

**Detailed Program**  
**Bachelor of Technology (B.Tech.)**  
**Computer Science Engineering (CSE)**  
**&**  
**CSE with Specialization in AI and ML**

**Semester-V**  
**(2023-2027)**

DOC202306090007



**RNB GLOBAL UNIVERSITY**  
RNB Global City, Ganganagar Road,  
Bikaner, Rajasthan 334601

## **OVERVIEW**

RNB Global University follows Semester System. Accordingly, each academic year is divided into two semesters, **Odd (July-December) and Even (January-June)**. Besides this, the university follows a system of continuous evaluation along with regular updating in course curricula and teaching pedagogy.

The curriculum for B. Tech (CSE) Program along for **(July-December) Odd Semester 2025** with examination pattern is as follows:

## **Course Scheme**

### **Semester -V**

| S. No.       | Course Code | Course Title                                               | L         | T        | P         | Credits   |
|--------------|-------------|------------------------------------------------------------|-----------|----------|-----------|-----------|
| 1.           | 19007400    | <b>Elective-I</b>                                          | 3         | 0        | 0         | 3         |
| 2.           | 19007500    | <b>Elective-I</b>                                          | 0         | 0        | 2         | 1         |
| 3.           | 19007600    | Analysis and Design of Algorithm                           | 3         | 0        | 0         | 3         |
| 4.           | 19007700    | Analysis and Design of Algorithm Lab                       | 0         | 0        | 2         | 1         |
| 5.           | 19015400    | Database Management Systems with MySQL                     | 3         | 0        | 0         | 3         |
| 6.           | 19015500    | Database Management Systems with MySQL Lab                 | 0         | 0        | 2         | 1         |
| 7.           | 19008000    | Computer Graphics                                          | 3         | 0        | 0         | 3         |
| 8.           | 19008100    | Computer Graphics Lab                                      | 0         | 0        | 2         | 1         |
| 9.           | 19008200    | Core Java                                                  | 3         | 0        | 0         | 3         |
| 10.          | 19008300    | Core Java Lab                                              | 0         | 0        | 2         | 1         |
| 11.          | 19008400    | PHP & My SQL                                               | 3         | 0        | 0         | 3         |
| 12.          | 19008500    | PHP & My SQL Lab                                           | 0         | 0        | 2         | 1         |
| 13.          | 19006300    | Ability & Skill Enhancement - V                            | 2         | 0        | 0         | 2         |
| 14.          | 19007300    | Summer Internship and Report                               | 0         | 0        | 8         | 4         |
| 15.          | 99003300    | Human Values & Social Service/NCC/NSS/Workshops & Seminars | -         | -        | -         | 1         |
| <b>Total</b> |             |                                                            | <b>20</b> | <b>0</b> | <b>20</b> | <b>31</b> |

**ELECTIVE-I**

| S. No. | Course Code | Course Name                    | Credits |
|--------|-------------|--------------------------------|---------|
| 1      | 19007400    | <b>Microprocessor</b>          | 3       |
| 2      | 19007500    | <b>Microprocessor Lab</b>      | 1       |
| 3      | 19012600    | LAMP Technologies              | 4       |
| 4      | 19012700    | Embedded Systems               | 4       |
| 5      | 19012800    | Mobile Application Programming | 4       |
|        |             | Any Related MOOC Course        |         |

**SPECIALIZATION ELECTIVES-I FOR AI & MACHINE LEARNING**

| SN | Course Code | Course Name       | L | T | P | Credits |
|----|-------------|-------------------|---|---|---|---------|
| 1. | 19015800    | Deep Learning     | 3 | 0 | 0 | 3       |
| 2. | 19015900    | Deep Learning Lab | 0 | 0 | 2 | 1       |

**EVALUATION SCHEME- THEORY**

The evaluation of the theory paper of B.Tech would be based on Internal and External Assessments. Internal Assessment would consist of 50% of the marks (50 marks) and external assessment (in form of End Term Exam) would consist of remaining 50% marks (50 marks). Detailed scheme of Internal and External Assessments as follows:

### **Internal Assessment**

The distribution of Internal Assessment Marks is as follows:

| Type                                                                               | Details                                         | Marks |
|------------------------------------------------------------------------------------|-------------------------------------------------|-------|
| Mid Term                                                                           | Two Mid-term Sessional of 15 marks each (15+15) | 30    |
| Marks obtained in various Tests, Assignments, Presentations, Quiz, Tutorials, etc. | Average of marks obtained                       | 15    |
| Attendance                                                                         | 75%+ : 5 marks                                  | 5     |
| <b>TOTAL</b>                                                                       | <b>50</b>                                       |       |

### **External Assessment**

| Type   | Marks |
|--------|-------|
| Theory | 50    |

### **EVALUATION SCHEME -PRACTICAL**

The evaluation of the practical paper of B. Tech would be based on Internal and External Assessments. Internal Assessment would consist of 50% of the marks (50 marks) and external assessment (in form of End Term Exam) would consist of remaining 50% marks (50 marks). Detailed scheme of Internal and External Assessment is as follows:

### **Internal Assessment**

| Type                                                                                                      | Details                   | Marks |
|-----------------------------------------------------------------------------------------------------------|---------------------------|-------|
| Marks obtained in various manuals, practical file, participation, any model prepared, output of practical | Average of marks obtained | 45    |
| Attendance                                                                                                | 75%+ : 5 marks            | 5     |
| <b>TOTAL</b>                                                                                              | <b>50</b>                 |       |

**External Assessment**

| Type      | Marks |
|-----------|-------|
| Practical | 50    |

**EVALUATION SCHEME- WORKSHOPS & SEMINARS & NCC/NSS**

1. NCC/NSS will be completed from Semester I – Semester IV. It will be evaluated internally by the institute. The credit for this will be given at the end of each Semester.
2. The students have to join club/clubs with the active participation in different activities of club. The students would be continuously assessed from Semester-I to Semester-IV and credits and marks would be given after the end of each Semester.

## **Bachelor of Technology – CSE (Four Years Course)**

### **1. Vision**

To deliver a high-quality education that will produce engineers of the highest caliber, equipped with the newest information and cutting-edge concepts in computer science engineering to fulfil the demands of industry and society.

### **2. Mission**

To create an academic setting for the growth of professionals equipped with the knowledge, abilities, values, and self-assurance to assume leadership positions in the field of computer science and engineering.

To promote a culture of research that produces knowledge and cutting-edge technologies that aid in society's sustainable development.

To improve academic collaborations for international exposure.

### **3. PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)**

**PEO1:** To produce students with strong foundation of knowledge and skills in the field of computer science and engineering.

**PEO2:** To produce students who are employable in private/public sector/research organizations or work as an entrepreneur.

**PEO3:** To produce students who can provide solutions to problems in their profession by applying computer engineering theory and practices.

**PEO4:** To produce graduates who can provide leadership and are effective in multidisciplinary environment.

#### **4. PROGRAMME OUTCOMES (POs)**

##### **Engineering Graduates will be able to:**

**P01:** Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

**P02:** Problem Analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

**P03:** Design/Development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

**P04:** Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

**P05:** Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitation.

**P06:** The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

**P07:** Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

**P08:** Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

**P09:** Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

**P010:** Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**P011:** Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

**P012:** Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

## **5. PROGRAMME SPECIFIC OUTCOMES (PSOs)**

**PSO1:** The ability to understand, analyze and develop computer programs in the areas related to algorithms, system software, multimedia, web design, big data analytics and networking for efficient design of computer-based systems of varying complexity.

**PSO2:** The ability to employ modern computer languages, environments, and platforms in creating innovative career paths to be an entrepreneur and a zest for higher studies/employability in the field of Computer Science & Engineering.

**PSO3:** Cultivate the field of computing and its latest trends, to pursue teaching, research & development activities and to work effectively in a team.



| 6. Course Outcomes                                        |                                                               |                                                                                                     |
|-----------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| Course Codes & Course Names                               | After completion of these courses' students should be able to |                                                                                                     |
| 19007400-<br>Microprocessor                               | <b>CO1:</b>                                                   | Define the basics of Digital Systems.                                                               |
|                                                           | <b>CO2:</b>                                                   | Explain the working of a microprocessor/controller.                                                 |
|                                                           | <b>CO3:</b>                                                   | Build a program for processor using assembly language.                                              |
|                                                           | <b>CO4:</b>                                                   | Classify the different peripherals in a digital system.                                             |
|                                                           | <b>CO5:</b>                                                   | Design and analyze combinational and sequential circuits.                                           |
| 19007500-<br>Microprocessor Lab                           | <b>CO1:</b>                                                   | Define the higher processor architectures descended from ADC, DAC, 8253, Printer, UP- PC Interface. |
|                                                           | <b>CO2:</b>                                                   | Explain the architecture of the advanced processor thoroughly to use the resources for programming. |
|                                                           | <b>CO3:</b>                                                   | Apply the assembly language programming to develop small real life embedded application.            |
|                                                           | <b>CO4:</b>                                                   | Construct an executable file and use it.                                                            |
|                                                           | <b>CO5:</b>                                                   | Create a model on UP-PC interface.                                                                  |
| 19007600-<br>Analysis and Design<br>of Algorithm          | <b>CO1:</b>                                                   | Find the various methods of calculating complexity.                                                 |
|                                                           | <b>CO2:</b>                                                   | Illustrate the best method for different algorithms.                                                |
|                                                           | <b>CO3:</b>                                                   | Make use of computational geometry, like Lower bound theory, modular arithmetic, and CRT.           |
|                                                           | <b>CO4:</b>                                                   | Various Decision Problems like NP Complete, NP hard.                                                |
|                                                           | <b>CO5:</b>                                                   | Analyse the knowledge of Graph and its algorithm.                                                   |
| 19007700-<br>Analysis and Design<br>of Algorithm Lab      | <b>CO1:</b>                                                   | Demonstrate the Divide and Conquer algorithm design technique for various applications.             |
|                                                           | <b>CO2:</b>                                                   | Apply the dynamic programming algorithm design technique for various applications.                  |
|                                                           | <b>CO3:</b>                                                   | Design a Greedy algorithm technique for various applications.                                       |
|                                                           | <b>CO4:</b>                                                   | Develop the backtracking algorithm technique for various applications.                              |
|                                                           | <b>CO5:</b>                                                   | Create a program to find the Time & Space Complexity.                                               |
| 19015400-<br>Database<br>Management<br>Systems with MySQL | <b>CO1:</b>                                                   | Explain the database management basics and different models and use for database design.            |
|                                                           | <b>CO2:</b>                                                   | Apply the different form of normalization on the Database.                                          |
|                                                           | <b>CO3:</b>                                                   | Analyze the concepts of transaction, concurrency, and recovery systems.                             |
|                                                           | <b>CO4:</b>                                                   | Design and architecture of relational model, relational algebra, and SQL queries.                   |
|                                                           | <b>CO5:</b>                                                   | Ability to compare different storage structures                                                     |

|                                                                  |             |                                                                                                                       |
|------------------------------------------------------------------|-------------|-----------------------------------------------------------------------------------------------------------------------|
| 19015500-<br>Database<br>Management<br>Systems with MySQL<br>Lab | <b>C01:</b> | Explain the use advanced database Programming concepts.                                                               |
|                                                                  | <b>C02:</b> | Develop the ability to handle databases of varying complexities.                                                      |
|                                                                  | <b>C03:</b> | Compare the types of normalization by using a database.                                                               |
|                                                                  | <b>C04:</b> | Design software solutions by evaluating alternate architectural patterns.                                             |
|                                                                  | <b>C05:</b> | Able to create triggers, cursors for given problem                                                                    |
| 19008000-<br>Computer Graphics                                   | <b>C01:</b> | Explain the structure of modern computer graphics system.                                                             |
|                                                                  | <b>C02:</b> | Identify the basic principles of implementing computer graphics primitives.                                           |
|                                                                  | <b>C03:</b> | Classify key algorithms for modeling and rendering graphical data.                                                    |
|                                                                  | <b>C04:</b> | Develop design and problem-solving skills with application to computer graphics.                                      |
|                                                                  | <b>C05:</b> | Able to Create animation scenes                                                                                       |
| 19008100-<br>Computer Graphics<br>Lab                            | <b>C01:</b> | Demonstrate the competency to understand the concepts related to Computer Vision and Virtual reality.                 |
|                                                                  | <b>C02:</b> | Develop scientific and strategic approach to solve complex problems Computer in the domain of Computer Graphics.      |
|                                                                  | <b>C03:</b> | Apply mathematics and logic to develop Computer programs for elementary graphic operations.                           |
|                                                                  | <b>C04:</b> | Create the logic to develop animation and gaming programs.                                                            |
|                                                                  | <b>C05:</b> | Create programs for animation scenes                                                                                  |
| 19008200-<br>Core Java                                           | <b>C01:</b> | Explain the use of packages and interfaces in java.                                                                   |
|                                                                  | <b>C02:</b> | Make use of user-defined and inbuilt exceptions Create multi-threaded Applications.                                   |
|                                                                  | <b>C03:</b> | Classify all types of Character and Byte Streams.                                                                     |
|                                                                  | <b>C04:</b> | Create GUI based trivial applications.                                                                                |
|                                                                  | <b>C05:</b> | Analyse and Design GUI based applications using swings and applets                                                    |
| 19008300-<br>Core Java Lab                                       | <b>C01:</b> | Explain inheritance, polymorphism and object relationship in java.                                                    |
|                                                                  | <b>C02:</b> | Apply decision and iteration control structures to implement algorithms in Java.                                      |
|                                                                  | <b>C03:</b> | Compare String and string buffer methods.                                                                             |
|                                                                  | <b>C04:</b> | Build the implement Packages.                                                                                         |
|                                                                  | <b>C05:</b> | Able to create GUI based applications using swings and applets                                                        |
| 19008400-<br>PHP & My SQL                                        | <b>C01:</b> | Explain the differences between typical scripting languages and typical system and application programming languages. |
|                                                                  | <b>C02:</b> | Apply your knowledge of the strengths and weaknesses of scripting languages to select an implementation language.     |

|                                                  |             |                                                                                                                                   |
|--------------------------------------------------|-------------|-----------------------------------------------------------------------------------------------------------------------------------|
|                                                  | <b>CO3:</b> | Analyse server-side scripts. File uploads and Database Connections.                                                               |
|                                                  | <b>CO4:</b> | Create software systems using scripting languages like VB Script and JavaScript.                                                  |
|                                                  | <b>CO5:</b> | Able to contrast server side scripting and Server side programming and develop database connectivity by make use of java and PHP. |
| 19008500-<br>PHP & My SQL Lab                    | <b>CO1:</b> | Define PHP programming language.                                                                                                  |
|                                                  | <b>CO2:</b> | Demonstrate the basics of PHP object-oriented programming concepts.                                                               |
|                                                  | <b>CO3:</b> | Build of Array concepts.                                                                                                          |
|                                                  | <b>CO4:</b> | Create some real time software modules.                                                                                           |
|                                                  | <b>CO5:</b> | Able to develop Web applications by using JSP with Database Connectivity.                                                         |
| 19006300-<br>Ability and Skill<br>Enhancement -V | <b>CO1:</b> | Express and build leadership quality                                                                                              |
|                                                  | <b>CO2:</b> | Recall the traits of Successful Entrepreneurs, and Entrepreneurial qualities                                                      |
|                                                  | <b>CO3:</b> | Classify the differences between organizational decision-making process, entrepreneurial decision making process                  |
|                                                  | <b>CO4:</b> | Create work related skills and prepare effective interview questions to conduct effective interviews.                             |
|                                                  | <b>CO5:</b> | Enhance employability skills                                                                                                      |
| 19007300-Summer<br>Internship and<br>Report      | <b>CO1:</b> | Encouraged to take internship program during their semester break.                                                                |
|                                                  | <b>CO2:</b> | Give guidelines, suggestions, and scope regarding companies.                                                                      |
|                                                  | <b>CO3:</b> | Provide the interacting lectures with the industrial experts.                                                                     |
|                                                  | <b>CO4:</b> | Improve the skills for choose best company for internship and make a report on internship.                                        |
|                                                  | <b>CO5:</b> | Create competency and skills to take decisions during crisis and conflict situations.                                             |

**Electives:**

|                            |             |                                                                                                              |
|----------------------------|-------------|--------------------------------------------------------------------------------------------------------------|
| 19015800-<br>Deep Learning | <b>CO1:</b> | Able to understand the mathematics behind functioning of artificial neural networks                          |
|                            | <b>CO2:</b> | Able to analyze the given dataset for designing a neural network-based solution                              |
|                            | <b>CO3:</b> | Able to carry out design and implementation of deep learning models for signal/image processing applications |
|                            | <b>CO4:</b> | Able to design and deploy simple TensorFlow-based deep learning solutions to classification problems         |
|                            | <b>CO5:</b> | Design deep learning solutions for complex real-world Problems using different deep learning tools.          |

|                                |             |                                                                           |
|--------------------------------|-------------|---------------------------------------------------------------------------|
| 19015900-<br>Deep Learning Lab | <b>C01:</b> | Make use of deep learning APIs like Keras                                 |
|                                | <b>C02:</b> | Implement multiple conversions for Analysis                               |
|                                | <b>C03:</b> | Apply deep learning techniques for object identification and segmentation |
|                                | <b>C04:</b> | Implement RNN and CNN for multiple problems                               |
|                                | <b>C05:</b> | Implement Autoencoders and GAN.                                           |

|                                |             |                                                                           |
|--------------------------------|-------------|---------------------------------------------------------------------------|
| 19012600-<br>LAMP Technologies | <b>C01:</b> | Understand and configure a LAMP stack environment.                        |
|                                | <b>C02:</b> | Develop dynamic web applications using PHP and MySQL.                     |
|                                | <b>C03:</b> | Implement basic Linux system administration for hosting web applications. |
|                                | <b>C04:</b> | Integrate backend and frontend functionality using PHP.                   |
|                                | <b>C05:</b> | Apply security and optimization techniques for web development.           |

|                               |             |                                                                                        |
|-------------------------------|-------------|----------------------------------------------------------------------------------------|
| 19012700-<br>Embedded Systems | <b>C01:</b> | Understand the microprocessor architecture and its components used in embedded systems |
|                               | <b>C02:</b> | Write the 8051-assembly language code for specific purposes                            |
|                               | <b>C03:</b> | Implement code for interfacing various devices.                                        |
|                               | <b>C04:</b> | Develop simple embedded systems for real time operations                               |
|                               | <b>C05:</b> | Composing simple embedded system with error free software to obtain target system      |

|                                                |             |                                                                                                                  |
|------------------------------------------------|-------------|------------------------------------------------------------------------------------------------------------------|
| 19012800-<br>Mobile Application<br>Programming | <b>C01:</b> | Analyze the architecture of android and current trends in mobile operating systems.                              |
|                                                | <b>C02:</b> | Apply suitable software tools and APIs for the development of User Interface of a particular mobile application. |
|                                                | <b>C03:</b> | Apply intents and broadcast receivers in android application.                                                    |
|                                                | <b>C04:</b> | Develop and design apps for mobile devices using SQLiteDatabase.                                                 |
|                                                | <b>C05:</b> | Deploy applications to the Android marketplace for distribution.                                                 |

## 7. CO PO Mapping

| 19007400 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| C01      | 3   |     | 3   | 2   | 3   | 2   | 2   | 2   |     |      | 2    | 3    |
| C02      | 3   | 2   | 2   |     | 3   | 3   |     |     |     |      |      | 3    |
| C03      |     |     | 2   |     | 2   |     |     |     | 2   |      |      |      |
| C04      | 2   | 2   | 2   | 2   |     | 3   |     |     | 2   |      |      | 3    |
| C05      | 3   |     | 3   |     | 3   |     | 3   | 3   |     | 3    | 3    | 2    |

| 19007500 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| C01      | 3   | 3   | 2   | 2   |     |     |     |     | 3   | 2    |      | 3    |
| C02      | 3   | 3   | 2   | 3   | 3   | 3   | 3   | 2   | 3   |      | 2    | 3    |
| C03      | 3   | 3   |     | 2   | 3   |     | 3   | 2   |     | 3    | 3    | 3    |
| C04      | 2   |     | 3   | 2   | 3   |     | 3   | 3   |     | 3    | 3    |      |
| C05      |     | 2   |     |     | 2   | 3   |     | 2   | 3   | 2    |      | 2    |

| 19007600 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| C01      | 3   |     |     | 2   | 3   | 3   |     | 3   |     |      |      | 3    |
| C02      | 3   | 2   | 3   |     | 3   |     |     |     |     | 2    | 3    | 3    |
| C03      | 2   | 2   | 3   | 2   |     | 3   |     |     | 2   |      | 2    |      |
| C04      |     |     | 2   |     |     | 3   |     |     |     | 2    | 3    | 3    |
| C05      | 2   |     |     | 3   |     |     |     | 2   | 3   | 3    |      | 2    |

| 19007700 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| C01      | 3   | 3   | 2   | 2   |     | 3   | 3   | 3   | 3   | 3    | 3    | 3    |
| C02      | 2   | 2   | 3   |     | 3   | 3   |     | 3   |     | 3    | 3    |      |
| C03      |     |     | 2   |     | 3   |     |     |     |     | 3    |      | 3    |
| C04      | 3   | 3   | 2   | 2   | 3   |     |     |     | 3   | 3    |      |      |
| C05      | 2   |     |     | 3   |     | 3   | 3   | 3   |     |      | 3    | 2    |

| 19015400 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| C01      | 3   | 3   |     | 2   |     | 3   |     |     | 3   | 2    |      | 3    |
| C02      | 3   | 2   | 2   | 3   |     | 3   |     |     |     | 2    |      | 3    |
| C03      | 2   | 2   |     | 3   | 2   |     |     |     | 2   |      | 2    |      |
| C04      |     | 2   |     | 2   |     | 3   |     |     | 3   | 2    |      | 3    |
| C05      | 2   |     | 3   |     | 3   |     | 3   | 3   |     |      | 3    | 2    |

| 19015500 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| C01      | 3   | 3   | 3   | 2   |     |     | 3   | 3   | 3   | 3    | 2    | 3    |
| C02      | 3   | 3   | 3   |     | 2   |     | 3   | 3   |     | 3    | 3    | 3    |
| C03      | 2   |     | 2   | 3   | 3   | 3   |     |     | 3   |      | 3    | 3    |
| C04      |     | 2   | 3   |     | 3   | 3   |     | 3   |     | 2    | 3    |      |
| C05      | 2   |     |     | 3   |     |     | 3   |     | 3   |      |      | 2    |

| 19008000 | P01 | P02 | P03 | P04 | P05 | P06 | P07 | P08 | P09 | P010 | P011 | P012 |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| C01      | 3   | 3   |     | 2   |     | 2   |     |     | 2   | 2    |      | 3    |
| C02      | 2   | 3   | 3   |     | 2   |     |     | 2   |     | 2    | 3    | 3    |
| C03      | 2   |     |     |     |     | 2   |     |     | 3   |      |      | 3    |
| C04      | 2   | 2   |     | 2   |     | 3   |     |     | 3   | 2    |      | 3    |
| C05      |     | 2   | 3   |     | 3   |     | 3   | 3   |     |      | 3    | 2    |

| 19008100 | P01 | P02 | P03 | P04 | P05 | P06 | P07 | P08 | P09 | P010 | P011 | P012 |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| C01      | 3   | 3   | 2   | 2   |     | 3   | 3   |     | 3   | 3    |      | 3    |
| C02      | 2   | 2   |     | 2   | 3   | 3   |     | 3   | 3   | 3    | 3    |      |
| C03      |     | 2   | 2   |     |     |     |     |     | 3   |      | 3    | 3    |
| C04      | 3   |     | 2   | 2   | 3   |     |     |     | 3   | 3    | 3    | 2    |
| C05      | 2   | 3   |     |     | 3   | 2   | 2   | 2   |     |      |      | 3    |

| 11018200 | P01 | P02 | P03 | P04 | P05 | P06 | P07 | P08 | P09 | P010 | P011 | P012 |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| C01      | 3   |     | 2   | 2   | 3   | 3   |     | 3   |     | 2    |      | 3    |
| C02      | 2   | 2   | 2   |     | 3   | 2   |     |     |     | 2    | 3    | 3    |
| C03      | 2   | 2   | 3   | 2   | 2   | 3   |     |     | 2   | 2    | 2    | 3    |
| C04      |     |     | 2   |     | 2   |     |     | 2   |     | 3    | 3    | 3    |
| C05      | 3   | 3   |     | 3   |     | 2   |     | 3   | 3   |      | 2    |      |

| 19008300 | P01 | P02 | P03 | P04 | P05 | P06 | P07 | P08 | P09 | P010 | P011 | P012 |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| C01      | 3   |     | 3   | 2   |     |     | 3   | 3   | 3   | 3    | 2    |      |
| C02      | 2   | 3   | 2   | 3   | 2   |     | 3   | 3   | 2   | 3    |      | 3    |
| C03      | 3   |     |     |     | 2   | 3   |     |     |     |      |      |      |
| C04      |     | 2   | 3   |     | 3   | 3   | 3   | 3   | 3   | 2    | 3    | 3    |
| C05      | 3   | 3   |     | 3   | 3   |     |     |     | 3   | 2    | 3    | 2    |

| 19008400 | P01 | P02 | P03 | P04 | P05 | P06 | P07 | P08 | P09 | P010 | P011 | P012 |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| C01      | 3   | 3   |     | 2   |     |     |     | 2   | 2   |      | 2    | 3    |
| C02      | 3   | 2   | 3   | 3   | 2   | 3   | 2   |     | 2   | 3    | 3    |      |
| C03      | 2   |     | 2   |     |     | 3   | 2   | 2   | 3   | 2    |      | 3    |
| C04      |     | 2   | 2   | 2   | 2   | 2   |     |     |     |      | 2    | 3    |
| C05      | 2   |     |     | 3   |     |     | 3   | 3   | 2   | 3    |      | 2    |

| 19008500 | P01 | P02 | P03 | P04 | P05 | P06 | P07 | P08 | P09 | P010 | P011 | P012 |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| C01      | 3   | 3   | 2   | 2   |     | 3   | 3   | 3   | 3   | 3    | 2    | 3    |
| C02      | 2   | 3   |     | 2   | 3   | 2   | 2   | 3   |     | 2    |      |      |
| C03      |     | 2   |     | 2   |     |     |     |     | 2   |      | 3    |      |
| C04      | 2   | 3   | 3   | 2   | 3   |     |     |     | 3   | 3    | 3    | 3    |
| C05      |     |     | 3   |     |     | 3   | 3   | 2   |     |      | 2    | 2    |

| 19006300 | P01 | P02 | P03 | P04 | P05 | P06 | P07 | P08 | P09 | P010 | P011 | P012 |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| C01      | 2   | 2   | 3   | 2   | 2   |     |     |     |     | 3    | 2    | 2    |
| C02      | 2   |     |     | 3   | 2   | 2   |     | 2   |     | 3    |      | 2    |
| C03      | 3   | 3   |     |     |     | 2   |     | 3   | 2   | 3    | 3    | 2    |
| C04      |     | 2   | 3   | 3   | 2   | 3   |     | 3   | 2   | 3    |      | 2    |
| C05      | 3   | 3   | 2   | 2   | 3   | 2   | 3   | 2   | 3   | 2    | 3    | 2    |

| 19007300 | P01 | P02 | P03 | P04 | P05 | P06 | P07 | P08 | P09 | P010 | P011 | P012 |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| C01      | 3   | 3   | 2   | 3   | 3   | 3   |     | 2   | 2   |      |      | 3    |
| C02      |     | 2   | 3   |     | 2   | 2   | 2   |     | 3   | 3    | 3    | 3    |
| C03      | 2   |     |     | 3   |     | 2   |     | 3   | 2   |      |      | 3    |
| C04      | 3   | 3   | 2   | 2   | 2   |     |     | 2   |     | 3    | 2    | 2    |
| C05      | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3    | 3    | 3    |

| 19015800 | P01 | P02 | P03 | P04 | P05 | P06 | P07 | P08 | P09 | P010 | P011 | P012 |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| C01      | 3   | 2   | 2   | 1   | 3   | 1   |     |     | 1   |      |      | 1    |
| C02      | 3   | 3   | 2   | 1   | 3   | 1   |     |     | 2   |      |      | 1    |
| C03      | 3   | 3   | 3   | 2   | 3   | 1   |     | 1   | 2   | 1    |      | 2    |
| C04      | 3   | 3   | 3   | 3   | 3   | 2   |     | 1   | 3   | 2    |      | 3    |
| C05      | 3   | 3   | 3   | 3   | 3   | 3   |     | 1   | 3   | 3    | 31   | 3    |

| 19015900 | P01 | P02 | P03 | P04 | P05 | P06 | P07 | P08 | P09 | P010 | P011 | P012 |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| C01      | 3   | 3   | 2   | 2   |     |     |     |     | 3   | 2    |      | 3    |
| C02      | 3   | 3   | 2   | 3   | 3   | 3   | 3   | 2   | 3   |      | 2    | 3    |
| C03      | 3   | 3   |     | 2   | 3   |     | 3   | 2   |     | 3    | 3    | 3    |
| C04      | 2   |     | 3   | 2   | 3   |     | 3   | 3   |     | 3    | 3    |      |
| C05      |     | 2   |     |     | 2   | 3   |     | 2   | 3   | 2    |      | 2    |

| 19012600 | P01 | P02 | P03 | P04 | P05 | P06 | P07 | P08 | P09 | P010 | P011 | P012 |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| C01      | 3   | 3   | 2   | 2   |     |     |     |     | 3   | 2    |      | 3    |
| C02      | 3   | 3   | 2   | 3   | 3   | 3   | 3   | 2   | 3   |      | 2    | 3    |
| C03      | 3   | 3   |     | 2   | 3   |     | 3   | 2   |     | 3    | 3    | 3    |
| C04      | 2   |     | 3   | 2   | 3   |     | 3   | 3   |     | 3    | 3    |      |
| C05      |     | 2   |     |     | 2   | 3   |     | 2   | 3   | 2    |      | 2    |

| 19012700 | P01 | P02 | P03 | P04 | P05 | P06 | P07 | P08 | P09 | P010 | P011 | P012 |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| C01      | 3   | 3   | 2   | 2   |     |     |     |     | 3   | 2    |      | 3    |
| C02      | 3   | 3   | 2   | 3   | 3   | 3   | 3   | 2   | 3   |      | 2    | 3    |
| C03      | 3   | 3   |     | 2   | 3   |     | 3   | 2   |     | 3    | 3    | 3    |
| C04      | 2   |     | 3   | 2   | 3   |     | 3   | 3   |     | 3    | 3    |      |
| C05      |     | 2   |     |     | 2   | 3   |     | 2   | 3   | 2    |      | 2    |

| 19012800 | P01 | P02 | P03 | P04 | P05 | P06 | P07 | P08 | P09 | P010 | P011 | P012 |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| C01      | 3   | 3   | 2   | 2   |     |     |     |     | 3   | 2    |      | 3    |
| C02      | 3   | 3   | 2   | 3   | 3   | 3   | 3   | 2   | 3   |      | 2    | 3    |
| C03      | 3   | 3   |     | 2   | 3   |     | 3   | 2   |     | 3    | 3    | 3    |
| C04      | 2   |     | 3   | 2   | 3   |     | 3   | 3   |     | 3    | 3    |      |
| C05      |     | 2   |     |     | 2   | 3   |     | 2   | 3   | 2    |      | 2    |



## **8. Curriculum**

**Course Name: Microprocessor**

**Course Code: 19007400**

### **Course Outline:**

#### **Unit I: Introduction to Microprocessors**

Need for Flexible Logic and Evolution of Microprocessors, Applications, Generic Architecture of a Microprocessor; INTEL 8085 Microprocessor: Pin Functions, Architecture, Addressing Modes, Instruction Set, Timing Diagrams, Interrupts, Programming Examples.

#### **Unit II: Basic Input/output Techniques**

Serial I/O, Parallel I/O, Programmed I/O, Interrupt Driven I/O, Direct Memory Access. Peripheral Controllers: USART (8251), RS-232C, Programmable Peripheral Interface (8255), Programmable Interrupt Controller (8259), Programmable Timer (8253/8254), Programmable Keyboard and Display Interface, DMA Controller (8257, 8237).

#### **Unit III: INTEL 8086 Microprocessor**

Pin Functions, Architecture, Characteristics and Basic Features of Family, Segmented Memory, Addressing Modes, Instruction Set, Data Transfer Instructions, Arithmetic, Logical, Shift & Rotate Instructions, String Instructions, Flag Control Instructions, Transfer of Control Instructions, Processor Control Instructions, Interrupt Structures, Multitasking and Multiprogramming, Programming Examples.

INTEL 8086 System Configuration: Clock Generator (8284), Bus Controller (8288), MIN/MAX Modes of 8086 and System Configurations.

#### **Unit IV: Interfacing with 8086**

Interfacing with RAMs, ROMs along with the explanation of timing diagrams; Interfacing with peripheral ICs like 8255, 8254, 8279, 8259 etc.; Main Memory System Design: Types of Main Memories, Memory Organization, CPU Read/Write Timing Diagrams, RAM and ROM Interface Requirements, DRAM Interfacing and DRAM Controller (8203);

**Suggested Readings:**

1. Gaonkar, Ramesh., Microprocessor Architecture, Programming and Applications with the 8085, Penram International Publishing India PVT.LTD. (2005) 5<sup>th</sup> Ed.
2. Hall, D.V., Microprocessor and Interfacing, Tata McGraw Hill Publishing Company, (2006) 2<sup>nd</sup> ed.
3. Rafiquzzaman, M., Microprocessors and. Microcomputer-Based System Design, CRC Press, (1995) 2<sup>nd</sup> ed.
4. Gibson, Glenn A., Liu, Yu-Cheng., Microcomputer Systems: The 8086/8088 Family Architecture Programming And Design, Pearson, (2001) 1<sup>st</sup> ed.

**Course Name: Microprocessors LabCourse**

**Code: 19007500**

**Course Outline:****Laboratory Work:**

1. Introduction to INTEL kit, Programming examples of 8085 and 8086.
2. Interfacing using 8085, 8086 kits, Interfacing of LED seven segment display,
3. ADC, DAC, 8253, Printer, UP- PC Interface. Microprocessor based project.

**Course Name: Analysis and Design of Algorithm Course**

**Code: 19007600**

**Course Outline:****Unit I: Basics of Algorithm Analysis & Design**

Stacks, queues, trees, heaps, sets and graphs; Algorithm Definition, Analyzing algorithms, order arithmetic, time and space complexity.

**Algorithm Design Techniques:** Divide and conquer; general method, merge sort, selection problem, Recurrences, Solving Recurrences by Substitution method, Recursive Tree Method.

**Unit II: Greedy method**

Job Sequencing with Deadlines, Knapsack problem, Optimal merge patterns, Optimal Storage on tapes, Minimum spanning trees, Huffman Encoding.

**Dynamic Programming:** Use of table instead of recursion, all pair shortest Path, 0/1 knapsack, Matrix Chain Multiplication, optimal binary search tree, Longest Common Subsequence, Travelling Salesperson Problem.

**Unit III: Search and Traversal**

Search techniques: breadth first search, depth first search, code optimization, Insertion Sort,

Quick Sort, Merge Sort, Selection Sort, Binary Search, Linear Search. **Backtracking:** 8 queens' problem, sum of subsets, graph coloring.

#### **Unit IV: Problem clauses**

P, NP, NP- Hard and NP-complete, Proving NP-Complete Problems - Satisfiability problem and Vertex Cover Problem; Approximation Algorithms for Travelling Salesman Problem.

#### **Suggested Readings:**

1. E.Horowitz & S.Sahani, Fundamentals of Computer Algorithms. Galgotia Publications.
2. Goodrich, Tamassia, Algorithm Analysis & Design, Wiley.
3. Corman, Leiserson & Rivest, Introduction to Algorithms, MIT Press.
4. Sara Basse, A.V. Geider, Computer Algorithms, Introduction to Design and Analysis.
5. Robert Lafore, Data Structures & Algorithms in Java, Pearson Education Asia.

**Course Name: Analysis and Design of Algorithm LabCourse**

**Code: 19007700**

#### **Course Outline:**

#### **Laboratory work:**

- Implementation of all the algorithmic techniques studied

**Course Name: Data Base Management Systems with MySQL**

**Course Code: 19005400**

#### **Objectives**

- To understand the different issues involved in the design and implementation of a database system.
- To study the physical and logical database designs, database modeling, relational, hierarchical, and network models.
- To understand and use data manipulation language to query, update, and manage database.
- To develop an understanding of essential DBMS concepts such as: database security, Integrity, concurrency, distributed database, and intelligent database, Client/Server (Database Server), Data Warehousing.
- To design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS.

## **Course Outline:**

### **Unit I: Introduction**

Data, data processing requirement, desirable characteristics of an ideal data processing system, traditional file-based system, its drawback, concept of data dependency, Def of database, database management system, 3-schema architecture, database terminology, benefits of DBMS, Database development process - conceptual data modeling, logical database design, physical database design, database implementation, database maintenance.

### **Unit II: Database Analysis**

Conceptual data modeling using E-R data model -entities, attributes, relationships, generalization, specialization, specifying constraints. 5 – 6 practical problems based on E-R data model.

**Database Design:** Logical database design and relational data model: Introduction to relational database theory: *def* of relation, relational model operators, relational model integrity rules, Normalization- 1NF, 2NF, 3NF, 4NF, BCNF & practical problems based on these forms. Denormalization.

### **Unit III: Database Implementation**

Introduction to SQL, DDL aspect of SQL, DML aspect of SQL – update, insert, delete & various form of SELECT- simple, using special operators, aggregate functions, group by clause, sub query, joins, co-related sub query, union clause, exist operator, PL/SQL - cursor, stored function, stored procedure, triggers, error handling, package.

### **Unit IV : Allied Topics**

Transaction processing - introduction, concurrency control techniques, database recovery, Overview of: client-server database environment, distributed databases, Object-relational database, object-oriented database, web technology and database, data warehousing and data mining. Comparative study of various DBMS products;

### **Suggested Readings:**

1. H. F. Korth & A. Silverschatz, Database Concepts, Tata Mcgraw Hill.
2. Elmasri & Navathe, Fundamentals of Database Systems, Pearson Education Asia.
3. Hoffer, prescott, McFadden, Modern Database Management, Pearson Education Asia.
4. C. J. Date, Database Systems, Pearson Education Asia.
5. Martin Gruber, Understanding SQL, BPB Publication.
6. Val Occardi, Relational Database: Theory &Practice, BPB Publication, New Delhi.
7. Scott Urman, Oracle PL/SQL Programming, Tata Mcgraw Hill.
8. Ivan Bayross, SQL and PL/SQL, BPB Publication.

**Course Name: Data Base Management Systems**

**with MySQL Lab**

**Course Code: 19015500**

**Course Outline:**

**Laboratory work:**

1. Data Definition Language (DDL) commands in RDBMS
2. Data Manipulation Language (DML) and Data Control Language (DCL)
3. High level language extensions with cursors
4. High level language extension with Triggers
5. Procedures and Functions
6. Embedded SQL
7. Design and implementation of Banking system
8. Design and implementation of Ticket booking.
9. Design and implementation of banking System.
10. Design and implementation of hostel Management or hotel management
11. Design and implementation of hospital management.
12. Design and implementation of Library Information System

## **Course Name: Computer Graphics**

**Course Code: 19008000**

### **Objectives**

- Identify and explain the core concepts of computer graphics.
- Apply graphics programming techniques to design and create computer graphics scenes.
- Create effective OpenGL programs to solve graphics programming issues, including 3D transformation, objects modeling, color modeling, lighting, textures, and ray tracing.

### **Course Outline**

#### **Unit I: Introduction**

The Advantages of Interactive Graphics, Representative Uses of Computer Graphics, Classification of Application Development of Hardware and software for computer Graphics, Conceptual Framework for Interactive Graphics, Overview, Scan: Converting Lines, Scan Converting Circles, Scan Converting Ellipses.

#### **Unit II: Hardcopy**

Technologies, Display Technologies, Raster-Scan Display System, Video Controller, Random-Scan Display processor, Input Devices for Operator Interaction, Image Scanners, Working exposure on graphics tools like Dream Weaver, 3D Effects etc, **Clipping** Southland- Cohen Algorithm, Cyrus-Beck Algorithm, Midpoint Subdivision Algorithm.

#### **Unit III: Geometrical Transformation**

2D Transformation, Homogeneous Coordinates and Matrix Representation of 2D Transformations, composition of 2D Transformations, the Window-to-Viewport Transformations, Introduction to 3D Transformations Matrix.

#### **Unit IV: Introductory Concepts**

Multimedia Definition, CD-ROM and the multimedia highway, Computer Animation (Design, types of animation, using different functions), Uses of Multimedia, Introduction to making multimedia – The stage of Project, hardware & software requirements to make good multimedia skills and Training opportunities in Multimedia Motivation for Multimedia usage.

### **Suggested Readings:**

1. D.Hearn & P.Baker , Computer Graphics, Pearson Education Asia.
2. Foley, Van Dam, Feiner, Hughes, Computer Graphics, Pearson Education Asia.

3. Rogers, Adams, Mathematical Elements for Computer Graphics, Tata Mcgraw Hill.
4. Newman, Sproull, Principles of Interactive Computer Graphics, Tata Mcgraw Hill.
5. Zhigang Xiang, Roy A Plastock, Schaum's Outlines Computer Graphics, Mcgraw Hill.

### **Course Name: Computer Graphics Lab**

**Course Code: 19008100**

#### **Course Outline:**

#### **Laboratory Work:**

1. Writing programs for implementing basic algorithms for line, circle etc.,
2. 2D transformations, clipping, 2D representations, algorithms for back face detection procedure, depth buffer method to display the visible surfaces in a scene containing any number of polyhedrons,
3. A-buffer algorithm to display a scene containing both opaque and transparent surfaces, depth sorting method to display the visible surfaces in a scene containing several polyhedrons.

### **Course Name: Core Java**

**Course Code: 19008200**

#### **Objectives:**

- Understand fundamentals of programming such as variables, conditional and iterative execution, methods, etc.
- Understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.
- Be aware of the important topics and principles of software development.
- Have the ability to write a computer program to solve specified problems.
- Be able to use the Java SDK environment to create, debug and run simple Java programs.

#### **Course Outline**

##### **Unit I: Introduction**

Object oriented programming, characteristics of object orientated languages, classes, Java **Programming:** Introduction, Data types, access specifiers, operators, control statements, arrays. **Classes:** Fundamentals, objects, methods, constructors. **Inheritance:** Super class, sub class, this and super operator, method overriding, use of final, packages, abstract class, interface. **Polymorphism:** Method overloading, constructor overloading.

## **Unit II: Exception Handling**

Exception Class, built in checked and unchecked exceptions, user defined exceptions, use of try, catch, throw, throws, finally. **Multi-threaded programming:** Overview, comparison with multiprocessing, Thread class and runnable interface, life cycle, creation of single and multiple threads, thread priorities, overview of Synchronization. **Java Library:** String handling (only main functions), String Buffer class. Elementary concepts of Input/Output :byte and character streams, System.in and System. out, print and printing, reading from a file and writing in a file.

## **Unit III: Software Development using Java: Applets**

Introduction, Life cycle, creation and implementation, AWT controls: Button, Label, Text Field, Text Area, Choice lists, list, scrollbars, check boxes, Layout managers, Elementary concepts of Event Handling: Delegation Event Model, Event classes and listeners, Adapter classes, Inner classes. **Swings:** Introduction and comparison with AWT controls.

## **Unit IV: Networking Basics**

Socket (datagram and TCP/IP based client and server socket), factory methods, Inet Address **JDBC:** JDBC Architecture, JDBC Drivers, Connecting to the Database **Introduction to Advance Java (Servlets):** Life cycle, Interfaces and classes in java. servlet package (only description) Creating a simple servlet.

## **Suggested Readings:**

1. Patrick Naughton and Herbert Schildt, "Java-2 The Complete Reference", TMH.
2. Y. Daniel Liang, "Introduction to Java Programming, Comprehensive Version, 7/e" Pearson.
3. Krishnamoorthy R, PrabhuS, "Internet and Java Programming", New Age Intl.
4. David Flanagan, Jim Farley, William Crawford and Kris Magnusson, "Java Enterprise in aNutshell", O'Reilly.

**Course Name: Core Java Lab**

**Course Code: 19008300**

## **Course Outline**

1. Write a program to display "Hello World" in 'JAVA' language
2. Implementation of input and output statements
3. Implementation of control statements.
4. Implementation of functions.
5. Implementation of single dimension, two dimension and three-dimension array



6. Write a JAVA program that uses a recursive function for solving Towers of Hanoi problem.
7. Write a JAVA program to implement the matrix ADT using a class. The operations supported by this ADT are:
  - a) Reading a matrix.
  - b) Addition of matrices.
  - c) Printing a matrix.
  - d) Subtraction of matrices.
  - e) Multiplication of matrices.
8. Write a JAVA program that overloads the + operator and relational operators (suitable) to perform the following operations:
  - a) Concatenation of two strings.
  - b) Comparison of two strings.
9. Write JAVA programs that illustrate how the following forms of inheritance are supported:
  - a) Single inheritance
  - b) Multiple inheritances
  - c) Multi inheritance
  - d) Hierarchical inheritance
10. Write a JAVA program that illustrates the order of execution of constructors and destructors when new class is derived from more than one base class.

**Course Name: Elective I - PHP & My SQL**

**Course Code: 19008400**

**Objectives:**

- PHP & MYSQL Lab course cover all the practical part of basic or advance programming in php and number of query like create database/table, drop database/table, insert/delete, update data from table, create and remove session/cookie, use basic component of form and string functions etc.

## **Course Outline**

### **Unit I: Introduction to PHP**

What is PHP How PHP better than other Benefits Of Using PHP MYSQL Server Client Environment Web Browse Web Server Installation & Configuration Files.

Development Concept: How PHP Script Work PHP Syntax Write your First PHP Program Embed PHP In HTML/HTML In PHP PHP Data Type Variable In PHP Contents In PHP Operator In PHP Control Structure: If Statement If.....Else Statement If...If Else Statement Nested If Statement Switch Statement

Looping Structure: For Loop While Loop Do...While Loop For each Loop Function: What is function Syntax User Defined Function System Defined Function Parameterized Function Parameterized Function Date & Time Function Hash Function Mail Function

File Inclusion: Include() Require()

Working with Forms What is a Form? Important HTML Tags Super-Global Variable , Different ways to carry form data (GET, POST), isset(), isempty()

### **Unit II: Array**

What is Array Syntax Associative Array Numeric Array Multi-Dimensional Array

String Function Chr() strlen() strpos() strcmp()

Working with File OpeningFile Reading File Writing File Closing File Appending File Uploading File.

OOPs Concept Class & Object Access Modifier Properties of Object Encapsulation and abstraction Inheritance Polymorphism Function overriding Abstract class.

State Management Creating Cookies Set Cookies Destroying Cookies Creating Session Set Session Destroying Session

Error Handling & Exception Introduction to Error Try,catch,throw Block Handling.

### **Unit III: Introduction to MYSQL**

What is Database? Understanding an RDBMS Understanding Tables, Record &Fields SQL Language; Working with MYSQL Admin Working with PHP My Admin Types Data Type Creating Database & Tables Dropping Database &Tables Adding Fields Selecting Table Alerting Fields Properties.

MySQL Function in PHP Database Connections Managing Database Connections Performing Queries Closing Connection.

### **Unit IV: SQL Queries**

Create Database & Table Drop Database & Table Insert Record Select Record Deleting Record Modifying Record WHERE Clause Using Operators Sorting Records Eliminating Duplicates Grouping Records, Having Clause Joining Tables Sub queries Using Table And Column Aliases

### **Suggested Readings:**

1. PHP and MySQL Web Development All-in-One Desk Reference For Dummies, Janet Valade with Tricia Ballard, Bill Ballard, Willey 2008
2. PHP and MySQL Web Development (Developer's Library) Kindle Edition, by Luke Welling, Laura Thomson ,Sams Publishing

## **Course Name: Elective-I - PHP & My SQL Lab**

**Course Code: 19008500**

### **Course Outline**

1. Create a php webpage and print "hello world".
2. Create a php program to find odd or even number from given number.
3. Write a php program to find maximum among three numbers.
4. Write a PHP program to swap two numbers.
5. Write a PHP Program to demonstrate the variable function:
  - a. Gettype()
  - b. Settype()
6. Write a PHP Program to demonstrate the variable uncton
  - a. isset()
  - b. unset()
7. Give the example of variable function:
  - a. strval()
  - b. floatval()
  - c. intval()
  - d. print\_r()
  - e. var\_dump()
8. Give the example of string function
  - a. substr()
  - b. substr()
  - c. strcmp()
  - d. strcasecmp()
  - e. strpos()
  - f. strpos()
9. Write a PHP program that demonstrate form element(input elements).
10. Write a PHP program that demonstrate passing variable using URL.

- i. Write a PHP program that demonstrate use of session:1
  - ii. Write a PHP program that demonstrate use of session:2
11. Write a program that demonstrate use of cookies: 1
  12. Write a program that demonstrate use of cookies: 2
  13. Write a PHP program to create a database using MySQL
  14. Write a PHP program to drop a database using MySQL.
  15. Write a PHP program to create a table in MySQL.
  16. Write a PHP program to insert record into a table using MySQL.
  17. Write a PHP program to drop table using MySQL.
  18. Write a program to update table:6
  19. Write a PHP program to select data and show into table format
  20. Create a student Registration in PHP and Save and Display the student Records.
  21. Write a program to Develop student registration form and display all the submitted data on another page.

**Course Name: Ability & Skill Enhancement - V**

**Course Code: 19006300**

**Objectives:**

- To make students understand the usage of Grammar in day to day life and improve their fluency and confidence while speaking English.

**Course Outline – Final Assessment - Interview with an Entrepreneur /Leader**

**Unit I: Leadership**

What is leadership? Traits of Leadership, Identifying leaders and traits of Leadership, Movie/ Story/ Interviews of leaders: Identify leadership qualities, Debate/ Discussion/ Presentations on leaders.

**Unit II: Entrepreneurship**

What is Entrepreneurship, Traits of Successful Entrepreneurs, Movie/ Story/Interviews of Entrepreneurs: Identify Entrepreneurial qualities, Debate/ Discussion/Presentation on Entrepreneurs.

### **Unit III: Organizational Skills & Employability Skills**

What are organizational skills, how to develop them, the skills needed to become a successful entrepreneur/administrator, good communication, ambition, courage, hardwork, planning, accountability. Organizational skills can be developed by discipline making a system, rules, delegation of power at workplace, etc.

How to enhance employability; skills, why do we need them, different workplaces, having different needs, different skills, how to recognize different work skills.

### **Unit IV: Decision making**

The process of decision making, its steps, what are its basics, what are the basics of organizational decision-making process, entrepreneurial decision making, how to make a right decision at right time, dilemma.

### **Unit V: Interview Skills**

Conducting Interviews with Leaders/ Entrepreneurs, Preparing Questions, Interviewing the fellow person, do's & don'ts while taking interview.

## **Course Name: Deep Learning**

**Course Code: 19015800**

### **Course Outline:**

**Unit I:** Artificial Neural Networks- The Neuron-Expressing Linear Perceptrons as Neurons-Feed-Forward Neural Networks- Linear Neurons and Their Limitations –Sigmoid – Tanh – and ReLU Neurons -Softmax Output Layers – Training Feed-Forward Neural Networks-Gradient Descent-Delta Rule and Learning Rates- Gradient Descent with Sigmoidal Neurons- The Backpropagation Algorithm-Stochastic and Minibatch Gradient Descent – Test Sets – Validation Sets – and Overfitting- Preventing Overfitting in Deep Neural Networks – Implementing Neural Networks in TensorFlow.

**Unit II:** Local Minima in the Error Surfaces of Deep Networks- Model Identifiability- Spurious Local Minima in Deep Networks- Flat Regions in the Error Surface – Momentum-Based Optimization – Learning Rate Adaptation.

**Unit III:** Convolutional Neural Networks(CNN) – Architecture -Accelerating Training with Batch Normalization- Building a Convolutional Network using TensorFlow- Visualizing Learning in Convolutional Networks – Embedding and Representation Learning -Autoencoder Architecture-Implementing an Autoencoder in TensorFlow –DenoisingSparsity in Autoencoders Models for Sequence Analysis – Recurrent Neural Networks- Vanishing GradientsLong Short-Term Memory (LSTM) Units- TensorFlow Primitives for RNN Models-Augmenting Recurrent Networks with Attention.

### **Suggested Readings:**

- Nikhil Buduma, “Fundamentals of Deep Learning:Designing Next-Generation Machine Intelligence Algorithm”, O'Reilly, 2017.
- Ian Goodfellow, YoshuaBengio and Aaron Courville, “Deep Learning”, MIT Press, 2016.

**Course Name: Deep Learning with Lab**  
**Course Code: 19015900**

**Laboratory Work:**

1. Build a deep neural network model start with linear regression using a single variable.
2. Build a deep neural network model start with linear regression using multiple variables.
3. Write a program to convert speech into text.
4. Write a program to convert text into speech.
5. Write a program to convert video into frames.
6. Write a program for Time-Series Forecasting with the LSTM Model.
7. Build a feed forward neural network for prediction of logic gates.
8. Write a program to implement deep learning Techniques for image segmentation.
9. Write a program for object detection using image labeling tools.

**Course Name: LAMP Technologies**  
**Course Code: 19012700**

**Unit I:** Introduction to LAMP Stack, Overview of Linux, Apache, MySQL, and PHP

Role of LAMP in web development, Setting up a LAMP environment, Basics of Linux commands and directory structure, Introduction to server-client architecture, Installing and configuring the LAMP stack on a local machine, Basic Linux file and permission management.

**Unit II:** Apache Web Server Installation and configuration of Apache, Managing virtual hosts

URL rewriting and redirection with .htaccess, Log management and debugging Apache errors  
Hosting a sample static website using Apache, Configuring custom domain names locally using virtual hosts.

**Unit III:** MySQL Database Management , Relational database basics, Installation and

configuration of MySQL, Writing basic SQL queries (SELECT, INSERT, UPDATE, DELETE)  
Database normalization and indexing, Backup and restoration of databases

Creating and managing a sample MySQL database, Writing queries for CRUD operations.

**Unit IV:** PHP Programming, Basics of PHP scripting, Variables, arrays, and loops in PHP

Form handling and validation, Session and cookie management, PHP-MySQL integration  
Error handling in PHP

**Unit V:** Security and Optimization, Securing a LAMP application, Input validation and

sanitization, Preventing SQL injection and XSS attacks, HTTPS and SSL certificates  
Performance tuning for Apache and MySQL, PHP performance tips and best practice

#### **Reference Books:**

1. "PHP and MySQL Web Development" by Luke Welling and Laura Thomson
2. "Linux Administration: A Beginner's Guide" by Wale Soyinka
3. "The Complete Reference: MySQL" by Vikram Vaswani
4. Online Resources:
5. Official documentation for PHP, Apache, and MySQL
6. Tutorials on Linux basics and commands

### **Course Name: Mobile Application Programming**

**Course Code: 19012800**

UNIT-I: Introduction to Android Operating System: Android OS and Features – Android development framework; Installing and running applications on Android Studio, Creating AVDs, Types of Android application; Creating Activities, Activity Life Cycle, Activity states, monitoring state changes

UNIT – II: Android application components – Android Manifest file, Externalizing resources like Simple Values, Drawables, Layouts, Menus, etc, Building User Interfaces: Fundamental Android UI design, Layouts – Linear, Relative, Grid and Table Layouts. User Interface (UI) Components

UNIT-III: Fragments – Creating fragments, Lifecycle of fragments, Fragment states, Adding fragments to Activity, adding, removing and replacing fragments with fragment transactions, interfacing between fragments and Activities

UNIT-IV: Intents and Broadcasts: Using intents to launch Activities, Types of Intents, Passing data to Intents, Getting results from Activities, Broadcast Receivers – Using Intent filters to service implicit Intents, Resolving Intent filters

UNIT-V Database: Introduction to SQLite database, creating and opening a database, creating tables, inserting retrieving and deleting data;

#### **TEXTBOOKS:**

1. Professional Android 4 Application Development, Reto Meier, Wiley India, (Wrox), 2012
2. Android Application Development for Java Programmers, James C Sheusi, Cengage Learning, 2013

### **Course Name: Embedded Systems**

**Course Code: 19012700**

**UNIT-I:** Embedded Systems Basics: Introduction to Embedded systems, Examples of embedded systems, Typical Hardware, Gates, Timing Diagrams, Memory, Microprocessors, Buses,

DirectMemoryAccess, Interrupts, Microprocess or Architecture, and Interrupt Basics.

**UNIT-II:** The 8051 Architecture-Introduction, 8051 Micro controller Hardware, Input/output Pin Ports and Circuits, External Memory, Serial data Input/output, Interrupts.

**UNIT-III:** Basic Assembly Language Programming Concepts: The Assembly Language Programming Process, Programming Tools and Techniques, Programming the 8051.

**UNIT-IV:** Moving Data: Introduction, Addressing Modes, External Data Moves, Code Memory ReadOnly Data Moves, Push and Pop Opcodes, Data Exchanges. Basic Design Using a Real-Time Operating System: Message Queues, Mailboxes and Pipes, Timer Functions, Events, Memory Management, Interrupt Routines in an RTOS Environment

**UNIT-V:** Applications: Introduction, keyboards, Human Factor, Key Switch Factors, Keyboard Configurations, Displays, Seven-Segment Numeric Display, D/A and A/D Conversions. Embedded Software Development Tools: Host and Target machines, Linker/Locators for Embedded Software, Getting Embedded Software into the Target System; Debugging Techniques: Testing on Host Machine, Using Laboratory Tools, An Example System.

**TEXTBOOKS:**

1. An Embedded Software Primer, David E. Simon, Pearson Education.
2. The 8051 Microcontroller, Third Edition, Kenneth J.Ayala, Thomson.



## 9. Lesson Plans

### 19007400– Micro processor

| Unit     | Particulars                                                                                        | Class No. | Pedagogy of Class     |
|----------|----------------------------------------------------------------------------------------------------|-----------|-----------------------|
| Unit-I   | INTRODUCTION TO MICROPROCESSOR                                                                     |           |                       |
| Unit-I   | Introduction of Syllabus, Introduction of Microprocessor, Evolution of Microprocessor              | C-1       | Lecture               |
| Unit-I   | Generic Architecture of Microprocessor, Application of Microprocessor                              | C-2       | Lecture               |
| Unit-I   | Introduction of 8085 Microprocessor, Pin diagram of Microprocessor, Architecture of microprocessor | C-3       | Lecture               |
| Unit-I   | Addressing Modes of Microprocessor, Introduction of Instruction, Instruction Type                  | C-4       | Lecture               |
| Unit-I   | Home Assignment No. 1 - Based on Computer Evolution                                                |           | Take Home Assignments |
| Unit-I   | Instruction Set - I - Data Transfer Instructions                                                   | C-5       | Lecture               |
| Unit-I   | Instruction Set - I - Arithmetic Instructions                                                      | C-6       | Lecture               |
| Unit-I   | Instruction Set - I - Logical Instruction                                                          | C-7       | Lecture               |
| Unit-I   | Instruction Set - I - Branch Instruction                                                           | C-8       | Lecture               |
| Unit-I   | Class Room Assignment No. 1 - Based on Instruction                                                 | C-9       | Class Room Assignment |
| Unit-I   | Timing Diagram and Interrupt                                                                       | C-10      | Lecture               |
| Unit-I   | Programming Examples -II                                                                           | C-11      | Lecture               |
| Unit-I   | Programming Examples -II                                                                           | C-12      | Lecture               |
| Unit-I   | Home Assignment No. 2 - Based on Programming                                                       |           | Take Home Assignments |
| Unit-I   | Clarification Class - 1                                                                            | C-13      | Clarification Class   |
| Unit-II  | BASIC INPUT/OUTPUT TECHNIQUES                                                                      |           |                       |
| Unit-II  | Programmed I/O, Interrupt Driven I/O, DMA                                                          | C-14      | Lecture               |
| Unit-II  | Class Room Assignment No. 2 - Based on Programming                                                 | C-15      | Class Room Assignment |
| Unit-II  | Peripheral Controller, USART, RS-232 C                                                             | C-16      | Lecture               |
| Unit-II  | 8255, 8259, 8253/8254                                                                              | C-17      | Lecture               |
| Unit-II  | DMA Controller 8237/8257                                                                           | C-18      | Lecture               |
| Unit-II  | Home Assignment - 3 - Based on Interfacing                                                         |           | Take Home Assignments |
| Unit-II  | Presentation No-1                                                                                  | C-19      | Presentation          |
| Unit-II  | Clarification Class - 2                                                                            | C-20      | Clarification Class   |
| Unit-II  | Programmable Keyboard and Display Interface                                                        | C-21      | Lecture               |
| Unit-III | INTEL MICROPROCESSOR 8086                                                                          |           |                       |
| Unit-III | Introduction of 8086, Difference between 8085 and 8086, Architecture of 8086                       | C-22      | Lecture               |
| Unit-III | Class Room Assignment No. 3                                                                        | C-23      | Class Room Assignment |
| Unit-III | Introduction of 8086, Difference between 8085 and 8086, Architecture of 8086                       | C-24      | Lecture               |

|          |                                                                   |      |                       |
|----------|-------------------------------------------------------------------|------|-----------------------|
| Unit-III | Pin Diagram of 8086, Features, Addressing modes, segmented Memory | C-25 | Lecture               |
| Unit-III | Presentation No. 2                                                | C-26 | Presentation          |
| Unit-III | Instruction Set - II                                              | C-27 | Lecture               |
| Unit-III | Instruction Set - II                                              | C-28 | Lecture               |
| Unit-III | Seminar                                                           | C-29 | Seminar               |
| Unit-III | Class Room Assignment No. 4                                       | C-30 | Class Room Assignment |
| Unit-III | Clock Generator 8284                                              | C-31 | Lecture               |
| Unit-III | Bus Controller                                                    | C-32 | Lecture               |
| Unit-III | Guest Lecture-I                                                   | C-33 | Guest lecture         |
| Unit-III | Presentation No. 3                                                | C-34 | Presentation          |
| Unit-III | Clarification Class - 3                                           | C-35 | Clarification Class   |
| Unit-IV  | INTERFACING WITH 8086 MICROPROCESSOR                              |      |                       |
| Unit-IV  | Types of Main Memory, Memory Organization                         | C-36 | Lecture               |
| Unit-IV  | Interfacing with RAM, ROMs                                        | C-37 | Lecture               |
| Unit-IV  | Webinar                                                           | C-38 | Webinar               |
| Unit-IV  | Presentation No. 4                                                | C-39 | Presentation          |
| Unit-IV  | Types of Main Memory, Memory Organization                         | C-40 | Lecture               |
| Unit-IV  | CPU Timing Diagram, RAM/ROM Interface Requirements                | C-41 | Lecture               |
| Unit-IV  | Guest Lecture-II                                                  | C-42 | Guest lecture         |
| Unit-IV  | Clarification Class 4                                             | C-43 | Clarification Class   |
| Unit-IV  | DRAM Controller                                                   | C-44 | Lecture               |
| Unit-IV  | Webinar-2                                                         | C-45 | Webinar               |

**19007500– Microprocessor Lab**

| S. No. | Particulars                                                                     | Class No. | Pedagogy of Class |
|--------|---------------------------------------------------------------------------------|-----------|-------------------|
| 1      | Introduction of Assembly Language Programming                                   | P-1,2     | Practical         |
| 2      | WAP to add two number using Registers                                           | P-3,4     | Practical         |
| 3      | WAP to add two 8-bit number using Memory location with Carry and Without Carry  | P-5,6     | Practical         |
| 4      | WAP to add two 16-bit number using Memory location with Carry and Without Carry | P-7,8     | Practical         |
| 5      | WAP to multiply two number using register and Memory location                   | P-9,10    | Practical         |
| 6      | WAP to transfer a Block of Data from one location to other location             | P-11,12   | Practical         |
| 7      | WAP a find larger number and smallest number                                    | P-13      | Practical         |
| 8      | WAP to find negative and positive number                                        | P-14      | Practical         |
| 9      | WAP to find odd number and even number                                          | P-15      | Practical         |
| 10     | WAP to find largest number and smallest number                                  | P-15      | Practical         |

**19007600– Analysis and Design of Algorithm**

| Unit    | Particulars                                                                    | Class No. | Pedagogy of Class     |
|---------|--------------------------------------------------------------------------------|-----------|-----------------------|
| Unit-I  | Basic of Algorithm Analysis & Design, Algorithm Design Techniques              |           |                       |
| Unit-I  | Algorithm Definition, Analyzing algorithms                                     | C-1       | Lecture               |
| Unit-I  | Order arithmetic, time and space complexity                                    | C-2       | Lecture               |
| Unit-I  | Stacks, Queues                                                                 | C-3       | Lecture               |
| Unit-I  | Trees, heaps, Sets and graphs                                                  | C-4       | Lecture               |
| Unit-I  | Algorithm Design Techniques: Divide and Conquer: general method                | C-5       | Lecture               |
| Unit-I  | Merge sort                                                                     | C-6       | Lecture               |
| Unit-I  | Home Assignment 1                                                              |           | Take Home Assignments |
| Unit-I  | Recurrences, Solving Recurrences by Substitution method                        | C-7       | Lecture               |
| Unit-I  | Recursive Tree Method.                                                         | C-8       | Lecture               |
|         | Clarification Class                                                            | C-9       | Clarification Class   |
|         | Presentation 1                                                                 | C-10      | Presentation          |
| Unit-II | Greedy Method                                                                  |           |                       |
| Unit-II | Job Sequencing with Deadlines                                                  | C-11      | Lecture               |
| Unit-II | Guest Lecture                                                                  | C-12      | Guest lecture         |
| Unit-II | Classroom Assignment 1                                                         | C-13      | Class Room Assignment |
| Unit-II | Knapsack problem                                                               | C-14      | Lecture               |
| Unit-II | Optimal merge patterns, Optimal Storage on tapes                               | C-15      | Lecture               |
| Unit-II | Minimum spanning trees                                                         | C-16      | Lecture               |
| Unit-II | Huffman Encoding                                                               | C-17      | Lecture               |
| Unit-II | Dynamic Programming, Use of table instead of recursion, All pair shortest Path | C-18      | Lecture               |
| Unit-II | Home Assignment 2                                                              |           | Take Home Assignments |
| Unit-II | Class Assignment 2                                                             | C-19      | Class Room Assignment |
| Unit-II | Presentation 2                                                                 | C-20      | Presentation          |
| Unit-II | 0/1 knapsack                                                                   | C-21      | Lecture               |
| Unit-II | Webinar                                                                        | C-22      | Webinar               |
| Unit-II | Matrix Chain Multiplication                                                    | C-23      | Lecture               |
| Unit-II | Guest Lecture                                                                  | C-24      | Guest lecture         |
| Unit-II | Home Assignment 3                                                              |           | Take Home Assignments |
| Unit-II | Optimal binary search tree                                                     | C-25      | Lecture               |
| Unit-II | Longest Common Subsequence                                                     | C-26      | Lecture               |
| Unit-II | Traveling salesperson problem                                                  | C-27      | Lecture               |
| Unit-II | Clarification Class                                                            | C-28      | Clarification Class   |
|         | Quiz                                                                           | C-29      | Quiz                  |
|         | Seminar                                                                        | C-30      | Seminar               |
|         | Activity                                                                       | C-31      | Activity              |

|          |                                                                                |      |                       |
|----------|--------------------------------------------------------------------------------|------|-----------------------|
| Unit-III | Search & Traversal, Backtracking                                               |      |                       |
| Unit-III | Search techniques: breadth first search, depth first search, code optimization | C-32 | Lecture               |
| Unit-III | Presentation 3                                                                 | C-33 | Presentation          |
| Unit-III | Insertion, Quick, Selection Sort                                               | C-34 | Lecture               |
| Unit-III | Binary Search & Linear Search                                                  | C-35 | Lecture               |
| Unit-III | Backtracking: 8 queens' problem                                                | C-36 | Lecture               |
| Unit-III | sum of subsets, graph coloring                                                 | C-37 | Lecture               |
| Unit-III | Classroom Assignment 3                                                         | C-38 | Class Room Assignment |
|          | Webinar                                                                        | C-39 | Webinar               |
|          | Clarification Class                                                            | C-40 | Clarification Class   |
| Unit-IV  | Problem Clauses                                                                |      |                       |
| Unit-IV  | P, NP, NP- Hard, NP-complete, Proving NP Complete Problems                     | C-41 | Lecture               |
| Unit-IV  | Presentation 4                                                                 | C-42 | Presentation          |
| Unit-IV  | algorithm for NP complete problems- TSP                                        | C-43 | Lecture               |
| Unit-IV  | Classroom Assignment 4                                                         | C-44 | Class Room Assignment |
| Unit-IV  | Clarification Class                                                            | C-45 | Clarification Class   |

**19007700– Analysis and Design of Algorithm Lab**

| S. No. | Particulars                                                                                  | Class No. | Pedagogy of Class   |
|--------|----------------------------------------------------------------------------------------------|-----------|---------------------|
| 1      | Introduction to Algorithms & Analysis Lab , Linear Search & Its Time Complexity Computation. | P-1,2     | Practical           |
| 2      | Binary Search & Its Time Complexity Computation.                                             | P-3,4     | Practical           |
| 3      | Insertion Sort & Its Time Complexity Computation                                             | P-5,6     | Practical           |
| 4      | BFS & DFS- Its Time Complexity Computation                                                   | P-7,8     | Practical           |
| 5      | Merge Sort & Its Time Complexity Computation                                                 | P-9,10    | Practical           |
| 6      | Activity/Webinar                                                                             | P-11,12   | Webinar             |
| 7      | Quick Sort & Its Time Complexity Computation                                                 | P-13,14   | Practical           |
| 8      | Quick Sort & Its Time Complexity Computation                                                 | P-15,16   | Practical           |
| 9      | Selection Sort & Its Time Complexity Computation                                             | P-17,18   | Practical           |
| 10     | Heap Sort & Its Time Complexity Computation                                                  | P-19,20   | Practical           |
| 11     | Heap Sort & Its Time Complexity Computation                                                  | P-21,22   | Practical           |
| 12     | LCS in two given sequence                                                                    | P-23,24   | Practical           |
| 13     | LCS in two given sequence                                                                    | P-25,26   | Practical           |
| 14     | Clarification Class                                                                          | P-27,28   | Clarification Class |
| 15     | Clarification Class                                                                          | P-29,30   | Clarification Class |

**19015400– Database Management Systems with MySQL**

| Unit    | Particulars                                                                                                                          | Class No. | Pedagogy of Class     |
|---------|--------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------|
| Unit-I  | Introduction                                                                                                                         |           |                       |
| Unit-I  | Introduction Of DBMS                                                                                                                 | C-1       | Lecture               |
| Unit-I  | Data, data processing requirement, desirable characteristics of an ideal data processing system,                                     | C-2       | Lecture               |
| Unit-I  | traditional file based system, its drawback, concept of data dependency, Def of database, database management system,                | C-3       | Lecture               |
| Unit-I  | traditional file based system, its drawback, concept of data dependency, Def of database, database management system,                | C-4       | Lecture               |
| Unit-I  | 3-schema architecture, database terminology,                                                                                         | C-5       | Lecture               |
| Unit-I  | 3-schema architecture, database terminology,                                                                                         | C-6       | Lecture               |
| Unit-I  | benefits of DBMS, Database development process - conceptual data modeling,                                                           | C-7       | Lecture               |
| Unit-I  | logical database design,                                                                                                             | C-8       | Lecture               |
| Unit-I  | physical database design,                                                                                                            | C-9       | Lecture               |
| Unit-I  | database implementation, database maintenance.                                                                                       | C10       | Lecture               |
| Unit-I  | Classroom Assignment 1                                                                                                               | C-11      | Classroom Assignment  |
| Unit-I  | Clarification Class 1                                                                                                                | C-12      | Clarification Class   |
|         | Presentation                                                                                                                         | C-13      | Presentation          |
|         | Take Home Assignments 1                                                                                                              |           | Take Home Assignments |
| Unit-II | Database Analysis                                                                                                                    |           |                       |
| Unit-II | Conceptual data modeling using E-R data model -entities, attributes,                                                                 | C-14      | Lecture               |
| Unit-II | relationships, generalization, specialization, specifying constraints.                                                               | C-15      | Lecture               |
| Unit-II | practical problems based on E-R data model.                                                                                          | C-16      | Lecture               |
| Unit-II | Activity                                                                                                                             | C-17      | Activity              |
| Unit-II | Database Design: Logical database design and relational data model                                                                   | C-18      | Lecture               |
| Unit-II | Introduction to relational database theory: def of relation, relational model operators,                                             | C-19      | Lecture               |
| Unit-II | relational model integrity rules, Normalization- 1NF, 2NF, 3NF, 4NF, BCNF & practical problems based on these forms. Denormalization | C-20      | Lecture               |
| Unit-II | Classroom Assignment 2                                                                                                               | C-21      | Classroom Assignment  |
| Unit-II | Clarification Class 2                                                                                                                | C-22      | Clarification Class   |
| Unit-II | Presentation 2                                                                                                                       | C-23      | Presentation          |
|         | Take Home Assignments 2                                                                                                              |           | Take Home             |

|          |                                                                                           |      |                       |
|----------|-------------------------------------------------------------------------------------------|------|-----------------------|
|          |                                                                                           |      | Assignments           |
| Unit-III | Database Implementation                                                                   |      |                       |
| Unit-III | Database Implementation: Introduction to SQL                                              | C-24 | Lecture               |
| Unit-III | DDL aspect of SQL, DML aspect of SQL – update,                                            | C-25 | Lecture               |
| Unit-III | insert, delete & various form of SELECT-simple, using special operators,                  | C-26 | Lecture               |
| Unit-III | aggregate functions, group by clause, sub query,                                          | C-27 | Lecture               |
| Unit-III | joins, co-related sub query, union clause, exist operator,                                | C-28 | Lecture               |
| Unit-III | Constrains, PL/SQL - cursor, stored function, stored procedure, triggers,                 | C-29 | Lecture               |
| Unit-III | Webinar 1                                                                                 | C-30 | Webinar               |
| Unit-III | Guest Lecture                                                                             | C-31 | Guest lecture         |
| Unit-III | Classroom Assignment 3                                                                    | C-32 | Classroom Assignment  |
| Unit-III | Clarification Class 3                                                                     | C-33 | Clarification Class   |
| Unit-III | Presentation 3                                                                            | C-34 | Presentation          |
|          | Take Home Assignments 3                                                                   |      | Take Home Assignments |
| Unit-IV  | Transaction processing                                                                    |      |                       |
| Unit-IV  | Transaction processing - introduction, concurrency control techniques, database recovery, | C-35 | Lecture               |
| Unit-IV  | Seminar                                                                                   | C-36 | Seminar               |
| Unit-IV  | Overview of client-server database environment,                                           | C-37 | Lecture               |
| Unit-IV  | distributed databases, Object-relational database, object-oriented database,              | C-38 | Lecture               |
| Unit-IV  | Webinar 2                                                                                 | C-39 | Webinar               |
| Unit-IV  | web technology and database,                                                              | C-40 | Lecture               |
| Unit-IV  | Guest lecture                                                                             | C-41 | Guest lecture         |
| Unit-IV  | Comparative study of various DBMS products.                                               | C-42 | Lecture               |
| Unit-IV  | Classroom Assignment 4                                                                    | C-43 | Classroom Assignment  |
| Unit-IV  | Clarification Class 4                                                                     | C-44 | Clarification Class   |
| Unit-IV  | Presentation 4                                                                            | C-45 | Presentation          |



**19015500– Database Management Systems with MySQL Lab**

| S. No. | Particulars                                                               | Class No. | Pedagogy of Class |
|--------|---------------------------------------------------------------------------|-----------|-------------------|
| 1      | Installation of database, Introduction of SQL server Management studio    | P-1,2     | Practical         |
| 2      | Create Database, Drop Database, Create Table, Insertion of data           | P-3,4     | Practical         |
| 3      | Working with Select Statement, Insert, Delete and Update                  | P-5,6     | Practical         |
| 4      | Order By, Group By, Like Operations                                       | P-7,8     | Practical         |
| 5      | MIN, MAX, AVG, COUNT                                                      | P-9,10    | Practical         |
| 6      | All Join operations                                                       | P-11,12   | Practical         |
| 7      | Working with Sub Queries                                                  | P-13,14   | Practical         |
| 8      | Creating Views, Creating Column Aliases Query - views                     | P-15,16   | Practical         |
| 9      | Seminar                                                                   | P-17,18   | Seminar           |
| 10     | DML DDL COMMAND                                                           | P-19,20   | Practical         |
| 11     | Query related to create table, SQL Constraints                            | P-21,22   | Practical         |
| 12     | Query related to Insert, Select, update, drop table or database and Alter | P-23,24   | Practical         |
| 13     | Activity                                                                  | P-25,26   | Activity          |
| 14     | Quiz ,                                                                    | P-27,28   | Quiz              |
| 15     | Activity                                                                  | P-29,30   | Activity          |

**19008000– Computer Graphics**

| Unit     | Particulars                                                                                                                             | Class No. | Pedagogy of Class     |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------|
| Unit-I   | Introduction                                                                                                                            |           |                       |
| Unit-I   | Introduction of Computer Graphics, The advantages of Interactive Graphics, Representative Uses of Computer Graphics                     | C-1       | Lecture               |
| Unit-I   | Classification of Application Development of Hardware and Software for Computer Graphics, Conceptual Framework for Interactive Graphics | C-2       | Lecture               |
| Unit-I   | Algorithm for Horizontal, Vertical & Diagonal Line Drawing                                                                              | C-3       | Lecture               |
| Unit-I   | Direct Method for Line Drawing                                                                                                          | C-4       | Lecture               |
| Unit-I   | DDA Algorithm for Line Drawing                                                                                                          | C-5       | Lecture               |
| Unit-I   | Bresenham's Line Drawing Algorithm                                                                                                      | C-6       | Lecture               |
| Unit-I   | Algorithms for drawing circle                                                                                                           | C-7       | Lecture               |
| Unit-I   | Algorithms for drawing ellipse                                                                                                          | C-8       | Lecture               |
| Unit-I   | Clarification Class                                                                                                                     | C-9       | Clarification Class   |
|          | Presentation                                                                                                                            | C-10      | Presentation          |
|          | Class Room Assignment                                                                                                                   | C-11      | Class Room Assignment |
|          | Guest lecture                                                                                                                           | C-12      | Guest lecture         |
| Unit-II  | Hardcopy                                                                                                                                |           |                       |
| Unit-II  | Display Technologies: Raster Scan Display & Random Scan Display                                                                         | C-13      | Lecture               |
| Unit-II  | Video Controller, Input Device for Operator Interaction, Image Scanners                                                                 | C-14      | Lecture               |
| Unit-II  | Working Exposure on graphic tools: Dream Weaver                                                                                         | C-15      | Lecture               |
| Unit-II  | Dream Weaver                                                                                                                            | C-16      | Lecture               |
| Unit-II  | Dream Weaver                                                                                                                            | C-17      | Lecture               |
| Unit-II  | Clipping Algorithm: Southland-Cohen Algorithm                                                                                           | C-18      | Lecture               |
| Unit-II  | Cyrus-Beck-Algorithm                                                                                                                    | C-19      | Lecture               |
| Unit-II  | Midpoint Subdivision Algorithm                                                                                                          | C-20      | Lecture               |
| Unit-II  | Presentation                                                                                                                            | C-21      | Presentation          |
| Unit-II  | Clarification Class                                                                                                                     | C-22      | Clarification Class   |
|          | Class Room Assignment                                                                                                                   | C-23      | Class Room Assignment |
|          | Webinar                                                                                                                                 | C-24      | Webinar               |
|          | Take Home Assignment                                                                                                                    |           | Take Home Assignments |
| Unit-III | Geometrical Transformation                                                                                                              |           |                       |
| Unit-III | 2D Transformation: Homogeneous Coordinates                                                                                              | C-25      | Lecture               |
| Unit-III | Matrix Representation of 2D                                                                                                             | C-26      | Lecture               |
| Unit-III | 2D Transformation                                                                                                                       | C-27      | Lecture               |
| Unit-III | Composition of 2D Transformation                                                                                                        | C-28      | Lecture               |
| Unit-III | Window-to-Viewport Transformation                                                                                                       | C-29      | Lecture               |
| Unit-III | Introduction to 3D Transformation Matrix                                                                                                | C-30      | Lecture               |

|          |                                                                                                                   |      |                       |
|----------|-------------------------------------------------------------------------------------------------------------------|------|-----------------------|
| Unit-III | 3D Transformation Matrix                                                                                          | C-31 | Lecture               |
| Unit-III | Presentation                                                                                                      | C-32 | Presentation          |
| Unit-III | Clarification Class                                                                                               | C-33 | Clarification Class   |
|          | Class Room Assignment                                                                                             | C-34 | Class Room Assignment |
|          | Guest lecture                                                                                                     | C-35 | Guest lecture         |
|          | Take Home Assignment                                                                                              |      | Take Home Assignments |
| Unit-IV  | Introductory Concepts                                                                                             |      |                       |
| Unit-IV  | Multimedia Definition, CD-ROM and the multimedia highway                                                          | C-36 | Lecture               |
| Unit-IV  | Computer Animation (Design, types of animation), Different Functions of Animations, Uses of Multimedia            | C-37 | Lecture               |
| Unit-IV  | Introduction to making multimedia: The stage of Project, Hardware & Software Requirements to make good multimedia | C-38 | Lecture               |
| Unit-IV  | Skills and Training opportunity in Multimedia Motivation for Multimedia usage                                     | C-39 | Lecture               |
| Unit-IV  | Presentation                                                                                                      | C-40 | Presentation          |
| Unit-IV  | Clarification Class                                                                                               | C-41 | Clarification Class   |
| Unit-IV  | Class Room Assignment                                                                                             | C-42 | Class Room Assignment |
|          | Webinar                                                                                                           | C-43 | Webinar               |
|          | Quiz                                                                                                              | C-44 | Quiz                  |
|          | Seminar                                                                                                           | C-45 | Seminar               |
|          | Take Home Assignment                                                                                              |      | Take Home Assignments |

**19008100– Computer Graphics Lab**

| S. No. | Particulars                                                                                          | Class No. | Pedagogy of Class   |
|--------|------------------------------------------------------------------------------------------------------|-----------|---------------------|
| 1      | Basic Graphics Function                                                                              | P-1,2     | Practical           |
| 2      | Wap to Draw a Line Using Mid-Point Algorithm or Bresenham's Algorithm                                | P-3,4     | Practical           |
| 3      | Wap to Draw a Line Using DDA Algorithm                                                               | P-5,6     | Practical           |
| 4      | Wap to Draw a Circle Using Bresenham's Algorithm                                                     | P-7,8     | Practical           |
| 5      | Wap to Draw an Ellipse Using Mid-Point Ellipse Drawing Algorithm                                     | P-9,10    | Practical           |
| 6      | Wap to Show Line Clipping                                                                            | P-11,12   | Practical           |
| 7      | Wap to Rotate a Triangle about Origin, Program to Scale the Triangle Program to Translate a Triangle | P-13,14   | Practical           |
| 8      | Program to Rotate a Point about a Point                                                              | P-15,16   | Practical           |
| 9      | Program to Rotate a Point about Origin                                                               | P-17,18   | Practical           |
| 10     | Program to Reflect a Triangle                                                                        | P-19,20   | Practical           |
| 11     | Program to Draw a Hut Using Simple Graphic Functions                                                 | P-21,22   | Practical           |
| 12     | Program to Fill a Polygon                                                                            | P-23,24   | Practical           |
| 13     | Presentation                                                                                         | P-25,26   | Presentation        |
| 14     | Clarification Class                                                                                  | P-27,28   | Clarification Class |
| 15     | Quiz                                                                                                 | P-29,30   | Quiz                |

**19008200– Core Java**

| Unit     | Particulars                                                                           | Class No. | Pedagogy of Class     |
|----------|---------------------------------------------------------------------------------------|-----------|-----------------------|
| Unit-I   | Object oriented programming, characteristics of object orientated languages, classes, | C-1       | Lecture               |
| Unit-I   | Java Programming: Introduction, Data types, access specifiers                         | C-2       | Lecture               |
| Unit-I   | operators, control statements, arrays                                                 | C-3       | Lecture               |
| Unit-I   | Classes: Fundamentals, objects, methods, constructors                                 | C-4       | Lecture               |
| Unit-I   | Inheritance: Super class, sub class                                                   | C-5       | Lecture               |
| Unit-I   | this and super operator, method overriding                                            | C-6       | Lecture               |
| Unit-I   | use of final, packages, abstract class, interface                                     | C-7       | Lecture               |
| Unit-I   | Polymorphism: Method overloading, constructor overloading                             | C-8       | Lecture               |
| Unit-I   | Clarification Class - 1                                                               | C-9       | Clarification Class   |
| Unit-I   | Take Home Assignments-1                                                               |           | Take Home Assignments |
| Unit-I   | Class Room Assignment-1                                                               | C-10      | Class Room Assignment |
|          | Presentation-1                                                                        | C-11      | Presentation          |
| Unit-II  | Exception Class, built in checked and unchecked exceptions, user defined exceptions   | C-12      | Lecture               |
| Unit-II  | use of try, catch, throw, throws, finally                                             | C-13      | Lecture               |
| Unit-II  | Overview, comparison with multiprocessing, Thread class and runnable interface        | C-14      | Lecture               |
| Unit-II  | life cycle, creation of single and multiple threads                                   | C-15      | Lecture               |
| Unit-II  | thread priorities, overview of Synchronization                                        | C-16      | Lecture               |
| Unit-II  | String handling (only main functions), String Buffer class                            | C-17      | Lecture               |
| Unit-II  | byte and character streams, System.in and System.out, print and println               | C-18      | Lecture               |
| Unit-II  | reading from a file and writing in a file                                             | C-19      | Lecture               |
| Unit-II  | Clarification Class-2                                                                 | C-20      | Clarification Class   |
| Unit-II  | Home Assignment-2                                                                     |           | Take Home Assignments |
| Unit-II  | Class Room Assignment-2                                                               | C-21      | Class Room Assignment |
|          | Presentation-2                                                                        | C-22      | Presentation          |
|          | Guest Lecture                                                                         | C-23      | Guest lecture         |
|          | Workshop                                                                              | C-24      | Workshop              |
|          | Quiz                                                                                  | C-25      | Quiz                  |
| Unit-III | Introduction, Life cycle, creation and implementation                                 | C-26      | Lecture               |
| Unit-III | AWT controls: Button, Label, Text Field, Text Area,                                   | C-27      | Lecture               |
| Unit-III | Choice lists, list, scrollbars, check boxes                                           | C-28      | Lecture               |
| Unit-III | Layout managers                                                                       | C-29      | Lecture               |
| Unit-III | Delegation Event Model, Event classes and listeners                                   | C-30      | Lecture               |
| Unit-III | Adapter classes, Inner classes                                                        | C-31      | Lecture               |
| Unit-III | Introduction and comparison with AWT controls                                         | C-32      | Lecture               |

|          |                                                             |      |                       |
|----------|-------------------------------------------------------------|------|-----------------------|
| Unit-III | Clarification Class-3                                       | C-33 | Clarification Class   |
| Unit-III | Home Assignment-3                                           |      | Take Home Assignments |
| Unit-III | Class Room Assignment-3                                     | C-34 | Class Room Assignment |
|          | Presentation-3                                              | C-35 | Presentation          |
|          | Activity - Mind Mapping                                     | C-36 | Activity              |
| Unit-IV  | Socket (datagram and TCP/IP based client and server socket) | C-37 | Lecture               |
| Unit-IV  | factory methods, Inet Address                               | C-38 | Lecture               |
| Unit-IV  | JDBC Architecture, JDBC Drivers                             | C-39 | Lecture               |
| Unit-IV  | Class Room Assignment-4                                     | C-40 | Class Room Assignment |
| Unit-IV  | Presentation-4                                              | C-41 | Presentation          |
| Unit-IV  | Life cycle, Interfaces                                      | C-42 | Lecture               |
| Unit-IV  | classes in javax. servlet package , Connecting Database     | C-43 | Lecture               |
| Unit-IV  | Creating a simple servlet                                   | C-44 | Lecture               |
|          | Clarification Class-3                                       | C-45 | Clarification Class   |

**19008300- Core Java Lab**

| S. No. | Particulars                                                                                                                                                                                                                                 | Class No. | Pedagogy of Class   |
|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|---------------------|
| 1      | Write a program to display "Hello World" in 'JAVA' language.                                                                                                                                                                                | P-1,2     | Practical           |
| 2      | Implementation of input and output statements                                                                                                                                                                                               | P-3,4     | Practical           |
| 3      | Implementation of control statements.                                                                                                                                                                                                       | P-5,6     | Practical           |
| 4      | Implementation of functions.                                                                                                                                                                                                                | P-7,8     | Practical           |
| 5      | Implementation of single dimension, two dimension array                                                                                                                                                                                     | P-9,10    | Practical           |
| 6      | Write a JAVA program that uses a recursive function for solving Towers of Hanoi problem.                                                                                                                                                    | P-11,12   | Practical           |
| 7      | Activity-Mind Mapping                                                                                                                                                                                                                       | P-13,14   | Activity            |
| 8      | Write a JAVA program to implement the matrix ADT using a class. The operations supported by this ADT are:<br>a) Reading a matrix. b) Addition of matrices. c) Printing a matrix. d) Subtraction of matrices. e) Multiplication of matrices. | P-15,16   | Practical           |
| 9      | Write a JAVA program that overloads the + operator and relational operators (suitable) to perform the following operations:<br>a) Concatenation of two strings. b) Comparison of two strings.                                               | P-17,18   | Practical           |
| 10     | Write JAVA programs that illustrate how the following forms of inheritance are supported:<br>a) Single inheritance b) Multiple inheritances c) Multi inheritance<br>d) Hierarchical inheritance                                             | P-19,20   | Practical           |
| 11     | Clarification Class                                                                                                                                                                                                                         | P-21,22   | Clarification Class |
| 12     | Test                                                                                                                                                                                                                                        | P-23,24   | Test                |
| 13     | Write a JAVA program that illustrates the order of execution of constructors and destructors when new class is derived from more than one base class.                                                                                       | P-25,26   | Practical           |
| 14     | Additional java Program for desktop application                                                                                                                                                                                             | P-27,28   | Practical           |
| 15     | Additional java Program for desktop application                                                                                                                                                                                             | P-29,30   | Practical           |

## 19008400- PHP & My SQL

| Unit     | Particulars                                                                                                           | Class No. | Pedagogy of Class     |
|----------|-----------------------------------------------------------------------------------------------------------------------|-----------|-----------------------|
| Unit-I   | Introduction to PHP: What is PHP How PHP better than other Benefits of Using PHP MYSQL Server Client Environment      | C-1       | Lecture               |
| Unit-I   | Web Browse Web Server Installation & Configuration Files.                                                             | C-2       | Lecture               |
| Unit-I   | Development Concept: How PHP Script Work PHP Syntax Write your First PHP Program Embed PHP In HTML/HTML In PHP        | C-3       | Lecture               |
| Unit-I   | PHP Data Type Variable In PHP Contents In PHP Operator In PHP                                                         | C-4       | Lecture               |
| Unit-I   | PHP Data Type Variable In PHP Contents In PHP Operator In PHP                                                         | C-5       | Lecture               |
| Unit-I   | Control Structure, Looping, Switch Statement                                                                          | C-6       | Lecture               |
| Unit-I   | Function: User-defined, Pre-defined, Array: Indexed, Associative, Multidimensional                                    | C-7       | Lecture               |
| Unit-I   | Date Time, Mail Function, Hash functions, Include(), Required(), Super-Global Variables, isset(), isempty() functions | C-8       | Lecture               |
| Unit-I   | Clarification Class                                                                                                   | C-9       | Clarification Class   |
|          | Class Room Assignment                                                                                                 | C-10      | Class Room Assignment |
|          | Presentation                                                                                                          | C-11      | Presentation          |
| Unit -II | Array: What is Array Syntax Associative Array Numeric Array Multi-Dimensional Array                                   | C-12      | Lecture               |
| Unit -II | String Function Chr() strlen() strpos() strcmp()                                                                      | C-13      | Lecture               |
| Unit -II | Working with File Opening File Reading File Writing File Closing File, Appending File Uploading File                  | C-14      | Lecture               |
| Unit -II | OOPs Concept Class & Object Access Modifier Properties of Object Encapsulation and abstraction                        | C-15      | Lecture               |
| Unit -II | Inheritance Polymorphism, Function overriding Abstract class                                                          | C-16      | Lecture               |
| Unit -II | State Management Creating Cookies Set Cookies Destroying Cookies Creating Session Set Session Destroying Session      | C-17      | Lecture               |
| Unit -II | Error Handling & Exception Introduction to Error Try, catch, throw Block Handling                                     | C-18      | Lecture               |
| Unit -II | Clarification Class                                                                                                   | C-19      | Clarification Class   |
|          | Class Room Assignment                                                                                                 | C-20      | Class Room Assignment |
|          | Presentation                                                                                                          | C-21      | Presentation          |
|          | Quiz                                                                                                                  | C-22      | Quiz                  |
|          | Webinar                                                                                                               | C-23      | Webinar               |
|          | Guest lecture                                                                                                         | C-24      | Guest lecture         |
|          | Take Home Assignments                                                                                                 |           | Take Home Assignments |



|           |                                                                                                                                                                                                                                                                                                     |      |                          |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|--------------------------|
| Unit -III | Introduction to MYSQL What is Database?<br>Understanding an RDBMS Understanding Tables,<br>Record & Fields SQL Language                                                                                                                                                                             | C-25 | Lecture                  |
| Unit -III | Working with MYSQL Admin Working with PHP My<br>Admin Types Data Type                                                                                                                                                                                                                               | C-26 | Lecture                  |
| Unit -III | Creating Database & Tables Dropping                                                                                                                                                                                                                                                                 | C-27 | Lecture                  |
| Unit -III | Database & Tables Adding Fields Selecting Table<br>Alerting Fields Properties                                                                                                                                                                                                                       | C-28 | Lecture                  |
| Unit -III | MySQL Function in PHP Database                                                                                                                                                                                                                                                                      | C-29 | Lecture                  |
| Unit -III | Connections Managing Database                                                                                                                                                                                                                                                                       | C-30 | Lecture                  |
| Unit -III | Connections Performing Queries Closing Connection                                                                                                                                                                                                                                                   | C-31 | Lecture                  |
|           | Clarification Class                                                                                                                                                                                                                                                                                 | C-32 | Clarification Class      |
|           | Class Room Assignment                                                                                                                                                                                                                                                                               | C-33 | Class Assignment         |
|           | Presentation                                                                                                                                                                                                                                                                                        | C-34 | Presentation             |
|           | Take Home Assignments                                                                                                                                                                                                                                                                               |      | Take Home<br>Assignments |
| Unit -IV  | SQL Queries Create Database & Table Drop Database<br>& Table Insert Record Select Record Deleting<br>Record Modifying Record WHERE Clause Using<br>Operators Sorting Records Eliminating Duplicates<br>Grouping Records, Having Clause Joining Tables Sub<br>queries Using Table And Column Aliases | C-35 | Lecture                  |
| Unit -IV  | SQL Queries Create Database & Table Drop Database<br>& Table Insert Record Select Record Deleting<br>Record Modifying Record WHERE Clause Using<br>Operators Sorting Records Eliminating Duplicates<br>Grouping Records, Having Clause Joining Tables Sub<br>queries Using Table And Column Aliases | C-36 | Lecture                  |
| Unit -IV  | SQL Queries Create Database & Table Drop Database<br>& Table Insert Record Select Record Deleting<br>Record Modifying Record WHERE Clause Using<br>Operators Sorting Records Eliminating Duplicates<br>Grouping Records, Having Clause Joining Tables Sub<br>queries Using Table And Column Aliases | C-37 | Lecture                  |
| Unit -IV  | SQL Queries Create Database & Table Drop Database<br>& Table Insert Record Select Record Deleting<br>Record Modifying Record                                                                                                                                                                        | C-38 | Lecture                  |
| Unit -IV  | WHERE Clause Using Operators Sorting Records<br>Eliminating Duplicates Grouping Records, Having<br>Clause Joining Tables Sub queries Using Table And<br>Column Aliases                                                                                                                              | C-39 | Lecture                  |
| Unit -IV  | Clarification Class                                                                                                                                                                                                                                                                                 | C-40 | Clarification Class      |
| Unit -IV  | Classroom Assignment                                                                                                                                                                                                                                                                                | C-41 | Class Assignment         |
| Unit -IV  | Presentation                                                                                                                                                                                                                                                                                        | C-42 | Presentation             |
|           | Webinar                                                                                                                                                                                                                                                                                             | C-43 | Webinar                  |
|           | Seminar                                                                                                                                                                                                                                                                                             | C-44 | Seminar                  |
|           | Guest lecture                                                                                                                                                                                                                                                                                       | C-45 | Guest lecture            |
|           | Take Home Assignments                                                                                                                                                                                                                                                                               |      | Take Home<br>Assignments |

**19008500- PHP & My SQL Lab**

| S. No. | Particulars                                                                                                                                                                                                                                                            | Class No. | Pedagogy of Class |
|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------------|
| 1      | 1. Create a php webpage and print "hello world".<br>2. Create a php program to find odd or even number from given number.                                                                                                                                              | P-1,2     | Practical         |
| 2      | 3. Write a php program to find maximum among three numbers<br>4. Write a PHP program to swap two numbers.                                                                                                                                                              | P-3,4     | Practical         |
| 3      | 5. Write a PHP Program to demonstrate the variable function:<br>a. Gettype()<br>b. Settype()<br>6. Write a PHP Program to demonstrate the variable Function<br>a. isset()<br>b. unset()                                                                                | P-5,6     | Practical         |
| 4      | 7. Give the example of variable function:<br>a. strval()<br>b. floatval()<br>c. intval()<br>d. print_r()<br>e. var_dump()<br>8. Give the example of string function<br>a. substr()<br>b. substr()<br>c. strcmp()<br>d. strcasecmp()<br>e. strpos()<br>f. strpos()      | P-7,8     | Practical         |
| 5      | 9. Write a PHP program that demonstrate form element(input elements).<br>10. Write a PHP program that demonstrate passing variable using URL.<br>i. Write a PHP program that demonstrate use of session:1<br>ii. Write a PHP program that demonstrate use of session:2 | P-9,10    | Practical         |
| 6      | 11. Write a program that demonstrate use of cookies: 1<br>Write a program that demonstrate use of cookies: 2<br>12. Write a PHP program to create a database using MySQL                                                                                               | P-11,12   | Practical         |
| 7      | 13. Write a PHP program to drop a database using MySQL.<br>14. Write a PHP program to create a table in MySQL.                                                                                                                                                         | P-13,14   | Practical         |
| 8      | 15. Write a PHP program to insert record into a table using MySQL.<br>16. Write a PHP program to drop table using MySQL.                                                                                                                                               | P-15,16   | Practical         |

|    |                                                                                                              |         |                     |
|----|--------------------------------------------------------------------------------------------------------------|---------|---------------------|
| 9  | 17. Write a program to update table                                                                          | P-17,18 | Practical           |
| 10 | 18. Write a PHP program to select data and show into table format                                            | P-19,20 | Practical           |
| 11 | 19. Create a student Registration in PHP and Save and Display the student Records.                           | P-21,22 | Practical           |
| 12 | 20. Write a program to Develop student registration form and display all the submitted data on another page. | P-23,24 | Practical           |
| 13 | Presentation                                                                                                 | P-25,26 | Presentation        |
| 14 | Clarification Class                                                                                          | P-27,28 | Clarification Class |
| 15 | Quiz                                                                                                         | P-29,30 | Quiz                |

**19006300– Ability and Skill Enhancement -V**

| Unit     | Particulars                                                                                                        | Class No. | Pedagogy of Class   |
|----------|--------------------------------------------------------------------------------------------------------------------|-----------|---------------------|
| Unit-I   | What is leadership? Traits of Leadership, Identifying leaders and traits of Leadership                             | C-1       | Lecture             |
| Unit-I   | What is leadership? Traits of Leadership, Identifying leaders and traits of Leadership                             | C-2       | Activity            |
| Unit-I   | Movie/ Story/ Interviews of leaders: Identify leadership qualities                                                 | C-3       | Activity            |
| Unit-I   | Leadership: Debate/ Screening of a debate                                                                          | C-4       | Activity            |
| Unit-I   | Leadership: Debate                                                                                                 | C-5       | Activity            |
| Unit-I   | Leadership: Group Discussion                                                                                       | C-6       | Group discussions   |
| Unit-I   | Leadership: Presentations on leaders                                                                               | C-7       | Group discussions   |
| Unit-I   | Leadership: Presentations on leaders                                                                               | C-8       | Presentation        |
| Unit-I   | Clarification Class I                                                                                              | C-9       | Clarification Class |
| Unit-II  | What is Entrepreneurship, Traits of Successful Entrepreneurs                                                       | C-10      | Lecture             |
| Unit-II  | Movie/ Story/Interviews of Entrepreneurs: Identify Entrepreneurial qualities,                                      | C-11      | Activity            |
| Unit-II  | Entrepreneurs: Group Discussion                                                                                    | C-12      | Activity            |
| Unit-II  | Entrepreneurs: Debate                                                                                              | C-13      | Debate              |
| Unit-II  | Presentation on Entrepreneurs                                                                                      | C-14      | Presentation        |
| Unit-II  | Presentation on Entrepreneurs                                                                                      | C-15      | Presentation        |
|          | Take Home Assignments I                                                                                            |           | Home Assignments    |
| Unit-III | What are organizational skills, how to develop them,                                                               | C-16      | Webinar             |
| Unit-III | Skills needed to become a successful entrepreneur/administrator                                                    | C-17      | Quiz                |
| Unit-III | Organizational skills can be developed by discipline making a system, rules, delegation of power at workplace, etc | C-18      | Presentation        |
| Unit-III | Employability Skills: How to enhance employability skills                                                          | C-19      | Guest lecture       |
| Unit-III | Employability Skills: why do we need them                                                                          | C-20      | Presentation        |
| Unit-III | Classroom Assignment-1                                                                                             | C-21      | Class Assignment    |
| Unit-III | Employability Skills: different workplaces, having different needs, different skills                               | C-22      | Activity            |
| Unit-III | how to recognize different work skills                                                                             | C-23      | Class Assignment    |
| Unit-III | Process of decision making- steps, its basics, and the basics of organizational decision-making process            | C-24      | Activity            |
| Unit-III | entrepreneurial decision making, how to make a right decision at right time, dilemma.                              | C-25      | Activity            |
| Unit-IV  | Clarification Class II                                                                                             | C-26      | Clarification Class |
| Unit-IV  | Conducting Interviews with Leaders/ Entrepreneurs                                                                  | C-27      | Class Assignment    |
| Unit-IV  | Take Home Assignments II                                                                                           |           | Home Assignments    |
| Unit-IV  | Preparing Questions                                                                                                | C-28      | Class Assignment    |
| Unit-IV  | Preparing Questions                                                                                                | C-29      | quiz                |
| Unit-IV  | Clarification Class III                                                                                            | C-30      | Clarification Class |

**19015800- Deep Learning**

| Unit     | Particulars                                                                                  | Class No. | Pedagogy of Class     |
|----------|----------------------------------------------------------------------------------------------|-----------|-----------------------|
| Unit-I   | Artificial Neural Networks                                                                   |           |                       |
| Unit-I   | The Neuron-Expressing Linear Perceptrons as Neurons-Feed-Forward Neural Networks             | C-1       | Lecture               |
| Unit-I   | Linear Neurons and Their Limitations –Sigmoid – Tanh – and ReLU Neurons                      | C-2       | Lecture               |
| Unit-I   | Linear Neurons and Their Limitations –Sigmoid – Tanh – and ReLU Neurons                      | C-3       | Lecture               |
| Unit-I   | Softmax Output Layers – Training Feed                                                        | C-4       | Lecture               |
| Unit-I   | Home Assignment No. 1                                                                        |           | Take Home Assignments |
| Unit-I   | Forward Neural Networks-Gradient Descent-Delta Rule and Learning Rates                       | C-5       | Lecture               |
| Unit-I   | Forward Neural Networks-Gradient Descent-Delta Rule and Learning Rates                       | C-6       | Lecture               |
| Unit-I   | Gradient Descent with Sigmoidal Neurons                                                      | C-7       | Lecture               |
| Unit-I   | The Backpropagation Algorithm-Stochastic and Minibatch Gradient Descent                      | C-8       | Lecture               |
| Unit-I   | Class Room Assignment No. 1                                                                  | C-9       | Class Room Assignment |
| Unit-I   | The Backpropagation Algorithm-Stochastic and Minibatch Gradient Descent                      | C-10      | Lecture               |
| Unit-I   | Test Sets – Validation Sets – and Overfitting                                                | C-11      | Lecture               |
| Unit-I   | Preventing Overfitting in Deep Neural Networks – Implementing Neural Networks in TensorFlow. | C-12      | Lecture               |
| Unit-I   | Home Assignment No. 2                                                                        |           | Take Home Assignments |
| Unit-I   | Clarification Class - 1                                                                      | C-13      | Clarification Class   |
| Unit-II  | Local Minima in the Error Surfaces of Deep Networks                                          |           |                       |
| Unit-II  | Local Minima in the Error Surfaces of Deep Networks                                          | C-14      | Lecture               |
| Unit-II  | Class Room Assignment No.                                                                    | C-15      | Class Room Assignment |
| Unit-II  | Model Identifiability                                                                        | C-16      | Lecture               |
| Unit-II  | Spurious Local Minima in Deep Networks                                                       | C-17      | Lecture               |
| Unit-II  | Flat Regions in the Error Surface – Momentum-Based Optimization                              | C-18      | Lecture               |
| Unit-II  | Home Assignment - 3                                                                          |           | Take Home Assignments |
| Unit-II  | Presentation No-1                                                                            | C-19      | Presentation          |
| Unit-II  | Clarification Class - 2                                                                      | C-20      | Clarification Class   |
| Unit-II  | Learning Rate Adaptation                                                                     | C-21      | Lecture               |
| Unit-III | Convolutional Neural Networks(CNN)                                                           |           |                       |
| Unit-III | Architecture                                                                                 | C-22      | Lecture               |
| Unit-III | Class Room Assignment No. 3                                                                  | C-23      | Class Room            |

|          |                                                                                    |      |                       |
|----------|------------------------------------------------------------------------------------|------|-----------------------|
|          |                                                                                    |      | Assignment            |
| Unit-III | Architecture                                                                       | C-24 | Lecture               |
| Unit-III | Accelerating Training with Batch Normalization                                     | C-25 | Lecture               |
| Unit-III | Presentation No. 2                                                                 | C-26 | Presentation          |
| Unit-III | Building a Convolutional Network using TensorFlow                                  | C-27 | Lecture               |
| Unit-III | Building a Convolutional Network using TensorFlow                                  | C-28 | Lecture               |
| Unit-III | Seminar                                                                            | C-29 | Seminar               |
| Unit-III | Class Room Assignment No. 4                                                        | C-30 | Class Room Assignment |
| Unit-III | Visualizing Learning in Convolutional Networks                                     | C-31 | Lecture               |
| Unit-III | Embedding and Representation Learning                                              | C-32 | Lecture               |
| Unit-III | Guest Lecture-I                                                                    | C-33 | Guest lecture         |
| Unit-III | Presentation No. 3                                                                 | C-34 | Presentation          |
| Unit-III | Clarification Class - 3                                                            | C-35 | Clarification Class   |
| Unit-III | Autoencoder Architecture                                                           |      |                       |
| Unit-III | Implementing an Autoencoder in TensorFlow                                          | C-36 | Lecture               |
| Unit-III | Denoising Sparsity in Autoencoders Models for Sequence Analysis                    | C-37 | Lecture               |
| Unit-III | Webinar                                                                            | C-38 | Webinar               |
| Unit-III | Presentation No. 4                                                                 | C-39 | Presentation          |
| Unit-III | Recurrent Neural Networks- Vanishing Gradients Long Short-Term Memory (LSTM) Units | C-40 | Lecture               |
| Unit-III | TensorFlow Primitives for RNN Models                                               | C-41 | Lecture               |
| Unit-III | Guest Lecture-II                                                                   | C-42 | Guest lecture         |
| Unit-III | Clarification Class 4                                                              | C-43 | Clarification Class   |
| Unit-III | Augmenting Recurrent Networks with Attention.                                      | C-44 | Lecture               |
|          | Webinar-2                                                                          | C-45 | Webinar               |

## 19015900- Deep Learning Lab

| S. No. | Particulars                                                                              | Class No. | Pedagogy of Class   |
|--------|------------------------------------------------------------------------------------------|-----------|---------------------|
| 1.     | Build a deep neural network model start with linear regression using a single variable.  | P-1,2     | Practical           |
| 2.     | Build a deep neural network model start with linear regression using multiple variables. | P-3,4     | Practical           |
| 3.     | Write a program to convert speech into text.                                             | P-5,6     | Practical           |
| 4.     | Write a program to convert text into speech.                                             | P-7,8     | Practical           |
| 5.     | Write a program to convert video into frames.                                            | P-9,10    | Practical           |
| 6.     | Write a program to convert video into frames.                                            | P-11,12   | Practical           |
| 7.     | Write a program for Time-Series Forecasting with the LSTM Model.                         | P-13,14   | Practical           |
| 8.     | Write a program for Time-Series Forecasting with the LSTM Model.                         | P-15,16   | Practical           |
| 9.     | Build a feed forward neural network for prediction of logic gates.                       | P-17,18   | Practical           |
| 10.    | Build a feed forward neural network for prediction of logic gates.                       | P-19,20   | Practical           |
| 11.    | Write a program to implement deep learning Techniques for image segmentation.            | P-21,22   | Practical           |
| 12.    | Write a program to implement deep learning Techniques for image segmentation.            | P-23,24   | Practical           |
| 13.    | Write a program for object detection using image labeling tools.                         | P-25,26   | Practical           |
| 14.    | Practice Class                                                                           | P-27,28   | Clarification Class |
| 15.    | Practice Class                                                                           | P-29,30   | Clarification Class |

## 19012600- LAMP Technologies

| Unit     | Particulars                                                                                                                   | Class No. | Pedagogy of Class     |
|----------|-------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------|
| Unit-I   | Introduction to LAMP Stack                                                                                                    |           |                       |
| Unit-I   | Overview of Linux                                                                                                             | C-1       | Lecture               |
| Unit-I   | Overview of Linux                                                                                                             | C-2       | Lecture               |
| Unit-I   | Apache                                                                                                                        | C-3       | Lecture               |
| Unit-I   | Apache                                                                                                                        | C-4       | Lecture               |
| Unit-I   | Home Assignment No. 1                                                                                                         |           | Take Home Assignments |
| Unit-I   | MySQL, and PHP                                                                                                                | C-5       | Lecture               |
| Unit-I   | Role of LAMP in web development                                                                                               | C-6       | Lecture               |
| Unit-I   | Setting up a LAMP environment,Basics of Linux commands and directory structure                                                | C-7       | Lecture               |
| Unit-I   | Setting up a LAMP environment,Basics of Linux commands and directory structure                                                | C-8       | Lecture               |
| Unit-I   | Introduction to server-client architecture,Installing and configuring the LAMP stack on a local machine                       | C-9       | Class Room Assignment |
| Unit-I   | Introduction to server-client architecture,Installing and configuring the LAMP stack on a local machine                       | C-10      | Lecture               |
| Unit-I   | Basic Linux file and permission management                                                                                    | C-11      | Lecture               |
| Unit-I   | Basic Linux file and permission management                                                                                    | C-12      | Lecture               |
| Unit-I   | Home Assignment No. 2                                                                                                         |           | Take Home Assignments |
| Unit-I   | Clarification Class - 1                                                                                                       | C-13      | Clarification Class   |
| Unit-II  | Apache Web Server                                                                                                             |           |                       |
| Unit-II  | Installation and configuration of Apache,Managing virtual hosts                                                               | C-14      | Lecture               |
| Unit-II  | Class Room Assignment No.                                                                                                     | C-15      | Class Room Assignment |
| Unit-II  | URL rewriting and redirection with .htaccess                                                                                  | C-16      | Lecture               |
| Unit-II  | Log management and debugging Apache errors                                                                                    | C-17      | Lecture               |
| Unit-II  | Hosting a sample static website using Apache                                                                                  | C-18      | Lecture               |
| Unit-II  | Home Assignment - 3                                                                                                           |           | Take Home Assignments |
| Unit-II  | Presentation No-1                                                                                                             | C-19      | Presentation          |
| Unit-II  | Clarification Class - 2                                                                                                       | C-20      | Clarification Class   |
| Unit-II  | Configuring custom domain names locally using virtual hosts                                                                   | C-21      | Lecture               |
| Unit-III | MySQL Database Management                                                                                                     |           |                       |
| Unit-III | Relational database basics,Installation and configuration of MySQL,Writing basic SQL queries (SELECT, INSERT, UPDATE, DELETE) | C-22      | Lecture               |
| Unit-III | Class Room Assignment No. 3                                                                                                   | C-23      | Class Room Assignment |
| Unit-III | Relational database basics,Installation and                                                                                   | C-24      | Lecture               |



|          |                                                                                      |      |                       |
|----------|--------------------------------------------------------------------------------------|------|-----------------------|
|          | configuration of MySQL, Writing basic SQL queries (SELECT, INSERT, UPDATE, DELETE)   |      |                       |
| Unit-III | Database normalization and indexing                                                  | C-25 | Lecture               |
| Unit-III | Backup and restoration of databases                                                  | C-26 | Presentation          |
| Unit-III | Creating and managing a sample MySQL database<br>Writing queries for CRUD operations | C-27 | Lecture               |
| Unit-IV  | PHP Programming: Basics of PHP scripting                                             | C-28 | Lecture               |
| Unit-IV  | PHP Programming: Basics of PHP scripting                                             | C-29 | Seminar               |
| Unit-IV  | Class Room Assignment No. 4                                                          | C-30 | Class Room Assignment |
| Unit-IV  | Variables, arrays                                                                    | C-31 | Lecture               |
| Unit-IV  | Variables, arrays                                                                    | C-32 | Lecture               |
| Unit-IV  | Guest Lecture-I                                                                      | C-33 | Guest lecture         |
| Unit-IV  | Presentation No. 3                                                                   | C-34 | Presentation          |
| Unit-IV  | Clarification Class - 3                                                              | C-35 | Clarification Class   |
| Unit-IV  | loops in PHP Form handling and validation                                            | C-36 | Lecture               |
| Unit-IV  | Session and cookie management                                                        | C-37 | Lecture               |
| Unit-IV  | Webinar                                                                              | C-38 | Webinar               |
| Unit-IV  | Presentation No. 4                                                                   | C-39 | Presentation          |
| Unit-IV  | Session and cookie management                                                        | C-40 | Lecture               |
| Unit-IV  | PHP-MySQL integration<br>Error handling in PHP                                       | C-41 | Lecture               |
|          | Guest Lecture-II                                                                     | C-42 | Guest lecture         |
| Unit-V   | Clarification Class 4                                                                | C-43 | Clarification Class   |
| Unit-V   | Security and Optimization                                                            | C-44 | Lecture               |
|          | Webinar-2                                                                            | C-45 | Webinar               |
| Unit-V   | Securing a LAMP application                                                          | C-46 | Lecture               |
| Unit-V   | Input validation and sanitization                                                    | C-47 | Lecture               |
| Unit-V   | Input validation and sanitization                                                    | C-48 | Lecture               |
| Unit-V   | Preventing SQL injection and XSS attacks                                             | C-49 | Lecture               |
| Unit-V   | Preventing SQL injection and XSS attacks                                             | C-50 | Lecture               |
| Unit-V   | Preventing SQL injection and XSS attacks                                             | C-51 | Lecture               |
| Unit-V   | HTTPS and SSL certificates<br>Performance tuning for Apache and MySQL                | C-52 | Lecture               |
| Unit-V   | HTTPS and SSL certificates<br>Performance tuning for Apache and MySQL                | C-53 | Lecture               |
| Unit-V   | PHP performance tips and best practice                                               | C-54 | Lecture               |
| Unit-V   | PHP performance tips and best practice                                               | C-55 | Lecture               |
| Unit-V   | PHP performance tips and best practice                                               | C-56 | Lecture               |
| Unit-V   | PHP performance tips and best practice                                               | C-57 | Lecture               |
| Unit-V   | PHP performance tips and best practice                                               | C-58 | Lecture               |
| Unit-V   | PHP performance tips and best practice                                               | C-59 | Lecture               |
| Unit-V   | Clarification Class - 3                                                              | C-60 | Clarification Class   |

## 19012700- Embedded Systems

| Unit     | Particulars                                  | Class No. | Pedagogy of Class     |
|----------|----------------------------------------------|-----------|-----------------------|
| Unit-I   | Embedded Systems Basics                      |           |                       |
| Unit-I   | Introduction to Embedded systems             | C-1       | Lecture               |
| Unit-I   | Examples of embedded systems                 | C-2       | Lecture               |
| Unit-I   | Typical Hardware                             | C-3       | Lecture               |
| Unit-I   | Timing Diagrams                              | C-4       | Lecture               |
| Unit-I   | Home Assignment No. 1                        |           | Take Home Assignments |
| Unit-I   | Memory, Microprocessors                      | C-5       | Lecture               |
| Unit-I   | Buses, DirectMemoryAccess                    | C-6       | Lecture               |
| Unit-I   | Interrupts                                   | C-7       | Lecture               |
| Unit-I   | Interrupts                                   | C-8       | Lecture               |
| Unit-I   | Class Room Assignment No. 1                  | C-9       | Class Room Assignment |
| Unit-I   | Microprocessor Architecture                  | C-10      | Lecture               |
| Unit-I   | Interrupt Basics                             | C-11      | Lecture               |
| Unit-I   | Interrupt Basics                             | C-12      | Lecture               |
| Unit-I   | Home Assignment No. 2                        |           | Take Home Assignments |
| Unit-I   | Clarification Class - 1                      | C-13      | Clarification Class   |
| Unit-II  | The 8051 Architecture-Introduction           |           |                       |
| Unit-II  | The 8051 Architecture-Introduction           | C-14      | Lecture               |
| Unit-II  | Class Room Assignment No.                    | C-15      | Class Room Assignment |
| Unit-II  | 8051 Micro controller Hardware               | C-16      | Lecture               |
| Unit-II  | Input/output Pin Ports and Circuits          | C-17      | Lecture               |
| Unit-II  | External Memory                              | C-18      | Lecture               |
| Unit-II  | Home Assignment - 3                          |           | Take Home Assignments |
| Unit-II  | Presentation No-1                            | C-19      | Presentation          |
| Unit-II  | Clarification Class - 2                      | C-20      | Clarification Class   |
| Unit-II  | Serial data Input/output, Interrupts         | C-21      | Lecture               |
| Unit-III | Basic Assembly Language Programming Concepts |           |                       |
| Unit-III | The Assembly Language Programming Process    | C-22      | Lecture               |
| Unit-III | Class Room Assignment No. 3                  | C-23      | Class Room Assignment |
| Unit-III | The Assembly Language Programming Process    | C-24      | Lecture               |
| Unit-III | Programming Tools and Techniques             | C-25      | Lecture               |
| Unit-III | Programming Tools and Techniques             | C-26      | Presentation          |
| Unit-III | Programming the 8051                         | C-27      | Lecture               |
| Unit-III | Programming the 8051                         | C-28      | Lecture               |
| Unit-III | Seminar                                      | C-29      | Seminar               |
| Unit-III | Class Room Assignment No. 4                  | C-30      | Class Room Assignment |
| Unit-III | Programming the 8051                         | C-31      | Lecture               |

|          |                                                                                                      |      |                     |
|----------|------------------------------------------------------------------------------------------------------|------|---------------------|
| Unit-III | Programming the 8051                                                                                 | C-32 | Lecture             |
| Unit-III | Guest Lecture-I                                                                                      | C-33 | Guest lecture       |
| Unit-III | Presentation No. 3                                                                                   | C-34 | Presentation        |
| Unit-III | Clarification Class - 3                                                                              | C-35 | Clarification Class |
| Unit-IV  | Moving Data                                                                                          |      |                     |
| Unit-IV  | Introduction, Addressing Modes, External Data Moves, Code Memory ReadOnly Data Moves                 | C-36 | Lecture             |
| Unit-IV  | Push and Pop Opcodes, Data Exchanges                                                                 | C-37 | Lecture             |
| Unit-IV  | Webinar                                                                                              | C-38 | Webinar             |
| Unit-IV  | Presentation No. 4                                                                                   | C-39 | Presentation        |
| Unit-IV  | Basic Design Using a Real-Time Operating System: Message Queues, Mailboxes and Pipes                 | C-40 | Lecture             |
| Unit-IV  | Timer Functions, Events, Memory Management, Interrupt Routines in an RTOS Environment                | C-41 | Lecture             |
| Unit-IV  | Guest Lecture-II                                                                                     | C-42 | Guest lecture       |
| Unit-IV  | Clarification Class 4                                                                                | C-43 | Clarification Class |
| Unit-IV  | Timer Functions, Events, Memory Management, Interrupt Routines in an RTOS Environment                | C-44 | Lecture             |
|          | Webinar-2                                                                                            | C-45 | Webinar             |
| Unit-V   | Applications: Introduction, keyboards, Human Factor, Key Switch Factors                              | C-46 | Lecture             |
| Unit-V   | Keyboard Configurations, Displays, Seven-Segment Numeric Display, D/A and A/D Conversions            | C-47 | Lecture             |
| Unit-V   | Keyboard Configurations, Displays, Seven-Segment Numeric Display, D/A and A/D Conversions            | C-48 | Lecture             |
| Unit-V   | Embedded Software Development Tools: Host and Target machines, Linker/Locators for Embedded Software | C-49 | Lecture             |
| Unit-V   | Embedded Software Development Tools: Host and Target machines, Linker/Locators for Embedded Software | C-50 | Lecture             |
| Unit-V   | Embedded Software Development Tools: Host and Target machines, Linker/Locators for Embedded Software | C-51 | Lecture             |
| Unit-V   | Getting Embedded Software into the Target System                                                     | C-52 | Lecture             |
| Unit-V   | Getting Embedded Software into the Target System                                                     | C-53 | Lecture             |
| Unit-V   | Debugging Techniques: Testing on Host Machine                                                        | C-54 | Lecture             |
| Unit-V   | Debugging Techniques: Testing on Host Machine                                                        | C-55 | Lecture             |
| Unit-V   | Debugging Techniques: Testing on Host Machine                                                        | C-56 | Lecture             |
| Unit-V   | Using Laboratory Tools, An Example System                                                            | C-57 | Lecture             |
| Unit-V   | Using Laboratory Tools, An Example System                                                            | C-58 | Lecture             |
| Unit-V   | Using Laboratory Tools, An Example System                                                            | C-59 | Lecture             |
| Unit-V   | Clarification Class - 5                                                                              | C-60 | Clarification Class |

## 19012800– Mobile Application Programming

| Unit     | Particulars                                                                                                    | Class No. | Pedagogy of Class     |
|----------|----------------------------------------------------------------------------------------------------------------|-----------|-----------------------|
| Unit-I   | Introduction to Android Operating System                                                                       |           |                       |
| Unit-I   | Android OS and Features – Android development framework; Installing and running applications on Android Studio | C-1       | Lecture               |
| Unit-I   | Android OS and Features – Android development framework; Installing and running applications on Android Studio | C-2       | Lecture               |
| Unit-I   | Creating AVDs                                                                                                  | C-3       | Lecture               |
| Unit-I   | Types of Android application                                                                                   | C-4       | Lecture               |
| Unit-I   | Home Assignment No. 1                                                                                          |           | Take Home Assignments |
| Unit-I   | Types of Android application                                                                                   | C-5       | Lecture               |
| Unit-I   | Types of Android application                                                                                   | C-6       | Lecture               |
| Unit-I   | Creating Activities                                                                                            | C-7       | Lecture               |
| Unit-I   | Creating Activities                                                                                            | C-8       | Lecture               |
| Unit-I   | Activity Life Cycle, Activity states, monitoring state changes                                                 | C-9       | Class Room Assignment |
| Unit-I   | Activity Life Cycle, Activity states, monitoring state changes                                                 | C-10      | Lecture               |
| Unit-I   | Activity Life Cycle, Activity states, monitoring state changes                                                 | C-11      | Lecture               |
| Unit-I   | Activity Life Cycle, Activity states, monitoring state changes                                                 | C-12      | Lecture               |
| Unit-I   | Home Assignment No. 2                                                                                          |           | Take Home Assignments |
| Unit-I   | Clarification Class - 1                                                                                        | C-13      | Clarification Class   |
| Unit-II  | Android application components – Android Manifest file                                                         |           |                       |
| Unit-II  | Android application components – Android Manifest file                                                         | C-14      | Lecture               |
| Unit-II  | Class Room Assignment No.                                                                                      | C-15      | Class Room Assignment |
| Unit-II  | Externalizing resources like Simple Values, Drawables                                                          | C-16      | Lecture               |
| Unit-II  | Layouts, Menus, etc                                                                                            | C-17      | Lecture               |
| Unit-II  | Building User Interfaces: Fundamental Android UI design                                                        | C-18      | Lecture               |
| Unit-II  | Home Assignment - 3                                                                                            |           | Take Home Assignments |
| Unit-II  | Presentation No-1                                                                                              | C-19      | Presentation          |
| Unit-II  | Clarification Class - 2                                                                                        | C-20      | Clarification Class   |
| Unit-II  | Layouts – Linear, Relative, Grid and Table Layouts. User Interface (UI) Components                             | C-21      | Lecture               |
| Unit-III | Fragments – Creating fragments                                                                                 |           |                       |
| Unit-III | Lifecycle of fragments                                                                                         | C-22      | Lecture               |

|          |                                                                        |      |                       |
|----------|------------------------------------------------------------------------|------|-----------------------|
| Unit-III | Class Room Assignment No. 3                                            | C-23 | Class Room Assignment |
| Unit-III | Adding fragments to Activity                                           | C-24 | Lecture               |
| Unit-III | Adding, removing and replacing fragments with fragment transactions    | C-25 | Lecture               |
| Unit-III | Presentation No. 2                                                     | C-26 | Presentation          |
| Unit-III | Adding, removing and replacing fragments with fragment transactions    | C-27 | Lecture               |
| Unit-III | Interfacing between fragments and Activities                           | C-28 | Lecture               |
| Unit-III | Seminar                                                                | C-29 | Seminar               |
| Unit-III | Class Room Assignment No. 4                                            | C-30 | Class Room Assignment |
| Unit-IV  | Intents and Broadcasts                                                 | C-31 | Lecture               |
| Unit-IV  | Intents and Broadcasts                                                 | C-32 | Lecture               |
| Unit-IV  | Guest Lecture-I                                                        | C-33 | Guest lecture         |
| Unit-IV  | Presentation No. 3                                                     | C-34 | Presentation          |
| Unit-IV  | Clarification Class - 3                                                | C-35 | Clarification Class   |
| Unit-IV  | Using intents to launch Activities                                     |      |                       |
| Unit-IV  | Types of Intents                                                       | C-36 | Lecture               |
| Unit-IV  | Passing data to Intents                                                | C-37 | Lecture               |
| Unit-IV  | Webinar                                                                | C-38 | Webinar               |
| Unit-IV  | Presentation No. 4                                                     | C-39 | Presentation          |
| Unit-IV  | Getting results from Activities                                        | C-40 | Lecture               |
| Unit-IV  | Broadcast Receivers – Using Intent filters to service implicit Intents | C-41 | Lecture               |
| Unit-IV  | Guest Lecture-II                                                       | C-42 | Guest lecture         |
| Unit-IV  | Clarification Class 4                                                  | C-43 | Clarification Class   |
| Unit-IV  | Resolving Intent filters                                               | C-44 | Lecture               |
|          | Webinar-2                                                              | C-45 | Webinar               |
| Unit-V   | Database: Introduction to SQLite database                              | C-46 | Lecture               |
| Unit-V   | Database: Introduction to SQLite database                              | C-47 | Lecture               |
| Unit-V   | Creating and opening a database                                        | C-48 | Lecture               |
| Unit-V   | Creating and opening a database                                        | C-49 | Lecture               |
| Unit-V   | Creating and opening a database                                        | C-50 | Lecture               |
| Unit-V   | Creating tables                                                        | C-51 | Lecture               |
| Unit-V   | Creating tables                                                        | C-52 | Lecture               |
| Unit-V   | Creating tables                                                        | C-53 | Lecture               |
| Unit-V   | Inserting retrieving and deleting data                                 | C-54 | Lecture               |
| Unit-V   | Inserting retrieving and deleting data                                 | C-55 | Lecture               |
| Unit-V   | Inserting retrieving and deleting data                                 | C-56 | Lecture               |
| Unit-V   | Inserting retrieving and deleting data                                 | C-57 | Lecture               |
| Unit-V   | Inserting retrieving and deleting data                                 | C-58 | Lecture               |
| Unit-V   | Inserting retrieving and deleting data                                 | C-59 | Lecture               |
| Unit-V   | Clarification Class - 5                                                | C-60 | Clarification Class   |

**Note:** The review of Syllabus happens on periodic basis for the benefit of the students. In case there are changes in curriculum due to review, students would be intimated in writing

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