

# NALLAMUTHU GOUNDER MAHALINGAM COLLEGE (AUTONOMOUS)-POLLACHI

|     |                       |                                                                    |          |      |
|-----|-----------------------|--------------------------------------------------------------------|----------|------|
| 248 | B.Com (E-Commerce)    | Modern Banking                                                     | 20UEC4A4 | 2020 |
| 249 | B.Com (E-Commerce)    | Investment Management                                              | 20UEC620 | 2020 |
| 250 | B.COM(FINANCE)        | Allied -I Business Economics                                       | 20UCF1A1 | 2020 |
| 251 | B.COM(FINANCE)        | CoreVII:Banking Law and Practice                                   | 20UCF307 | 2020 |
| 252 | B.COM(FINANCE)        | Core XIV - Principles of Insurance                                 | 20UCF514 | 2020 |
| 253 | B.Com PA              | Core XVI : Financial Services                                      | 20UPA516 | 2020 |
| 254 | B.Com (BPS)           | Supply Chain Management for Business Process Services              | 20UBP308 | 2020 |
| 255 | B.COM IB              | Sourcing & Procurement for International Business                  | 20UIB6E5 | 2020 |
| 256 | M.A Tamil             | Ikkala illakiyam                                                   | 20PTM101 | 2020 |
| 257 | M.A Tamil             | Bhakthi ilakkamum sitrilakkiamum                                   | 20PTM205 | 2020 |
| 258 | M.A Tamil             | Kaappiangal                                                        | 20PTM205 | 2020 |
| 259 | M.A Tamil             | Thonmaillakkiam                                                    | 20PTM414 | 2020 |
| 260 | M.Sc. Botany          | Enterpreneurship Botany                                            | 20PBY2N1 | 2020 |
| 261 | M.Sc. Botany          | Plant ecology, tissue culture and Phytochemical techniques         | 20PBY315 | 2020 |
| 262 | M.Sc Computer Science | Advanced Database Management System                                | 20PCS103 | 2020 |
| 263 | M.Sc Computer Science | Advanced Java Programming                                          | 20PCS207 | 2020 |
| 264 | M.Sc Computer Science | Cloud and Big Data Analytics                                       | 20PCS209 | 2020 |
| 265 | M.Sc Computer Science | Programming Lab -III : Advanced Java Programming                   | 20PCS210 | 2020 |
| 266 | M.Sc Computer Science | R Lab                                                              | 20PCS314 | 2020 |
| 267 | M.Sc Computer Science | Network Security and Cryptography                                  | 20PCS314 | 2020 |
| 268 | M.Sc. Physics         | Non Conventional Energy Sources                                    | 20PPS2N1 | 2020 |
| 269 | M.Sc. Chemistry       | Organic Chemistry I: Reactions and Mechanism                       | 20PCY102 | 2020 |
| 270 | M.Sc. Chemistry       | Inorganic Chemistry III-Bioinorganic and Inner Transition Elements | 20PCY412 | 2020 |
| 271 | M.Sc. Chemistry       | Phytochemical Techniques and health chemistry                      | 20PCY414 | 2020 |
| 272 | M.Com (CA)            | Higher Corporate Accounting                                        | 20PCC101 | 2020 |
| 273 | M.Com (CA)            | Basics of Income Tax                                               | 20PCC2N1 | 2020 |

BOS HIGHLIGHTED



Metric : 1.2.1



New Course Introduced

**Dr. R. MUTHUKUMARAN,**  
 M.A., M.Phil., B.Ed., Ph.D.  
**PRINCIPAL,**  
 N.G.M. College, Pollachi - 642 001  
 Coimbatore District

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MEMBERS

SIGNATURE

S.No

CHAIRMAN

Dr. M. Sakthi

M. Sakthi  
22/02/2020

Dr. M. SAKTHI, M.Sc., M.Phil., Ph.D.  
Associate Professor & Head  
Department of Computer Science  
V.N.J. College, Pollachi - 642 001.

UNIVERSITY NOMINEE

Dr. S. N. Geethalakshmi  
Professor in Computer Science,  
Avinashilingam Institute for Home  
Sciences and Higher Education for Women  
Coimbatore

S. N. Geethalakshmi  
22/02/2020  
UNIVERSITY NOMINEE  
Board of Studies in Computer Science (PG)  
Vallamthi Gounder Mahalingam College (Autonomous)  
Pollachi - 642 001

ACADEMIC AUDITOR

Dr. V. Bhuvaneshwari  
Associate Professor  
Department of Computer Applications  
Bharathiar University  
Coimbatore

V. Bhuvaneshwari  
22/02/2020  
ACADEMIC AUDITOR  
Board of Studies in Computer Science (PG)  
Vallamthi Gounder Mahalingam College (Autonomous)  
Pollachi - 642 001

SUBJECT EXPERT

Dr. P. Shanmugasundaram,  
Prof., Dept. of Computer Science & Applications,  
Grandhiyam Rural Institute (Deemed to be University)

P. Shanmugasundaram  
22/02/2020  
SUBJECT EXPERT  
Board of Studies in Computer Science (PG)  
Vallamthi Gounder Mahalingam College (Autonomous)  
Pollachi - 642 001

INDUSTRY EXPERT

P. Karthikeyan  
Senior Analyst  
Accenture  
Chennai

P. Karthikeyan  
22/02/2020

MINUTES

The BOS of PG, Computer Science meet on 22.02.2020 at 2.00pm under the chairmanship of Dr. M. Sakthi, Head, Dept of Computer Science. The chairman welcomed the members of PG CS Bas and placed the agenda. The board discussed the proposed scheme for the I-IV Semester of the batch 2020-2022.

The Board resolves the proposed schemes for the batch (2020-2022) syllabi.

→ A minimum of two value added course will be offered. Each course can have 2 Credits.

→ Advanced learners course will be offered.

→ The Continuous internal assessment for the academic year 2020-2022 are as follows.

Internal : 30 marks

External : 70 marks

→ All the students will be enrolled in any of the MOOC courses in the portals like Swayam, NPTEL, Coursera, Edx and also our students are encouraged to take up Data Analytics/Machine Learning related course in IBM Cognitive class.

Based on the suggestions of Bas members,

→ Advanced Network paper of the first semester has been moved to the second semester of the 2020-2022 batch. Instead of the Advanced Networks, Advanced Database Management System (20PCS102) was introduced based on Bas members suggestions.

→ The programming Lab I, Design & Analysis of algorithms and Advanced DBMS has appended with Advanced DBMS programs.

## ALUMNI

Mr. Bhuvanesh Kumar  
Test Engineer  
Infosys  
Chennai

NRN  
22/02/2020.

7 Mr. R. Nandha Kumar

*[Signature]* 22/02/2020

8 Dr. R. Deepa

*[Signature]* 22/02/2020

9 Ms. M. Dhara Priya

*[Signature]* 22/02/2020

10 Ms. S. Sharmila

*[Signature]* 22/02/2020

11 Ms. N. Yasodha

*[Signature]*

12 Ms. M. Meena Krithika

*[Signature]* 22/02/2020

13 Ms. S. S. Shanthi

*[Signature]* 22/02/2020

14 Mr. N. Anul Kumar

*[Signature]* 22/02/2020

15 Mr. N. Kasthikayan

*[Signature]* 22/02/2020

16 Ms. K. Kannika Parameswari

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17 Dr. A. Kanagaraj

*[Signature]* 22/02/2020

18 Ms. P. Jayapriya

*[Signature]* 22/02/2020

→ Data Analytics using python programming (19PCS207), Information Security and Cryptography (19PCS208), programming Lab-III: Data Analytics (19PCS210), programming Lab IV: Scala programming Lab (19PCS211), programming Lab V: Unified Modeling Language and R tool lab (19PCS212) of second semester has been removed from 2019-2021 syllabus. Instead of the above lab papers Advanced Java programming (20PCS211), Networking Lab (20PCS212) and mini project (20PCS213) were introduced respectively.

→ Advanced Java programming (19PCS313) from third semester and Advanced Networks (19PCS103) from first semester has been carried to second semester and coded as 20PCS207 and 20PCS208 respectively. 60% changes were made in the Advanced Network syllabus.

→ Big Data Analytics (19PCS209) has been nomenclatured as Cloud and Big Data Analytics and coded as 20PCS209. There was a 100% change in the syllabus as per the research and industry ready need for students. A new paper software Engineering (20PCS210) has been introduced in the second semester.

→ Instead of 19PCS313, problem solving using python and R-Lab (20PCS314) has been introduced.

→ Digital Image Processing was removed and instead of this, Internet of Things was placed with the code 20PCS315. Network security and cryptography is introduced in third semester and coded as 20PCS316.

→ Programming Lab-V: Problem solving using python and R-Lab, Programming Lab VI: Internet of Things Labs were introduced newly in third semester.

## Scheme of Examination

| Part        | Subject Code          | Title of the Paper                                                  | Duration in Hours in per week | Examination |     |     |       |         |
|-------------|-----------------------|---------------------------------------------------------------------|-------------------------------|-------------|-----|-----|-------|---------|
|             |                       |                                                                     |                               | Hours       | CIA | ESE | Total | Credits |
| I SEMESTER  |                       |                                                                     |                               |             |     |     |       |         |
| III         | 20PCS101              | Design & Analysis of Algorithms                                     | 5                             | 3           | 30  | 70  | 100   | 5       |
|             | 20PCS102              | Internet of Things                                                  | 5                             | 3           | 30  | 70  | 100   | 5       |
|             | 20PCS103              | Advanced Database Management System                                 | 5                             | 3           | 30  | 70  | 100   | 4       |
|             | 20PCS104              | Data Mining and Warehousing                                         | 5                             | 3           | 30  | 70  | 100   | 4       |
|             | 20PCS105              | Programming Lab - I: Design & Analysis of Algorithms &Advanced DBMS | 5                             | 3           | 40  | 60  | 100   | 4       |
|             | 20PCS106              | Programming Lab –II: Internet of Things                             | 5                             | 3           | 40  | 60  | 100   | 4       |
| II SEMESTER |                       |                                                                     |                               |             |     |     |       |         |
| III         | 20PCS207              | Advanced Java Programming                                           | 5                             | 3           | 30  | 70  | 100   | 5       |
|             | 20PCS208              | Advanced Networks                                                   | 4                             | 3           | 30  | 70  | 100   | 5       |
|             | 20PCS209              | Cloud and Big Data Analytics                                        | 4                             | 3           | 30  | 70  | 100   | 4       |
|             | 20PCS210              | Programming Lab -III : Advanced Java Programming                    | 5                             | 3           | 40  | 60  | 100   | 4       |
|             | 20PCS211              | Programming Lab-IV : Networks                                       | 5                             | 3           | 40  | 60  | 100   | 4       |
|             | 20PCS2P1              | Pilot Project – I                                                   | 2                             | -           | -   | 100 | 100   | 2       |
|             | 20PCS2EX              | Elective – I                                                        | 4                             | 3           | 30  | 70  | 100   | 4       |
| IV          | 20PCS2N1/<br>20PCS2N2 | Non Major Elective: Multimedia Packages Lab /Web Designing Lab      | 1                             | 3           | -   | 100 | 100   | 2       |



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| Part         | Subject Code | Title of the paper                              | Duration in Hrs per week | Examination |     |     |       |         |
|--------------|--------------|-------------------------------------------------|--------------------------|-------------|-----|-----|-------|---------|
|              |              |                                                 |                          | Hours       | CIA | ESE | Total | Credits |
| III SEMESTER |              |                                                 |                          |             |     |     |       |         |
| III          | 20PCS312     | Advanced Python Programming                     | 4                        | 3           | 30  | 70  | 100   | 5       |
|              | 20PCS313     | Android Programming                             | 5                        | 3           | 30  | 70  | 100   | 5       |
|              | 20PCS314     | Network Security & Cryptography                 | 5                        | 3           | 30  | 70  | 100   | 4       |
|              | 20PCS315     | Programming Lab-V : Advanced Python Programming | 5                        | 3           | 40  | 60  | 100   | 4       |
|              | 20PCS316     | Programming Lab-VI: Android Programming         | 5                        | 3           | 40  | 60  | 100   | 4       |
|              | 20PCS3EX     | Elective-II                                     | 5                        | 3           | 30  | 70  | 100   | 4       |
| IV SEMESTER  |              |                                                 |                          |             |     |     |       |         |
| III          | 20PCS4P2     | Project Work and Viva voce (Individual)         | -                        | -           | -   | 200 | 200   | 8       |
| TOTAL MARKS  |              |                                                 |                          |             |     |     | 2200  | 90      |



*R. Manicka Chezian*  
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**ELECTIVE I**

| S.No | SUBJECT CODE | TITLE                  |
|------|--------------|------------------------|
| 1    | 20PCS2E1     | SOFTWARE AGENTS        |
| 2    | 20PCS2E2     | COMPUTING TECHNOLOGIES |
| 3    | 20PCS2E3     | MOBILE COMPUTING       |

**ELECTIVE II**

| S.No | SUBJECT CODE | TITLE                                      |
|------|--------------|--------------------------------------------|
| 1    | 20PCS3E1     | ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS |
| 2    | 20PCS3E2     | MACHINE LEARNING                           |
| 3    | 20PCS3E3     | EMBEDDED SYSTEMS                           |



*[Signature]*  
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|                        |          |                                             |                            |           |
|------------------------|----------|---------------------------------------------|----------------------------|-----------|
| <b>Programme code:</b> | M.Sc     | <b>Programme Title :</b>                    | Master of Computer Science |           |
| <b>Course Code:</b>    | 20PCS103 | <b>Title</b>                                | <b>Batch :</b>             | 2019-2021 |
|                        |          | <b>Advanced Database Management Systems</b> | <b>Semester</b>            | I         |
| <b>Hrs/Week:</b>       | 5        |                                             | <b>Credits:</b>            | 4         |

### Course Objective

On successful completion of the course, the students should understand the concepts and terminology related to DBMS and various Databases.

### Course Outcomes (CO)

|    |     |                                                                                 |
|----|-----|---------------------------------------------------------------------------------|
| K1 | C01 | To remember the underlying principles of Relational Database Management System. |
| K2 | C02 | To understand relational data model and ER with EER mapping                     |
| K3 | C03 | To deploy the concepts of various databases and its applications                |
| K4 | C04 | To the design and implement various Databases with normalization                |
| K5 | C05 | To evaluate and develop a database application system as part of a team         |

| CONTENTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  | Hours |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-------|
| <b>UNIT I</b><br><b>INTRODUCTION AND CONCEPTUAL MODELING:</b> Database and database users – Characteristics of the Database Approach – Advantages of Using the DBMS Approach - Data Models, Schemas, and Instances - Three-Schema Architecture and Data Independence Database Languages and Interfaces The Database System Environment Centralized and Client/Server Architectures for DBMSs -Classification of Database Management Systems - data modeling using Entity-Relationship model – Enhanced Entity-Relationship model.                                                                                                                                                                                                                                                |  | 13    |
| <b>UNIT II</b><br><b>THE RELATIONAL DATA MODEL:</b> Relational model: Concepts, Constraints, Languages, Design and Programming – Relational data model and relational database constraints – relational algebra - relational database design by ER and EER-to-relational mapping – SQL – schema definition, constraints, Queries and Views.                                                                                                                                                                                                                                                                                                                                                                                                                                      |  | 13    |
| <b>UNIT III</b><br><b>DATABASE DESIGN THEORY AND NORMALIZATION:</b> Basics of Functional Dependencies and Normalization for Relational Databases - Informal Design Guidelines for Relation Schemas - Functional Dependencies - Normal Forms Based on Primary Keys - General Definitions of Second and Third Normal Forms - Boyce-Codd Normal Form Multivalued Dependency and Fourth Normal Form Join Dependencies and fifth normal form. <b>Indexing Structures for Files and Physical Database Design:</b> Types of Single - Level Ordered Indexes - Multilevel Indexes - Dynamic Multilevel Indexes Using B-Trees and B+ -Trees Indexes on Multiple Keys - Other Types of Indexes – Some General Issues Concerning Indexing - Physical Database Design in Relational Databases |  | 13    |
| <b>UNIT IV</b><br><b>TRANSACTION PROCESSING AND CONCURRENCY CONTROL:</b><br>Introduction to Transaction Processing - Transaction and System Concepts – Desirable Properties of Transactions - Characterizing Schedules Based on Recoverability – Characterizing Schedules Based on Serializability - Transaction Support in SQL<br><b>Concurrency Control Techniques:</b> Two-Phase Locking Techniques for Concurrency Control - Concurrency Control Based on Timestamp Ordering Multiversion Concurrency                                                                                                                                                                                                                                                                        |  | 13    |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| Control Techniques - Validation (Optimistic) Techniques and Snapshot Isolation - Concurrency Control - Granularity of Data Items and Multiple Granularity Locking – Using Locks for Concurrency Control in Indexes - Other Concurrency Control Issues.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |           |
| <b>UNIT V</b><br><b>ADVANCED MODELING:</b> Distributed Database Concept Distributed Database Concepts Data Fragmentation, Replication, and Allocation Techniques for Distributed Database Design - Overview of Concurrency Control and Recovery in Distributed Databases Overview of Transaction Management in Distributed Database – Query Processing and Optimization in Distributed Databases Types of Distributed Database Systems - Distributed Database Architectures - Distributed Catalog Management.<br><b>NoSQL Databases and Big Data Storage Systems:</b> Introduction to NoSQL Systems - The CAP Theorem – Document Based NoSQL Systems and MongoDB - NoSQL Key-Value Stores – Column Based or Wide Column NoSQL Systems - NoSQL Graph Databases and Neo4j. | <b>13</b> |
| <b>Total Hours</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>65</b> |
| <i>*Italicized texts are for self study</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |           |
| Power point Presentations, Seminar , Assignment, Activity, Case study                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |           |
| <b>Text Books</b><br>1. Ramez Elmasri and Shamkant B.Navathe, “Fundamentals of Database Systems”, 7 <sup>th</sup> Edition, Pearson, 2017.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |
| <b>Reference Books</b><br>1. Silberschatz, H. Korth and S. Sudarshan, “Database System Concepts”, 6th Edition, McGraw-Hill International, 2011.<br>2. Hector Garcia-Molina, Jeffrey D.Ullman, Jennifer Widom, “Database System The Complete Book”, 2 <sup>nd</sup> Edition, Pearson 2008.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |

**MAPPING**

| PSO<br>CO  | PS01 | PS02 | PS03 | PS04 | PS05 |
|------------|------|------|------|------|------|
| <b>C01</b> | M    | H    | H    | H    | H    |
| <b>C02</b> | M    | M    | H    | H    | H    |
| <b>C03</b> | M    | H    | H    | H    | M    |
| <b>C04</b> | M    | H    | M    | M    | H    |
| <b>C05</b> | H    | H    | M    | M    | H    |

**H: High M: Medium L: Low**

| Course Designed by  | Verified by HOD     | Checked by          | Approved by               |
|---------------------|---------------------|---------------------|---------------------------|
| Name and Signature  | Name with Signature | CDC                 | COE                       |
| Name: M. Dhavapriya | Name: Dr.M. Sakthi  | Name: K. Srinivasan | Name: Dr. R. Muthukumaran |
| Signature:          | Signature:          | Signature:          | Signature:                |

|                        |          |                           |                            |           |
|------------------------|----------|---------------------------|----------------------------|-----------|
| <b>Programme code:</b> | M.Sc     | <b>Programme Title :</b>  | Master of Computer Science |           |
| <b>Course Code:</b>    | 20PCS207 | <b>Title</b>              | <b>Batch :</b>             | 2020-2022 |
|                        |          | Advanced Java Programming | <b>Semester</b>            | II        |
| <b>Hrs/Week:</b>       | 5        |                           | <b>Credits:</b>            | 5         |

### Course Objective

On successful completion of this course, the students will be able to understand the advanced Java concepts, to develop Java based applications and hands on practices by applying these advanced concepts to implement in web based applications.

### Course Outcomes (CO)

|    |     |                                                                              |
|----|-----|------------------------------------------------------------------------------|
| K1 | CO1 | To recollect different classes, constructors and methods of Swing components |
| K2 | CO2 | To get an idea to construct an enterprise application using Java Beans       |
| K3 | CO3 | To deploy RMI programs for real world applications                           |
| K4 | CO4 | To analyze session tracking using Session objects and Cookies                |
| K5 | CO5 | To validate server side java programs using Servlets and JSP                 |

| CONTENTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  | Hours |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-------|
| <b>UNIT I</b><br><b>Java Swings:</b> JPanel-JFrame-JApplet-JSplitPane-JTabbedPane-JViewport-JMenu-Items and Labels - JTextField - JTextArea - JButtons - JButton Classes - JCheckBoxes - JRadioButton-JComboBoxes-JList.                                                                                                                                                                                                                                                                                                                      |  | 13    |
| <b>UNIT II</b><br><b>Advanced Components:</b> JTree - JTable - JInternalFrame - JDesktopPane -JTextPane - JProgressbar.                                                                                                                                                                                                                                                                                                                                                                                                                       |  | 13    |
| <b>UNIT III</b><br><b>Java Beans:</b> Introduction to Java Bean-Advantages of a Java Bean-Application Builder tools-The Bean Developer Kit (BDK)-Jar files-Introspection-Developing a Simple Bean-Using Bound Properties-Using Bean Info Interface-Constrained Properties-Persistence-Customizers-Java Bean API.                                                                                                                                                                                                                              |  | 13    |
| <b>UNIT IV</b><br><b>Servlet Overview and Architecture:</b> Movement to Server Side Java-Practical Applications for Java Servlets-Java Servlet Alternatives-Reason to use Java Servlets-Java Server Architecture – Servlet Basics-The Lifecycle of Servlet-A Basic Servlet.<br><b>Servlet Chaining:</b> Definition for Servlet Chaining-Uses of Servlet Chains-A Practical example using Servlet Chaining-Servlets and JDBC-Two Tier and Three Tier Database access models-JDBC Servlet-Session Tracking-Using Cookies-Using Session Objects. |  | 13    |
| <b>UNIT V</b><br><b>Java Server Page (JSP):</b> Introduction-Server-side programming-Life Cycle of JSP- To create and run JSP- Architecture of JSP-Scripting tag Elements- Implicit Object- Beans - Conditions - Directives - Declarations – Implicit Variables -Expressions.<br><b>RMI (Remote Method Invocation):</b> Introduction - RMI Architecture-Bootstrapping and RMI Registry - The RMI Compiler - Object Specialization and Parameter Passing - A Simple example.                                                                   |  | 13    |
| <b>Total Hours</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  | 65    |
| <i>*Italicized texts are for self study</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |       |
| Power point Presentations, Seminar , Assignment, Brain storming                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |       |

**Text Books**

1. Herbert Schildt, “Java-2, The Complete Reference”, 11<sup>th</sup> Edition, Tata McGraw Hill, 2019.
2. Jim Keogh, “The Complete Reference J2EE”, Tata McGraw Hill, 2007.
3. KogentSolutionss, “Java Server Programming Java EE7 Black Book”, Dreamtech Press, 2014.
4. Sams Series, James GoodWill, “Developing Java Servlets”, 1<sup>st</sup> Edition, SAMS Techmedia, 2004.
5. Sam Series, “Java RMI”, Tata McGraw Hill, 2006.

**Reference Books**

1. Brian Cole, Robert Eckstein, James Elliott, Marc Loy, David Wood, “Java Swing”, 2<sup>nd</sup> Edition, O’Reilly Publishers, 2002.
2. Stephen Potts, Mike Kopack, “Web Services”, Kindle Edition, Pearson Education, 2004.

**MAPPING**

| CO \ PSO   | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|------------|------|------|------|------|------|
| <b>CO1</b> | H    | H    | M    | H    | H    |
| <b>CO2</b> | M    | M    | H    | M    | H    |
| <b>CO3</b> | H    | H    | H    | H    | M    |
| <b>CO4</b> | H    | H    | H    | H    | H    |
| <b>CO5</b> | H    | H    | M    | H    | M    |

**H: High M: Medium L: Low**

| Course Designed by | Verified by HOD     | Checked by          | Approved by               |
|--------------------|---------------------|---------------------|---------------------------|
| Name and Signature | Name with Signature | CDC                 | COE                       |
| Name: N.Arul kumar | Name: Dr.M. Sakthi  | Name: K. Srinivasan | Name: Dr. R. Muthukumaran |
| Signature:         | Signature:          | Signature:          | Signature:                |

|                        |          |                                     |                            |           |
|------------------------|----------|-------------------------------------|----------------------------|-----------|
| <b>Programme code:</b> | M.Sc     | <b>Programme Title :</b>            | Master of Computer Science |           |
| <b>Course Code:</b>    | 20PCS209 | <b>Title</b>                        | <b>Batch :</b>             | 2020-2022 |
|                        |          | <b>Cloud and Big Data Analytics</b> | <b>Semester</b>            | II        |
| <b>Hrs/Week:</b>       | 4        |                                     | <b>Credits:</b>            | 4         |

### Course Objective

On successful of this course, students will understand the concept of Virtualization and design of cloud Services and will be able to analyze the big data using intelligent techniques.

### Course Outcomes (CO)

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |     |                                                                      |       |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|----------------------------------------------------------------------|-------|
| K1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | C01 | To remember the fundamental concepts of big data                     |       |
| K2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | C02 | To understand the applications using Map Reduce Concepts             |       |
| K3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | C03 | To deploy the concept of Virtualization and design of cloud Services |       |
| K4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | C04 | To analyze the big data using intelligent techniques                 |       |
| K5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | C05 | To present the broad perceptive of cloud architecture and model      |       |
| CONTENTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |     |                                                                      | Hours |
| UNIT I<br>Cloud Architecture and Mode: Technologies for Network-Based System – System Models for Distributed and Cloud Computing - NIST Cloud Computing Reference Architecture. Cloud Models:-Characteristics – Cloud Services – Cloud Models (IaaS,PaaS,SaaS) – Public vs Private Cloud – Cloud Solutions – Cloud ecosystem – Service Management – Computing on demand, Virtualization : Basics of Virtualization – Types of Virtualization – Implementation Levels of Virtualization – Virtualization Structures - Tools and Mechanism – Virtualization of CPU, Memory I/O Devices - Virtual Clusters and Resource Management – Virtualization for Data-Center Automation. |     |                                                                      | 11    |
| UNIT II<br>Cloud Infrastructure: Architectural Design of Compute and Storage Clouds – Layered Cloud Architecture Development – Design Challenges – Inter Cloud Resource Management – Resource Provisioning and Platform Deployment – Global Exchange of Cloud Resources. Programming Model: Parallel and Distributed Programming Paradigms – MapReduce, Twister and Iterative MapReduce – Hadoop Library from Apache – Mapping Applications – Programming Support – Google App Engine, Amazon AWS – Cloud Software Environments – Eucalyptus, Open Nebula, OpenStack, Aneka, CloudSim.                                                                                       |     |                                                                      | 11    |
| UNIT III<br>Getting Started with Big Data: Introduction – Grasping the Fundamentals of Big Data-Examining Big Data Types – Old Meets New - Technology Foundation for Big Data : Digging into Big Data Technology Components – Virtualization and How It Supports Distributed Computing – Examining the Cloud and Big Data – Big Data Management: Operational Databases - Map Reduce Fundamentals – Exploring the World of Hadoop – The Hadoop Foundation and Ecosystem – Appliances and Big Data Warehouses.                                                                                                                                                                 |     |                                                                      | 10    |
| UNIT IV<br>Analytics and Big Data: Defining Big Data Analytics – Understanding Text Analytics and                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |     |                                                                      | 10    |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| Big Data – Customized Approaches for Analysis of Big Data. Big Data Implementation: Integrating Data Sources – Dealing with Real-Time Data Streams and Complex Event Processing – Operationalizing Big Data – Applying Big Data within Your Organization – Security and Governance for Big Data Environments.                                                                                                                                           |           |
| <b>UNIT V</b><br>Big Data Solutions in the Real World: The Importance of Big Data to Business – Analyzing Data in Motion – Improving Business Process With Big Data Analytics. The Part of Tense: Ten Big Data Best Practices-Ten Great Big Data Resources – Ten Big Data Do's and Don'ts.                                                                                                                                                              | <b>10</b> |
| <b>Total Hours</b>                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>52</b> |
| <i>*Italicized texts are for self study</i>                                                                                                                                                                                                                                                                                                                                                                                                             |           |
| Power point Presentations, Seminar ,Assignment, Experience Discussion, Brain storming                                                                                                                                                                                                                                                                                                                                                                   |           |
| <b>Text Books</b><br>1. Kai Hwang, Geoffrey C Fox, Jack G Dongarra, “Distributed and Cloud Computing, Processing to the Internet of Things”, Morgan Kaufmann Publishers, 2012 from Parallel (Unit I – II).<br>2. Judith Hurwitz, Alan Nugent, Dr. Fern Halper and Marcia Kaufman, “Big Data for Dummies” A Wiley Brand Publications.2013. (Unit III–V).<br>3. Jeffrey Stanton, “An Introduction to Data Science” Syracuse University, 2012(Case Study). |           |
| <b>Reference Books</b><br>1. Michael Miller, ”Cloud Computing”, Que Publishing , 2008<br>2. Nick Antonopoulos, Cloud Computing, Springer Publications, 2010.                                                                                                                                                                                                                                                                                            |           |

### MAPPING

| PSO<br>CO  | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|------------|------|------|------|------|------|
| <b>C01</b> | M    | M    | M    | M    | H    |
| <b>C02</b> | M    | H    | H    | M    | M    |
| <b>C03</b> | H    | H    | H    | M    | M    |
| <b>C04</b> | H    | M    | M    | M    | H    |
| <b>C05</b> | M    | M    | H    | M    | M    |

**H: High M: Medium L: Low**

| Course Designed by  | Verified by HOD     | Checked by          | Approved by               |
|---------------------|---------------------|---------------------|---------------------------|
| Name and Signature  | Name with Signature | CDC                 | COE                       |
| Name: M. Dhavapriya | Name: Dr.M. Sakthi  | Name: K. Srinivasan | Name: Dr. R. Muthukumaran |
| Signature:          | Signature:          | Signature:          | Signature:                |

|                        |          |                                  |                            |           |
|------------------------|----------|----------------------------------|----------------------------|-----------|
| <b>Programme code:</b> | M.Sc     | <b>Programme Title :</b>         | Master of Computer Science |           |
| <b>Course Code:</b>    | 20PCS210 | <b>Title</b>                     | <b>Batch :</b>             | 2020-2022 |
|                        |          | <b>Programming Lab -III :</b>    | <b>Semester</b>            | II        |
| <b>Hrs/Week:</b>       | 5        | <b>Advanced Java Programming</b> | <b>Credits:</b>            | 4         |

### Course Objective

On successful completion of the course the students should understand the advanced Java concepts such as Swing, Servlets, Web Services, Beans, RMI and JSP.

### Course Outcomes (CO)

|    |     |                                                                           |
|----|-----|---------------------------------------------------------------------------|
| K3 | CO1 | To implement server side validations with session and database using JDBC |
| K4 | CO2 | To analyze web application using Servlet, Java Server Pages and RMI       |
| K5 | CO3 | To validate Swing component events in an application                      |

#### Swing:

1. Demonstrate Swing components – JLabel, JTextField, JTextArea and JButton
2. Demonstrate Swing component - JMenu
3. Demonstrate Swing component - JTree
4. Demonstrate Swing component - JTable
5. Demonstrate Swing component - JProgressBar
6. Demonstrate Swing component – JScrollPane
7. Demonstrate Swing component – JTabbedPane
8. Demonstrate Swing component - JComboBox
9. Demonstrate Swing component - JRadioButton
10. Demonstrate Swing component - JCheckBox
11. Demonstrate Swing component – JList

#### Servlet:

12. Demonstrate Generic Servlet.
13. Demonstrate HTTP Servlet
14. Demonstrate Servlet Chaining
15. Demonstrate JDBC Connectivity
16. Demonstrate JDBC using Servlet
17. Demonstrate Cookies.

#### Bean:

18. Demonstrate Juggler Bean
19. Demonstrate Molecular Bean
20. Implement Simple Property Bean
21. Write a program for Introspection

#### JSP:

22. Write a JSP program for Fibonacci Series
23. Write a JSP program for Employee salary details.

#### RMI:

24. Write a RMI Program for Student Mark list
25. Write a RMI Program for finding the greatest of two numbers

|                        |          |                                            |                            |           |
|------------------------|----------|--------------------------------------------|----------------------------|-----------|
| <b>Programme code:</b> | M.Sc     | <b>Programme Title :</b>                   | Master of Computer Science |           |
| <b>Course Code:</b>    | 20PCS314 | <b>Title</b>                               | <b>Batch :</b>             | 2020-2022 |
|                        |          | <b>Network Security &amp; Cryptography</b> | <b>Semester</b>            | III       |
| <b>Hrs/Week:</b>       | 5        |                                            | <b>Credits:</b>            | 4         |

### Course Objective

On successful completion of this course, students will understand Cryptography Theories, Algorithms and necessary approaches and techniques to build protection mechanisms in order to secure computer networks.

### Course Outcomes (CO)

|    |     |                                                                                            |
|----|-----|--------------------------------------------------------------------------------------------|
| K1 | CO1 | To remember the basics of network security and cryptography                                |
| K2 | CO2 | To understand the symmetric key cryptography and Mathematics of symmetric key cryptography |
| K3 | CO3 | To apply the mathematics of asymmetric key cryptography                                    |
| K4 | CO4 | To analyze differential message authentication and integrity                               |
| K5 | CO5 | To evaluate various security practice and system security                                  |

| CONTENTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  | Hours |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-------|
| <b>UNIT I</b><br><b>Introduction:</b> Security trends – Legal, Ethical and Professional Aspects of Security, Need for Security at Multiple levels, Security Policies – Model of network security – Security attacks, services and mechanisms – OSI security architecture – Classical encryption techniques: substitution techniques, transposition techniques, steganography- Foundations of modern cryptography: perfect security – information theory – product cryptosystem – cryptanalysis.                         |  | 13    |
| <b>UNIT II</b><br><b>Symmetric Key Cryptography</b><br><b>Mathematics Of Symmetric Key Cryptography:</b> Algebraic structures – Modular arithmetic- Euclid's algorithm- Congruence and matrices – Groups, Rings, Fields- Finite fields- SYMMETRIC KEY CIPHERS: SDES – Block cipher Principles of DES – Strength of DES – Differential and linear cryptanalysis – Block cipher design principles – Block cipher mode of operation – Evaluation criteria for AES – Advanced Encryption Standard – RC4 – Key distribution. |  | 13    |
| <b>UNIT III</b><br><b>Public Key Cryptography</b><br><b>Mathematics Of Asymmetric Key Cryptography:</b> Primes – Primality Testing – Factorization – Euler's totient function, Fermat's and Euler's Theorem – Chinese Remainder Theorem – Exponentiation and logarithm – ASYMMETRIC KEY CIPHERS: RSA cryptosystem – Key distribution – Key management – Diffie Hellman key exchange – ElGamal cryptosystem – Elliptic curve arithmetic-Elliptic curve cryptography                                                      |  | 13    |

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|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>UNIT IV</b><br><b>Message Authentication And Integrity:</b> Authentication requirement – Authentication function – MAC – Hash function – Security of hash function and MAC – SHA –Digital signature and authentication protocols – DSS- Entity Authentication: Biometrics, Passwords, Challenge Response protocols- Authentication applications – Kerberos, X.509 | <b>13</b> |
| <b>UNIT V</b><br><b>Security Practice And System Security:</b> Electronic Mail security – PGP, S/MIME – IP security – Web Security – System Security: Intruders – Malicious software – viruses – Firewalls.                                                                                                                                                          | <b>13</b> |
| <b>Total Contact Hrs</b>                                                                                                                                                                                                                                                                                                                                             |           |
| <i>*Italicized texts are for self study</i>                                                                                                                                                                                                                                                                                                                          |           |
| Power point Presentations, Seminar , Assignment                                                                                                                                                                                                                                                                                                                      |           |
| <b>Text Books</b>                                                                                                                                                                                                                                                                                                                                                    |           |
| 1. William Stallings, Cryptography and Network Security: Principles and Practice, PHI 3rd Edition, 2006.                                                                                                                                                                                                                                                             |           |
| <b>Reference Books</b>                                                                                                                                                                                                                                                                                                                                               |           |
| 1. C K Shyamala, N Harini and Dr. T R Padmanabhan: Cryptography and Network Security Wiley India Pvt.Ltd                                                                                                                                                                                                                                                             |           |
| 2. Behrouz A. Forouzan, Cryptography and Network Security, Tata McGraw Hill 2007.                                                                                                                                                                                                                                                                                    |           |
| 3. Charlie Kaufman, Radia Perlman, and Mike Speciner, Network Security: PRIVATE Communication in a PUBLIC World, Prentice Hall, ISBN 0-13-046019-2                                                                                                                                                                                                                   |           |

**MAPPING**

| CO \ PSO   | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|------------|------|------|------|------|------|
| <b>CO1</b> | H    | H    | M    | H    | H    |
| <b>CO2</b> | H    | M    | H    | H    | L    |
| <b>CO3</b> | H    | H    | H    | M    | M    |
| <b>CO4</b> | M    | H    | H    | H    | H    |
| <b>CO5</b> | H    | M    | H    | H    | L    |

**H: High M: Medium L: Low**

| Course Designed by   | Verified by HOD     | Checked by          | Approved by               |
|----------------------|---------------------|---------------------|---------------------------|
| Name and Signature   | Name with Signature | CDC                 | COE                       |
| Name: N. Karthikeyan | Name: Dr.M. Sakthi  | Name: K. Srinivasan | Name: Dr. R. Muthukumaran |
| Signature:           | Signature:          | Signature:          | Signature:                |