

**Sacred Heart College (Autonomous)**

**Department of Computer Science**

**BCA**

**(Mobile Applications and Cloud Technology)**

**Course Plan**

**Academic Year: 2018 - 19**

**Semester IV**

| <b>COURSE CODE</b> | <b>TITLE OF THE COURSE</b>             | <b>NO. OF HRS./WEEK</b> | <b>CREDITS</b> | <b>TOTAL HRS./SEM</b> |
|--------------------|--|-------------------------|----------------|-----------------------|
| U4CRBCA12          | Mobile Web and Application Development | 4                       | 4              | 72                    |
| U4VCBCA1           | Introduction to Cloud Technology       | 4                       | 4              | 72                    |
| U4VCBCA2           | Fundamentals of Data Centre            | 4                       | 4              | 72                    |
| U4CRBCA13          | Basic Android                          | 4                       | 4              | 72                    |
| U4CRBCA14          | Mobile Device and Network Architecture | 4                       | 4              | 72                    |
| U4PRBCA7           | Basic Android - Lab                    | 2                       | 1              | 30                    |
| U4PVBCA1           | Introduction to Cloud Technology - Lab | 2                       | 1              | 30                    |

**COURSEPLAN: U4CRBCA12 - MOBILE WEB AND APPLICATION DEVELOPMENT**

|                              |   |                  |           |
|------------------------------|---|------------------|-----------|
| <b>PROGRAMME</b>             | <b>BCA (MOBILE APPLICATIONS &amp; CLOUD TECHNOLOGY)</b>   | <b>SEMESTER</b>  | <b>4</b>  |
| <b>COURSE CODE AND TITLE</b> | <b>U4CRBCA12 - MOBILE WEB AND APPLICATION DEVELOPMENT</b> | <b>CREDITS</b>   | <b>4</b>  |
| <b>HOURS/WEEK</b>            | <b>4</b>  | <b>HOURS/SEM</b> | <b>72</b> |
| <b>FACULTY NAME</b>          | <b>Dr. REGITHA M R</b>                                    |                  |           |

| <b>COURSE OBJECTIVES</b>                                     |
|--|
| To understand mobile application principles                  |
| To impart knowledge about mobile platform and NW environment |
| To understand the web architecture                           |

| SESSION   | TOPIC   | LEARNING RESOURCES | VALUE ADDITIONS | REMARKS |
|---|---|--------------------|-----------------|---------|
| <b>MODULE 1 - MOBILE APPLICATION PRINCIPLES</b>               |   |                    |                 |         |
| 1   | Mobile Application Development Paradigm.              | Lecture using PPT  | Online Tutorial |         |
| 2   | Mobile Application Development Paradigm               | Lecture using PPT  |                 |         |
| 3   | Application & Mobile Application                      | Lecture using PPT  |                 |         |
| 4   | Programming rules and Challenges                      | Lecture using PPT  |                 |         |
| 5   | Mobile Programming Tools                              | Lecture using PPT  |                 |         |
| 6   | Mobile Application Evolution                          | Lecture using PPT  | Video           |         |
| 7   | Thin Client   | Lecture using PPT  |                 |         |
| 8   | Thin Client   | Lecture using PPT  |                 |         |
| 9   | Fat Client  | Lecture using PPT  |                 |         |
| 10  | Fat Client  | Lecture using PPT  |                 |         |
| 11  | Future of Mobile App Development                      | Lecture using PPT  |                 |         |
| 12  | Future of Mobile App Development                      | Lecture using PPT  | e-resource      |         |
| <b>MODULE II - MOBILE PROGRAMMING LANGUAGES AND PRACTICES</b> |   |                    |                 |         |
| 13  | Mobile App Programming in Java                        | Lecture using PPT  |                 |         |
| 14  | Mobile App Programming in Java                        | Lecture using PPT  |                 |         |
| 15  | Introduction to Java, Java Compiler, Java Interpreter | Lecture using PPT  |                 |         |
| 16  | Introduction to Java, Java Compiler, Java Interpreter | Lecture using PPT  |                 |         |
| 17  | Advantages of Java, Disadvantages of Java,            | Lecture using PPT  |                 |         |
| 18  | CIA 1   |                    |                 |         |
| 19  | CIA 2   |                    |                 |         |

|   |  |                   |            |  |
|---|--|-------------------|------------|--|
| 20  | Programming Methodology                | Lecture using PPT |            |  |
| 21  | Mobile App Programming in C++          | Lecture using PPT |            |  |
| 22  | Mobile App Programming in C++          | Lecture using PPT | e-resource |  |
| 23  | Introduction to C++                    | Lecture using PPT | Video      |  |
| 24  | Symbian C++                            | Lecture using PPT |            |  |
| 25  | Symbian C++                            | Lecture using PPT | Video      |  |
| 26  | Microsoft embedded VC++                | Lecture using PPT |            |  |
| 27  | Mobile Programming best practices      | Lecture using PPT |            |  |
| 28  | User Analysis, Organizational Analysis | Lecture using PPT | e-resource |  |
| 29  | User Analysis, Organizational Analysis | Lecture using PPT |            |  |
| 30  | User Analysis, Organizational Analysis | Lecture using PPT |            |  |
| <b>MODULE III - MOBILE PLATFORM AND NEW ENVIRONMENT</b> |  |                   |            |  |
| 31  | Mobile App Testing Environment         | Lecture using PPT | e-resource |  |
| 32  | OTA App Provisioning                   | Lecture using PPT |            |  |
| 33  | Mobile Applications                    | Lecture using PPT |            |  |
| 34  | Context of Mobile Applications         | Lecture using PPT |            |  |
| 35  | Pros and Cons of Mobile Web App        | Lecture using PPT | e-resource |  |
| 36  | SIM based Mobile App Development       | Lecture using PPT |            |  |
| 37  | What is SIM?, SIM as a Platform        | Lecture using PPT |            |  |
| 38  | SIM as Service Differentiator          | Lecture using PPT |            |  |
| 39  | Introduction to UI                     | Lecture using PPT |            |  |
| 36  | Principles for UI development          | Lecture using PPT |            |  |
| 40  | Application Servers                    | Lecture using PPT | Quiz       |  |
| <b>MODULE IV: ARCHITECTURE</b>                          |  |                   |            |  |

|  |  |                                |                    |  |
|--|--|--------------------------------|--------------------|--|
| 41   | World Wide Web, Basics of WWW<br>Web Application | Lecture using PPT              |                    |  |
| 42   | Web Application Architecture                     | Java Servlets:<br>Introduction | Video              |  |
| 43   | CIA 2  |                                |                    |  |
| 44   | CIA 2  |                                |                    |  |
| 45   | CIA 2  |                                |                    |  |
| 46   | CIA 2  |                                |                    |  |
| 47   | CIA 2  |                                |                    |  |
| 48   | Web Server                                       | Lecture using PPT              | Online<br>Tutorial |  |
| 49   | Web Server Features                              | Lecture using PPT              | Online<br>Tutorial |  |
| 50   | Web Application Server                           | Lecture using PPT              |                    |  |
| 51   | Web Technologies and Standards                   | Lecture using PPT              |                    |  |
| 52   | HTTP, HTML, HTML Tags                            | Lecture using PPT              |                    |  |
| 53   | CSS (Cascading Style Sheets                      | Lecture using PPT              |                    |  |
| 54   | XML  | Lecture using PPT              | Online<br>Tutorial |  |
| 55   | Introduction to Cookies                          | Lecture using PPT              | Online<br>Tutorial |  |
| 56   | Create web pages using HTML, and<br>CSS.         | Lecture using PPT              | Online<br>Tutorial |  |
| 57   | Create web pages using HTML, and<br>CSS.         | Lecture using PPT              | Online<br>Tutorial |  |
| <b>MODULE 5: WEB ARCHITECTURE, STANDARDS AND TOOLS</b> |  |                                |                    |  |
| 58   | Mobile Internet Access                           | Lecture using PPT              | Online<br>Tutorial |  |

|    |  |                   |            |  |
|----|--|-------------------|------------|--|
| 59 | Mobile Web browser Evolution                     | Lecture using PPT |            |  |
| 60 | Mobile Web Standards and development time        | Lecture using PPT |            |  |
| 61 | WAP and WAP Standards, XHTML, WML and WML Script | Lecture using PPT |            |  |
| 62 | WAP and WAP Standards, XHTML, WML and WML Script | Lecture using PPT |            |  |
| 63 | Mobile Web Development Approaches                | Lecture using PPT |            |  |
| 64 | Content Adaption and Adaption Strategies         | Lecture using PPT |            |  |
| 65 | Recognize end user device                        | Lecture using PPT | e-resource |  |
| 66 | Device Detection in PHP                          | Lecture using PPT |            |  |
| 67 | Tools Available for mobile web development       | Lecture using PPT |            |  |
| 68 | Tools Available for mobile web development       | Lecture using PPT |            |  |
| 69 | Conversion Engines, Emulators                    | Lecture using PPT |            |  |
| 70 | Mobile Web Checkers                              | Lecture using PPT | e-resource |  |
| 71 | Revision   |                   |            |  |
| 72 | Revision   |                   |            |  |

**INDIVIDUAL ASSIGNMENTS/SEMINAR – DETAILS & GUIDELINES**

| <b>Sl. No.</b> | <b>Date of completion</b> | <b>Topic of Assignment &amp; Nature of assignment (Individual/Group – Written/Presentation – Graded or Non-graded etc.)</b> |
|----------------|---------------------------|---|
| 1              | 04-01-2019                | Mobile Application Development Paradigm.  |
| 2              | 04-01-2019                | Mobile Application, Programming rules and Challenges.   |
| 3              | 04-01-2019                | Mobile Programming Tools and Mobile Application Evolution.  |
| 4              | 04-01-2019                | Thin Client, Fat Client and Future of Mobile App Development.   |
| 5              | 04-01-2019                | Mobile App Programming in Java and Introduction to Java.  |
| 6              | 04-01-2019                | Java Compiler, Java Interpreter, Advantages of Java and Disadvantages of Java.  |
| 7              | 04-01-2019                | Programming Methodology, Mobile App Programming in C++, Introduction to C++.  |
| 8              | 04-01-2019                | Symbian C++, Microsoft embedded VC++.   |
| 9              | 04-01-2019                | Mobile Programming best practices, User Analysis, Organizational Analysis.  |
| 10             | 04-01-2019                | Mobile App Testing Environment and OTA App Provisioning.  |
| 11             | 04-01-2019                | Mobile Applications and mobile web applications, and their pros and cons.   |
| 12             | 04-01-2019                | SIM based Mobile App Development, introduction to SIM, SIM as a Platform, and SIM as Service Differentiator.                |
| 13             | 04-01-2019                | Introduction to UI, Principles for UI development, Application Servers.   |
| 14             | 04-01-2019                | World Wide Web, Basics of WWW, Web Application,   |

|    |            |  |
|----|------------|--|
|    |            | Web Application Architecture.  |
| 15 | 04-01-2019 | Web Server, Web Server Features, Web Application Server.                             |
| 16 | 04-01-2019 | Web Technologies and Standards: HTTP, HTML, HTML Tags, CSS (Cascading Style Sheets). |
| 17 | 04-01-2019 | XML and Cookies,   |
| 18 | 04-01-2019 | Creation of web pages using HTML, and CSS.   |
| 19 | 04-01-2019 | Mobile Internet Access, Mobile Web browser Evolution.                                |
| 20 | 04-01-2019 | Mobile Web Standards and development time.   |
| 21 | 04-01-2019 | WAP and WAP Standards.   |
| 22 | 04-01-2019 | XHTML, WML and WML Script.   |
| 23 | 04-01-2019 | Mobile Web Development Approaches, Content Adaption and Adaption Strategies.         |
| 24 | 04-01-2019 | Recognition of end user device, device detection in PHP                              |
| 25 | 04-01-2019 | Tools Available for mobile web development,  |
| 26 | 04-01-2019 | Conversion Engines, Emulators, Mobile Web Checkers                                   |

#### **GROUP ASSIGNMENTS/ACTIVITES – DETAILS & GUIDELINES**

|   | <b>Date of completion</b> | <b>Topic of Assignment &amp; Nature of assignment (Individual/Group – Written/Presentation – Graded or Non-graded etc.)</b> |
|---|---------------------------|---|
| 1 | 29.02.2019                | Create a website of your department   |

#### **REFERENCES:**

- Jeff McWherter (2012), Professional Mobile Application Development, Scott Gowell
- Reza B'Far (2005), Mobile Computing Principles Designing and Developing Mobile Applications, Cambridge University



- Valentino Lee, Heather Schneider and Robbie Schell (2004), Mobile Applications: Architecture, Design, and Development , Pearson Education

**COURSE PLAN: U4VCBCA1-INTRODUCTION TO CLOUD TECHNOLOGY**

|                              |  |                  |           |
|------------------------------|--|------------------|-----------|
| <b>PROGRAMME</b>             | <b>BACHELOR OF COMPUTER APPLICATIONS</b>         | <b>SEMESTER</b>  | <b>4</b>  |
| <b>COURSE CODE AND TITLE</b> | <b>U4VCBCA1:INTRODUCTION TO CLOUD TECHNOLOGY</b> | <b>CREDIT</b>    | <b>3</b>  |
| <b>HOURS/WEEK</b>            | <b>4</b>   | <b>HOURS/SEM</b> | <b>72</b> |
| <b>FACULTY NAME</b>          | <b>CHRISTY JACQUELINE</b>                        |                  |           |

| <b>COURSE OBJECTIVES</b>   |
|--|
| To understand the basics of cloud computing architecture and models                |
| To demonstrate the cloud computing types and service models                        |
| To demonstrate the cloud infrastructure mechanisms                                 |
| To evaluate the risk assessment and risk mitigation strategies,                    |
| To apply the foundations of cloud computing concepts and explore the case studies. |

| <b>SESSION</b> | <b>TOPIC</b>                                   | <b>LEARNING RESOURCES</b> | <b>VALUE ADDITIONS</b> | <b>REMARKS</b> |
|----------------|--|---------------------------|------------------------|----------------|
|                | <b>MODULE I</b>                                |                           |                        |                |
| 1              | Introduction to Cloud Computing                | PPT                       |                        |                |
| 2              | History and Evolution of Cloud Computing       | PPT/Lecture               |                        |                |
| 3              | Types of Cloud Computing                       | PPT/Lecture               | Video                  |                |
| 4              | Cloud computing Architecture- General and NIST | PPT/Lecture               |                        |                |
| 5              | Actors of cloud computing architecture         | PPT/Lecture               |                        |                |
| 6              | Basics of Cloud Infrastructure                 | PPT/Lecture               |                        |                |
| 7              | Merits and Demerits of cloud                   | Lecture                   |                        |                |
| 8              | Vulnerabilities of cloud                       | Lecture                   |                        |                |
| 9              | Application of cloud computing                 | Lecture                   |                        |                |
| 10             | Cloud Computing Types                          | Lecture                   | E-resource             |                |
| 11             | Attributes of cloud                            | PPT/Lecture               |                        |                |

|    |  |             |                       |  |
|----|--|-------------|-----------------------|--|
| 12 | Delivery models                          | PPT/Lecture |                       |  |
| 13 | Obstacles of cloud computing             | PPT/Lecture | E-resource            |  |
| 14 | Challenges of cloud computing            | PPT/Lecture |                       |  |
|    | <b>MODULE II</b>                         |             |                       |  |
| 15 | Web-based services,                      | PPT/Lecture |                       |  |
| 16 | Business process examples                | Lecture     |                       |  |
| 17 | Case studies                             | Lecture     |                       |  |
| 18 | Broad approaches to migrating into cloud | Lecture     |                       |  |
| 19 | Lift and Shift Approach                  | Lecture     |                       |  |
| 20 | Modernization Approach                   | PPT/Lecture |                       |  |
| 21 | Comparison between approaches            | PPT/Lecture |                       |  |
| 22 | Need for migrating into cloud            | PPT/Lecture |                       |  |
| 23 | Efficient steps for migrating into cloud | PPT/Lecture |                       |  |
| 24 | Risks in cloud computing                 | Lecture     |                       |  |
| 25 | Measurement of Risk                      | Lecture     | Quiz                  |  |
| 26 | <b>CIA-1</b>                             |             |                       |  |
| 27 | Risk Assessment                          | Lecture     |                       |  |
| 28 | Risk Management                          | Lecture     |                       |  |
| 29 | Risk Mitigation strategies               | PPT/Lecture |                       |  |
| 30 | Case studies                             | PPT/Lecture |                       |  |
| 31 | Case studies                             | PPT/Lecture |                       |  |
| 32 | Case studies                             | PPT/Lecture |                       |  |
|    | <b>MODULE III</b>                        |             |                       |  |
| 33 | Evaluating the need                      | PPT/Lecture |                       |  |
| 34 | Evaluating cloud computing solution      | PPT/Lecture |                       |  |
| 35 | Need for Cloud computing solution        | PPT/Lecture |                       |  |
| 36 | Comparison between solutions             | Lecture     | Quiz                  |  |
| 37 | Virtualization                           | Lecture     |                       |  |
| 38 | Upscaling and downsizing                 | PPT/Lecture |                       |  |
| 39 | Need for scalability                     | PPT/Lecture |                       |  |
| 40 | AWS Example                              | PPT/Lecture | E-resource            |  |
| 41 | Cost Benefit Analysis,                   | PPT/Lecture |                       |  |
| 42 | Measuring Actual cost                    | Lecture     |                       |  |
| 43 | Leading cloud service providers          | PPT/Lecture | E-resource<br>& video |  |
| 44 | Considerations of cloud solutions        | PPT/Lecture |                       |  |
| 45 | Best practices of cloud                  | PPT/Lecture |                       |  |
| 46 | Practical Issues to be considered        | PPT/Lecture |                       |  |
| 47 | Case studies                             | PPT/Lecture |                       |  |
| 48 | Case studies                             | PPT/Lecture |                       |  |

| <b>MODULE IV</b> |   |             |            |  |
|------------------|---|-------------|------------|--|
| 49               | Cloud Governance,                                 | PPT/Lecture |            |  |
| 50               | Need of Cloud Governance in Enterprise            | Lecture     |            |  |
| 51               | Cloud Governance- Important aspects               | PPT/Lecture |            |  |
| 52               | Cloud Governance- key dimensions                  | PPT/Lecture | Video      |  |
| 53               | Activities in Cloud Governance                    | PPT/Lecture |            |  |
| 54               | SPOT Framework                                    | PPT/Lecture |            |  |
| 55               | Cloud Governance in delivery models               | Lecture     |            |  |
| 56               | Legal Issues in cloud computing,                  | Lecture     | Quiz       |  |
| 57               | Contract models-cloud                             | PPT/Lecture |            |  |
| 58               | Standard Contract model in cloud                  | PPT/Lecture |            |  |
| 59               | Data security                                     | PPT/Lecture |            |  |
| 60               | Jurisdictional issues                             | PPT/Lecture |            |  |
| 61               | legal issues                                      | PPT/Lecture |            |  |
| 62               | compliance issues                                 | PPT/Lecture |            |  |
| <b>CIA – II</b>  |   |             |            |  |
| <b>MODULE V</b>  |   |             |            |  |
| 63               | Analysing the existing services                   | Lecture     | Demo video |  |
| 64               | Best Practices for migrating into cloud           | Lecture     |            |  |
| 65               | Practices to avoid while migrating into cloud     | Lecture     | Quiz       |  |
| 66               | Future of cloud computing                         | Lecture     |            |  |
| 67               | Application of cloud computing in various sectors | PPT/Lecture | E-resource |  |
| 68               | career opportunities in cloud                     | PPT/Lecture |            |  |
| 69               | Applications- case studies                        | PPT/Lecture |            |  |
| 70               | Revision  |             |            |  |
| 71               | Revision  |             |            |  |
| 72               | Revision  |             |            |  |

#### **INDIVIDUAL ASSIGNMENTS/SEMINAR – Details & Guidelines**

| Sl.No | Date of completion | Topic of Assignment & Nature of assignment (Individual/Group – Written/Presentation – Graded or Non-graded etc) |
|-------|--------------------|---|
| 1     | 22/11/2018         | Applications of cloud computing   |

### **GROUP ASSIGNMENTS/ACTIVITES – Details & Guidelines**

| Sl.No | Date of completion | Topic of Assignment & Nature of assignment (Individual/Group – Written/Presentation – Graded or Non-graded etc) |
|-------|--------------------|---|
| 1     | 17/01/2019         | Cloud Governance Activities   |

#### **References**

- Cloud computing: Concepts, Technology and Architecture, Thomar Erl
- Cloud Computing: From Beginning to end, Ray J Rafaels

#### **Web resource references:**

- Handbook of cloud computing

**COURSE PLAN: U4VCBCA2-FUNDAMENTALS OF DATA CENTER**

|                              |  |                  |           |
|------------------------------|--|------------------|-----------|
| <b>PROGRAMME</b>             | <b>BACHELOR OF COMPUTER APPLICATIONS</b>     | <b>SEMESTER</b>  | <b>4</b>  |
| <b>COURSE CODE AND TITLE</b> | <b>U4VCBCA2: FUNDAMENTALS OF DATA CENTER</b> | <b>CREDITS</b>   | <b>4</b>  |
| <b>HOURS/WEEK</b>            | <b>4</b>                                     | <b>HOURS/SEM</b> | <b>72</b> |
| <b>FACULTY NAME</b>          | <b>NIJO ANTONY</b>                           |                  |           |

| <b>COURSE OBJECTIVES</b>   |
|--|
| To understand the fundamental concepts in data centers and different architectural models.   |
| To analyze the data center tradeoffs in terms of Network power, efficiency and cost.         |
| To discuss Virtualization and outline its role in enabling the cloud computing system model. |
| To evaluate the data center storage architecture with respect to the FOS                     |
| To understand the storage virtualization techniques.   |

| <b>SESSION</b> | <b>TOPIC</b>  | <b>LEARNING RESOURCES</b> | <b>VALUE ADDITIONS</b> | <b>REMARKS</b> |
|----------------|---|---------------------------|------------------------|----------------|
|                | <b>MODULE I</b>   |                           |                        |                |
| 1              | Data Centers Defined, Data Center Goals                   | PPT/Lecture               | Video                  |                |
| 2              | Data Center Facilities                                    | PPT/Lecture               |                        |                |
| 3              | Roles of Data Centers in the Enterprise                   | PPT/Lecture               |                        |                |
| 4              | Roles of Data Centers in the Service Provider Environment | PPT/Lecture               |                        |                |
| 5              | Application Architecture Models                           | PPT/Lecture               |                        |                |
| 6              | The Client/Server Model and Its Evolution                 | PPT/Lecture               |                        |                |
| 7              | The n-Tier Model  | PPT/Lecture               |                        |                |
| 8              | The n-Tier Model  | PPT/Lecture               |                        |                |
| 9              | The n-Tier Model  | PPT/Lecture               |                        |                |
| 10             | Multitier Architecture Application Environment            | PPT/Lecture               | Video                  |                |

|                   |  |             |       |  |
|-------------------|--|-------------|-------|--|
| 12                | Data Center Architecture                     | PPT/Lecture |       |  |
| <b>MODULE II</b>  |  |             |       |  |
| 13                | Cloud Data Center Networking Topologies      | PPT/Lecture | Video |  |
| 14                | Traditional Multi-tiered Enterprise Networks | PPT/Lecture |       |  |
| 15                | Data Center Network Switch Types             | PPT/Lecture |       |  |
|                   | Flat Data Center Networks                    | PPT/Lecture |       |  |
| 16                | Rack Scale Architectures                     | PPT/Lecture |       |  |
| 17                | Data Center Networking Standards             | Lecture     |       |  |
| 18                | Data Center Networking Standards             | Lecture     |       |  |
| 19                | Virtual Local Area Networks                  | Lecture     |       |  |
| 20                | JUnit classes                                | Lecture     |       |  |
| 21                | Ethernet Data Rate Standards                 | PPT/Lecture | Video |  |
| 22                | Data Center Bridging                         | PPT/Lecture |       |  |
| 23                | Improving Network Bandwidth                  | PPT/Lecture |       |  |
| 24                | Remote Direct Memory Access                  | PPT/Lecture |       |  |
| 25                | Remote Direct Memory Access                  | Lecture     |       |  |
| 26                | Activity Testing, what to Test               | Lecture     | Video |  |
| CIA-1             |  |             |       |  |
| 27                | ContentProvider Testing                      | Lecture     |       |  |
| 28                | service Testing, choosing devices to test    | Lecture     |       |  |
| 29                | Testing tools                                | PPT/Lecture |       |  |
| <b>Module III</b> |  |             |       |  |
| 30                | Server Virtualization and Networking         | PPT/Lecture |       |  |
| 31                | Server Virtualization and Networking         | PPT/Lecture |       |  |
| 32                | VM Overview                                  | Lecture     | video |  |
|                   | Virtual Switching, PCI Express               |             |       |  |
| 33                | VM Migration                                 | PPT/Lecture |       |  |
| 34                | Network Virtualization                       | PPT/Lecture |       |  |
| 35                | Multi-Tenant Environments                    | PPT/Lecture |       |  |
| 36                | Multi-Tenant Environments                    | Lecture     |       |  |
| 37                | Traditional network Tunneling Protocols      | Lecture     |       |  |
| 38                | Traditional network Tunneling Protocols      | PPT/Lecture |       |  |
| 39                | Traditional network Tunneling                | PPT/Lecture |       |  |

|                  |  |             |       |  |
|------------------|--|-------------|-------|--|
|                  | Protocols                                  |             |       |  |
| 40               | Traditional network Tunneling<br>Protocols | PPT/Lecture |       |  |
| 41               | Traditional network Tunneling<br>Protocols | PPT/Lecture | Video |  |
| 42               | VXLAN                                      | Lecture     |       |  |
| 43               | VXLAN                                      |             |       |  |
| 44               | NVGRE                                      | PPT/Lecture |       |  |
| 45               | NVGRE                                      | PPT/Lecture |       |  |
| 46               | Tunnel Locations                           | PPT/Lecture |       |  |
| 47               | Load Balancing                             | PPT/Lecture |       |  |
| 48               | Load Balancing                             | PPT/Lecture |       |  |
| <b>Module IV</b> |  |             |       |  |
| 49               | Storage Networks Storage<br>Background     | PPT/Lecture |       |  |
| 50               | Storage Networks Storage<br>Background     | PPT/Lecture | Video |  |
| 51               | Advanced Storage Technologies              | PPT/Lecture |       |  |
| 52               | Advanced Storage Technologies              | PPT/Lecture |       |  |
| 53               | Advanced Storage Technologies              | PPT/Lecture |       |  |
| 54               | Storage Communication Protocols            | PPT/Lecture |       |  |
| 55               | Storage Communication Protocols            | PPT/Lecture |       |  |
| 56               | Network Convergence                        | PPT/Lecture |       |  |
| 57               | Software Defined Storage                   | PPT/Lecture |       |  |
| 58               | Storage in Cloud Data centers              | PPT/Lecture |       |  |
| <b>Module V</b>  |  |             |       |  |
| 59               | Software-Defined Networking                | PPT/Lecture | Video |  |
| 60               | Software-Defined Networking                | PPT/Lecture |       |  |
| 61               | Data Center Software Background            | PPT/Lecture |       |  |
| 62               | Data Center Software Background            | PPT/Lecture | Video |  |
| <b>CIA - II</b>  |  |             |       |  |
| 63               | OpenStack                                  | PPT/Lecture | Video |  |
| 64               | OpenStack                                  | PPT/Lecture |       |  |
| 65               | OpenFlow                                   | PPT/Lecture |       |  |
| 66               | OpenFlow                                   | PPT/Lecture | Video |  |
| 67               | Network Function Virtualization            | PPT/Lecture |       |  |
| 68               | Network Function Virtualization            | PPT/Lecture |       |  |
| 69               | Network Function Virtualization            | PPT/Lecture |       |  |
| 70               | SDN Deployment                             | PPT/Lecture |       |  |
| 71               | SDN Deployment                             | PPT/Lecture | Video |  |

|    |          |            |  |  |
|----|----------|------------|--|--|
| 72 | Revision | Discussion |  |  |
|----|----------|------------|--|--|

**INDIVIDUAL ASSIGNMENTS/SEMINAR – Details & Guidelines**

|   | Date of completion | Topic of Assignment & Nature of assignment (Individual/Group – Written/Presentation – Graded or Non-graded etc) |
|---|--------------------|---|
| 1 | 17 - 30/2/2019     | Data Center environment and marketing trends  |

**GROUP ASSIGNMENTS/ACTIVITES – Details & Guidelines**

|   | Date of completion | Topic of Assignment & Nature of assignment (Individual/Group – Written/Presentation – Graded or Non-graded etc) |
|---|--------------------|---|
| 1 | 2/2/2019           | Virtualization, Data center networking, Protocols, and technologies   |

**References**

- [1] Gary Lee (2014 ), Cloud Networking Understanding Cloud based Data Center Networks, Elsevier
- [2] Gary Oreinstein (2006 ), IP Storage Networking, Addison Wesley Professional
- [3] G. Somasundaram , Alok Srivastava (2009 ), Information Storage and Management 1st edition, Wiley
- [4] Kailash Jayswal (2005 ), Administering Data Centers 1st edition, Wiley



**COURSEPLAN:U4CRBCA13-BASIC ANDROID**

|                              |  |                  |           |
|------------------------------|--|------------------|-----------|
| <b>PROGRAMME</b>             | <b>BACHELOR OF COMPUTER APPLICATIONS</b> | <b>SEMESTER</b>  | <b>4</b>  |
| <b>COURSE CODE AND TITLE</b> | <b>U4CRBCA13: BASIC ANDROID</b>          | <b>CREDIT</b>    | <b>4</b>  |
| <b>HOURS/WEEK</b>            | <b>4</b>                                 | <b>HOURS/SEM</b> | <b>72</b> |
| <b>FACULTY NAME</b>          | <b>NEETHU A S</b>                        |                  |           |

**COURSE OBJECTIVES**

To describe Android Architecture, Android SDK, Android versions, Application components, Intent and Intent filters

To design user interface using views, layouts, fragments in Android platform

To discuss the use shared preferences, Internal storage, external storage, SQLite database, Content Providers,

To discuss the use Media API, Video, Audio and Camera, Sensors, Bluetooth in Android applications, Ability to use maps and location based services

To describe the basics of testing android applications

| <b>SESSION</b> | <b>TOPIC</b>                      | <b>LEARNING RESOURCES</b> | <b>VALUE ADDITIONS</b> | <b>REMARKS</b> |
|----------------|-----------------------------------|---------------------------|------------------------|----------------|
|                | <b>MODULE I</b>                   |                           |                        |                |
| 1              | Introduction to Android           | PPT                       | video                  |                |
| 2              | Android components and features   | PPT/Lecture               |                        |                |
| 3              | Android architecture              | PPT/Lecture               |                        |                |
| 4              | Introduction to Android SDK       | PPT/Lecture               | e-resource             |                |
| 5              | Components of Android Application | PPT/Lecture               |                        |                |
| 6              | Creating the Activity             | PPT/Lecture               |                        |                |
| 7              | Exploring the Activity Lifecycle  | Lecture                   |                        |                |
| 8              | XML vs Programmatic Layouts       | Lecture                   |                        |                |
| 9              | Android Manifest File             | Lecture                   |                        |                |
| 10             | Intent and types Intent Filter    | Lecture                   |                        |                |

|                   |  |             |            |  |
|-------------------|--|-------------|------------|--|
| 11                | Services   | PPT/Lecture |            |  |
| 12                | Content Providers                                  | PPT/Lecture |            |  |
| 13                | Broadcast Receiver                                 | PPT/Lecture |            |  |
| 14                | Revision   |             |            |  |
| <b>MODULE II</b>  |  |             |            |  |
| 15                | View, Event handling and listeners<br>Introduction | PPT/Lecture | video      |  |
| 16                | Layouts- Relative, Linear                          | Lecture     |            |  |
| 17                | Layout- Constraint, Table                          | Lecture     |            |  |
| 18                | Adapters   | Lecture     | e-resource |  |
| 19                | Menu   | Lecture     |            |  |
| 20                | Action bar   | PPT/Lecture |            |  |
| 21                | Notification- notification with alarms             | PPT/Lecture |            |  |
| 22                | Alert Dialog                                       | PPT/Lecture |            |  |
| 23                | Designing for Tablets                              | PPT/Lecture |            |  |
| 24                | Resources and Assets                               | Lecture     |            |  |
| 25                | Localization                                       | Lecture     |            |  |
| 26                | Testing and publishing localized applications      | Lecture     |            |  |
| 27                | Introduction to Fragments                          | Lecture     |            |  |
| 28                | Fragment lifecycle                                 | Lecture     |            |  |
| 29                | Revision   |             |            |  |
| 30                | Revision   |             |            |  |
| <b>MODULE III</b> |  |             |            |  |
| 31                | Data storage Introduction                          | PPT/Lecture | video      |  |
| 32                | Data Storage using shared preferences              | PPT/Lecture |            |  |
| 33                | How to access shared preferences                   | PPT/Lecture |            |  |
| 34                | How to save data to shared preferences             | PPT/Lecture | e-resource |  |

|                  |  |             |                 |  |
|------------------|--|-------------|-----------------|--|
| 35               | Data Storage using File system               | PPT/Lecture |                 |  |
| 36               | How to access internal storage               | Lecture     |                 |  |
| 37               | How to access the external storage           | Lecture     | Q & Ans Session |  |
| 38               | Create database and table                    | PPT/Lecture |                 |  |
| 39               | CRUD operations on database                  | PPT/Lecture |                 |  |
| 40               | Building and accessing a database            | PPT/Lecture |                 |  |
| 41               | Networking                                   | PPT/Lecture |                 |  |
| 42               | Content Provider                             | Lecture     |                 |  |
| 43               | Using Built in Content provider              | PPT/Lecture |                 |  |
| 44               | Creating a Content Provider                  | PPT/Lecture |                 |  |
| 45               | Content Provider CRUD operations             | PPT/Lecture |                 |  |
| 46               | Revision                                     | PPT/Lecture |                 |  |
| <b>Module IV</b> |  |             |                 |  |
| 48               | Android Media Playing Audio Introduction     | PPT/Lecture |                 |  |
| 49               | Playing video                                | PPT/Lecture |                 |  |
| 50               | Capturing media- audio capture               | Lecture     | Q & Ans Session |  |
| 51               | Recording video                              | PPT/Lecture |                 |  |
| 52               | Sensors                                      | PPT/Lecture | Video           |  |
| 53               | Exploring Android Bluetooth capabilities     | PPT/Lecture |                 |  |
| 54               | Maps and Location: Android communication     | PPT/Lecture |                 |  |
| 55               | Using Location manager and Location provider | PPT/Lecture |                 |  |
| 56               | Location based services                      | Lecture     |                 |  |
| 57               | Map based activities –to find Map API Key    | PPT/Lecture |                 |  |
| 58               | Maps via Intent and Map Activity             | PPT/Lecture |                 |  |

|                 |   |             |                 |  |
|-----------------|---|-------------|-----------------|--|
| 59              | Location Updates                            | PPT/Lecture |                 |  |
| 60              | Revision                                    | Lecture     | Q & Ans Session |  |
| 61              | Revision                                    | Lecture     | Q & Ans Session |  |
| 62              | Revision                                    | PPT/Lecture |                 |  |
| <b>CIA – II</b> |   |             |                 |  |
| <b>Module V</b> |   |             |                 |  |
| 63              | Module 5: Basics of testing                 | PPT/Lecture | video           |  |
| 64              | Activity testing                            | PPT/Lecture |                 |  |
| 65              | Service testing                             | PPT/Lecture |                 |  |
| 66              | Content provider testing                    | PPT/Lecture | e-resource      |  |
| 67              | Test classes                                | PPT/Lecture |                 |  |
| 68              | Commercializing Applications: DDMS overview | Lecture     |                 |  |
| 69              | Running and Debugging using DDMS            | PPT/Lecture |                 |  |
| 70              | Debugging using DDMS                        | PPT/Lecture |                 |  |
| 71              | Revision                                    |             |                 |  |
| 72              | Revision                                    |             |                 |  |

#### **INDIVIDUAL ASSIGNMENTS/SEMINAR – Details & Guidelines**

|   | <b>Date of completion</b> | <b>Topic of Assignment &amp; Nature of assignment (Individual/Group – Written/Presentation – Graded or Non-graded etc)</b>   |
|---|---------------------------|--|
| 1 | 12/1/2019                 | Create an android application to implement a simple calculator.  |
| 2 | 28/1/2019                 | Create an android application unit converter to convert height from cm to inch and vice-versa, also to convert weight from kg to pound and vice-versa (use radio button and button group). |

## GROUP ASSIGNMENTS/ACTIVITES – Details & Guidelines

|   | Date of completion | Topic of Assignment & Nature of assignment<br>(Individual/Group – Written/Presentation – Graded or Non-graded etc)  |
|---|--------------------|---|
| 1 | 10/1/2019          | Create a user login form and registration form. First time users have to register through the registration form and the details should be stored in the database. Then they can login using the login page. |

### References

- Android Application Development Cookbook, by Wei-Meng Lee, John Wiley and Sons
- Android in Action, Third Edition, by W. Frank Ableson, RobiSen, Chris King, C. Enrique Ortiz
- Professional Android 4 Development by Reto Meier, John Wiley and Sons, 2012

### Web resource references:

- <https://developer.android.com/>

**COURSEPLAN: U4CRBCA14 -MOBILE DEVICE AND NETWORK ARCHITECTURE**

|                              |  |                  |           |
|------------------------------|--|------------------|-----------|
| <b>PROGRAMME</b>             | <b>BCA</b>   | <b>SEMESTER</b>  | <b>4</b>  |
| <b>COURSE CODE AND TITLE</b> | <b>U4CRBCA14 :MOBILE DEVICE AND NETWORK ARCHITECTURE</b> | <b>CREDITS</b>   | <b>4</b>  |
| <b>HOURS/WEEK</b>            | <b>4</b>   | <b>HOURS/SEM</b> | <b>72</b> |
| <b>FACULTY NAME</b>          | <b>SANTHOSH KUMAR K P</b>                                |                  |           |

| <b>COURSE OBJECTIVES</b>  |
|---|
| To summarize the basic wireless communication principles and the types of wireless networks                     |
| To interpret the concepts of cellular networks and the mobile handover mechanisms with in the cellular network. |
| To illustrate the concepts of GSM, 2G, mobile IP and UMTS   |
| To explain the features of a mobile device.   |

| <b>SESSION</b>  | <b>TOPIC</b>  | <b>LEARNING RESOURCES</b> | <b>VALUE ADDITIONS</b> | <b>REMARKS</b> |
|-----------------|---|---------------------------|------------------------|----------------|
| <b>MODULE I</b> |   |                           |                        |                |
| 1               | Wireless Communication Principles                                   | PPT                       | video                  |                |
| 2               | Radio Communication   | PPT/Lecture               |                        |                |
| 3               | Analog and Digital Communication, Benefits of Digital Signals       | PPT/Lecture               |                        |                |
| 4               | Computer Network, OSI Model   | PPT/Lecture               | e-resource             |                |
| 5               | Mobile Network, OSI layer functions, Mobile Network Protocol Layers | PPT/Lecture               |                        |                |
| 6               | Mobile Network, OSI layer functions, Mobile Network Protocol Layers | PPT/Lecture               |                        |                |
| 7               | Mobile Network, OSI layer functions, Mobile Network Protocol Layers | Lecture                   |                        |                |
| 8               | Introduction to Basic Telephony, POTS                               | Lecture                   |                        |                |
| 9               | Telephony Networks, PSTN  | Lecture                   |                        |                |
| 10              | Telephone Network Hierarchy   | Lecture                   |                        |                |

|                   |  |             |  |  |
|-------------------|--|-------------|--|--|
| 11                | Telecommunication Networks   | PPT/Lecture |  |  |
| 12                | Fixed Networks   | PPT/Lecture |  |  |
| 13                | Mobile Networks  | PPT/Lecture |  |  |
| 14                | Revision   |             |  |  |
| <b>MODULE II</b>  |  |             |  |  |
| 15                | Cellular Network Concepts, Cells and Base Stations                 | PPT/Lecture |  |  |
| 16                | Cellular Network Concepts, Cells and Base Stations                 | Lecture     |  |  |
| 17                | Frequency and Interface in Cells, access channel                   | Lecture     |  |  |
| 18                | Mobile Network Architecture  | Lecture     |  |  |
| 19                | Mobile Network Subsystems, Mobile Station, Base Station Subsystems | Lecture     |  |  |
| 20                | Network Switching Subsystems                                       | PPT/Lecture |  |  |
| 21                | Mobile Network, Protocol Stacks, Core Networks, PLMN               | PPT/Lecture |  |  |
| 22                | Mobile Network, Protocol Stacks, Core Networks, PLMN               | PPT/Lecture |  |  |
| 23                | Mobile Network, Protocol Stacks, Core Networks, PLMN               | PPT/Lecture |  |  |
| 24                | Mobile Network Fundamentals, Mobile Network Features               | Lecture     |  |  |
| 25                | Mobile Network Fundamentals, Mobile Network Features               | Lecture     |  |  |
| 26                | <b>CIA-1</b>   |             |  |  |
| 27                | Mobility, Registration, Handoff, Roaming                           | Lecture     |  |  |
| 28                | Mobile Network Fundamentals (SMS), SMS                             | Lecture     |  |  |
| 29                | SMS Network Architecture, SMS Network Elements                     | PPT/Lecture |  |  |
| 30                | SMS Protocols, SMS Applications & Short Codes                      | PPT/Lecture |  |  |
| 31                | SMS Protocols, SMS Applications & Short Codes                      | PPT/Lecture |  |  |
| 32                | revision   |             |  |  |
| <b>MODULE III</b> |  |             |  |  |
| 33                | GSM History, GSM RF Channels                                       | PPT/Lecture |  |  |

|                  |  |             |                 |  |
|------------------|--|-------------|-----------------|--|
| 34               | 2G Network Architecture  | PPT/Lecture |                 |  |
| 35               | GSM Protocol Stack, GPRS Standards, CS and PS Domains                | PPT/Lecture |                 |  |
| 36               | GPRS Architecture, GPRS Network Architecture                         | Lecture     | Quiz            |  |
| 37               | GPRS Architecture, GPRS Network Architecture                         | Lecture     | Q & Ans Session |  |
| 38               | GPRS protocol  | PPT/Lecture |                 |  |
| 39               | CDMA Evolution, 2G CDMAOne, CDMA 2G Standards                        | PPT/Lecture |                 |  |
| 40               | 3GPP2 Network  | PPT/Lecture |                 |  |
| 41               | Mobile IP, UMTS Spectrum   | PPT/Lecture |                 |  |
| 42               | Mobile IP, UMTS Spectrum   | Lecture     |                 |  |
| 43               | UMTS Radio Access Network, UMTS Protocol stack                       | PPT/Lecture |                 |  |
| 44               | SIP Network, UMTS Multiple Access Network Architecture               | PPT/Lecture |                 |  |
| 45               | 4G   | PPT/Lecture |                 |  |
| 46               | Revision   | PPT/Lecture |                 |  |
| <b>MODULE IV</b> |  |             |                 |  |
| 47               | Mobile Phone and Network Evolution                                   | PPT/Lecture |                 |  |
| 48               | Cellular Networks, Cell Phones                                       | PPT/Lecture |                 |  |
| 49               | Mobile Phones, Mobile Handset Characteristics                        | PPT/Lecture |                 |  |
|                  | CIA II   |             |                 |  |
| 50               | Wireless Cellular, Bluetooth   |             |                 |  |
| 51               | Display, Keypad, Camera  |             |                 |  |
| 52               | Handset Categories   | PPT/Lecture |                 |  |
| 53               | Low end Phones, Feature Phones, Smart phones                         | PPT/Lecture |                 |  |
| 54               | Handset Components   | PPT/Lecture |                 |  |
| 55               | Handset Design   |             |                 |  |
| 56               | Handset Manufacture, Handset Bill of Materials, assembling handsets. |             |                 |  |
| 57               | Revision   |             |                 |  |
| <b>MODULE V</b>  |  |             |                 |  |
| 58               | Handset hardware architecture  | Lecture     | Debate          |  |
| 59               | Primary Hardware Subsystems, Element inside a Mobile                 | PPT/Lecture |                 |  |



|    |   |             |                  |  |
|----|---|-------------|------------------|--|
| 60 | Hardware Architecture Evolution                                     | PPT/Lecture |                  |  |
| 61 | Processing Subsystem architecture                                   | PPT/Lecture |                  |  |
| 62 | CPU and Memory, Memory, Internal storage                            | PPT/Lecture |                  |  |
| 63 | Introduction to the Radio subsystems, Function of the RF Subsystems | PPT/Lecture |                  |  |
| 64 | Introduction to the Radio subsystems, Function of the RF Subsystems | PPT/Lecture |                  |  |
| 65 | Handset Power requirement   | Lecture     | Demo video       |  |
| 66 | Power Management, Power reduction techniques                        | Lecture     |                  |  |
| 67 | Power Management, Power reduction techniques                        | Lecture     | Group discussion |  |
| 68 | Introduction and Definition to the SIM                              | Lecture     |                  |  |
| 69 | Smartcards in general and concept of mobile identity                | PPT/Lecture |                  |  |
| 68 | Smartcards in general and concept of mobile identity                | PPT/Lecture |                  |  |
| 69 | Functions and usage of the SIM , Phones without SIMs                | PPT/Lecture |                  |  |
| 70 | Functions and usage of the SIM , Phones without SIMs                | PPT/Lecture |                  |  |
| 71 | Revision  |             |                  |  |
| 72 | Revision  |             |                  |  |

#### INDIVIDUAL ASSIGNMENTS/SEMINAR – Details & Guidelines

|   | Date of completion | Topic of Assignment & Nature of assignment (Individual/Group – Written/Presentation – Graded or Non-graded etc) |
|---|--------------------|---|
| 1 | 16/12/2018         | Architecture or cellular networks: assignment   |
| 2 | 17/01/2019         | Seminar   |

### GROUP ASSIGNMENTS/ACTIVITIES – Details & Guidelines

|   | Date of completion | Topic of Assignment & Nature of assignment (Individual/Group – Written/Presentation – Graded or Non-graded etc) |
|---|--------------------|---|
| 1 | 30/01/2019         | Security issues in mobile phones  |

### TEXT BOOKS:

- Wireless and Mobile Network Architectures by Yi-Bang Lin and Imrich Chlamtac, Wiley-India, 2008
- Mobile Networks Architecture by Andre Perez, Wiley, March 2012
- Mobile Computing – Technology, Application & Service Creation by Asoke. K Talukder, Roopa R. Yavagal, Asoke K. Talukder, Tata McGraw-Hill, 2005
- GSM - Architecture, Protocols and Services by Jörg Eberspächer, Hans-JoergVögel, Christian Bettstetter, Christian Hartmann John Wiley & Sons, Dec-2008