies, strategic sectors, corporate and industries, foreign countries and international students, based on specific requirements.

**What is the estimated uptake of this qualification and what is the basis of this estimate?**

Being an open source platform, Android offers great freedom and flexibility to developers, allowing them to easily adapt and edit the programming codes.

Nowadays Android Apps are made for everything. Literally for everything.

According to the Glassdoor survey in last month the most popular and higher paid jobs was for Android App Development.

Mobility is the future and that's why the demand of android developers is increasing day by day. Its not only in India but also in all the growing and developed economies. USA, UK, Germany, Middle East, Africa and Singapore have seen great rise in demand of mobility solutions, which is bound to grow.

<http://www.mobileapptelligence.com/android-app-developer.html>

Android total market share is 68.54%

<https://www.netmarketshare.com/operating-system-market-share.aspx?qprid=8&qpcustomd=1>

The worldwide smartphone market grew 0.7% year over year in 2016Q2, with 344.7 million shipments, according to data from the International Data Corporation (IDC) Worldwide Quarterly Mobile Phone Tracker

As but one example, a recent article in InformationWeek projected salary increases of nearly 9% for Mobile App Developers in 2016! And, Business Insider included the position in its 19 hottest jobs for 2016 list, and a recent article in Inc. noted a rather astonishing 83,649 more App Developer jobs posted than people hired, thus qualifying App Developer as #2 on their "10 Hottest Jobs in 2016" list. And finally, the U.S. Bureau of Labor Statistics continues to project incredible growth for the App Developer job market, with estimates running above 20% over the next five years.

**What steps were taken to ensure that the qualification(s) does/do not duplicate already existing or planned qualifications in the NSQF?**

NA

**What arrangements are in place to monitor and review the qualification(s)? What data will be used and at what point will the qualification(s) be revised or updated?**

Set up the Advanced Computing Training School (ACTS) in 1993 to meet the ever-increasing skilled manpower requirements of the Information Communication Technologies (ICT) industry as well as supplement its intellectual resource base for cutting-edge research and development. Over the years has designed and delivered various postgraduate and undergraduate degree and diploma programmes. In addition, imparts ICT training to state and national governments and agencies, strategic sectors, corporate and industries, foreign countries and international students, based on specific requirements.

The Education and Training activities of are governed and steered by Academic Council (AC) and Academic

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Management Committee (AMC). As per the Academic Council minutes and direction, a syllabus updation subcommittee is formed by combining members from different centres. The sub-committee gave their inputs for syllabus updation. The resource centre has conducted meetings for updating required modifications in the current syllabus of PG-Diploma. After that, minutes of the meeting with draft syllabus contents were circulated across all the participating centres for any suggestion and comments. If any suggestions come through discussion of all concerned members, we incorporate the same and circulate again for finalization. After that we make the source book and informed to all centres for their review.

### SECTION 4

#### EVIDENCE OF RECOGNITION AND PROGRESSION

**What steps have been taken in the design of this or other qualifications to ensure that there is a clear path to other qualifications in this sector?**

- This qualification has been designed in consultation with industry and domain expert keeping in mind today's need. Evaluation criteria have been added to ensure progression to related path ways identified as per career path.

Please attach any documents giving further information about any of the topics above.

Give details of the document(s) here:

1. Course Content

## QUALIFICATION FILE

### Certificate Course in Android Programming

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
7	Fundamentals of Computer	20
<b>Total</b>		<b>320</b>

**Eligibility:** Any Engineering /Science graduate with mathematics up to 10+2 level

**Course Pre-requisites:** Sound knowledge of Computing Fundamentals and Fundamentals of Programming.

**Course Focus:** The objective of this course is to provide the student with an expertise in Website development.

### Detailed Syllabus

#### Fundamentals of Computer (20 Hours)

- Uses of Computer, Hardware, Accessories,
- Interfaces and their functions, Computer hardware connectivity
- Primary and Secondary storage
- Input-output devices
- Software, types of software, Operating Systems
- Computer language, Different types of Programming Languages
- Operating System (Introduction, The Need of Operating System, Functions of Operating System User Interface)
- Introduction to RDBMS
- Overview of OORD (Oracle)
- Introduction SQL\*Plus
- DDL, DML and DCL

#### Java Programming (70 hours)

- Object Oriented concepts
- Classes and Objects
- Access Specifiers
- Overloading
- Inheritance
- Polymorphism
- Data Types, Operators and Language
- Constructs
- Classes and Objects, Inner Classes and Inheritance
- Interface and Package
- Exceptions
- Threads
- Java.lang
- Java.util
- Java.io
- Java.swing
- Introduction to servlet & JSP

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### **Mobile and Wireless Technologies (20 hours)**

- Basics of Wireless Technologies
- Cellular Communication: Single cell systems, multi-cell systems, frequency reuse, analog cellular systems, digital cellular systems
- GSM standard: Mobile Station, BTS, BSC, MSC, SMS sever, call processing and protocols
- CDMA standard: spread spectrum technologies, 2.5G and 3G Systems: HSCSD, GPRS, W-CDMA/UMTS, 3GPP and international roaming, Multimedia services, CDMA based cellular mobile communication systems
- Wireless Personal Area Networks: Bluetooth, IEEE 802.11a/b/g standards
- Mobile Handset Device Interfacing: Data Cables, IrDA, Bluetooth, Touch- Screen Interfacing, Wireless Security, Telemetry
- Introduction to WAP, WML Script and XHTML
- Introduction to Multimedia Messaging Services (MMS)
- NFC (Near Field Communication)

### **Android Programming (110 hours)**

- Introduction of android
- Why develop for android
- Android SDK features
- Creating android activities
- Fundamental android UI design
- Intents, adapters, dialogs
- Android Technique for saving data
- Data base in Androids
- Maps, Geocoding, Location based services
- Toast, using alarms,
- Instant messaging
- Using blue tooth
- Using Telephony
- Introducing sensor manager
- Managing network and wi-fi connection
- Advanced androids development
- Linux kernel security
- Push Notification in Android
- Android cloud

### **Management Development Program**

Introduction to communication, Barriers to communication, Kind of communication, Confidence building Non-verbal Communication, Fluency and vocabulary, Synonyms, Antonyms, Grammar, Noun Pronoun, Verb, Adjective, Preposition, Conjunction, Words of Idioms & phrases, Sentence Construction, Fill up the blanks, Pronunciation, Conversation practice, Polite Conversation, Greeting, Logical reasoning, General Aptitude, Writing: Covering letter, Resume, Email, Presentation Skill, group discussion, Interview skills, Mock interview

### **Project**