

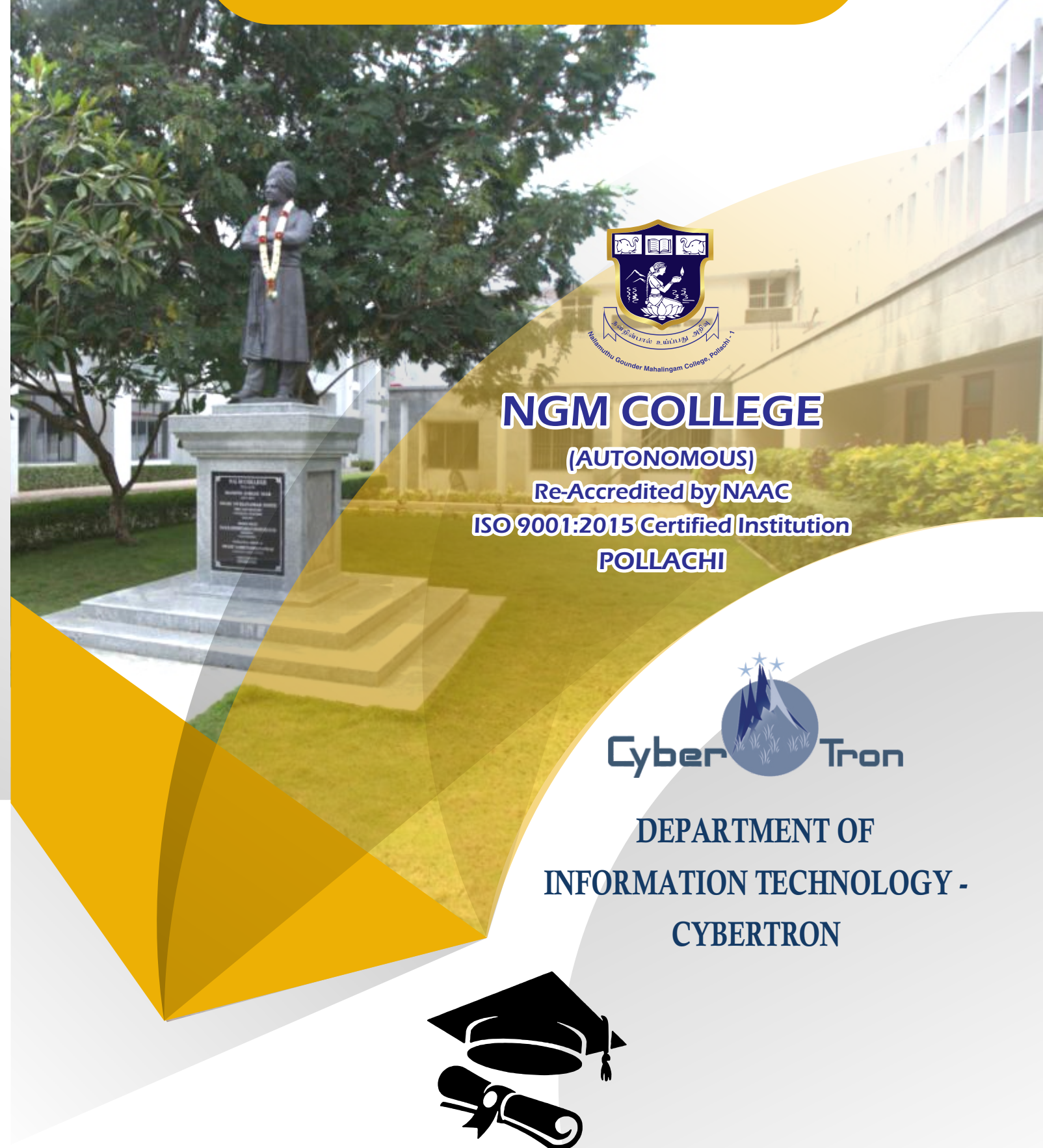


"A College is a temple of wisdom, seed bed of character, model of discipline, training ground of democracy and a nursery of great hearts, strong mind, true faith and willing hands. Hence, education has a pivotal role in harvesting the available resources to contribute to the prosperity of the nation"

- Arutchelvar Dr. N. Mahalingam

Holistic Education for the wholesome development of Human personality for the overall well-being of the Humanity as a whole.

Dr. B. K. Krishnaraj Vanavarayar  
President



## ACADEMIC COUNCIL MEETING

EMPOWER THE YOUTH TO ENRICH THE NATION

11.11.2020

## **NGM COLLEGE**

### **Vision**

Our dream is to make the College an institution of Excellence at the national level by imparting quality education of global standards to make students academically superior, socially committed, ethically strong and culturally rich citizens to contribute to the holistic development of the self and society.

### **Mission**

Training students to become role models in academic arena by strengthening infrastructure, upgrading extension through an enlightened management and committed faculty who ensure knowledge transfer, instil research aptitude and infuse ethical and cultural values to transform students into disciplined citizens in order to improve quality of life.

## **Department of Information Technology**

### **Vision**

The Vision of our Department is to assist the student in becoming proficient in using latest Technologies, and critical thinking being prepared for the next level of education and successfully attaining the skills and proficiencies required of today's work force.

### **Mission**

The Information Technology department is committed to providing the highest quality technology services and support, thereby enhancing the operation, and educational capabilities among the students.

# DEPARTMENT OF INFORMATION TECHNOLOGY

NALLAMUTHU GOUNDER MAHALINGAM COLLEGE

## SCHEME OF EXAMINATION

UNDER CBCS PATTERN GUIDED BY UNIVERSITY AND TANSCH

(FOR THE STUDENTS ADMITTED FROM THE 2020-2023 BATCH)

OUTCOME BASED EDUCATION (OBE)

| PART        | SUBJECT CODE | SUBJECT TITLE                                               | HOURS PER WEEK | EXAMINATION |     |     |       | CREDITS |
|-------------|--------------|-------------------------------------------------------------|----------------|-------------|-----|-----|-------|---------|
|             |              |                                                             |                | EX. HRS     | INT | EXT | TOTAL |         |
| SEMESTER I  |              |                                                             |                |             |     |     |       |         |
| I           | 20UTL101     | Tamil – I                                                   | 6              | 3           | 30  | 70  | 100   | 3       |
|             | 20UHN101     | Hindi – I                                                   |                |             |     |     |       |         |
|             | 20UFR101     | French – I                                                  |                |             |     |     |       |         |
| II          | 20UEN101     | English – I                                                 | 5              | 3           | 30  | 70  | 100   | 3       |
|             |              | CORE PAPERS:                                                |                |             |     |     |       |         |
| III         | 20UIT101     | Programming in 'C'                                          | 4              | 3           | 30  | 70  | 100   | 4       |
|             | 20UIT102     | Computer System Architecture                                | 5              | 3           | 30  | 70  | 100   | 4       |
|             | 20UIT103     | Lab. I - Programming in 'C'                                 | 4              | 3           | 20  | 30  | 50    | 2       |
|             |              | ALLIED PAPERS:                                              |                |             |     |     |       |         |
|             | 20UIT1A1     | Mathematics – I (Statistics)                                | 4              | 3           | 30  | 70  | 100   | 4       |
| IV          | 20UHR101     | Human Rights                                                | 1              | 2           | --  | 50  | 50    | 2       |
|             | 20HEC101     | Value Education : Human Excellence Course - Personal Values | 1              | 2           | 25  | 25  | 50    | 1       |
| V           |              | Extension Activities (See Annexure – I)                     |                |             |     |     |       |         |
|             | TOTAL        |                                                             | 30             |             |     |     | 650   | 23      |
| SEMESTER II |              |                                                             |                |             |     |     |       |         |
| I           | 20UTL202     | Tamil – II                                                  | 6              | 3           | 30  | 70  | 100   | 3       |
|             | 20UHN202     | Hindi – II                                                  |                |             |     |     |       |         |
|             | 20UFR202     | French – II                                                 |                |             |     |     |       |         |
| II          | 20UEN202     | English – II                                                | 5              | 3           | 30  | 70  | 100   | 3       |
|             |              | CORE PAPERS:                                                |                |             |     |     |       |         |
| III         | 20UIT204     | Object Oriented Programming with Java                       | 4              | 3           | 30  | 70  | 100   | 4       |
|             | 20UIT205     | Data Structures                                             | 4              | 3           | 30  | 70  | 100   | 4       |
|             | 20UIT206     | Lab. II - Programming in Java                               | 4              | 3           | 20  | 30  | 50    | 2       |
|             |              | ALLIED PAPERS:                                              |                |             |     |     |       |         |
|             | 20UIT2A2     | Mathematics – II (Discrete Mathematics)                     | 4              | 3           | 30  | 70  | 100   | 4       |
| IV          | 20EVS201     | Environmental Studies                                       | 2              | 2           | --  | 50  | 50    | 2       |
|             | 20HEC202     | Value Education : Human Excellence Course - Family Values   | 1              | 2           | 25  | 25  | 50    | 1       |
| V           |              | Extension Activities (See Annexure – I)                     |                |             |     |     |       |         |
|             | TOTAL        |                                                             | 30             |             |     |     | 650   | 23      |

| PART         | SUBJECT CODE          | SUBJECT TITLE                                                      | Hrs/<br>Week | EX.<br>HRS | INT | EXT | TOTAL | CREDITS |
|--------------|-----------------------|--------------------------------------------------------------------|--------------|------------|-----|-----|-------|---------|
| SEMESTER III |                       |                                                                    |              |            |     |     |       |         |
|              |                       | CORE PAPERS:                                                       |              |            |     |     |       |         |
| III          | 20UIT307              | Operating Systems                                                  | 5            | 3          | 30  | 70  | 100   | 4       |
|              | 20UIT308              | Relational Database Management System                              | 5            | 3          | 30  | 70  | 100   | 4       |
|              | 20UIT309              | Service Oriented Architecture                                      | 5            | 3          | 30  | 70  | 100   | 4       |
|              | 20UIT310              | Lab. III – RDBMS                                                   | 4            | 3          | 40  | 60  | 100   | 2       |
|              | 20UIT311              | Lab. IV – Web Designing (HTML, CSS, JavaScript & Angular)          | 4            | 3          | 40  | 60  | 100   | 2       |
|              |                       | ALLIED PAPERS:                                                     |              |            |     |     |       |         |
|              | 20UIT3A3              | Microprocessor and Assembly Language Programming                   | 5            | 3          | 30  | 70  | 100   | 4       |
| IV           | 20UIT3N1/<br>20UIT3N2 | Skill Based Non-Major- I (Social Networks / Hardware &Networking ) | 1            | 2          | --  | 50  | 50    | 2       |
|              | 20HEC303              | Value Education: Human Excellence Course - Professional Values     | 1            | 2          | 25  | 25  | 50    | 1       |
| V            |                       | Extension Activities (See Annexure – I)                            |              |            |     |     |       |         |
|              |                       | MOOC Course I [Extra Credit]                                       | -            | -          | -   | -   | -     | 2       |
|              | TOTAL                 |                                                                    | 30           |            |     |     | 700   | 23      |
| SEMESTER IV  |                       |                                                                    |              |            |     |     |       |         |
| III          |                       | CORE PAPERS:                                                       |              |            |     |     |       |         |
|              | 20UIT412              | Data Communication and Networks                                    | 5            | 3          | 30  | 70  | 100   | 4       |
|              | 20UIT413              | Advanced Java Programming                                          | 5            | 3          | 30  | 70  | 100   | 4       |
|              | 20UIT414              | Visual Programming                                                 | 5            | 3          | 30  | 70  | 100   | 4       |
|              | 20UIT415              | Lab. V – Programming in Advanced Java                              | 5            | 3          | 40  | 60  | 100   | 3       |
|              | 20UIT416              | Lab. VI - Visual Programming                                       | 3            | 3          | 20  | 30  | 50    | 2       |
|              |                       | Project Internship                                                 | -            | -          | 10  | -   | -     | -       |
|              |                       | ALLIED PAPERS:                                                     |              |            |     |     |       |         |
|              | 20UIT4A4              | Software Engineering                                               | 5            | 3          | 30  | 70  | 100   | 4       |
| IV           | 20UIT4N3/<br>20UIT4N4 | Skill Based Non-Major- II (Data Analytics / Computer Security)     | 1            | 2          | --  | 50  | 50    | 2       |
|              | 20HEC404              | Value Education: Human Excellence Course - Social Values           | 1            | 2          | 25  | 25  | 50    | 1       |
| V            |                       | Extension Activities (See Annexure – I)                            |              |            | --  | 50  | 50    | 1       |
|              | TOTAL                 |                                                                    | 30           |            |     |     | 700   | 25      |

| PART               | SUBJECT CODE                       | SUBJECT TITLE                                                             | Hrs/<br>Week | EX.<br>HRS | INT | EXT | TOTAL       | CREDITS    |
|--------------------|------------------------------------|---------------------------------------------------------------------------|--------------|------------|-----|-----|-------------|------------|
| <b>SEMESTER V</b>  |                                    |                                                                           |              |            |     |     |             |            |
| III                | 20UIT517                           | Open Source Methodologies                                                 | 6            | 3          | 30  | 70  | 100         | 4          |
|                    | 20UIT518                           | Information Security                                                      | 6            | 3          | 30  | 70  | 100         | 4          |
|                    | 20UIT5E1/<br>20UIT5E2/<br>20UIT5E3 | Major Elective - I                                                        | 6            | 3          | 30  | 70  | 100         | 5          |
|                    | 20UIT519                           | Lab. VII - Open Source Methodologies                                      | 5            | 3          | 40  | 60  | 100         | 3          |
|                    | 20UIT520                           | Lab. VIII - Software Testing Tools                                        | 4            | 3          | 20  | 30  | 50          | 2          |
| IV                 | 20GKL501                           | General Knowledge & General Awareness (SBE) (Online)                      | SS           | 2          | --  | 50  | 50          | 2          |
|                    | 20UIT5S1/<br>20UIT5S2              | Skill Based Major Elective - Lab. I Web Programming (Python / PHP)        | 2            | 2          | --  | 50  | 50          | 2          |
|                    | 20HEC505                           | Value Education: Human Excellence Course - National Values                | 1            | 2          | 25  | 25  | 50          | 1          |
| V                  |                                    | MOOC Course II [Extra Credit]                                             | -            | -          | -   | -   | -           | 2          |
|                    | <b>TOTAL</b>                       |                                                                           | <b>30</b>    |            |     |     | <b>600</b>  | <b>23</b>  |
| <b>SEMESTER VI</b> |                                    |                                                                           |              |            |     |     |             |            |
| III                | 20UIT621                           | Computer Graphics                                                         | 6            | 3          | 30  | 70  | 100         | 4          |
|                    | 20UIT6E4/<br>20UIT6E5/<br>20UIT6E6 | Major Elective - II                                                       | 6            | 3          | 30  | 70  | 100         | 5          |
|                    | 20UIT6E7/<br>20UIT6E8/<br>20UIT6E9 | Major Elective - III                                                      | 6            | 3          | 30  | 70  | 100         | 5          |
|                    | 20UIT622                           | Lab. IX - Graphics & Multimedia                                           | 5            | 3          | 40  | 60  | 100         | 3          |
|                    | 20UIT623                           | Project                                                                   | 4            | --         | 30  | 70  | 100         | 3          |
| IV                 | 20UIT6S3/<br>20UIT6S4              | Skill Based Major Elective - Lab. II DTP Software (CorelDraw / Photoshop) | 2            | 2          | --  | 50  | 50          | 2          |
|                    | 20HEC606                           | Value Education: Human Excellence Course - Global Values                  | 1            | 2          | 25  | 25  | 50          | 1          |
|                    | <b>TOTAL</b>                       |                                                                           | <b>30</b>    |            |     |     | <b>600</b>  | <b>23</b>  |
|                    |                                    |                                                                           | <b>180</b>   |            |     |     | <b>3900</b> | <b>140</b> |

### Annexure I: List of Part – V Subjects

| S. No. | SUBJECT CODE | SUBJECTS                                    |
|--------|--------------|---------------------------------------------|
| 1      | 20UNC401     | NCC                                         |
| 2      | 20UNS402     | NSS                                         |
| 3      | 20USG403     | Sports And Games                            |
| 4      | 20URO404     | Rotract Club                                |
| 5      | 20URR405     | Red Ribbon Club                             |
| 6      | 20UYR406     | Youth Red Cross                             |
| 7      | 20UCA407     | Consumer Awareness Club                     |
| 8      | 20UED408     | Entrepreneurship Development Cell           |
| 9      | 20UCR409     | Center For Rural Development                |
| 10     | 20USS410     | Student Guild Of Service                    |
| 11     | 20UGS411     | Green Society                               |
| 12     | 20UEO412     | Equal Opportunity Cell                      |
| 13     | 20UFA413     | Fine Arts Club                              |
| 14     | 20UAM414     | Arutchelvar Students Thinkers Forum         |
| 15     | 20USV415     | Swami Vivekanandhar Students Thinkers Forum |

### List of Major Elective courses V & VI Semesters only (CBCS method)

| ELECTIVE | SEMESTER | SUBJECT CODE            | SUBJECTS                    |
|----------|----------|-------------------------|-----------------------------|
| I        | V        | 20UIT5E1                | Data Mining and Analytics   |
|          |          | 20UIT5E2                | Cloud Computing             |
|          |          | 20UIT5E3                | Digital Image Processing    |
| II       | VI       | 20UIT6E4                | Embedded Systems            |
|          |          | 20UIT6E5                | E-Commerce                  |
| 20UIT6E6 |          | Artificial Intelligence |                             |
| III      |          | 20UIT6E7                | Mobile Computing            |
|          |          | 20UIT6E8                | Software Project Management |
|          |          | 20UIT6E9                | Multimedia Techniques       |

## Bloom's Taxonomy Based Assessment Pattern

**K1-Remember; K2- Understanding; K3- Apply; K4-Analyze; K5- Evaluate**

### 1. Theory Examinations: 70 Marks (Part I, II, & III)

**(i) Test- I & II and ESE:**

| Knowledge Level        | Section                                                | Marks       | Description              | Total |
|------------------------|--------------------------------------------------------|-------------|--------------------------|-------|
| K1 & K2<br>(Q 1 -10)   | A (Q 1 – 5 MCQ)<br>(Q 6–10 Define/Short Answer)        | 10 x 1 = 10 | MCQ<br>Define            | 70    |
| K3 (Q 11-15)           | B (Either or pattern)                                  | 5 x 4 = 20  | Short Answers            |       |
| K4 & K5<br>(Q 16 – 21) | C ( Q -16 is Compulsory and Q<br>17 – 21 answer any 3) | 4 x 10 = 40 | Descriptive/<br>Detailed |       |

### 2. Theory Examinations: 50 Marks (Part IV)

| Knowledge Level     | Section                                         | Marks       | Description   | Total |
|---------------------|-------------------------------------------------|-------------|---------------|-------|
| K1& K2<br>(Q 1 -10) | A (Q 1 – 5 MCQ)<br>(Q 6–10 Define/Short Answer) | 10 x 1 = 10 | MCQ<br>Define | 50    |
| K3 (Q 11-18)        | B (Answer 5 out of 8)                           | 5 x 8 = 40  | Short Answers |       |

### 3. Practical Examinations: 100/50 Marks

| Knowledge Level | Section                 | Marks | Total  |
|-----------------|-------------------------|-------|--------|
| K3              | Record work & Practical | 60/30 | 100/50 |
| K4              |                         | 40/20 |        |
| K5              |                         |       |        |

### 4. Components of Continuous Assessment

| Components                                             |      | Calculation             | CIA Total |
|--------------------------------------------------------|------|-------------------------|-----------|
| Test 1                                                 | 70   | $\frac{70+70+60+10}{7}$ | 30        |
| Test 2 (Model)                                         | 70   |                         |           |
| Assignment, Seminar/Tutorial,<br>Knowledge Enhancement | 3*20 |                         |           |
| Information Acquisition                                | 10   |                         |           |

## **Programme Outcomes**

**PO1** To make students as computer professionals, who can be directly employed or start his/her own work as Programmer, Web Designer, Database User, Testing professional, Designer of a System and Network administrator or implementer.

**PO2** To train students to a level where they can readily compete for the higher educational degree courses like MCA, M.Sc. (CS), M.Sc. (IT), MBA, etc.

**PO3** Be acquainted with the contemporary issues, latest trends in technological development and there by innovate new ideas and solutions to existing problems.

**PO4** Recognize the industry and social needs have the preparation to engage independent learning for developing the applications by project work.

## **Programme Specific Outcomes**

**PSO1** Have good mathematical ability to develop algorithms and solve the logical problems.

**PSO2** Have adequate knowledge about hardware and software.

**PSO3** Have sufficient skills in programming languages, web-based languages, designing and managing databases.

**PSO4** To fulfill the current industry needs through advanced courses.

**PSO5** To develop software and industrial applications by project work.

|                        |          |                         |                                    |
|------------------------|----------|-------------------------|------------------------------------|
| <b>Programme Code:</b> | B.Sc.    | <b>Programme Title:</b> | Bachelor of Information Technology |
| <b>Course Code:</b>    | 20UIT101 | <b>Title</b>            | <b>Batch:</b> 2020 - 2023          |
|                        |          | Programming in 'C'      | <b>Semester:</b> I                 |
| <b>Hrs/Week:</b>       | 4        | <b>Credits:</b>         | 4                                  |

### Course Objective

To cultivate programming ability on logic development, clear view on control structures, pointers (memory management), file handling, etc.

### Course Outcomes

|    |     |                                                           |
|----|-----|-----------------------------------------------------------|
| K1 | CO1 | To keep in mind the fundamentals of C programming.        |
| K2 | CO2 | To understand the concepts of problem solving techniques. |
| K3 | CO3 | To apply concepts and techniques for implementation.      |
| K4 | CO4 | To evaluate the logical thinking in program development.  |

| Units           | Content                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Hrs       |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>Unit I</b>   | Programming development methodologies - Programming style – <b>Problem solving techniques:</b> Algorithm, Flowchart, Pseudo code. Structure of a C program – C character set - Delimiters – Keywords – Identifiers – Constants – Variables – Rules for defining variables – Data types – Declaring and initializing variables – Type conversion. * <i>Operators and Expressions.</i>                                                                                            | <b>12</b> |
| <b>Unit II</b>  | <b>Formatted and Unformatted I/O functions. Decision statements:</b> If, If...Else, Nested If. Else, Break, Continue, Go to, Switch, Nested switch...case, switch...case and nested ifs statements. <b>Loop control statements:</b> For, Nested for, While, Do...while and with while loops.                                                                                                                                                                                    | <b>10</b> |
| <b>Unit III</b> | <b>Arrays:</b> Initialization, definition, characteristics, * <i>One dimensional</i> , predefined streams, two dimensional, three or multi dimensional arrays – scanf (), printf (). <b>Strings:</b> Declaration and initialization, displaying, standard functions and applications. <b>Pointers:</b> Futures, Declarations, arithmetic operations, pointers and arrays, two dimensional arrays, array of pointers, pointers to pointers, pointers and strings, void pointers. | <b>10</b> |
| <b>Unit IV</b>  | <b>Functions:</b> Definition, declaration, return statements, types, call by value and reference, returning more multiple values, function as an argument, function with arrays and pointers. <b>Structure and Union:</b> Features of structure, Declaration and initialization of structure, Structure within structure, Array of structure, Pointer to structure, structure and functions, typedef, Bit fields, Enumerated data types, Union, union of structures.            | <b>10</b> |
| <b>Unit V</b>   | <b>Files:</b> Streams and file types, * <i>Steps for file operation</i> , File I/O, Structures read and write, Other file functions, searching errors in reading or writing files, low level disk I/O, Command line arguments, I/O redirection. <b>Preprocessor directives:</b> #define, #include, #ifndef, #error, #line, #pragma, and Predefined macros.                                                                                                                      | <b>10</b> |
|                 | <b>Total Contact Hrs</b> * <i>self study</i>                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>52</b> |

Power Point Presentation, Seminar, Quiz, Assignments.

**Books for study**

- ❖ Ashok .N. Kamthane. (2004). *PROGRAMMING AND DATA STRUCTURES*. First Indian Print. Pearson Education: ISBN 81-297-0327-0.

**Books for Reference**

- ❖ Balagurusamy. E. (1998). *Programming in ANSI C*. Tata McGraw-Hill.
- ❖ Pradip Dey, Manas Ghosh. (2008). *Computer Fundamentals and Programming in c*. Oxford.

**Mapping**

| CO \ PSO | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|----------|------|------|------|------|------|
| CO1      | 1    | 1    | 3    | 1    | 3    |
| CO2      | 3    | 3    | 3    | 2    | 3    |
| CO3      | 2    | 3    | 3    | 2    | 3    |
| CO 3     | 3    | 3    | 1    | 1    | 2    |

Low – 1, Medium – 2, High – 3

| Course Designed by                    | Verified by HOD                        | Checked by                                | Approved by                                 |
|---------------------------------------|----------------------------------------|-------------------------------------------|---------------------------------------------|
| Name and Signature                    | Name and Signature                     | CDC                                       | COE                                         |
| Name: B. Kalaiselvi<br><br>Signature: | Name: K. Vijayakumar<br><br>Signature: | Name: Mr. K. Srinivasan<br><br>Signature: | Name: Dr. R. Muthukumaran<br><br>Signature: |

|                        |          |                              |                                    |             |
|------------------------|----------|------------------------------|------------------------------------|-------------|
| <b>Programme Code:</b> | B. Sc.   | <b>Programme Title:</b>      | Bachelor of Information Technology |             |
| <b>Course Code:</b>    | 20UIT102 | <b>Title</b>                 | <b>Batch:</b>                      | 2020 - 2023 |
|                        |          | Computer System Architecture | <b>Semester:</b>                   | I           |
| <b>Hrs/Week:</b>       | 5        |                              | <b>Credits:</b>                    | 4           |

### Course Objective

To obtain the basic knowledge of computer organization, input output organization, pipeline, vector processing, and memory organization.

### Course Outcomes

|    |     |                                                                                     |
|----|-----|-------------------------------------------------------------------------------------|
| K1 | CO1 | To remember basic building block of digital computer system                         |
| K2 | CO2 | To understand the execution sequence of instruction through the processor           |
| K3 | CO3 | To apply interfacing of various peripheral devices used with the system             |
| K4 | CO4 | To analyze functioning of various parts of the computer from hardware point of view |

| Units    | Content                                                                                                                                                                                                                                 | Hrs |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| Unit I   | <b>Binary Systems:</b> Numbers – Conversions – Complements – Codes – Logic. <b>Canonical &amp; Standard Forms. Digital Logic Gates. Simplification of Boolean Functions:</b> Map method – Two & Three Variable Map – Four Variable Map. | 13  |
| Unit II  | <b>Basic Computer Organization and Design:</b> Instruction Codes - Computer Registers – Computer Instructions – Instruction Cycle – Memory Reference Instructions – * <i>Input Output</i> and Interrupt.                                | 13  |
| Unit III | <b>Central Processing Unit (CPU):</b> General Register Organization – Stack Organization - Instruction Formats – Addressing Modes – Data Transfer and Manipulation – * <i>Program Control</i> .                                         | 12  |
| Unit IV  | <b>Input – Output Organization:</b> * <i>Peripheral Devices</i> - Input – Output Interface – Asynchronous Data Transfer - Direct Memory Access (DMA) - CPU-IOP Communication.                                                           | 13  |
| Unit V   | <b>Memory Organization:</b> Memory Hierarchy – Main Memory - Auxiliary Memory - Cache Memory – Associative Memory - Virtual Memory.                                                                                                     | 14  |
|          | <b>Total Contact Hrs</b> * <i>self study</i>                                                                                                                                                                                            | 65  |

|                                           |
|-------------------------------------------|
| Presentations, Seminar , Quiz, Assignment |
|-------------------------------------------|

**Books for study**

- ❖ M. Morris Mano (2013). *Digital Logic and Computer Design*. 16<sup>th</sup> Impression, Pearson Publication. (Unit I)
- ❖ M. Morris Mano. (2008). *Computer System Architecture*. 3<sup>rd</sup> Edition .PHI (Units II, III, IV, V).

**Books for Reference**

- ❖ M. Carter. (2001). *Computer Architecture*. Schaum's outline series, TMH Pub.
- ❖ William Stallings. (2006), *Computer System and Architecture*, 8<sup>th</sup> Edition, Pearson Publication.

**Mapping**

| CO \ PSO | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|----------|------|------|------|------|------|
| CO1      | 1    | 3    | 1    | 3    | 2    |
| CO2      | 1    | 3    | 3    | 1    | 1    |
| CO3      | 1    | 3    | 1    | 2    | 1    |
| CO4      | 2    | 3    | 1    | 2    | 3    |

Low – 1, Medium – 2, High – 3

| Course Designed by | Verified by HOD      | Checked by              | Approved by               |
|--------------------|----------------------|-------------------------|---------------------------|
| Name and Signature | Name and Signature   | CDC                     | COE                       |
| Name: R.Sekar      | Name: K. Vijayakumar | Name: Mr. K. Srinivasan | Name: Dr. R. Muthukumaran |
| Signature:         | Signature:           | Signature:              | Signature:                |

|                        |          |                             |                                    |             |
|------------------------|----------|-----------------------------|------------------------------------|-------------|
| <b>Programme Code:</b> | B. Sc.   | <b>Programme Title:</b>     | Bachelor of Information Technology |             |
| <b>Course Code:</b>    | 20UIT103 | <b>Title</b>                | <b>Batch:</b>                      | 2020 - 2023 |
|                        |          | LAB. I – Programming in ‘C’ | <b>Semester:</b>                   | I           |
| <b>Hrs/Week:</b>       | 4        |                             | <b>Credits:</b>                    | 2           |

### Course Objective

To understand, learn and apply the various programming concepts of ‘C’ and improving the programming skills in ‘C’.

### Course Outcomes

|    |     |                                                                        |
|----|-----|------------------------------------------------------------------------|
| K3 | CO3 | To apply appropriate data structure, mathematical and scientific logic |
| K4 | CO4 | To analyze a problem in different logic                                |
| K5 | CO5 | To verify the solutions of various problems with input and output data |

| Content                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Hrs |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <p style="text-align: center;"><b>SAMPLE PROGRAM LIST</b></p> <p><b>Test I</b></p> <ol style="list-style-type: none"> <li>Create a C program to implement basic operators.</li> <li>Create a C program to implement if, if-else, nested if.</li> <li>Create a C program to implement switch case.</li> <li>Create a C program to implement while loop.</li> <li>Create a C program to implement do-while loop.</li> <li>Create a C program to implement for loop.</li> <li>Create a C program to implement one dimensional array.</li> <li>Create a C program to implement multi-dimensional array.</li> <li>Create a C program to implement strings.</li> <li>Create a C program to implement basic pointer operations.</li> </ol> <p><b>Test II</b></p> <ol style="list-style-type: none"> <li>Create a C program to implement array of pointers.</li> <li>Create a C program to implement functions using call by value.</li> <li>Create a C program to implement functions using call by reference.</li> <li>Create a C program to implement structure and array of structure.</li> <li>Create a C program to implement union.</li> <li>Create a file to perform read and write operations using file accessing modes.</li> <li>Create a C program to implement preprocessor directives.</li> </ol> | 52  |

**Mapping**

| CO \ PSO | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|----------|------|------|------|------|------|
| CO1      | 3    | 3    | 3    | 2    | 2    |
| CO2      | 3    | 2    | 3    | 2    | 2    |
| CO3      | 3    | 3    | 3    | 3    | 3    |

Low – 1, Medium – 2, High – 3

| Course Designed by        | Verified by HOD           | Checked by              | Approved by               |
|---------------------------|---------------------------|-------------------------|---------------------------|
| <b>Name and Signature</b> | <b>Name and Signature</b> | <b>CDC</b>              | <b>COE</b>                |
| Name: B. Kalaiselvi       | Name: K. Vijayakumar      | Name: Mr. K. Srinivasan | Name: Dr. R. Muthukumaran |
| Signature:                | Signature:                | Signature:              | Signature:                |

|                        |          |                                 |                                    |             |
|------------------------|----------|---------------------------------|------------------------------------|-------------|
| <b>Programme Code:</b> | B.Sc.    | <b>Programme Title :</b>        | Bachelor of Information Technology |             |
| <b>Course Code:</b>    | 20UIT1A1 | <b>Title:</b>                   | <b>Batch :</b>                     | 2020 - 2023 |
|                        |          | Mathematics – I<br>(Statistics) | <b>Semester :</b>                  | I           |
| <b>Hrs/Week:</b>       | 4        |                                 | <b>Credits :</b>                   | 4           |

### Course Objective

Learning various statistical methods like central tendency, dispersion, correlation and regression, probability and sampling theory.

### Course Outcomes (CO)

|    |     |                                                                                                                                                      |
|----|-----|------------------------------------------------------------------------------------------------------------------------------------------------------|
| K1 | CO1 | To remember the formula of different Means, Median, Mode, Deviations, Correlation, Regression, Probability, Chi square test, Degree of Freedom, etc. |
| K2 | CO2 | To understand the concepts Central tendency, Dispersion, Correlation and regression, Probability and Sampling theory.                                |
| K3 | CO3 | To solve the problems by using formula to apply the programs                                                                                         |
| K4 | CO4 | To evaluate the results through the program outputs                                                                                                  |

| Units           | Content                                                                                                                                                                                                                                                                                                                        | Hrs       |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>Unit I</b>   | <b>Measures of central tendency:</b> Mean: <i>*Arithmetic Mean</i> , Weighted Arithmetic Mean, Combined Arithmetic Mean, Geometric Mean, Harmonic Mean, Median and mode – Relation between mean, median and mode.                                                                                                              | 12        |
| <b>Unit II</b>  | <b>Dispersion:</b> <i>*Range</i> - Mean deviation - Standard deviation - Coefficient of Variation – Quartile Deviation.                                                                                                                                                                                                        | 9         |
| <b>Unit III</b> | <b>Correlation:</b> Karl Pearson's Coefficient of Correlation – Rank correlation.<br><b>Regression:</b> Regression Equations - <i>*Difference between correlation &amp; Regression.</i>                                                                                                                                        | 9         |
| <b>Unit IV</b>  | <b>Probability:</b> Permutation and Combination- Important terms in probability-<br><b>Measurement of Probability:</b> Classical Approach- Relative Frequency theory of probability – Personalistic view of probability – Axiomatic Approach of probability. <b>Theorems of probability:</b> Addition – Multiplication – Odds. | 12        |
| <b>Unit V</b>   | <b>Sampling Theory and Test of Significance:</b> Introduction – Estimation theory – Testing of hypothesis – Testing if significance for large samples and small samples. <b>Chi Square Test:</b> Introduction – $\chi^2$ test, Degrees of freedom, Test of goodness of fit, Test of Independence.                              | 10        |
|                 | <b>Total Contact Hrs</b> <i>* Self-Study</i>                                                                                                                                                                                                                                                                                   | <b>52</b> |

|                                  |
|----------------------------------|
| Seminar, Assignment, Discussion. |
|----------------------------------|

**Books for study:**

- ❖ Pillai R. S. N. Bagavathi V. (2019). *Statistical Methods*. 8<sup>th</sup> Edition, Sultan Chand and Sons & Company Ltd. New Delhi.

**Books for Reference:**

- ❖ Gupta. S.C. Kapoor. V.K. (Reprint 2014). *Fundamentals of Mathematical Statistics*. 11<sup>th</sup> edition. S. Chand and Sons.

**Mapping**

| CO \ PSO | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|----------|------|------|------|------|------|
| CO1      | 3    | 1    | 2    | 2    | 1    |
| CO2      | 2    | 2    | 2    | 2    | 1    |
| CO3      | 3    | 2    | 3    | 3    | 2    |
| CO4      | 3    | 2    | 3    | 2    | 2    |

Low – 1, Medium – 2, High – 3

| Course Designed by                     | Verified by HOD                        | Checked by                                | Approved by                                 |
|----------------------------------------|----------------------------------------|-------------------------------------------|---------------------------------------------|
| Name and Signature                     | Name and Signature                     | CDC                                       | COE                                         |
| Name: K. Vijayakumar<br><br>Signature: | Name: K. Vijayakumar<br><br>Signature: | Name: Mr. K. Srinivasan<br><br>Signature: | Name: Dr. R. Muthukumaran<br><br>Signature: |

|                        |          |                                       |                                    |             |
|------------------------|----------|---------------------------------------|------------------------------------|-------------|
| <b>Programme Code:</b> | B. Sc.   | <b>Programme Title:</b>               | Bachelor of Information Technology |             |
| <b>Course Code:</b>    | 20UIT204 | <b>Title</b>                          | <b>Batch:</b>                      | 2020 - 2023 |
|                        |          | Object Oriented Programming with Java | <b>Semester:</b>                   | II          |
| <b>Hrs/Week:</b>       | 4        |                                       | <b>Credits:</b>                    | 4           |

### Course Objective

To provide knowledge about the basic concepts of OOPs, methods, interfaces multithreads, packages and applets.

### Course Outcomes

|    |     |                                                                          |
|----|-----|--------------------------------------------------------------------------|
| K1 | CO1 | To keep in mind the basic concepts of OOPs                               |
| K2 | CO2 | To apprehend a knowledge about how to use java for internet applications |
| K3 | CO3 | To implement file, applet, thread concepts                               |
| K4 | CO4 | To review the usage of packages, exceptions and string concepts.         |

| Units           | Content                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Hrs       |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>Unit I</b>   | <b>Fundamentals of Object Oriented Programming:</b> Introduction – Paradigm - Basics – Benefits – Applications. <b>Java Evolution:</b> History – Features – Difference from C/C++ - * <i>Internet – World wide web – Web browsers – Hardware and software requirements – Support systems –Environment.</i> <b>Overview of Java language. Constants, Variables and Data types.</b>                                                                                                                                                                                                                          | 11        |
| <b>Unit II</b>  | <b>Classes, Objects and Methods:</b> Introduction – Defining – Field, Method Declaration – Creating Objects – Accessing class members – Constructors – Method Overloading - Static Members – Nesting of Methods – Inheritance – Overriding – Final Variables, Methods and Classes. Finalizer Methods – Abstract methods and classes – Methods with Varargs – Visibility control. <b>Arrays, Strings and Vectors:</b> Introduction – * <i>One dimensional – Creation – Two-dimensional – Strings - Vectors – Wrapper classes – Enumerated types – Annotations.</i> <b>Interfaces: Multiple Inheritance.</b> | 10        |
| <b>Unit III</b> | <b>Packages: Putting classes together:</b> Introduction – API packages – System packages – Naming Conventions – Creation – Accessing – Using – Adding a Class to a package – Hiding classes – Static import. <b>Multithreaded Programming :</b> Introduction – Creation – Extending – Stopping and blocking – Life cycle – Using thread methods – Exceptions – Priorities – Synchronization – Implementing the Runnable interface – Inter-thread communication. <b>Managing Errors and Exceptions.</b>                                                                                                     | 11        |
| <b>Unit IV</b>  | <b>Abstract Windowing Toolkit (AWT) - Applet Programming:</b> Introduction – Difference between Applet and other Applications - Writing and Building Applet - Life Cycle – Creating Executable applets – Designing a Web page – Applet Tag – Applet to HTML – Running Applets – Passing Parameters – Aligning the display – * <i>HTML tags – Numerical Values – User input – Event Handling.</i>                                                                                                                                                                                                           | 10        |
| <b>Unit V</b>   | <b>Managing Input / Output Files:</b> Introduction – Streams – Stream Classes – Byte Stream – Character Stream – Using Stream – Useful I/O Classes – File Classes – I/O Exceptions – File Creation – Reading Writing Characters and Bytes – Primitive Data Types – Concatenating and Buffering - Random Access File – Interactive I/O – Other Stream Classes.                                                                                                                                                                                                                                              | 10        |
|                 | <b>Total Contact Hrs</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>52</b> |

\* self study

**Books for study**

- ❖ E. Balagurusamy. (2019). “*Programming with JAVA – A Primer*”, Tata McGraw-Hill Publishing Company Limited, 6<sup>th</sup> Edition. (Unit I, II, III, V)
- ❖ Instructional Software Research and Development (ISRD) Group. 2001. “*Introduction to Object Oriented Programming through Java*”, Tata McGraw-Hill Publishing Company Limited, New Delhi. (Unit IV – AWT)

**Books for Reference**

- ❖ Herbert Schild, (2002). *Java Complete Reference*, 5<sup>th</sup> Edition, Tata McGraw Hill Pub

**Mapping**

| CO \ PSO | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|----------|------|------|------|------|------|
| CO1      | 1    | 1    | 3    | 2    | 2    |
| CO2      | 1    | 1    | 3    | 3    | 3    |
| CO3      | 1    | 2    | 3    | 2    | 2    |
| CO4      | 1    | 1    | 3    | 2    | 2    |

Low – 1, Medium – 2, High – 3

| Course Designed by    | Verified by HOD      | Checked by              | Approved by               |
|-----------------------|----------------------|-------------------------|---------------------------|
| Name and Signature    | Name and Signature   | CDC                     | COE                       |
| Name: C.R.Durga devi. | Name: K. Vijayakumar | Name: Mr. K. Srinivasan | Name: Dr. R. Muthukumaran |
| Signature:            | Signature:           | Signature:              | Signature:                |

|                        |          |                         |                                    |             |
|------------------------|----------|-------------------------|------------------------------------|-------------|
| <b>Programme Code:</b> | B. Sc.   | <b>Programme Title:</b> | Bachelor of Information Technology |             |
| <b>Course Code:</b>    | 20UIT205 | <b>Title</b>            | <b>Batch:</b>                      | 2020 - 2023 |
|                        |          | Data Structures         | <b>Semester:</b>                   | II          |
| <b>Hrs/Week:</b>       | 4        |                         | <b>Credits:</b>                    | 4           |

### Course Objective

To have adequate knowledge about linear data structures, queues, linked list, trees, searching, sorting and hashing.

### Course Outcomes

|    |     |                                                                                             |
|----|-----|---------------------------------------------------------------------------------------------|
| K1 | CO1 | To recollect basic concepts of data handle.                                                 |
| K2 | CO2 | To comprehend data structures like stack, queue, linked list and trees.                     |
| K3 | CO3 | To implement data structure techniques in problem solving                                   |
| K4 | CO4 | To analyze space and time complexity of algorithms and to evaluate various data structures. |

| Units           | Content                                                                                                                                                                                                                                                                                                                                                                                   | Hrs       |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>Unit I</b>   | <b>Arrays:</b> Introduction to Linear and Non Linear Data Structures - Arrays in C – <i>*Single Dimensional Arrays</i> - Array Operations. <b>Linked List:</b> Introduction to List and Linked Lists - Dynamic Memory Allocation - Basic Linked List Operations- Doubly Linked List - Circular Linked List - Atomic Node Linked List - Linked List in Arrays - Linked List versus Arrays. | <b>13</b> |
| <b>Unit II</b>  | <b>Stacks:</b> Introduction to Stacks - Stack as an Abstract Data Type - Representation of Stacks Through Arrays - Representation of Stacks Through Linked List - <i>*Applications of Stacks</i> - Stacks and Recursion.                                                                                                                                                                  | <b>8</b>  |
| <b>Unit III</b> | <b>Queues:</b> Introduction - Queue as an Abstract Data Type - Representation of Queues - Circular Queues - Double Ended Queues - Dequeue - Priority Queues - <i>*Application of Queues</i> .                                                                                                                                                                                             | <b>9</b>  |
| <b>Unit IV</b>  | <b>Binary Trees:</b> Introduction to nonlinear Data Structure - Introduction to Binary Trees - <i>*Types of Trees</i> - Definitions - Properties - Representation - Operations – Traversal - Reconstruction - Counting Number - Applications. <b>Searching:</b> An Introduction - Binary Search-Indexed Sequential search.                                                                | <b>11</b> |
| <b>Unit V</b>   | <b>Graph:</b> Traversal – Spanning trees. <b>Sorting:</b> Sorting - An Introduction - Efficiency of sorting Algorithms - Bubble sort - Selection sort - Quick sort - Insertion sort - Merge sort - Binary Tree Sort - Radix sort - Shell sort – Heap sort. <b>Hashing:</b> An Introduction - Hash functions.                                                                              | <b>11</b> |
|                 | <b>Total Contact Hrs.</b> <span style="float: right;"><i>* self study</i></span>                                                                                                                                                                                                                                                                                                          | <b>52</b> |

|                                                                 |
|-----------------------------------------------------------------|
| Presentations, Seminar , Quiz, Assignment, Activity, Case study |
|-----------------------------------------------------------------|

**Books for study**

- ❖ ISRD group. (2010). Data structure using C. Seventh Reprint. Tata McGraw-Hill.

**Books for Reference**

- ❖ Aaron .M. Tanenbaum, Yedidyeh Langsam, Moshe .J. Augenstein. (2007). *Data Structure using C*. 3<sup>rd</sup> Edition. PHI Pub.
- ❖ Ashok. N. Kamthane. (2004). *Programming And Data Structures*. First Indian Print. Pearson Education. ISBN 81-297-0327-0.

**Mapping**

| CO \ PSO | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|----------|------|------|------|------|------|
| CO1      | 1    | 3    | 3    | 1    | 2    |
| CO2      | 3    | 3    | 3    | 2    | 2    |
| CO3      | 2    | 2    | 3    | 3    | 3    |
| CO4      | 3    | 3    | 3    | 2    | 3    |

Low – 1, Medium – 2, High – 3

| Course Designed by  | Verified by HOD      | Checked by              | Approved by               |
|---------------------|----------------------|-------------------------|---------------------------|
| Name and Signature  | Name and Signature   | CDC                     | COE                       |
| Name: B. Kalaiselvi | Name: K. Vijayakumar | Name: Mr. K. Srinivasan | Name: Dr. R. Muthukumaran |
| Signature:          | Signature:           | Signature:              | Signature:                |

|                        |          |                               |                                    |             |
|------------------------|----------|-------------------------------|------------------------------------|-------------|
| <b>Programme Code:</b> | B. Sc.   | <b>Programme Title:</b>       | Bachelor of Information Technology |             |
| <b>Course Code:</b>    | 20UIT206 | <b>Title</b>                  | <b>Batch:</b>                      | 2020 - 2023 |
|                        |          | LAB. II – Programming in Java | <b>Semester:</b>                   | II          |
| <b>Hrs/Week:</b>       | 4        |                               | <b>Credits:</b>                    | 2           |

### Course Objective

To apply various concepts of java like inheritance, multithreading, exception handling, AWT, applet, package for improving the programming skills in java.

### Course Outcomes

|    |     |                                                                    |
|----|-----|--------------------------------------------------------------------|
| K3 | CO3 | To apply basic object oriented concepts                            |
| K4 | CO4 | To analyze the usage of packages, exceptions, thread, OOPs         |
| K5 | CO5 | To verify the working of applications using AWT, frames and applet |

| Content                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Hrs       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <p style="text-align: center;"><b>SAMPLE PROGRAM LIST</b></p> <p><b>Test I</b></p> <ol style="list-style-type: none"> <li>1. Program to create a class using constructor.</li> <li>2. Program to implement method overloading.</li> <li>3. Program to implement method overriding.</li> <li>4. Program to implement one and multi dimensional array.</li> <li>5. Program to implement multiple inheritance using interfaces.</li> <li>6. Program to create packages and sub packages.</li> </ol> <p><b>Test II</b></p> <ol style="list-style-type: none"> <li>7. Program for implementing threads.</li> <li>8. Program to implement inter-thread communication.</li> <li>9. Program for Exception Handling</li> <li>10. Program to create shapes using applets.</li> <li>11. Program to handle events.</li> <li>12. Program to create a form using AWT Components.</li> <li>13. Program to create files.</li> </ol> | <b>52</b> |

**Mapping**

| CO \ PSO | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|----------|------|------|------|------|------|
| CO1      | 3    | 3    | 3    | 2    | 2    |
| CO2      | 3    | 2    | 3    | 2    | 2    |
| CO3      | 3    | 3    | 3    | 3    | 3    |

Low – 1, Medium – 2, High – 3

| <b>Course Designed by</b> | <b>Verified by HOD</b>    | <b>Checked by</b>       | <b>Approved by</b>        |
|---------------------------|---------------------------|-------------------------|---------------------------|
| <b>Name and Signature</b> | <b>Name and Signature</b> | <b>CDC</b>              | <b>COE</b>                |
| Name: V. Prabavathi       | Name: K. Vijayakumar      | Name: Mr. K. Srinivasan | Name: Dr. R. Muthukumaran |
| Signature:                | Signature:                | Signature:              | Signature:                |

|                        |          |                                            |                                    |             |
|------------------------|----------|--------------------------------------------|------------------------------------|-------------|
| <b>Programme Code:</b> | B.Sc.    | <b>Programme Title :</b>                   | Bachelor of Information Technology |             |
| <b>Course Code:</b>    | 20UIT2A2 | <b>Title:</b>                              | <b>Batch :</b>                     | 2020 - 2023 |
|                        |          | Mathematics – II<br>(Discrete Mathematics) | <b>Semester :</b>                  | II          |
| <b>Hrs/Week:</b>       | 4        |                                            | <b>Credits :</b>                   | 4           |

### Course Objective

On successful completion of this subject the students should know Set theory, Mathematical logic, Relations, Graph theory, Languages and Grammars

### Course Outcomes (CO)

|    |     |                                                                                         |
|----|-----|-----------------------------------------------------------------------------------------|
| K1 | CO1 | To remember the concepts of set theory, mathematical logic, relations and graph theory. |
| K2 | CO2 | To understand the basic terminology of discrete mathematics                             |
| K3 | CO3 | To execute discrete notations in the programs                                           |
| K4 | CO4 | To evaluate the discrete concepts through programs                                      |

| Unit            | Content                                                                                                                                                                                                                                                                                                                                 | Hrs       |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>Unit I</b>   | <b>Set Theory:</b> Introduction-Set & its Elements-Set Description- <i>Types of sets</i> -Venn-Euler Diagrams - Set operations & Laws of set theory - Fundamental products - partitions of sets - min sets - Algebra of sets and Duality – Inclusion and Exclusion principle                                                            | <b>10</b> |
| <b>Unit II</b>  | <b>Mathematical Logic:</b> Introduction - Propositional Logic –Introduction, Proofs – <i>* Basic logical operations</i> – Tautologies – Contradiction - Predicate calculus.                                                                                                                                                             | <b>10</b> |
| <b>Unit III</b> | <b>Relations:</b> Binary Relations – Set operation on relations -Types of Relations – Partial order relation – Equivalence relation – Composition of relations. <b>Functions:</b> Types of functions – Invertible functions – Composition of functions.                                                                                 | <b>10</b> |
| <b>Unit IV</b>  | <b>Graph Theory:</b> Basic terminology – paths, cycle & Connectivity – Sub graphs – Types of graphs – Representation of graphs in computer memory - Trees - Properties of trees – Binary trees – Computer Representation of general trees.                                                                                              | <b>10</b> |
| <b>Unit V</b>   | <b>Number Theory:</b> Introduction – properties of integer – Greatest Common Divisor – Euclidean algorithm – <i>* Least Common Multiple</i> – testing for Prime number. <b>Language and Grammar:</b> Introduction – The set theory of strings – Languages – Regular expressions and Regular languages – Grammar – Finite state machine. | <b>12</b> |
|                 | <b>Total Contact Hrs</b> <span style="float: right;"><i>* Self-Study</i></span>                                                                                                                                                                                                                                                         | <b>52</b> |

|                                  |
|----------------------------------|
| Seminar, Assignment, Discussion. |
|----------------------------------|

**Books for study:**

- ❖ Sharma. J.K. (2005). *Discrete Mathematics*. 2<sup>nd</sup> Edition. Macmillan India Ltd.

**Books for Reference:**

- ❖ Kenneth H. Rosen. (2003). *Discrete Mathematics and Its Applications*, 5<sup>th</sup> Edition, McGraw Hill Pub.
- ❖ Dr. Venkataraman. M. K. Dr. Sridharan. N, Chandarasekaran. N. (2000). *Discrete Mathematics*. The National publishing Company Chennai.

**Mapping**

| CO \ PSO | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|----------|------|------|------|------|------|
| CO1      | 3    | 1    | 2    | 2    | 1    |
| CO2      | 3    | 2    | 2    | 2    | 1    |
| CO3      | 3    | 2    | 3    | 3    | 2    |
| CO4      | 3    | 2    | 3    | 2    | 2    |

Low – 1, Medium – 2, High – 3

| Course Designed by | Verified by HOD      | Checked by              | Approved by               |
|--------------------|----------------------|-------------------------|---------------------------|
| Name and Signature | Name and Signature   | CDC                     | COE                       |
| Name: R.Sekar.     | Name: K. Vijayakumar | Name: Mr. K. Srinivasan | Name: Dr. R. Muthukumaran |
| Signature:         | Signature:           | Signature:              | Signature:                |

|                        |          |                          |                                    |             |
|------------------------|----------|--------------------------|------------------------------------|-------------|
| <b>Programme Code:</b> | B.Sc.    | <b>Programme Title :</b> | Bachelor of Information Technology |             |
| <b>Course Code:</b>    | 20UIT307 | <b>Title:</b>            | <b>Batch :</b>                     | 2020 - 2023 |
|                        |          | Operating Systems        | <b>Semester :</b>                  | III         |
| <b>Hrs/Week:</b>       | 5        |                          | <b>Credits :</b>                   | 4           |

### Course Objective

On successful completion of this subject the students should know the basic concepts of operating system, memory management, process management, information management, deadlocks, parallel processing, distributed processing and Windows NT, XP, & 7.

### Course Outcomes (CO)

|    |     |                                                                                                                    |
|----|-----|--------------------------------------------------------------------------------------------------------------------|
| K1 | CO1 | To recollect fundamentals of operating system.                                                                     |
| K2 | CO2 | To understand basic principles and advanced concepts of the operating system.                                      |
| K3 | CO3 | To apply the different mathematical foundations, algorithmic principles with approaches in computer based systems. |
| K4 | CO4 | To analyze the various architectural components involved in OS and its applications.                               |

| Units           | Content                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Hrs       |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>Unit I</b>   | <b>Operating System-Functions and Structure:</b> Operating System Definition- Different services of Operating System- Uses of System Calls- Issue of Portability-Operating System Structure- Virtual machine- Booting. <b>Information Management:</b> Introduction - The File System- Introduction - Block and Block numbering scheme - <i>*Relationship between OS and DMS</i> - File Directory entry - Open/Close Operations. <b>Device Driver (DD):</b> The Basics, I/O Procedure, I/O Scheduler. | 13        |
| <b>Unit II</b>  | <b>Process Management:</b> Introduction – States – Transitions – Operations on a Process – Process Scheduling – Multithreading. <b>Inter Process Communication</b> - The Producer Consumer Problem. <b>Solutions to the Producer Consumer problems:</b> Interrupt Disabling/Enabling - Lock-flag – Primitive for mutual exclusion - Alternating Policy – Semaphores - <i>*Classical IPC Problems</i> .                                                                                               | 13        |
| <b>Unit III</b> | <b>Deadlocks:</b> Introduction - Graphical Representation of Deadlock - Deadlock Prerequisites - Deadlock Strategies. <b>Memory Management:</b> Introduction - <i>*Single Contiguous Memory Management</i> - Fixed Partition Memory Management - Variable Partitions - Non Contiguous Allocation General Concepts: Paging, Segmentation. <b>Virtual Memory Management System:</b> Jargon – Page Replacement Policies.                                                                                | 13        |
| <b>Unit IV</b>  | <b>Parallel Processing:</b> Introduction - Difference between Distributed and Parallel Processing - <i>*Advantages of Parallel Processing</i> - Machine Architectures supporting Parallel Processing - Operating System for Parallel Processing. <b>Distributed Processing:</b> Introduction - Distributed Processing - Process Migration – RPC - Distributed Processes - Distributed File Management - Cache Management.                                                                            | 14        |
| <b>Unit V</b>   | <b>Windows NT/2000:</b> History – Programming: Native NT API – Win32 API – Registry. Structure – Booting – <i>*Processes and Threads</i> – Memory Management – NTFS – Security. <b>Windows XP &amp; 7:</b> Introduction – Design principles - Architecture.                                                                                                                                                                                                                                          | 12        |
|                 | <b>Total Contact Hrs</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>65</b> |

*\* Self Study*

Seminar, Assignment, Quiz, Discussion.

**Books for study:**

- ❖ Achyut s Godbole. (2005). *Operating Systems*, 2<sup>nd</sup> Edition, TMH Publications (Units I – IV).

**Web References: (Unit V)**

- ❖ <https://www.os-book.com/OSE1/slide-dir/PDF-dir/ch16.pdf>
- ❖ <http://cc.ee.ntu.edu.tw/~farn/courses/OS/slides/ch22.pdf>

**Books for Reference:**

- ❖ H. M Deitel. (2003). *Operating Systems*, 2<sup>nd</sup> Edition, Pearson Education Publication.
- ❖ John J. Donovan. (1991). *Systems Programming*, TMH Publications.
- ❖ Mark G. Sobell, (2004 Edition), *A Practical Guide to Red Hat Linux 8*, Pearson Education.
- ❖ W. Frank Ableson, Robisen, Chris king. (2011), *Android in Action*, 2<sup>nd</sup> Edition, Dream Tech Press.

**Mapping**

| CO \ PSO | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|----------|------|------|------|------|------|
| CO1      | 2    | 3    | 3    | 3    | 2    |
| CO2      | 3    | 3    | 3    | 2    | 2    |
| CO3      | 3    | 3    | 3    | 3    | 2    |
| CO4      | 3    | 3    | 3    | 3    | 3    |

Low – 1, Medium – 2, High – 3

| Course Designed by  | Verified by HOD      | Checked by              | Approved by               |
|---------------------|----------------------|-------------------------|---------------------------|
| Name and Signature  | Name and Signature   | CDC                     | COE                       |
| Name: V. Prabavathi | Name: K. Vijayakumar | Name: Mr. K. Srinivasan | Name: Dr. R. Muthukumaran |
| Signature:          | Signature:           | Signature:              | Signature:                |

|                        |          |                                        |                                    |           |
|------------------------|----------|----------------------------------------|------------------------------------|-----------|
| <b>Programme Code:</b> | B. Sc.   | <b>Programme Title:</b>                | Bachelor of Information Technology |           |
| <b>Course Code:</b>    | 20UIT308 | <b>Title</b>                           | <b>Batch:</b>                      | 2020-2023 |
|                        |          | Relational Database Management Systems | <b>Semester:</b>                   | III       |
| <b>Hrs/Week:</b>       | 5        |                                        | <b>Credits:</b>                    | 4         |

### Course Objective

To provide better understanding of various concepts of DBMS, Oracle, normalization, data management and retrieval, PL/SQL commands, operations and Security.

### Course Outcomes

|    |     |                                                                         |
|----|-----|-------------------------------------------------------------------------|
| K1 | CO1 | To keep in mind the basic concepts of database                          |
| K2 | CO2 | To get the idea of a database from SQL statements                       |
| K3 | CO3 | To execute different forms of queries using SQL and PL/SQL statements   |
| K4 | CO4 | To analyze various data models which describe the structure of database |

| Units           | Content                                                                                                                                                                                                                                                                                                                                                                                                    | Hrs       |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>Unit I</b>   | <b>Database Concepts:</b> Database – DBMS Vs RDBMS- Normalization -Introduction to Oracle-Software development tools for Oracle- Introduction to SQL. <b>Interactive SQL Part - I :</b> Table Fundamentals- Create Table- Viewing -Eliminating Duplicate Rows -Sorting - Creating a Table from a Table - Insert -Delete - Update- Modify- Rename- Truncate- Destroy- Creating Synonyms- Examining Objects. | 12        |
| <b>Unit II</b>  | <b>Interactive SQL Part - II:</b> Data Constraints - Types-Defining Different Constraints - User Constraints- Defining Integrity Constraints - Dropping Integrity Constraints -Default value concepts. <b>Interactive SQL Part - III:</b> Computations done on Table Data- Sysdate- Oracle Functions - Date Conversion Functions - Date Functions - Miscellaneous Functions.                               | 13        |
| <b>Unit III</b> | <b>Interactive SQL Part - IV:</b> Grouping Data from Tables- Sub queries - Joins - Concatenating Data from table Columns- Union, Intersect and Minus Clause. <b>SQL Performance Tuning:</b> Indexes- Multiple Indexes - Using Rowid to delete Duplicate Rows- Using ROWNUM in SQL -Views-Clusters- Cluster Indexes- Sequences-Snapshots.                                                                   | 13        |
| <b>Unit IV</b>  | <b>Security Management using SQL:</b> Granting and Revoking Permissions - Revoking Privileges Given. <b>Introduction To PL/SQL:</b> Advantages of PL/SQL- Generic PL?SQL BLOCK - PL/SQL Execution Environment - PL/SQL - Control Structure. <b>SQL Transactions:</b> Oracle Transactions- Processing PL/SQL Block- Cursor- Cursor FOR Loops- Parameterized Cursors- Cursor within Cursor.                  | 13        |
| <b>Unit V</b>   | <b>PL/SQL Security:</b> Locks- Error handling in PL/SQL - Oracles Named Exception Handlers. <b>PL/SQL Database Objects:</b> Procedures and Functions Reside- advantages - Procedures Vs Functions- Oracle Packages - Database Triggers- Types - Deleting a Trigger- Raise Application Error Procedure.                                                                                                     | 14        |
|                 | <b>Total Contact Hrs</b> * self study                                                                                                                                                                                                                                                                                                                                                                      | <b>65</b> |

Presentations, Seminar , Quiz, Brain storming, Case study

### Books for study

- ❖ Ivan Bayross (2017), *SQL, PL/SQL the Programming Language of ORACLE*, 4<sup>th</sup> Edition, BPB Publications.

### Books for Reference

- ❖ Nilesh Shah. (2009), *Database Systems Using Oracle*, 2<sup>nd</sup> Edition, PHI.
- ❖ Arun Majumdar & Pritimoy Bhattacharya. (2001). *Database Management Systems*, TMH.
- ❖ Jeffrey A. Hoffer, Joey F. George, Joseph S. Valacich, ( 2009). *Modern Systems Analysis and Design*. 2<sup>nd</sup> Edition. 5<sup>th</sup> Edition. Pearson Education Pub's.
- ❖ Gerald V. Post. (2005). *Database Management Systems*, 3<sup>rd</sup> Edition, TMH.

### Mapping

| CO \ PSO | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|----------|------|------|------|------|------|
| CO1      | 2    | 3    | 2    | 3    | 3    |
| CO2      | 1    | 2    | 3    | 3    | 3    |
| CO3      | 1    | 2    | 3    | 3    | 3    |
| CO4      | 2    | 3    | 3    | 1    | 1    |

Low – 1, Medium – 2, High – 3

| Course Designed by        | Verified by HOD           | Checked by              | Approved by               |
|---------------------------|---------------------------|-------------------------|---------------------------|
| <b>Name and Signature</b> | <b>Name and Signature</b> | <b>CDC</b>              | <b>COE</b>                |
| Name: B.Kalaiselvi        | Name: K. Vijayakumar      | Name: Mr. K. Srinivasan | Name: Dr. R. Muthukumaran |
| Signature:                | Signature:                | Signature:              | Signature:                |

|                        |          |                               |                                    |           |
|------------------------|----------|-------------------------------|------------------------------------|-----------|
| <b>Programme Code:</b> | B.Sc.    | <b>Programme Title :</b>      | Bachelor of Information Technology |           |
| <b>Course Code:</b>    | 20UIT309 | <b>Title:</b>                 | <b>Batch :</b>                     | 2020-2023 |
|                        |          | Service Oriented Architecture | <b>Semester :</b>                  | III       |
| <b>Hrs/Week:</b>       | 5        |                               | <b>Credits :</b>                   | 4         |

### Course Objective

Understand the various concepts of Client/Server computing and web services, SOAP, UDDI, XML, WSDL etc.

### Course Outcomes (CO)

|    |     |                                                                      |
|----|-----|----------------------------------------------------------------------|
| K1 | CO1 | To keep in mind the various client/server concepts, middleware.      |
| K2 | CO2 | To Understand the basic concepts of C/S and service architectures    |
| K3 | CO3 | To apply web services in WSDL                                        |
| K4 | CO4 | To analyze the various registries, RPC and messages in web services. |

| Unit     | Content                                                                                                                                                                                                                                                                                                                                                                                                  | Hrs       |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| Unit I   | <b>Distributed Information Systems:</b> Design of an Information system – Architecture – communications. <b>Middleware:</b> Understanding middleware -RPC and related middleware.                                                                                                                                                                                                                        | 13        |
| Unit II  | <b>Middleware:</b> TP monitors - Object brokers - Message-oriented middleware. <b>Web Technologies:</b> Exchanging Information over the Internet-Web technologies for supporting remote clients-Application servers-Web technologies for application integration.                                                                                                                                        | 13        |
| Unit III | <b>Web Services:</b> *Introduction – <b>Emergence of web services:</b> Background-Server-side Architecture progression - Client-side Architecture progression-Service-oriented Architecture and web services. <b>Web Services Application Scenario:</b> Background - Web services Hype and the industry -Web services and the industry acceptance.                                                       | 13        |
| Unit IV  | <b>Extensible Markup Language:</b> *Background – History – XML - Validation of XML data - Advanced XML-Document Constraining. <b>Simple Object Access Protocol:</b> Background – SOAP - Interaction –Modeling – Encoding - Binding. <b>Web services Description Language:</b> Background - WSDL - Web service invocation and WSDL - Web services description details - Service Description through WSDL. | 14        |
| Unit V   | <b>Registries: Universal Description, Discovery and Integration-</b> Background-UDDI – Nomenclature - Core UDDI - Service publication - Discovery. <b>Remote Procedure Call and Messaging:</b> Background-Synchronous Web services-Asynchronous web Services-Remote procedure call or messaging- <b>Case Study:</b> Industry adoption.                                                                   | 12        |
|          | <b>Total Contact Hrs</b>                                                                                                                                                                                                                                                                                                                                                                                 | <b>65</b> |

*\*Self Study*

|                                                   |
|---------------------------------------------------|
| Presentation, Seminar, Assignment, and Discussion |
|---------------------------------------------------|

**Books for study:**

- ❖ Gustavo Alonso, Fabio Casati, Harumi kuno, Vijay Machiraju, (2009), “*Web Services Concepts, Architectures and Applications*”, Springer, First Reprint (Units - I & II).
- ❖ B V Kumar, S V Subrahmanya, (2009), “*Web Services – An Introduction*”, Tata McGraw Hill Pub, Sixth Reprint (Units – III, IV & V).

**Books for Reference:**

- ❖ Neil Jenkins, et al, (1996), “*Client/Server Unleashed*” Tec Media Publications, First Edition.
- ❖ Thomas Erl, (2008), “*Service Oriented Architecture Concepts, Technology and Design*”, Pearson Education, Second Impression.
- ❖ Thomas Erl, (2016), “*Service Oriented Architecture Analysis and Design for Services and Microservices*”, Prentice Hall, Second Edition.

**Mapping**

| CO \ PSO | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|----------|------|------|------|------|------|
| CO1      | 2    | 3    | 2    | 3    | 3    |
| CO2      | 1    | 3    | 3    | 3    | 2    |
| CO3      | 2    | 2    | 2    | 2    | 3    |
| CO4      | 1    | 3    | 2    | 3    | 3    |

Low – 1, Medium – 2, High – 3

| Course Designed by   | Verified by HOD      | Checked by              | Approved by               |
|----------------------|----------------------|-------------------------|---------------------------|
| Name and Signature   | Name and Signature   | CDC                     | COE                       |
| Name: K. Vijayakumar | Name: K. Vijayakumar | Name: Mr. K. Srinivasan | Name: Dr. R. Muthukumaran |
| Signature:           | Signature:           | Signature:              | Signature:                |

|                        |          |                         |                                    |             |
|------------------------|----------|-------------------------|------------------------------------|-------------|
| <b>Programme Code:</b> | B. Sc.   | <b>Programme Title:</b> | Bachelor of Information Technology |             |
| <b>Course Code:</b>    | 20UIT310 | <b>Title</b>            | <b>Batch:</b>                      | 2020 - 2023 |
|                        |          | Lab. III - RDBMS        | <b>Semester:</b>                   | III         |
| <b>Hrs/Week:</b>       | 4        |                         | <b>Credits:</b>                    | 2           |

### Course Objective

To understand, learn and apply the various programming concepts in ORACLE (Basic commands, Trigger, Functions, etc.)

### Course Outcomes

|    |     |                                                                                         |
|----|-----|-----------------------------------------------------------------------------------------|
| K3 | CO3 | To apply appropriate queries in Oracle and various tags to the Angular JS applications. |
| K4 | CO4 | To analyze various commands in SQL and PL/SQL and tags and concepts in the application. |
| K5 | CO5 | To create various applications.                                                         |

| Content                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Hrs |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <p style="text-align: center;"><b>SAMPLE PROGRAM LIST</b></p> <p><b>Test I</b></p> <ol style="list-style-type: none"> <li>DDL commands.</li> <li>Constraints</li> <li>DML commands.</li> <li>Arithmetic operations on tables.</li> <li>Where clause</li> <li>Case structures</li> <li>Built-in functions</li> <li>Group functions</li> <li>Joins and set operations</li> <li>Sub queries</li> </ol> <p><b>Test II</b></p> <p style="text-align: center;">PL/SQL Block structure.</p> <ol style="list-style-type: none"> <li>Control Structures in PL/SQL.</li> <li>Embedded SQL</li> <li>Cursors</li> <li>Exceptions</li> <li>PL/SQL Records and Tables.</li> <li>Procedures and Functions</li> <li>Packages and Triggers.</li> <li>Use Java as Front end and connect the oracle tables.</li> </ol> | 52  |

**Mapping**

| CO \ PSO | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|----------|------|------|------|------|------|
| CO1      | 1    | 1    | 3    | 2    | 1    |
| CO2      | 1    | 1    | 3    | 3    | 3    |
| CO3      | 1    | 3    | 3    | 3    | 3    |

Low – 1, Medium – 2, High – 3

| <b>Course Designed by</b> | <b>Verified by HOD</b>    | <b>Checked by</b>       | <b>Approved by</b>        |
|---------------------------|---------------------------|-------------------------|---------------------------|
| <b>Name and Signature</b> | <b>Name and Signature</b> | <b>CDC</b>              | <b>COE</b>                |
| Name: C.R. Durga devi     | Name: K. Vijayakumar      | Name: Mr. K. Srinivasan | Name: Dr. R. Muthukumaran |
| Signature:                | Signature:                | Signature:              | Signature:                |

|                        |          |                                                           |                                    |             |
|------------------------|----------|-----------------------------------------------------------|------------------------------------|-------------|
| <b>Programme Code:</b> | B.Sc.    | <b>Programme Title :</b>                                  | Bachelor of Information Technology |             |
| <b>Course Code:</b>    | 20UIT311 | <b>Title:</b>                                             | <b>Batch :</b>                     | 2020 - 2023 |
|                        |          | Lab. IV – Web Designing (HTML, CSS, JavaScript & Angular) | <b>Semester :</b>                  | <b>III</b>  |
| <b>Hrs/Week:</b>       | 4        |                                                           | <b>Credits :</b>                   | 2           |

### Course Objective

To know the various scripting programming concepts of HTML tags, Style sheets, Angular Modules, Controllers, Scopes, Filters, Services, Events, API, Routing and Animation and JavaScript.

### Course Outcomes (CO)

|    |     |                                                                       |
|----|-----|-----------------------------------------------------------------------|
| K3 | CO3 | To deploy the various HTML tags and CSS for page design               |
| K4 | CO4 | To analyze the various HTML tags and concepts of JavaScript programs. |
| K5 | CO5 | To create the various Angular applications.                           |

| Content                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Hrs       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <p align="center"><b>SAMPLE PROGRAM LIST</b></p> <p><b>Test I</b></p> <p><b>HTML &amp; CSS</b></p> <ol style="list-style-type: none"> <li>1. Webpage creation using CSS.</li> <li>2. Ordered List and Un-Ordered List.</li> <li>3. Table Tags.</li> <li>4. Frame creation.</li> <li>5. Font Attributes.</li> <li>6. Style sheets</li> </ol> <p><b>JavaScript</b></p> <ol style="list-style-type: none"> <li>1. Program to Display Digital clock.</li> <li>2. onClick and onChange Event.</li> <li>3. onFocus Event and onSubmit Event.</li> </ol> <p><b>Test II</b></p> <p><b>JavaScript</b></p> <ol style="list-style-type: none"> <li>4. onMouseOver and onMouseOut example</li> <li>5. Displaying Date and Time.</li> <li>6. createElement and createTextNode example.</li> <li>7. Redirection using location object.</li> </ol> | <b>52</b> |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>Angular</b> <ol style="list-style-type: none"> <li>1. Program to create a modules &amp; Controllers in a file.</li> <li>2. Program to implement the scopes.</li> <li>3. Program to apply filters.</li> <li>4. Program to create services.</li> <li>5. Programs to create simple tables.</li> <li>6. Program to perform events.</li> <li>7. Program to create a new form.</li> <li>8. Program to validate the email username &amp; password.</li> <li>9. Program to implement API.</li> <li>10. Program to implement routing.</li> <li>11. Program to perform animation.</li> <li>12. Program to create a simple application -I.</li> <li>13. Program to create a simple application - II.</li> </ol> |           |
| <b>Total Contact Hrs</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>52</b> |

### Mapping

| CO \ PSO | PS01 | PS02 | PS03 | PS04 | PS05 |
|----------|------|------|------|------|------|
| C03      | 2    | 2    | 3    | 3    | 3    |
| C04      | 2    | 2    | 3    | 3    | 3    |
| C05      | 2    | 2    | 3    | 3    | 3    |

Low – 1, Medium – 2, High – 3

| Course Designed by    | Verified by HOD      | Checked by              | Approved by               |
|-----------------------|----------------------|-------------------------|---------------------------|
| Name and Signature    | Name and Signature   | CDC                     | COE                       |
| Name: C.R. Durga devi | Name: K. Vijayakumar | Name: Mr. K. Srinivasan | Name: Dr. R. Muthukumaran |
| Signature:            | Signature:           | Signature:              | Signature:                |

|                        |          |                                                  |                                    |           |
|------------------------|----------|--------------------------------------------------|------------------------------------|-----------|
| <b>Programme Code:</b> | B.Sc.    | <b>Programme Title :</b>                         | Bachelor of Information Technology |           |
| <b>Course Code:</b>    | 20UIT3A3 | <b>Title:</b>                                    | <b>Batch :</b>                     | 2020-2023 |
|                        |          | Microprocessor and Assembly Language Programming | <b>Semester :</b>                  | III       |
| <b>Hrs/Week:</b>       | 5        |                                                  | <b>Credits :</b>                   | 4         |

### Course Objective

Understand the evolution of microprocessor, Addressing modes, pin diagrams of various processors, Assembly Language Programs, Other Microprocessors, Advanced Microprocessor, Mobile Processors, Interfacing A/D converter and Applications.

### Course Outcomes (CO)

|    |     |                                                                                                                   |
|----|-----|-------------------------------------------------------------------------------------------------------------------|
| K1 | CO1 | To keep in mind the various microprocessor and microcontrollers manufacturer name, year, versions, bit-size, etc. |
| K2 | CO2 | To Understand the basic concepts of 16 bit and 32 bit microprocessors.                                            |
| K3 | CO3 | To apply the instructions in the Assembly Language Programs.                                                      |
| K4 | CO4 | To analyze the various products of processors and controllers.                                                    |

| Unit                     | Content                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Hrs                             |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|
| <b>Unit I</b>            | <b>Introduction to Microprocessors:</b> * <i>Evolution of microprocessors</i> – Single- chip Microcomputer – Embedded Microprocessors – Bit - Slice processors – Microprogramming – RISC and CISC Processors – Scalar and Superscalar Processors – Vector Processors – Array Processors – Symbolic Processors – Digital Signal Processors Intel 8086 – Pin Description of Intel 8086 – Operating modes of 8086 – Register organization of 8086 – BIU and EU – Interrupts – 8086 based computer system – Addressing Modes of 8086. | 14                              |
| <b>Unit II</b>           | <b>8086 Instruction Set</b> – * <i>Instruction Groups</i> – Addressing Mode Byte – Segment Register Selection – Segment Override – 8086 Instructions. <b>Assembly Language Programs for 8086:</b> Largest Number, Smallest Number in a Data Array – Numbers in Ascending and Descending order – Block Move or Relocation – Block Move using REP instruction – Sum of a series – Multi byte Addition.                                                                                                                              | 13                              |
| <b>Unit III</b>          | <b>Intel 386 and 486 Microprocessors:</b> Intel 386 and 486 Microprocessor – 486DX Architecture – Register Organization of 486 Microprocessor – Memory Organization – Operating Modes of Intel 486 – Virtual Memory – Memory Management Unit – Gates – Interrupts and Exceptions – Addressing Modes of 80486 – Pin Configuration - Input devices – * <i>Output devices</i> .                                                                                                                                                      | 13                              |
| <b>Unit IV</b>           | <b>Other Microprocessors :</b> Pentium – Pentium Pro – Pentium II, III, IV - Alpha – Cyrix – MIPS – AMD Processors. <b>Advanced Core Processors:</b> Dual Core - Core2 Duo - i3 - i5 - i7 – i9 - Quad – Octa - Penta – Comparison. <b>Mobile Processors:</b> Introduction – Models – Architecture.                                                                                                                                                                                                                                | 13                              |
| <b>Unit V</b>            | <b>Interfacing of A/D Converter and Applications:</b> Introduction – Interfacing of ADC 0808 or ADC 0809 to Intel 8086 – Bipolar to Unipolar Converter – Sample and Hold Circuit, LF 398 – Microprocessor-based Measurement and Control of Physical Quantities.                                                                                                                                                                                                                                                                   | 12                              |
| <b>Total Contact Hrs</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <i>*Self Study</i><br><b>65</b> |

Seminar, Assignment, Quiz and Discussion

**Books for study:**

- ❖ Badri Ram. (2007). *Advanced Microprocessors and Interfacing*. Tata McGraw-Hill Publishing Company Limited, Fourteenth reprint.
- ❖ Course Materials from INTERNET (Advanced Core Processors).

**Web References: (Unit IV)**

- ❖ [https://en.wikipedia.org/wiki/List\\_of\\_Intel\\_Core\\_i9\\_microprocessors](https://en.wikipedia.org/wiki/List_of_Intel_Core_i9_microprocessors)
- ❖ <https://images-eu.ssl-images-amazon.com/images/I/C1lp5blG39S.pdf>
- ❖ <https://www.intel.com/content/dam/www/public/us/en/documents/datasheets/8th-gen-core-family-datasheet-vol-1.pdf>

**Books for Reference:**

- ❖ A.K. Ray, K.M. Bhurchandi. (2007). *Advanced Microprocessors and Peripherals*. Tata McGraw-Hill Publishing Company Limited, 2<sup>nd</sup> Edition.
- ❖ Ramesh S. Gaonkar. (1997). *Microprocessor Architecture, Programming, and Applications with the 8085*. 3<sup>rd</sup> Edition. PRI India.

**Mapping**

| CO \ PSO | PSO | PS01 | PS02 | PS03 | PS04 | PS05 |
|----------|-----|------|------|------|------|------|
| C01      |     | 2    | 3    | 2    | 3    | 2    |
| C02      |     | 2    | 3    | 2    | 3    | 2    |
| C03      |     | 2    | 3    | 3    | 3    | 2    |
| C04      |     | 2    | 3    | 2    | 3    | 2    |

Low – 1, Medium – 2, High – 3

| Course Designed by | Verified by HOD      | Checked by              | Approved by               |
|--------------------|----------------------|-------------------------|---------------------------|
| Name and Signature | Name and Signature   | CDC                     | COE                       |
| Name: R. Sekar     | Name: K. Vijayakumar | Name: Mr. K. Srinivasan | Name: Dr. R. Muthukumaran |
| Signature:         | Signature:           | Signature:              | Signature:                |

|                        |          |                                          |                                    |             |
|------------------------|----------|------------------------------------------|------------------------------------|-------------|
| <b>Programme Code:</b> | B.Sc.    | <b>Programme Title:</b>                  | Bachelor of Information Technology |             |
| <b>Course Code:</b>    | 20UIT3N1 | <b>Title :</b>                           | <b>Batch:</b>                      | 2020 - 2023 |
|                        |          | Skill Based Non-Major- I Social Networks | <b>Semester:</b>                   | III         |
| <b>Hrs/Week:</b>       | 1        |                                          | <b>Credits:</b>                    | 2           |

### Course Objective

To provide the overall view of various concepts of Social Networks such as history, classification of social media, services, pros and cons.

### Course Outcomes

|    |     |                                                  |
|----|-----|--------------------------------------------------|
| K1 | CO1 | To keep in mind basics of Social Networks        |
| K2 | CO2 | To understand the classification of Social Media |
| K3 | CO3 | To deploy various social media platforms         |
| K4 | CO4 | To analyze the types of social media.            |

| Units           | Content                                                                               | Hrs |
|-----------------|---------------------------------------------------------------------------------------|-----|
| <b>Unit I</b>   | Social Networks: Introduction – Definition - History                                  | 2   |
| <b>Unit II</b>  | Impact of social media - Privacy and Identity : Data Sharing and Safety               | 2   |
| <b>Unit III</b> | Types of services – Platforms - Building and Strengthening of social media.           | 3   |
| <b>Unit IV</b>  | Spamming in social networks – social aspects- Design Issues                           | 3   |
| <b>Unit V</b>   | Growing Constituency through Social Media – A glance at social media Do's and Don'ts. | 3   |
|                 | <b>Total Contact Hrs</b>                                                              | 13  |

|                                                     |
|-----------------------------------------------------|
| Presentations, Group discussions, Quiz, Assignments |
|-----------------------------------------------------|

**Online Reference Materials**

1. <https://www.usaid.gov/sites/default/files/documents/1866/SMGuide4CSO.pdf>
2. [https://www.symantec.com/content/en/us/.../the\\_risks\\_of\\_social\\_networking.pdf](https://www.symantec.com/content/en/us/.../the_risks_of_social_networking.pdf)

**Mapping**

| CO \ PSO | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|----------|------|------|------|------|------|
| CO1      | 3    | 3    | 2    | 1    | 3    |
| CO2      | 1    | 3    | 1    | 1    | 2    |
| CO3      | 1    | 3    | 1    | 1    | 2    |
| CO4      | 1    | 3    | 1    | 1    | 2    |

Low – 1, Medium – 2, High – 3

| Course Designed by    | Verified by HOD      | Checked by              | Approved by               |
|-----------------------|----------------------|-------------------------|---------------------------|
| Name and Signature    | Name and Signature   | CDC                     | COE                       |
| Name: C.R. Durga devi | Name: K. Vijayakumar | Name: Mr. K. Srinivasan | Name: Dr. R. Muthukumaran |
| Signature:            | Signature:           | Signature:              | Signature:                |

|                        |          |                                                 |                                    |             |
|------------------------|----------|-------------------------------------------------|------------------------------------|-------------|
| <b>Programme Code:</b> | B.Sc.    | <b>Programme Title:</b>                         | Bachelor of Information Technology |             |
| <b>Course Code:</b>    | 20UIT3N2 | <b>Title</b>                                    | <b>Batch:</b>                      | 2020 - 2023 |
|                        |          | Skill Based Non-Major I - Hardware & Networking | <b>Semester:</b>                   | III         |
| <b>Hrs/Week:</b>       | 1        |                                                 | <b>Credits:</b>                    | 2           |

### Course Objective

To make understand various concepts of processors, input / output hardware, communication channels, networks with their types etc.

### Course Outcomes

|    |     |                                                       |
|----|-----|-------------------------------------------------------|
| K1 | CO1 | To recollect the basics of I/O hardware               |
| K2 | CO2 | To understand about working of processors             |
| K3 | CO3 | To implement a network operating system               |
| K4 | CO4 | To analyze different types of networks and topologies |

| Units           | Content                                                                                                                                                                                                              | Hrs       |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>Unit I</b>   | <b>Processors:</b><br>Microchips, Miniaturization and Mobility - CPU and Main Memory - Microcomputer System Unit.                                                                                                    | 2         |
| <b>Unit II</b>  | <b>Input and Output Hardware:</b><br>Input Hardware - Keyboard Input- Pointing Devices - Output Hardware - Display Screens.                                                                                          | 3         |
| <b>Unit III</b> | <b>Communication Channels:</b><br>Electromagnetic Spectrum - Twisted Pair - Coaxial Cable - Fiber Optic Cable – Microwave and Satellite Systems - Wireless Communications - Next Generation Wireless Communications. | 4         |
| <b>Unit IV</b>  | <b>Communication Networks:</b><br>Types of Networks - Network Operating System - Host and Node - Servers and Clients – Advantages of Networks.                                                                       | 2         |
| <b>Unit V</b>   | <b>Local Networks:</b><br>N/W Types - Types of LAN's – Components – Topology - Impact of LAN.                                                                                                                        | 2         |
|                 | <b>Total Contact Hrs</b>                                                                                                                                                                                             | <b>13</b> |

|                                           |
|-------------------------------------------|
| Presentations, Seminar , Quiz, Assignment |
|-------------------------------------------|

**Books for study**

- Williams, Sawyer and Hutchinson. (2001). *Using Information Technology - A Practical Introduction to Computers & Communications*. 3<sup>rd</sup> Edition. Tata McGraw Hill.

**Books for Reference**

- Course Material from Internet.

**Mapping**

| CO \ PSO | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|----------|------|------|------|------|------|
| CO1      | 1    | 3    | 2    | 3    | 3    |
| CO2      | 1    | 3    | 2    | 3    | 3    |
| CO3      | 1    | 4    | 2    | 3    | 3    |
| CO4      | 2    | 3    | 2    | 2    | 2    |

Low – 1, Medium – 2, High – 3

| Course Designed by | Verified by HOD      | Checked by              | Approved by               |
|--------------------|----------------------|-------------------------|---------------------------|
| Name and Signature | Name and Signature   | CDC                     | COE                       |
| Name: R. Sekar     | Name: K. Vijayakumar | Name: Mr. K. Srinivasan | Name: Dr. R. Muthukumaran |
| Signature:         | Signature:           | Signature:              | Signature:                |

|                        |          |                                 |                                    |             |
|------------------------|----------|---------------------------------|------------------------------------|-------------|
| <b>Programme Code:</b> | B.Sc.    | <b>Programme Title:</b>         | Bachelor of Information Technology |             |
| <b>Course Code:</b>    | 20UIT412 | <b>Title</b>                    | <b>Batch:</b>                      | 2020 - 2023 |
|                        |          | Data Communication and Networks | <b>Semester:</b>                   | IV          |
| <b>Hrs/Week:</b>       | 5        |                                 | <b>Credits:</b>                    | 4           |

### Course Objective

To provide basic concepts of networking like data transmission, topology, OSI model, TCP/IP, transmission media, X.25 protocol, frame relay, ATM and accessing the internet.

### Course Outcomes

|    |     |                                                         |
|----|-----|---------------------------------------------------------|
| K1 | CO1 | To remember basics of data communication and networking |
| K2 | CO2 | To comprehend various types of networks and topologies  |
| K3 | CO3 | To implement routing algorithms                         |
| K4 | CO4 | To review different ways of accessing the internet      |

| Units           | Content                                                                                                                                                                                                                                                                                                                                           | Hrs       |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>Unit I</b>   | Introduction to Data Communications and Networking – <i>*Information Encoding</i> - Analog and Digital Transmission Methods – Modes of Data Transmission and Multiplexing.                                                                                                                                                                        | 12        |
| <b>Unit II</b>  | <b>Transmission Errors:</b> Detection and Correction - <b>Transmission Media:</b> Guided Media, Unguided Media. <b>Network Topologies:</b> Mesh, Star, Tree, Ring, Bus topology. Switching- Circuit, Message, Packet switching. Routers and Routing – Factors affecting Routing Algorithms – Routing Algorithms – <i>*Approaches to Routing</i> . | 13        |
| <b>Unit III</b> | Network Protocols and OSI Model – <i>*TCP/IP</i> - Local Area Networks (LAN), Metropolitan Area Networks (MAN) and Wide Area Networks (WAN) – Integrated Services Digital Network (ISDN).                                                                                                                                                         | 13        |
| <b>Unit IV</b>  | <b>X.25 Protocol:</b> Working principle-Characteristics – Packet format – operations. <b>Frame Relay:</b> Need – Working principle – Frame format-congestion & traffic control – FRAD & Features. <b>Asynchronous Transfer Mode:</b> Introduction- Packet size- Virtual circuits – Cells- <i>*Switching, Layers</i> .                             | 14        |
| <b>Unit V</b>   | Internetworking Concepts, Devices, Internet Basics, History and Architecture. <b>Ways of Accessing the Internet:</b> Introduction- Dial- up access- Leased lines- DSL- Cable modems.                                                                                                                                                              | 13        |
|                 | <b>Total Contact Hrs</b> <span style="float: right;"><i>* self study</i></span>                                                                                                                                                                                                                                                                   | <b>65</b> |

|                                                              |
|--------------------------------------------------------------|
| Presentations, Group discussions, Seminar , Quiz, Assignment |
|--------------------------------------------------------------|

**Books for study**

- Achyut S.Godbole. (2007). *Data Communications and Networks*. Tata McGraw-Hill Publishing Company Limited, Ninth reprint

**Books for Reference**

- Behrouz A. Forouzan. (2007). *Data Communications and Networking*, 2<sup>nd</sup> Edition Update. Tata McGraw-Hill Publishing Company Limited, Nineteenth reprint.
- Andrew S. Tanenbaum. (2000). *Computer Networks*. 3<sup>rd</sup> Edition, Prentice Hall of India.

**Mapping**

| CO \ PSO | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|----------|------|------|------|------|------|
| CO1      | 3    | 3    | 2    | 2    | 2    |
| CO2      | 3    | 3    | 3    | 2    | 2    |
| CO3      | 3    | 3    | 3    | 3    | 1    |
| CO4      | 1    | 3    | 3    | 3    | 3    |

Low – 1, Medium – 2, High – 3

| Course Designed by    | Verified by HOD      | Checked by              | Approved by               |
|-----------------------|----------------------|-------------------------|---------------------------|
| Name and Signature    | Name and Signature   | CDC                     | COE                       |
| Name: C.R. Durga devi | Name: K. Vijayakumar | Name: Mr. K. Srinivasan | Name: Dr. R. Muthukumaran |
| Signature:            | Signature:           | Signature:              | Signature:                |

|                        |          |                           |                                    |
|------------------------|----------|---------------------------|------------------------------------|
| <b>Programme Code:</b> | B.Sc.    | <b>Programme Title:</b>   | Bachelor of Information Technology |
| <b>Course Code:</b>    | 20UIT413 | <b>Title</b>              | <b>Batch:</b>                      |
|                        |          | Advanced Java Programming | <b>Semester:</b> IV                |
| <b>Hrs/Week:</b>       | 5        | <b>Credits:</b>           | 4                                  |

### Course Objective

On successful completion of this subject the students can understand various concepts of Swings, Beans, JDBC, Servlet, JSP, JSTL, AJAX etc.

### Course Outcomes

|           |            |                                                                                                         |
|-----------|------------|---------------------------------------------------------------------------------------------------------|
| <b>K1</b> | <b>CO1</b> | To recollect the knowledge of GUI based applications, Web based applications and Database applications. |
| <b>K2</b> | <b>CO2</b> | To understand development of the Internet programming through java programming.                         |
| <b>K3</b> | <b>CO3</b> | To apply different powerful GUI components from existing applications to create new web pages.          |
| <b>K4</b> | <b>CO4</b> | To analysis different applications for solving the real time problems in Industry.                      |

| Units                    | Content                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Hrs                           |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| <b>Unit I</b>            | <b>Swing Basic Concepts:</b> JFC- The Swing and the AWT - Swing Packages - Structure of A Swing Application – Top - Level Swing Containers - Lightweight Swing Container - JComponent Class - Basic Swing Components - Swing Text Components. <b>Exploring Swing:</b> Menu Components -Space Saving Lightweight Containers - Advanced Components – Virtual Desktop Components -Advanced Text Component - <i>*New Layout Managers.</i>                                                                                                     | 13                            |
| <b>Unit II</b>           | <b>Java Beans:</b> Definition - Advantages - Application Builder Tools - Using The Bean Development Kit (BDK) - JAR Files - Developing a Simple Bean Using the BDK - Using Bound Properties - Using the Bean info Interface - <i>*Constrained Properties - Persistence - Customizers</i> - The Java Bean API - Using Bean Builder.                                                                                                                                                                                                        | 13                            |
| <b>Unit III</b>          | <b>JDBC:</b> Architecture - <i>*JDBC-ODBC Relationship</i> – Types of Drivers – Components - Interfaces and classes - Steps for Querying the Database with JDBC - Creating an ODBC Data source - Querying and updating Database Tables - passing parameters to a statement. <b>Servlets:</b> Introduction-Architecture - Designing - Servlet generating Plain Text, HTML - Handling GET Request.                                                                                                                                          | 13                            |
| <b>Unit IV</b>           | <b>Cookies:</b> Overview of cookies – Servlet cookie API – Read, Use, Send cookies in a Servlet, Get client's address in a Servlet – Hit counter example. <b>JSP:</b> Introduction – Scripting elements - life cycle.                                                                                                                                                                                                                                                                                                                     | 12                            |
| <b>Unit V</b>            | <b>JSTL Tags:</b> Overview – EL Support – i18n support - Database Support (SQL Tags) – XML support. <b>AJAX:</b> Introduction – working concepts - Benefits - Role of Ajax in enhancing the user experience on the web - Rich internet application - What can Ajax do? - Impact of Ajax on user experience - on mobile - Traditional means of web application development - Web application development - Data exchange - Advantages and disadvantages - Web framework XML HTTP request object – Examples (First Program and Login Form). | 14                            |
| <b>Total Contact Hrs</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <i>* Self Study</i> <b>65</b> |

|                                          |
|------------------------------------------|
| Seminar, Assignment, Quiz and Discussion |
|------------------------------------------|

**Books for Study:**

- ISRD Group, (2007), *Introduction to Object Oriented Programming through Java*, Tata McGraw-Hill Publishing Company Limited, New Delhi. (Units I, III)
- Herbert Schild, (2002). *Java Complete Reference*, 5<sup>th</sup> Edition, Tata McGraw Hill Pub (Unit II).
- S. Padma Priya, (2011), *Web Technology*, Scitech Pub (Units IV, V).

**Books for Reference:**

- Rashim Mogha, V.V. Preetham, (2010), *Java Web Services Programming*, Willy India Pub.

**Mapping**

| CO \ PSO | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|----------|------|------|------|------|------|
| CO1      | 2    | 3    | 3    | 3    | 2    |
| CO2      | 3    | 3    | 3    | 3    | 2    |
| CO3      | 3    | 3    | 3    | 3    | 3    |
| CO4      | 3    | 3    | 3    | 3    | 3    |

Low – 1, Medium – 2, High – 3

| Course Designed by        | Verified by HOD           | Checked by              | Approved by               |
|---------------------------|---------------------------|-------------------------|---------------------------|
| <b>Name and Signature</b> | <b>Name and Signature</b> | <b>CDC</b>              | <b>COE</b>                |
| Name: V. Prabavathi       | Name: K. Vijayakumar      | Name: Mr. K. Srinivasan | Name: Dr. R. Muthukumaran |
| Signature:                | Signature:                | Signature:              | Signature:                |

|                        |          |                          |                                    |             |
|------------------------|----------|--------------------------|------------------------------------|-------------|
| <b>Programme Code:</b> | B.Sc.    | <b>Programme Title :</b> | Bachelor of Information Technology |             |
| <b>Course Code:</b>    | 20UIT414 | <b>Title:</b>            | <b>Batch :</b>                     | 2020 - 2023 |
|                        |          | Visual Programming       | <b>Semester :</b>                  | IV          |
| <b>Hrs/Week:</b>       | 5        |                          | <b>Credits :</b>                   | 4           |

### Course Objective

Understand the various concepts of C#.Net (Data types, Statements, Properties, Inheritance, Polymorphism, Multithreading, Database Connectivity and Web Services).

### Course Outcomes (CO)

|           |            |                                                                                                                  |
|-----------|------------|------------------------------------------------------------------------------------------------------------------|
| <b>K1</b> | <b>CO1</b> | To keep in mind the various statements, data types, properties, Indexes, Interfaces, Events and Attributes, etc. |
| <b>K2</b> | <b>CO2</b> | To Understand the basic concepts of Methods, Arrays, Overloading, Threading, File Streams, and Web Services.     |
| <b>K3</b> | <b>CO3</b> | To apply the concepts into the Lab. programs.                                                                    |
| <b>K4</b> | <b>CO4</b> | To analyze the various controls of OOPs, Windows Applications and Web Services.                                  |

| Units           | Content                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Hrs       |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>Unit I</b>   | <b>Visual C#.Net:</b> Introduction - Features – Data types and console I/O. <i>*Control Statements (if, switch, while, do...while, for, for...Each, go to).</i> <b>Arrays:</b> One Dimensional, Two Dimensional, Jagged. <b>Methods:</b> (value, ref, out, params) –Overloading.                                                                                                                                                                                                                   | 12        |
| <b>Unit II</b>  | <b>Classes and Objects:</b> Introduction – Definition - Data members (constant, Read-only). <i>*Constructors: Overloading – Copy – Static.</i> <b>Properties, Indexes and Operator Overloading:</b> Introduction – Properties – Indexes – Operator overloading – Conversion operators. <b>Inheritance and Polymorphism:</b> Introduction – Example – Method Overriding – Accessing Base class Members and Constructors – Virtual methods – Abstract Classes and Abstract Methods – Sealed classes. | 13        |
| <b>Unit III</b> | <b>Interfaces:</b> Introduction – Definition and usage – Multiple implementations – Inheritance. <b>Namespaces and Components</b> – Namespaces – Components – Components and Namespaces – Access modifiers. <b>Delegates, Events and Attributes.</b> <b>Exception handling:</b> Introduction – Mechanism (Default, User – defined). Backtracking – throw statement – Custom Exception. <b>Multithreading:</b> Introduction – Usage – Thread Class and Priority – Synchronization.                  | 14        |
| <b>Unit IV</b>  | <b>I/O Streams:</b> Introduction – Streams – Binary Data files – Text files – Data files – File and Directory Operations. <b>Windows applications - I. Windows applications-II. Database connectivity.</b>                                                                                                                                                                                                                                                                                         | 13        |
| <b>Unit V</b>   | <b>Basic Web controls. Validation and list web controls:</b> Introduction – validation – list. <b>User and Custom web controls:</b> Introduction – <i>*User controls</i> – controls and custom properties, controls. <b>Web services:</b> Introduction – concepts – creation – Creating a web service that use data source.<br><b>Case Study:</b> Develop a unique application using this course.                                                                                                  | 13        |
|                 | <b>Total Contact Hrs</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>65</b> |

*\*Self Study*

Presentation, Seminar, Assignment, and Discussion

**Books for study:**

- ❖ Muthu C. (2008). *Visual C#.Net*. First Reprint. Tata Mc-Graw Hill Pub.

**Books for Reference:**

- ❖ Kogent learning solutions (2011) *ASP.NET 4.0 in Simple Steps*- -Dream Tech Press Publication.
- ❖ Padmapriya .S (2011) *Web Technology* - Scitech Publications.

**Mapping**

| <div>PSO</div> <div>CO</div> | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|------------------------------|------|------|------|------|------|
| CO1                          | 2    | 2    | 2    | 3    | 3    |
| CO2                          | 2    | 1    | 3    | 3    | 3    |
| CO3                          | 3    | 2    | 3    | 3    | 3    |
| CO4                          | 2    | 2    | 2    | 3    | 3    |

Low – 1, Medium – 2, High – 3

| Course Designed by | Verified by HOD      | Checked by              | Approved by               |
|--------------------|----------------------|-------------------------|---------------------------|
| Name and Signature | Name and Signature   | CDC                     | COE                       |
| Name: R. Sekar     | Name: K. Vijayakumar | Name: Mr. K. Srinivasan | Name: Dr. R. Muthukumaran |
| Signature:         | Signature:           | Signature:              | Signature:                |

|                        |          |                                       |                                    |             |
|------------------------|----------|---------------------------------------|------------------------------------|-------------|
| <b>Programme Code:</b> | B.Sc.    | <b>Programme Title :</b>              | Bachelor of Information Technology |             |
| <b>Course Code:</b>    | 20UIT415 | <b>Title:</b>                         | <b>Batch :</b>                     | 2020 - 2023 |
|                        |          | Lab. V – Programming in Advanced Java | <b>Semester :</b>                  | IV          |
| <b>Hrs/Week:</b>       | 5        |                                       | <b>Credits :</b>                   | 3           |

### Course Objective

Understand the practical experience in various concepts of Swings, Beans, JDBC, Servlet, JSP, JSTL, AJAX, etc...

### Course Outcomes

|           |            |                                                                                   |
|-----------|------------|-----------------------------------------------------------------------------------|
| <b>K3</b> | <b>CO3</b> | To apply the different components of java programming.                            |
| <b>K4</b> | <b>CO4</b> | To analysis the concepts to enhance in the application level.                     |
| <b>K5</b> | <b>CO5</b> | To validate the user friendliness and desire performance implied for given input. |

| <b>Contents</b>                                                                                                                                                                                                                                                                                                                                   | <b>Hrs</b> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| <b>Test I</b><br>1. Create JCheckBox<br>2. Creating a menu<br>3. Program for swing<br>4. JTabbedPane<br>5. Function of JTree<br>6. Create JScrollPane using swing<br><b>Test II</b><br>7. Develop a Generic Servlet.<br>8. Implement JDBC using Servlet.<br>9. Create a Javabean to create Juggler Bean.<br>10. Generate simple property Javabean | <b>65</b>  |
| <b>Total Contact Hrs</b>                                                                                                                                                                                                                                                                                                                          | <b>65</b>  |

**Mapping**

| CO \ PSO | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|----------|------|------|------|------|------|
| CO3      | 2    | 2    | 3    | 2    | 2    |
| CO4      | 1    | 2    | 3    | 3    | 3    |
| CO5      | 2    | 2    | 3    | 3    | 3    |

Low – 1, Medium – 2, High – 3

| <b>Course Designed by</b> | <b>Verified by HOD</b>    | <b>Checked by</b>       | <b>Approved by</b>        |
|---------------------------|---------------------------|-------------------------|---------------------------|
| <b>Name and Signature</b> | <b>Name and Signature</b> | <b>CDC</b>              | <b>COE</b>                |
| Name: V. Prabavathi       | Name: K. Vijayakumar      | Name: Mr. K. Srinivasan | Name: Dr. R. Muthukumaran |
| Signature:                | Signature:                | Signature:              | Signature:                |

|                        |          |                              |                                    |             |
|------------------------|----------|------------------------------|------------------------------------|-------------|
| <b>Programme Code:</b> | B.Sc.    | <b>Programme Title :</b>     | Bachelor of Information Technology |             |
| <b>Course Code:</b>    | 20UIT416 | <b>Title:</b>                | <b>Batch :</b>                     | 2020 - 2023 |
|                        |          | Lab. VI - Visual Programming | <b>Semester :</b>                  | IV          |
| <b>Hrs/Week:</b>       | 3        |                              | <b>Credits :</b>                   | 2           |

### Course Objective

Understand the practical experience in various concepts of C#.Net (Data types, Statements, Properties, Inheritance, Polymorphism, Multithreading, and Database Connectivity and Web Services).

### Course Outcomes (CO)

|           |            |                                                     |
|-----------|------------|-----------------------------------------------------|
| <b>K3</b> | <b>CO3</b> | To apply the concepts of web oriented programs.     |
| <b>K4</b> | <b>CO4</b> | To analyze the various commands and concepts.       |
| <b>K5</b> | <b>CO5</b> | To verify the results for the different input data. |

| Content                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Hrs       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <p style="text-align: center;"><b>Sample Program List</b></p> <p><b>Test I:</b></p> <ol style="list-style-type: none"> <li>1.Switch Statement</li> <li>2.Method overloading.</li> <li>3.Constructor overloading</li> <li>4. Implement Inheritance</li> <li>5. Create User-Defined exception.</li> <li>6. Create an application using button controls (check box, radio).</li> <li>7. Generate Monthly calendar.</li> </ol> <p><b>Test II:</b></p> <ol style="list-style-type: none"> <li>8. Create applications using controls (trackbar, panel, tree view)</li> <li>9. Create applications using controls (splitter, menu dialog boxes).</li> <li>10. Implement ADO.Net.</li> <li>11. Generate basic manipulation using web controls.</li> <li>12. Check All validation controls using web controls.</li> <li>13. Creating a simple web service using controls.</li> </ol> | 39        |
| <b>Total Contact Hrs</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>39</b> |

### Mapping

| CO \ PSO | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|----------|------|------|------|------|------|
| CO3      | 2    | 2    | 3    | 3    | 3    |
| CO4      | 1    | 2    | 3    | 3    | 3    |
| CO5      | 1    | 2    | 3    | 3    | 3    |

Low – 1, Medium – 2, High – 3

| Course Designed by | Verified by HOD      | Checked by              | Approved by               |
|--------------------|----------------------|-------------------------|---------------------------|
| Name and Signature | Name and Signature   | CDC                     | COE                       |
| Name: R. Sekar     | Name: K. Vijayakumar | Name: Mr. K. Srinivasan | Name: Dr. R. Muthukumaran |
| Signature:         | Signature:           | Signature:              | Signature:                |

|                        |          |                          |                                    |           |
|------------------------|----------|--------------------------|------------------------------------|-----------|
| <b>Programme Code:</b> | B.Sc.    | <b>Programme Title :</b> | Bachelor of Information Technology |           |
| <b>Course Code:</b>    | 20UIT4A4 | <b>Title:</b>            | <b>Batch :</b>                     | 2020-2023 |
|                        |          | Software Engineering     | <b>Semester :</b>                  | IV        |
| <b>Hrs/Week:</b>       | 5        |                          | <b>Credits :</b>                   | 4         |

### Course Objective

Understand the software development life cycle, process models, requirements analysis, design concepts, software quality and testing techniques.

### Course Outcomes (CO)

|    |     |                                                                                   |
|----|-----|-----------------------------------------------------------------------------------|
| K1 | CO1 | To recollect the various process models, requirements, Designs, Quality, Testing. |
| K2 | CO2 | To Understand the software development phases.                                    |
| K3 | CO3 | To apply concepts into the testing lab.                                           |
| K4 | CO4 | To evaluate the expected result with testing output.                              |

| Unit            | Content                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Hrs                          |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Unit I</b>   | <b>Software and Software Engineering:</b> The Nature of software-The Unique Nature of WebApps-Software Engineering-The software process-Software Engineering practice- <i>*Software Myths</i> . <b>Process Models:</b> A Generic process model-Process Assessment and Improvement-Perspective process model-Specialized process models-The Unified process- Personal and team process models-process Technology-Product and Process. <b>AGILE Development:</b> Agility – Cost of change - Process - <b>Extreme programming:</b> Values – Process – Industry – Debate. | 15                           |
| <b>Unit II</b>  | Requirement analysis-Scenario based modeling-UML Models-Data modeling concepts-Class based modeling. <b>Requirements Modeling:</b> Flow (DFD, Activity, ER), Behavior, Patterns - and WebApps.                                                                                                                                                                                                                                                                                                                                                                        | 13                           |
| <b>Unit III</b> | <b>Design concepts:</b> The design process-Design concepts-Design model. <b>User Interface Design:</b> The golden rule-User Interface Analysis and Design-Interface Analysis-Interface Design Steps-WebApp Interface Design- <i>*Design evaluation</i> .                                                                                                                                                                                                                                                                                                              | 12                           |
| <b>Unit IV</b>  | <b>Quality Concepts:</b> Software Quality-Dilemma- <i>*Achieving Software Quality</i> . <b>Software Quality Assurance:</b> Elements – Tasks, Goals and metrics – Statistical SQA – Software reliability – SQA plan.                                                                                                                                                                                                                                                                                                                                                   | 12                           |
| <b>Unit V</b>   | <b>Software Testing strategies:</b> Strategic Approach to Software Testing-Strategic Issues-Unit Testing-Integration Testing-Validation Testing-System Testing. <b>Testing conventional Applications:</b> Software Testing Fundamentals-Internal and External view of Testing-White Box Testing-Basis Path Testing - <i>*Control Structure Testing</i> -Black Box Testing. <b>Case study:</b> Draft an ER & DFD for a unique problem.                                                                                                                                 | 13                           |
|                 | <b>Total Contact Hrs</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <i>*Self Study</i> <b>65</b> |

Presentation, Seminar, Assignment, and Discussion

**Books for study:**

- ❖ Roger S. Pressman (2010) *Software Engineering-A Practitioner's Approach*, 5<sup>th</sup> Edition, McGraw-Hill International Pub.
- ❖ Jeffrey A. Hoffer, Joey F. Georgr, Joseph S. Valacich (2000), “*Modern Systems Analysis and Design*”, 2<sup>nd</sup> Edition, Pearson Education publications. (Unit II – DFD, ER)

**Books for Reference:**

- ❖ Richard Fairley (2010), *Software Engineering Concepts*, 33<sup>rd</sup> Reprint, Tata McGraw-Hill Publishing Company Limited.
- ❖ Pankaj Jalote (2001), *An Integrated Approach to Software Engineering*, 3<sup>rd</sup> Edition Narosa Publication.

**Mapping**

| CO \ PSO | PSO | PS01 | PS02 | PS03 | PS04 | PS05 |
|----------|-----|------|------|------|------|------|
| C01      |     | 3    | 3    | 2    | 3    | 3    |
| C02      |     | 3    | 2    | 3    | 3    | 3    |
| C03      |     | 3    | 3    | 3    | 3    | 3    |
| C04      |     | 3    | 2    | 3    | 3    | 3    |

Low – 1, Medium – 2, High – 3

| Course Designed by | Verified by HOD      | Checked by              | Approved by               |
|--------------------|----------------------|-------------------------|---------------------------|
| Name and Signature | Name and Signature   | CDC                     | COE                       |
| Name: R. Sekar     | Name: K. Vijayakumar | Name: Mr. K. Srinivasan | Name: Dr. R. Muthukumaran |
| Signature:         | Signature:           | Signature:              | Signature:                |

|                        |          |                                            |                                    |             |
|------------------------|----------|--------------------------------------------|------------------------------------|-------------|
| <b>Programme Code:</b> | B.Sc.    | <b>Programme Title:</b>                    | Bachelor of Information Technology |             |
| <b>Course Code:</b>    | 20UIT4N3 | <b>Title</b>                               | <b>Batch:</b>                      | 2020 - 2023 |
|                        |          | Skill Based Non-Major – II. Data Analytics | <b>Semester:</b>                   | IV          |
| <b>Hrs/Week:</b>       | 1        |                                            | <b>Credits:</b>                    | 2           |

### Course Objective

To bestow an understanding of various concepts of data analytics, tools, applications and career opportunities in the field of data analytics.

### Course Outcomes

|    |     |                                                                           |
|----|-----|---------------------------------------------------------------------------|
| K1 | CO1 | To keep in mind the basic understanding of fundamentals of data analytics |
| K2 | CO2 | To understand the types of data analytics                                 |
| K3 | CO3 | To apply the tools in various domain                                      |
| K4 | CO4 | To identify career opportunities                                          |

| Units           | Content                                                                                                                                 | Hrs       |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>Unit I</b>   | Data analytics: Introduction – Importance - Types of analytics                                                                          | 2         |
| <b>Unit II</b>  | Common Terminologies - Tools and basic prerequisites                                                                                    | 3         |
| <b>Unit III</b> | Advanced Tools - Workflow                                                                                                               | 2         |
| <b>Unit IV</b>  | Applications: Industries – Business Functions                                                                                           | 3         |
| <b>Unit V</b>   | Career in analytics: Data scientist - Life of a data scientist - become a data scientist - Technical skills - Career path in analytics. | 3         |
|                 | <b>Total Contact Hrs</b>                                                                                                                | <b>13</b> |

|                                                     |
|-----------------------------------------------------|
| Presentations, Group discussions, Quiz, Assignments |
|-----------------------------------------------------|

**Online Course Materials:**

- ❖ <https://data36.com/data-analytics-basics-intro/>
- ❖ <https://blog.k2datascience.com/the-basics-of-data-analytics-77e5cc7ea741>
- ❖ [https://www.jigsawacademy.com/em/Beginners\\_Guide\\_to\\_Analytics.pdf](https://www.jigsawacademy.com/em/Beginners_Guide_to_Analytics.pdf)

**Mapping**

| CO \ PSO | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|----------|------|------|------|------|------|
| CO1      | 1    | 2    | 2    | 3    | 3    |
| CO2      | 3    | 2    | 3    | 2    | 2    |
| CO3      | 2    | 2    | 2    | 2    | 1    |
| CO4      | 3    | 3    | 3    | 3    | 3    |

Low – 1, Medium – 2, High – 3

| Course Designed by    | Verified by HOD      | Checked by              | Approved by               |
|-----------------------|----------------------|-------------------------|---------------------------|
| Name and Signature    | Name and Signature   | CDC                     | COE                       |
| Name: C.R. Durga devi | Name: K. Vijayakumar | Name: Mr. K. Srinivasan | Name: Dr. R. Muthukumaran |
| Signature:            | Signature:           | Signature:              | Signature:                |

|                        |          |                                                |                                    |             |
|------------------------|----------|------------------------------------------------|------------------------------------|-------------|
| <b>Programme Code:</b> | B.Sc.    | <b>Programme Title:</b>                        | Bachelor of Information Technology |             |
| <b>Course Code:</b>    | 20UIT4N4 | <b>Title</b>                                   | <b>Batch:</b>                      | 2020 - 2023 |
|                        |          | Skill Based Non-Major – II. Computer Security. | <b>Semester:</b>                   | IV          |
| <b>Hrs/Week:</b>       | 1        | <b>Credits:</b>                                | 2                                  |             |

### Course Objective

To bestow an understanding of various concepts of data security, cryptography, substitution techniques, encryption, decryption etc.

### Course Outcomes

|    |     |                                                                          |
|----|-----|--------------------------------------------------------------------------|
| K1 | CO1 | To keep in mind the basic understanding of fundamentals of data security |
| K2 | CO2 | To understand the concepts of ciphers and cryptography methods           |
| K3 | CO3 | To apply the idea of encryption and decryption methods                   |
| K4 | CO4 | To analyze basic issues in data security                                 |

| Units           | Content                                                                                                                    | Hrs       |
|-----------------|----------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>Unit I</b>   | Introduction-The need for security- Security Approaches: Trusted system.                                                   | 2         |
| <b>Unit II</b>  | Security models-Security management practices- Principles of security.                                                     | 3         |
| <b>Unit III</b> | Cryptography : Concepts and Techniques - Introduction-Plain text and Cipher text                                           | 2         |
| <b>Unit IV</b>  | Substitution Techniques : Caesar cipher-Mono Alphabetic cipher-Homophonic substitution cipher-Polygram substitution cipher | 3         |
| <b>Unit V</b>   | Transposition Techniques: Rail fence-Simple Columnar. Encryption and Decryption                                            | 3         |
|                 | <b>Total Contact Hrs</b>                                                                                                   | <b>13</b> |

Presentations, Group discussions, Quiz, Assignments

**Books for study**

- Atul Kahate. (2009). *Cryptography and Network Security*, 2<sup>nd</sup> Edition.

**Books for Reference**

- [www.tutorialspoint.com](http://www.tutorialspoint.com)

**Mapping**

| CO \ PSO | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|----------|------|------|------|------|------|
| CO1      | 1    | 3    | 2    | 3    | 3    |
| CO2      | 3    | 3    | 3    | 2    | 2    |
| CO3      | 3    | 3    | 3    | 2    | 1    |
| CO4      | 3    | 3    | 3    | 3    | 3    |

Low – 1, Medium – 2, High – 3

| Course Designed by  | Verified by HOD      | Checked by              | Approved by               |
|---------------------|----------------------|-------------------------|---------------------------|
| Name and Signature  | Name and Signature   | CDC                     | COE                       |
| Name: V. Prabavathi | Name: K. Vijayakumar | Name: Mr. K. Srinivasan | Name: Dr. R. Muthukumaran |
| Signature:          | Signature:           | Signature:              | Signature:                |

|                        |          |                           |                                    |             |
|------------------------|----------|---------------------------|------------------------------------|-------------|
| <b>Programme Code:</b> | B.Sc.    | <b>Programme Title :</b>  | Bachelor of Information Technology |             |
| <b>Course Code:</b>    | 20UIT517 | <b>Title:</b>             | <b>Batch :</b>                     | 2020 - 2023 |
|                        |          | Open Source Methodologies | <b>Semester :</b>                  | V           |
| <b>Hrs/Week:</b>       | 6        | <b>Credits :</b>          | 4                                  |             |

### Course Objective

On successful completion of this subject the students should have the knowledge about Unix & Linux Operating System concepts, normal & administrative commands and Android application development.

### Course Outcomes (CO)

|    |     |                                                                                                                                  |
|----|-----|----------------------------------------------------------------------------------------------------------------------------------|
| K1 | CO1 | To remember the various Unix commands for directory, editor, shell programming. Android layers, components, and user interfaces. |
| K2 | CO2 | To get the idea of the Unix, Linux, and Android program commands.                                                                |
| K3 | CO3 | To execute the programs by using the various Unix, Linux commands.                                                               |
| K4 | CO4 | To review by using the commands and operations get proper output.                                                                |

| Unit            | Content                                                                                                                                                                                                                                                                                                                                                                                                                                         | Hrs       |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>Unit I</b>   | <b>Getting Started:</b> Introduction – UNIX, Linux and GNU – Programming Linux-Getting help. <b>The VIM Editor:</b> History – Creating and editing a file – features. Command Mode: moving the cursor – Deleting and changing text. Input Mode - Searching and substituting – <i>*Miscellaneous commands</i> – yank, put and delete commands – Reading and writing files – Setting parameters – Advanced editing techniques – Units of measure. | 16        |
| <b>Unit II</b>  | <b>Shell Programming:</b> Usage – Philosophy – Definition – Pipes and redirection – As a programming language – Syntax – Graphical (Dialog Utility).                                                                                                                                                                                                                                                                                            | 16        |
| <b>Unit III</b> | <b>Working with Files:</b> Linux file structure – System calls and device drivers – <i>*Low level file access</i> – <i>*Standard I/O file library</i> – File and directory maintenance – Scanning directories. <b>Linux Environment.</b>                                                                                                                                                                                                        | 16        |
| <b>Unit IV</b>  | <b>Android:</b> Introduction – Features – AOS versions – Google play - Packages – ASDK – OOP – Test driving Tip calculator App in AVD – Build Apps – Development resources.                                                                                                                                                                                                                                                                     | 15        |
| <b>Unit V</b>   | <b>Welcome App:</b> Introduction – Overview – Creation – Android studio Window – Building App's GUI with layout editor – Run Welcome App – Making your App accessible – Internationalizing App.                                                                                                                                                                                                                                                 | 16        |
|                 | <b>Total Contact Hrs</b> <i>*Self Study</i>                                                                                                                                                                                                                                                                                                                                                                                                     | <b>78</b> |

Presentation, Seminar, Assignment, and Discussion

**Books for study:****20UIT517**

- ❖ Neil Matthew and Richard Stones, (2006). *Beginning LINUX Programming*, 3<sup>rd</sup> Edition, Wiley Dream Tech Publications (Units I – III).
- ❖ Paul and Harvey Deitel, (2018), *Android 6 for Programmers*, 3<sup>rd</sup> Edition, Pearson Education Publications. (Units IV & V).

**Books for Reference:**

- ❖ Sumithaba Das, (2006). *Unix Concepts and Applications*, Version 4.
- ❖ Mark G. Sobell, (2004), *A Practical Guide to Red Hat Linux 8*, Pearson Education, Edition.
- ❖ Jang, (2003). *Mastering Red Hat Linux Fedora Core 5*, Wiley Pub.

**Mapping**

| PSO \ CO | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|----------|------|------|------|------|------|
| CO1      | 1    | 2    | 3    | 3    | 3    |
| CO2      | 1    | 2    | 3    | 3    | 3    |
| CO3      | 2    | 2    | 3    | 2    | 3    |
| CO4      | 2    | 1    | 2    | 3    | 2    |

Low – 1, Medium – 2, High – 3

| Course Designed by                     | Verified by HOD                        | Checked by                                | Approved by                                 |
|----------------------------------------|----------------------------------------|-------------------------------------------|---------------------------------------------|
| Name and Signature                     | Name and Signature                     | CDC                                       | COE                                         |
| Name: K. Vijayakumar<br><br>Signature: | Name: K. Vijayakumar<br><br>Signature: | Name: Mr. K. Srinivasan<br><br>Signature: | Name: Dr. R. Muthukumaran<br><br>Signature: |

|                        |          |                         |                                    |             |
|------------------------|----------|-------------------------|------------------------------------|-------------|
| <b>Programme Code:</b> | B.Sc.    | <b>Programme Title:</b> | Bachelor of Information Technology |             |
| <b>Course Code:</b>    | 20UIT518 | <b>Title</b>            | <b>Batch:</b>                      | 2020 - 2023 |
|                        |          | Information Security    | <b>Semester:</b>                   | V           |
| <b>Hrs/Week:</b>       | 6        |                         | <b>Credits:</b>                    | 4           |

### Course Objective

To endow with better knowledge on various concepts of Security, Symmetric and Asymmetric algorithms, Digital certificates, E-mail, WWW, 2G, 3G etc.

### Course Outcomes

|    |     |                                                 |
|----|-----|-------------------------------------------------|
| K1 | CO1 | To recollect basic concepts of network security |
| K2 | CO2 | To understand basic knowledge of cryptography   |
| K3 | CO3 | To apply diverse security mechanisms            |
| K4 | CO4 | To evaluate various security algorithms         |

| Units           | Content                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Hrs       |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>Unit I</b>   | <b>Security:</b> Introduction – Need – Approaches – Principles – <i>*Types of attacks</i> . <b>Cryptography:</b> Introduction – Plain text and Cipher text – Substitution & Transposition techniques – Encryption and Decryption – Symmetric and Asymmetric key Cryptography – Steganography – Key range and Key size - Possible types of attacks.                                                                                                                                                                                                                              | 14        |
| <b>Unit II</b>  | <b>Symmetric Key Algorithms:</b> Introduction - <i>*Algorithm Types and modes</i> – Overview – DES– IDEA– RC4 & 5 – Blowfish – AES.                                                                                                                                                                                                                                                                                                                                                                                                                                             | 15        |
| <b>Unit III</b> | <b>Asymmetric Key Algorithms:</b> Introduction – History – Overview - RSA algorithm – <i>*Symmetric and asymmetric cryptography</i> . <b>Digital Signatures:</b> Introduction – Message Digests - MD5 – Secure Hash Algorithm. Knapsack algorithm – Other algorithms.                                                                                                                                                                                                                                                                                                           | 16        |
| <b>Unit IV</b>  | <b>Digital Certificates:</b> Introduction – Concepts – <i>*Certification Authority</i> – Technical details – Creation – Cross certification – Revocations. <b>Private key management - PKIX model – PKCS.</b>                                                                                                                                                                                                                                                                                                                                                                   | 16        |
| <b>Unit V</b>   | <b>Internet Security Protocols:</b> Introduction – Concepts. <b>Secure Socket Layer (SSL):</b> <b>Transport Layer Security (TLS)</b> – <b>Secure Hyper Text Transfer Protocol (SHTTP)</b> – <b>Time Stamping Protocol (TSP)</b> . <b>Secure Electronic Transaction (SET):</b> Introduction – Participants – Process – Internals. SSL Versus SET – 3-D secure Protocol. <b>Electronic Money:</b> Introduction – Security mechanisms – Types. <b>Email security:</b> Introduction – Privacy Enhanced Mail – Pretty Good Privacy. WAP Security - Security in GSM – Security in 3G. | 17        |
|                 | <b>Total Contact Hrs</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>78</b> |

*\* Self Study*

Presentations, Seminar, Quiz, Assignment, Activity

**Books for study**

- ATUL KAHATE. (2013). *CRYPTOGRAPHY and NETWORK SECURITY*. 3<sup>rd</sup> Edition, McGraw-Hill Education Pvt Ltd.

**Books for Reference**

- William Stallings. (2006). *Cryptography and Network Security Principles and Practices*. 4<sup>th</sup> Edition. PHI Education Asia.
- Behrouz A. Forouzan. (2007). *CRYPTOGRAPHY and NETWORK SECURITY*. Tata McGraw Hill Pub.

**Mapping**

| CO \ PSO | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|----------|------|------|------|------|------|
| CO1      | 3    | 3    | 2    | 2    | 3    |
| CO2      | 3    | 3    | 3    | 2    | 2    |
| CO3      | 3    | 3    | 1    | 1    | 1    |
| CO4      | 3    | 3    | 1    | 2    | 2    |

Low – 1, Medium – 2, High – 3

| Course Designed by   | Verified by HOD      | Checked by              | Approved by               |
|----------------------|----------------------|-------------------------|---------------------------|
| Name and Signature   | Name and Signature   | CDC                     | COE                       |
| Name: B. Kalaiselvi. | Name: K. Vijayakumar | Name: Mr. K. Srinivasan | Name: Dr. R. Muthukumaran |
| Signature:           | Signature:           | Signature:              | Signature:                |

|                        |          |                                                 |                                    |             |
|------------------------|----------|-------------------------------------------------|------------------------------------|-------------|
| <b>Programme Code:</b> | B.Sc.    | <b>Programme Title:</b>                         | Bachelor of Information Technology |             |
| <b>Course Code:</b>    | 20UIT5E1 | <b>Title</b>                                    | <b>Batch:</b>                      | 2020 - 2023 |
|                        |          | Major Elective – I<br>Data Mining and Analytics | <b>Semester:</b>                   | V           |
| <b>Hrs/Week:</b>       | 6        |                                                 | <b>Credits:</b>                    | 5           |

### Course Objective

To give a better understanding of various concepts of Data mining includes KDD, Association rules, Classification, Clustering, different types of mining and also about big data analytics.

### Course Outcomes

|    |     |                                                                                   |
|----|-----|-----------------------------------------------------------------------------------|
| K1 | CO1 | To keep in mind the various concepts of data mining                               |
| K2 | CO2 | To understand the types of data mining and analytics                              |
| K3 | CO3 | To execute data mining algorithms for finding hidden interesting patterns in data |
| K4 | CO4 | To evaluate various data mining algorithms and analysis of big data.              |

| Units           | Content                                                                                                                                                                                                                                                                                                                                                                                 | Hrs       |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>Unit I</b>   | <b>Data mining and the data warehouse:</b> Introduction - Data mining -Kinds of data-functionalities- classification-Task primitives-Integration with database or warehouse-Major issues. <b>Mining frequent patterns, association and correlations:</b> Basic concepts. <b>Efficient and scalable frequent itemset mining methods:</b> Apriori Algorithm-Generating association rules. | 16        |
| <b>Unit II</b>  | <b>Classification and prediction:</b> Definition – Issues - <i>*classification by Decision tree</i> Induction – Bayesian classification-rule based classification - classification by back propagation - support vector machine.                                                                                                                                                        | 16        |
| <b>Unit III</b> | <b>Cluster analysis:</b> Definition - types of data in cluster analysis - categorization of major clustering methods - partitioning methods - hierarchical methods                                                                                                                                                                                                                      | 15        |
| <b>Unit IV</b>  | Spatial data mining - multimedia data mining - text mining - mining the www - <i>*data mining Applications.</i>                                                                                                                                                                                                                                                                         | 16        |
| <b>Unit V</b>   | <b>Big data Analytics :</b> Introduction - Drivers for big data-Applications-Architecture-Advanced Analytics platform-Implementation                                                                                                                                                                                                                                                    | 15        |
|                 | <b>Total Contact Hrs</b> <span style="float: right;"><i>* Self Study</i></span>                                                                                                                                                                                                                                                                                                         | <b>78</b> |

|                                                     |
|-----------------------------------------------------|
| Presentations, Brain storming, Activity, Case study |
|-----------------------------------------------------|

**Books for study**

- Jiawei Han and Micheline Kamber (2005) *Data Mining concepts and techniques*, Elsevier publication (Units – I, II, III & IV).
- Dr. Aravind Sathi (2012) *Big Data Analytics: Disruptive Technologies for Changing the Game*, 1<sup>st</sup> Edition, MC Press publication (Unit – V).

**Books for Reference**

- Margaret H. Dunham (2009), *Data Mining Introductory and Advanced Topics*, Pearson Education Publications.
- Vikram Pudi, P.Radha Krishna (2009), *Data Mining*, Oxford University Press, 1<sup>st</sup> Edition.
- Anand Rajaraman and Jeffry David Ullman (2012), “Mining of Massive Datasets”, Cambridge University Press.

**Web Reference**

- [www.it-ebooks.info](http://www.it-ebooks.info).
- <https://aws.amazon.com>

**Mapping**

| CO \ PSO | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|----------|------|------|------|------|------|
| CO1      | 3    | 3    | 3    | 3    | 3    |
| CO2      | 2    | 2    | 3    | 1    | 1    |
| CO3      | 3    | 2    | 3    | 3    | 3    |
| CO4      | 2    | 2    | 2    | 2    | 3    |

Low – 1, Medium – 2, High – 3

| Course Designed by  | Verified by HOD      | Checked by              | Approved by               |
|---------------------|----------------------|-------------------------|---------------------------|
| Name and Signature  | Name and Signature   | CDC                     | COE                       |
| Name: B. Kalaiselvi | Name: K. Vijayakumar | Name: Mr. K. Srinivasan | Name: Dr. R. Muthukumaran |
| Signature:          | Signature:           | Signature:              | Signature:                |

|                        |          |                                       |                                    |             |
|------------------------|----------|---------------------------------------|------------------------------------|-------------|
| <b>Programme Code:</b> | B.Sc.    | <b>Programme Title:</b>               | Bachelor of Information Technology |             |
| <b>Course Code:</b>    | 20UIT5E2 | <b>Title :</b>                        | <b>Batch:</b>                      | 2020 - 2023 |
|                        |          | Major Elective – I<br>Cloud Computing | <b>Semester:</b>                   | V           |
| <b>Hrs/Week:</b>       | 6        |                                       | <b>Credits:</b>                    | 5           |

### Course Objective

To understand various concepts of cloud computing and learn types of cloud services, usage of cloud etc.

### Course Outcomes

|    |     |                                                                                  |
|----|-----|----------------------------------------------------------------------------------|
| K1 | CO1 | To recollect cloud networking concepts                                           |
| K2 | CO2 | To understand and familiar with the basic concepts of cloud computing and python |
| K3 | CO3 | To apply cloud to large scale distributed systems                                |
| K4 | CO4 | To figure out security issues in cloud computing                                 |

| Units           | Content                                                                                                                                                                                                                                                                                                                                                                                                                   | Hrs       |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>Unit I</b>   | <b>Introduction to Cloud Computing:</b> Characteristics – Models – <i>*Services Examples</i> – Services and Applications. <b>Cloud concepts and technologies:</b> Virtualization – Load balancing – scalability and elasticity – Deployment – Replication – Monitoring – Software defined Networking – Network function virtualization – MapReduce – Identity and access management - Service level agreements – Billing. | 16        |
| <b>Unit II</b>  | <b>Cloud services and Platforms:</b> Compute – <i>*Storage</i> – Database – Application – Content Delivery – analytics – Deployment and Management – Identity and access Management – Open source Private Cloud Software. <b>Hadoop and MapReduce:</b> Apache Hadoop – MapReduce Job execution – Schedulers – Cluster setup.                                                                                              | 15        |
| <b>Unit III</b> | <b>Cloud Application Design:</b> Introduction – Design considerations – Reference Architectures – Design methodologies – Data storage approaches. <b>Cloud Application Benchmarking and Tuning:</b> Introduction – Workload Characteristics – Application Performance Metrics – Design Considerations – Benchmarking Tools – Deployment prototyping – Load Testing and Bottleneck Deduction – Hadoop Benchmarking.        | 15        |
| <b>Unit IV</b>  | <b>Cloud Security:</b> Introduction – CSA Cloud Security Architecture – Authentication – Authorization – Identity and Access Management – Data Security – Key Management – Auditing. <b>Cloud For Industry, Health Care and Education:</b> Health Care – Energy systems – Transportation systems – Manufacturing Industry – Education.                                                                                    | 16        |
| <b>Unit V</b>   | <b>Python Basics:</b> Introduction – Installation – Data types and Data structures – <i>*Control flow</i> – Functions – Modules – Packages – File handling – Date/Time – Operations – Classes. <b>Python for Cloud:</b> Amazon web services – Google Platform – Windows Azure – MapReduce – Packages – Web Application Framework – Designing a RESTful Web API.                                                           | 16        |
|                 | <b>Total Contact Hrs</b> <i>* self study</i>                                                                                                                                                                                                                                                                                                                                                                              | <b>78</b> |

Power point Presentations, Seminar ,Quiz, Assignment

**Books for study**

- ❖ Arshdeep Bahga, Vijay Madisetti. (2016). *Cloud Computing – A Hands-on Approach*. Universities Press Pvt. Ltd.

**Books for Reference**

- ❖ Anthony T.Velte, Toby J.Velte, Robert Elsenpeter. (2013). *Cloud Computing - A Practical Approach*. Mc Graw Hill Publications. Fourteenth reprint.
- ❖ Michael Miller. (2009). *Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online*, Que Publishing.

**Mapping**

| CO \ PSO | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|----------|------|------|------|------|------|
| CO1      | 3    | 3    | 2    | 3    | 3    |
| CO2      | 3    | 2    | 3    | 3    | 3    |
| CO3      | 2    | 3    | 3    | 3    | 3    |
| CO4      | 3    | 3    | 1    | 3    | 3    |

Low – 1, Medium – 2, High – 3

| Course Designed by                      | Verified by HOD                        | Checked by                                | Approved by                                 |
|-----------------------------------------|----------------------------------------|-------------------------------------------|---------------------------------------------|
| Name and Signature                      | Name and Signature                     | CDC                                       | COE                                         |
| Name: C.R. Durga devi<br><br>Signature: | Name: K. Vijayakumar<br><br>Signature: | Name: Mr. K. Srinivasan<br><br>Signature: | Name: Dr. R. Muthukumaran<br><br>Signature: |

|                        |          |                                                |                                    |             |
|------------------------|----------|------------------------------------------------|------------------------------------|-------------|
| <b>Programme Code:</b> | B.Sc.    | <b>Programme Title :</b>                       | Bachelor of Information Technology |             |
| <b>Course Code:</b>    | 20UIT5E3 | <b>Title:</b>                                  | <b>Batch :</b>                     | 2020 - 2023 |
|                        |          | Major Elective – I<br>Digital Image Processing | <b>Semester :</b>                  | V           |
| <b>Hrs/Week:</b>       | 6        |                                                | <b>Credits :</b>                   | 5           |

### Course Objective

To understand the concepts of algorithmic designs of digital image processing techniques, inculcate knowledge in features of MATLAB tool and implement concepts in MATLAB.

### Course Outcomes (CO)

|    |     |                                                                                              |
|----|-----|----------------------------------------------------------------------------------------------|
| K1 | CO1 | To remember the various image processing tools, transformations, filtering, and conversions. |
| K2 | CO2 | To get the idea of creation and modifications of digital images.                             |
| K3 | CO3 | To execute the filtering and transferring images using MATLAB.                               |
| K4 | CO4 | To review the processed image from the existing one.                                         |

| Units    | Content                                                                                                                                                                                                                                                                                                                                                                                                                                               | Hrs       |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| Unit I   | <b>Introduction:</b> Digital Image Processing - Background on MATLAB and the Image - Processing Toolbox - The MATLAB Desktop. <b>Fundamentals :</b> Digital Image Representation - <i>*Reading Images</i> - Displaying Images - Writing Images- Classes - Image Types - Converting between Classes - Array Indexing - Introduction to M-Function Programming                                                                                          | 15        |
| Unit II  | <b>Intensity Transformations and Spatial Filtering:</b> Intensity Transformation Functions - Histogram Processing and Function Plotting - Spatial Filtering - Image Processing Toolbox Standard Spatial Filters. <b>Image Restoration and Reconstruction:</b> A Model of the Image Degradation/Restoration Process - Noise Models - Restoration in the Presence of Noise Only—Spatial Filtering - Direct Inverse Filtering - <i>*Wiener Filtering</i> | 16        |
| Unit III | <b>Color Image Processing:</b> Color Image Representation in MATLAB - Converting Between Color Spaces - The Basics of Color Image Processing - Color Transformations - Spatial Filtering of Color Images.                                                                                                                                                                                                                                             | 15        |
| Unit IV  | <b>Image Compression:</b> Background - Coding Redundancy - Spatial Redundancy - Irrelevant Information - JPEG Compression - Video Compression.                                                                                                                                                                                                                                                                                                        | 15        |
| Unit V   | <b>Morphological Image Processing:</b> Preliminaries - Dilation and Erosion - Combining Dilation and Erosion - Labeling Connected Components - Morphological Reconstruction - <i>*Gray-Scale Morphology</i> . <b>Image Segmentation:</b> Point, Line, and Edge Detection - Thresholding - Region-Based Segmentation - Segmentation Using the Watershed Transform                                                                                      | 17        |
|          | <b>Total Contact Hrs</b>                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>78</b> |

*\*Self Study*

Presentation, Seminar, Assignment, and Discussion

**Books for study:**

- ❖ Rafael C. Gonzalez, Richard E. Woods, Steven L. Eddins, (2009), *Digital Image Processing using MATLAB*, 2<sup>nd</sup> Edition, Gatesmark Pub.

**Books for Reference:**

- ❖ Nick Efford, (2004), *Digital Image Processing A Practical Introducing Using Java*, 5<sup>th</sup> Edition, Pearson Education Publications.
- ❖ B. Chanda, D. Dutta Majumder, (2003), *Digital Image Processing and Analysis*, PHI Publications.

**Mapping**

| PSO \ CO | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|----------|------|------|------|------|------|
| CO1      | 3    | 2    | 3    | 2    | 2    |
| CO2      | 3    | 2    | 3    | 2    | 2    |
| CO3      | 3    | 3    | 3    | 2    | 2    |
| CO4      | 3    | 2    | 3    | 2    | 3    |

Low – 1, Medium – 2, High – 3

| Course Designed by   | Verified by HOD      | Checked by              | Approved by               |
|----------------------|----------------------|-------------------------|---------------------------|
| Name and Signature   | Name and Signature   | CDC                     | COE                       |
| Name: K. Vijayakumar | Name: K. Vijayakumar | Name: Mr. K. Srinivasan | Name: Dr. R. Muthukumaran |
| Signature:           | Signature:           | Signature:              | Signature:                |

|                        |          |                                      |                                    |             |
|------------------------|----------|--------------------------------------|------------------------------------|-------------|
| <b>Programme Code:</b> | B.Sc.    | <b>Programme Title :</b>             | Bachelor of Information Technology |             |
| <b>Course Code:</b>    | 20UIT519 | <b>Title:</b>                        | <b>Batch :</b>                     | 2020 - 2023 |
|                        |          | Lab. VII – Open Source Methodologies | <b>Semester :</b>                  | V           |
| <b>Hrs/Week:</b>       | 5        |                                      | <b>Credits :</b>                   | 3           |

### Course Objective

To obtain the practical knowledge about Unix & Linux Operating System commands, Administrative, Normal Commands and Basic Android Applications.

### Course Outcomes (CO)

|    |     |                                                     |
|----|-----|-----------------------------------------------------|
| K3 | CO3 | To apply the concepts of GNOME, shell and SDK.      |
| K4 | CO4 | To analyze the various commands.                    |
| K5 | CO5 | To verify the results for the different input data. |

| Content                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Hrs       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <p style="text-align: center;"><b>Sample Program List</b></p> <p><b>Test I</b><br/>Using GNOME, perform the following</p> <ol style="list-style-type: none"> <li>1. Change the Desktop Background and mouse pointer theme.</li> <li>2. Change the Root Password.</li> <li>3. Add/Remove software.</li> <li>4. List and view all the files using Icon.</li> <li>5. Create an Archive file and Extract all Individual files from it.</li> <li>6. Perform character Mapping.</li> </ol> <p>Using Shell perform the following</p> <ol style="list-style-type: none"> <li>7. To execute the File manipulation commands</li> <li>8. To execute the Directory manipulation commands</li> <li>9. To execute the Utility commands</li> <li>10. To execute the Pipes &amp; Filter commands</li> </ol> <p><b>Test II</b><br/>Using Android SDK perform the following</p> <ol style="list-style-type: none"> <li>11. Display the phone dialer with the given number filled in.</li> <li>12. Doing a Google search using Intent.</li> <li>13. Sending a text message and showing a picture (using extra attributes).</li> <li>14. Launch the Music player and play a song stored in SD card.</li> <li>15. Create a simple android application.</li> </ol> | <b>65</b> |
| <b>Total Contact Hrs</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>65</b> |

**Mapping**

| CO \ PSO | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|----------|------|------|------|------|------|
| CO3      | 2    | 2    | 3    | 3    | 3    |
| CO4      | 2    | 2    | 3    | 3    | 3    |
| CO5      | 2    | 2    | 3    | 3    | 3    |

Low – 1, Medium – 2, High – 3

| <b>Course Designed by</b> | <b>Verified by HOD</b>    | <b>Checked by</b>       | <b>Approved by</b>        |
|---------------------------|---------------------------|-------------------------|---------------------------|
| <b>Name and Signature</b> | <b>Name and Signature</b> | <b>CDC</b>              | <b>COE</b>                |
| Name: K. Vijayakumar      | Name: K. Vijayakumar      | Name: Mr. K. Srinivasan | Name: Dr. R. Muthukumaran |
| Signature:                | Signature:                | Signature:              | Signature:                |

|                        |          |                                  |                                    |             |
|------------------------|----------|----------------------------------|------------------------------------|-------------|
| <b>Programme Code:</b> | B.Sc.    | <b>Programme Title :</b>         | Bachelor of Information Technology |             |
| <b>Course Code:</b>    | 20UIT520 | <b>Title:</b>                    | <b>Batch :</b>                     | 2020 - 2023 |
|                        |          | Lab.-VIII Software Testing Tools | <b>Semester :</b>                  | V           |
| <b>Hrs/Week:</b>       | 4        |                                  | <b>Credits :</b>                   | 2           |

### Course Objective

To gain the knowledge to apply the various programming concepts of Software testing like integration, unit, functional, non-functional testing and about product metrics.

### Course Outcomes (CO)

|    |     |                                                         |
|----|-----|---------------------------------------------------------|
| K3 | CO3 | To apply the testing in programming concepts.           |
| K4 | CO4 | To analyze the different concepts and tools.            |
| K5 | CO5 | To verify the expected result with the obtained result. |

| Content                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Hrs       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <p align="center"><b>SAMPLE PROGRAM LIST</b></p> <p><b>Test I</b></p> <ol style="list-style-type: none"> <li>1. Create a payroll system and test using the tool.</li> <li>2. Create a ration shop management system and test using the tool.</li> <li>3. Create airline reservation system and test using the tool.</li> <li>4. Create Library management system and test using the tool.</li> <li>5. Create Banking system and test using the tool.</li> </ol> <p><b>Test II</b></p> <ol style="list-style-type: none"> <li>6. Create Book shop management system and test using the tool.</li> <li>7. Create Electricity billing system and test using the tool.</li> <li>8. Create online cinema ticket reservation system and test using the tool.</li> <li>9. Create Music gallery and test using the tool.</li> <li>10. Create trading system and test the tool.</li> </ol> | 52        |
| <b>Total Contact Hrs</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>52</b> |

**Mapping**

| CO \ PSO | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|----------|------|------|------|------|------|
| CO3      | 2    | 2    | 3    | 3    | 3    |
| CO4      | 3    | 2    | 3    | 3    | 3    |
| CO5      | 2    | 2    | 3    | 3    | 3    |

Low – 1, Medium – 2, High – 3

| Course Designed by | Verified by HOD      | Checked by              | Approved by               |
|--------------------|----------------------|-------------------------|---------------------------|
| Name and Signature | Name and Signature   | CDC                     | COE                       |
| Name: R. Sekar     | Name: K. Vijayakumar | Name: Mr. K. Srinivasan | Name: Dr. R. Muthukumaran |
| Signature:         | Signature:           | Signature:              | Signature:                |

|                        |          |                                                              |                                    |             |
|------------------------|----------|--------------------------------------------------------------|------------------------------------|-------------|
| <b>Programme Code:</b> | B.Sc.    | <b>Programme Title :</b>                                     | Bachelor of Information Technology |             |
| <b>Course Code:</b>    | 20UIT5S1 | <b>Title:</b>                                                | <b>Batch :</b>                     | 2020 - 2023 |
|                        |          | Skill Based Major Elective Lab. I – Web Programming (Python) | <b>Semester :</b>                  | V           |
| <b>Hrs/Week:</b>       | 2        |                                                              | <b>Credits :</b>                   | 2           |

### Course Objective

To know the various programming concepts of string handling, mathematical functions, control structure and files in Python language.

### Course Outcomes (CO)

|    |     |                                                            |
|----|-----|------------------------------------------------------------|
| K3 | CO3 | To deploy the list and dictionary using control structures |
| K4 | CO4 | To analyze the various string functions                    |
| K5 | CO5 | To create files and handle its functions                   |

| Content                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Hrs       |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <p style="text-align: center;"><b>SAMPLE PROGRAM LIST</b></p> <ol style="list-style-type: none"> <li>1. Create a program to read a number n and print an inverted star pattern of the desired size.</li> <li>2. Create a program to search the number of times a particular number occurs in a list.</li> <li>3. Create a program to read a list of words and return the length of the longest one</li> <li>4. Create a program to take a string and replace every blank space with a hyphen</li> <li>5. Create a program to check if a given key exists in a dictionary or not</li> <li>6. Create a program to check common letters in the two input strings</li> <li>7. Create a program to reverse a string using recursion.</li> <li>8. Create a program to read the contents of a file.</li> <li>9. Create a program to find the area of a rectangle using classes.</li> <li>10. Create a program to read a string from the user and appends it into a file.</li> </ol> | <b>26</b> |
| <b>Total Contact Hrs</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>26</b> |

**Mapping**

| CO \ PSO | PS01 | PS02 | PS03 | PS04 | PS05 |
|----------|------|------|------|------|------|
| C03      | 2    | 2    | 3    | 3    | 3    |
| C04      | 3    | 2    | 3    | 3    | 3    |
| C05      | 2    | 2    | 3    | 3    | 3    |

Low – 1, Medium – 2, High – 3

| <b>Course Designed by</b> | <b>Verified by HOD</b>    | <b>Checked by</b>       | <b>Approved by</b>        |
|---------------------------|---------------------------|-------------------------|---------------------------|
| <b>Name and Signature</b> | <b>Name and Signature</b> | <b>CDC</b>              | <b>COE</b>                |
| Name: C. R. Durga devi    | Name: K. Vijayakumar      | Name: Mr. K. Srinivasan | Name: Dr. R. Muthukumaran |
| Signature:                | Signature:                | Signature:              | Signature:                |

|                        |          |                                                           |                                    |             |
|------------------------|----------|-----------------------------------------------------------|------------------------------------|-------------|
| <b>Programme Code:</b> | B.Sc.    | <b>Programme Title :</b>                                  | Bachelor of Information Technology |             |
| <b>Course Code:</b>    | 20UIT5S2 | <b>Title:</b>                                             | <b>Batch :</b>                     | 2020 - 2023 |
|                        |          | Skill Based Major Elective Lab. I – Web Programming (PHP) | <b>Semester :</b>                  | V           |
| <b>Hrs/Week:</b>       | 2        |                                                           | <b>Credits :</b>                   | 2           |

### Course Objective

To know the various programming concepts of database, string functions, date & time functions, content navigation and creating web page.

### Course Outcomes (CO)

|    |     |                                                          |
|----|-----|----------------------------------------------------------|
| K3 | CO3 | To deploy the tags and database to the C/S applications. |
| K4 | CO4 | To analyze the various tags in the application.          |
| K5 | CO5 | To verify the output from the different input data.      |

| Content                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Hrs       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <p style="text-align: center;"><b>SAMPLE PROGRAM LIST</b></p> <ol style="list-style-type: none"> <li>Program to print an array.</li> <li>Program to sort elements in an array in ascending and descending order.</li> <li>Program to split a string as array elements based on delimiter.</li> <li>Program to combine the array elements into a string with given delimiter.</li> <li>Program to create a Simple Calculator.</li> <li>Programs to create simple Login and Logout using sessions.</li> <li>Program to upload a file to the Server.</li> <li>Program to create a New Database.</li> <li>Program to connect to the server and selecting database.</li> <li>Program to insert records to the table in Database.</li> <li>Program to fetch records from the table in Database.</li> <li>Program to Store an image in Database.</li> <li>Program to Read image from Database.</li> <li>Program to create a simple Registration form.</li> <li>Contact form using PHP.</li> </ol> | <b>26</b> |
| <b>Total Contact Hrs</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>26</b> |

**Mapping**

| CO \ PSO | PS01 | PS02 | PS03 | PS04 | PS05 |
|----------|------|------|------|------|------|
| C03      | 2    | 2    | 3    | 3    | 3    |
| C04      | 2    | 2    | 3    | 3    | 3    |
| C05      | 2    | 2    | 3    | 3    | 3    |

Low – 1, Medium – 2, High – 3

| <b>Course Designed by</b> | <b>Verified by HOD</b>    | <b>Checked by</b>       | <b>Approved by</b>        |
|---------------------------|---------------------------|-------------------------|---------------------------|
| <b>Name and Signature</b> | <b>Name and Signature</b> | <b>CDC</b>              | <b>COE</b>                |
| Name: K. Vijayakumar      | Name: K. Vijayakumar      | Name: Mr. K. Srinivasan | Name: Dr. R. Muthukumaran |
| Signature:                | Signature:                | Signature:              | Signature:                |

|                        |          |                         |                                    |             |
|------------------------|----------|-------------------------|------------------------------------|-------------|
| <b>Programme Code:</b> | B. Sc.   | <b>Programme Title:</b> | Bachelor of Information Technology |             |
| <b>Course Code:</b>    | 20UIT621 | <b>Title</b>            | <b>Batch:</b>                      | 2020 - 2023 |
|                        |          | Computer Graphics       | <b>Semester:</b>                   | VI          |
| <b>Hrs/Week:</b>       | 6        |                         | <b>Credits:</b>                    | 4           |

### Course Objective

To offer programming ability on graphics, clear view on graphics functions, output devices, 3D and 2D transformations etc.

### Course Outcomes

|    |     |                                                             |
|----|-----|-------------------------------------------------------------|
| K1 | CO1 | To keep in mind basic graphics systems                      |
| K2 | CO2 | To understand various graphical algorithms                  |
| K3 | CO3 | To implement two, three dimensional and clipping algorithms |
| K4 | CO4 | To sort of visible surface detection methods                |

| Unit            | Content                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Hrs       |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>Unit I</b>   | <b>Overview of Graphics Systems:</b> Video Display Devices, Refresh Cathode ray tubes, Raster Scan displays, Random Scan Displays, Color CRT monitors, Direct view storage tubes, Flat panel Displays, 3-Dimensional viewing devices, Stereoscopic and Virtual Reality systems, Raster Scan Systems, Random Scan Systems, <i>*Input Devices</i> , Graphics software.                                                                                                                                                                          | <b>15</b> |
| <b>Unit II</b>  | <b>Output Primitives:</b> Points and Lines – Line-Drawing algorithms – Loading frame Buffer – Line function – Circle-Generating algorithms. <b>Attributes of Output Primitives:</b> Line Attributes – Curve attributes – Color and Grayscale Levels – <i>*Area-fill attributes</i> – Character Attributes.                                                                                                                                                                                                                                    | <b>15</b> |
| <b>Unit III</b> | <b>2D Geometric Transformations:</b> Basic Transformations – Matrix Representations – <i>*Composite Transformations</i> – Other Transformations. <b>2D Viewing:</b> The Viewing Pipeline – Viewing Co-ordinate Reference Frame – Window-to-Viewport Co-ordinate Transformation - 2D Viewing Functions – Clipping Operations – Point, Line: Cohen-Sutherland Line Clipping, Liang- Barsky Line Clipping, Polygon, Curve, Text and Exterior clippings.                                                                                          | <b>16</b> |
| <b>Unit IV</b>  | <b>3D Concepts:</b> 3D Display Methods – 3D Graphics Packages. <b>3D Object Representations:</b> Polygon Surfaces – <i>*Curved lines and Surfaces</i> – <i>Blobby Objects</i> . <b>3D Geometric Modeling and Transformations:</b> Translation – Rotation – Scaling – Other Transformations.                                                                                                                                                                                                                                                   | <b>16</b> |
| <b>Unit V</b>   | <b>Visible-Surface Detection Methods:</b> Classification of Visible-Surface algorithms – Depth-Buffer Method – Scan- Line Method – Depth-Sorting Method – BSP-Tree Method – Area-Subdivision Method – Octree Methods – Ray-casting Methods – Curved surfaces – Wire frame Methods – Visibility-Detection functions. <b>Illumination Models:</b> Standard Primaries and the Chromaticity Diagram – Intuitive color Concepts – RGB Color Model – YIQ Color Model – CMY Color Model – HLS Color Model- <i>*Color selection ad Applications</i> . | <b>16</b> |
|                 | <b>Total Contact Hrs</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>78</b> |

*\* self study*

|                                          |
|------------------------------------------|
| Presentations, Seminar, Quiz, Assignment |
|------------------------------------------|

**Books for study**

- ❖ Donald Hearn, Pauline Baker, (2008). COMPUTER GRAPHICS. 2<sup>nd</sup> Edition. PHI, Indian reprint.
- ❖ Donald Hearn, Pauline Baker, Warren Carithers (2016). COMPUTER GRAPHICS. 4<sup>th</sup> Edition. Pearson Education, Indian reprint.

**Books for Reference**

- ❖ William M. Newman & Robert F. Sproull. (2007). *PRINCIPLES OF INTERACTIVE COMPUTER GRAPHICS*. TMH.
- ❖ Malay K. Pakhira (2008), *COMPUTER GRAPHICS, MULTIMEDIA AND ANIMATION*, New Delhi, Prentice Hall of India Pvt. Ltd.

**Mapping**

| CO \ PSO | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|----------|------|------|------|------|------|
| CO1      | 1    | 3    | 1    | 2    | 2    |
| CO2      | 3    | 3    | 3    | 2    | 2    |
| CO3      | 3    | 3    | 3    | 2    | 1    |
| CO4      | 3    | 2    | 2    | 1    | 1    |

Low – 1, Medium – 2, High – 3

| Course Designed by  | Verified by HOD      | Checked by              | Approved by               |
|---------------------|----------------------|-------------------------|---------------------------|
| Name and Signature  | Name and Signature   | CDC                     | COE                       |
| Name: B. Kalaiselvi | Name: K. Vijayakumar | Name: Mr. K. Srinivasan | Name: Dr. R. Muthukumaran |
| Signature:          | Signature:           | Signature:              | Signature:                |

|                        |          |                                      |                                    |             |
|------------------------|----------|--------------------------------------|------------------------------------|-------------|
| <b>Programme Code:</b> | B.Sc.    | <b>Programme Title:</b>              | Bachelor of Information Technology |             |
| <b>Course Code:</b>    | 20UIT6E4 | <b>Title</b>                         | <b>Batch:</b>                      | 2020 - 2023 |
|                        |          | Major Elective – II Embedded Systems | <b>Semester:</b>                   | VI          |
| <b>Hrs/Week:</b>       | 6        |                                      | <b>Credits:</b>                    | 5           |

### Course Objective

To provide understanding of various concepts of VLSI circuit, Processor, device drivers, programming techniques, RTOS, etc.

### Course Outcomes

|    |     |                                                                          |
|----|-----|--------------------------------------------------------------------------|
| K1 | CO1 | To keep in mind a broad understanding of technologies of embedded system |
| K2 | CO2 | To understand the structural design of embedded systems                  |
| K3 | CO3 | To apply embedded/real time operating systems                            |
| K4 | CO4 | To analyze the issues associated with embedded systems                   |

| Units           | Content                                                                                                                                                                                                                                                                                                                                                                                                                               | Hrs       |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>Unit I</b>   | <b>Introduction to Embedded System:</b> Embedded System – Processor Embedded into the System – Embedded Hardware units and Devices in a System – Embedded Software in a system – Examples of embedded system – Embedded system on chip and use of VLSI circuit - Classification of embedded systems – <i>*Skills required for an embedded System Designer.</i>                                                                        | 15        |
| <b>Unit II</b>  | <b>Devices and buses for device networks:</b> I/O Types and Examples – Serial Communication devices: Synchronous, Iso-Synchronous and Asynchronous communication from serial devices – Parallel Device Ports - Timer and counting devices – Watchdog timer – <i>*Real time clock</i> – Network Embedded Systems – Serial Bus Communication Protocol.                                                                                  | 15        |
| <b>Unit III</b> | <b>Device drivers and Interrupts servicing mechanism:</b> Device drivers – Interrupt servicing mechanism – Context and the periods for context-switching, dead-line and interrupt latency – Device Driver Programming: – Parallel port device drivers – Serial port device drivers – Device drivers for IPTD.                                                                                                                         | 15        |
| <b>Unit IV</b>  | <b>Programming concepts and embedded programming in C and C++:</b> Embedded programming in C++ and in Java. <b>Program modeling concepts in single and multi processor systems:</b> Program Models – DFG Models – State Machine Programming Models for Event-controlled Program Flow – Modeling of Multiprocessor Systems.                                                                                                            | 17        |
| <b>Unit V</b>   | <b>Inter – process communication and synchronization of processes. Tasks and threads:</b> Multiple processes in an application – Multiple Threads Shared Data – Inter process communication. <b>Real time operating systems:</b> Operating system services – I/O subsystem – Real time operating systems – Basic Design using RTOS – RTOS Task scheduling Models, Interrupt Latency and Response of the Tasks as Performance Metrics. | 16        |
|                 | <b>Total Contact Hrs</b>                                                                                                                                                                                                                                                                                                                                                                                                              | <b>78</b> |

Presentations, Group discussions, Brain storming, Activity, Case study

**Books for study**

- ❖ Raj Kamal, (2011) *Embedded Systems – Architecture, Programming and Design*, TMH.

**Books for Reference**

- ❖ Daniel W. Lewis, (2007), “Fundamentals of Embedded Software”, 1<sup>st</sup> Edition, PHI Education Publications, ISBN: 81-7808-604-2.
- ❖ Shibu K V, (2009), “Introduction to Embedded Systems”, 1<sup>st</sup> Edition, McGraw Hill Education, ISBN-13: 9780070145894.
- ❖ [http://www.dauniv.ac.in/downloads/EmbsysRevEd\\_PPTs/Chap01Lesson\\_1Emsys.pdf](http://www.dauniv.ac.in/downloads/EmbsysRevEd_PPTs/Chap01Lesson_1Emsys.pdf)

**Mapping**

| CO \ PSO | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|----------|------|------|------|------|------|
| CO1      | 3    | 3    | 3    | 2    | 3    |
| CO2      | 2    | 3    | 3    | 4    | 1    |
| CO3      | 3    | 2    | 4    | 3    | 2    |
| CO4      | 4    | 3    | 2    | 3    | 1    |

Low – 1, Medium – 2, High – 3

| Course Designed by  | Verified by HOD      | Checked by              | Approved by               |
|---------------------|----------------------|-------------------------|---------------------------|
| Name and Signature  | Name and Signature   | CDC                     | COE                       |
| Name: V. Prabavathi | Name: K. Vijayakumar | Name: Mr. K. Srinivasan | Name: Dr. R. Muthukumaran |
| Signature:          | Signature:           | Signature:              | Signature:                |

|                        |          |                                   |                                    |             |
|------------------------|----------|-----------------------------------|------------------------------------|-------------|
| <b>Programme Code:</b> | B.Sc.    | <b>Programme Title:</b>           | Bachelor of Information Technology |             |
| <b>Course Code:</b>    | 20UIT6E5 | <b>Title</b>                      | <b>Batch:</b>                      | 2020 - 2023 |
|                        |          | Major Elective – II<br>E-commerce | <b>Semester:</b>                   | VI          |
| <b>Hrs/Week:</b>       | 6        |                                   | <b>Credits:</b>                    | 5           |

### Course Objective

To learn E-Business revenue models, Law & taxation, online payment systems and sales.

### Course Outcomes

|    |     |                                                                                          |
|----|-----|------------------------------------------------------------------------------------------|
| K1 | CO1 | To remember basic concepts of e-commerce                                                 |
| K2 | CO2 | To understand the role of E-marketing, E-security, E-payment systems in current scenario |
| K3 | CO3 | To apply mobile payments.                                                                |
| K4 | CO4 | To analyze various portals, legal and ethical issues associated with e-commerce          |

| Units           | Content                                                                                                                                                                                                                                                                                                                                                                                                                                            | Hrs                             |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|
| <b>Unit I</b>   | <b>e-Commerce:</b> Introduction- Early Business information interchange efforts – Emergence of the internet – Milestones – <i>*Advantages – Disadvantages</i> – Online extension of BAM model – Transition to e-commerce in India – E-transition challenges for Indian corporates. <b>Business Models:</b> Introduction – E-Business models based on the relationship of transaction parties and transaction types.                                | <b>16</b>                       |
| <b>Unit II</b>  | <b>E-Marketing:</b> Traditional Marketing – Identifying web presence goals – Online marketing – E-Advertising – Internet marketing trends – Target Markets – Marketing strategies.                                                                                                                                                                                                                                                                 | <b>15</b>                       |
| <b>Unit III</b> | <b>E-Security:</b> Information system security – <i>*Security on the internet</i> . <b>E-Payment Systems:</b> Internet Banking – Digital payment requirements – Digital token based e-payment systems – Classification of new payment systems – Electronic cash – Risk and e-Payment system – Online financial services in India – Online stock trading.                                                                                           | <b>16</b>                       |
| <b>Unit IV</b>  | <b>E-customer Relationship Management:</b> CRM – Typical Business Touch Points. <b>E-supply Chain Management:</b> CISCO – supply chain. <b>Information Systems for Mobile Commerce:</b> Introduction – Mobile payments – Mobile Commerce in India.                                                                                                                                                                                                 | <b>15</b>                       |
| <b>Unit V</b>   | <b>Portals for E-Business:</b> <i>*Portals</i> – Requirements of intelligent websites – portals for mass collaborations – portals for Enterprise Resource Planning – ERP – Intranet Portals – HRM – Various HRIS modules. <b>Legal and Ethical Issues:</b> Ethical issues in Digital economy – cyber stalking – Phishing – Application fraud – Skimming – Copyright – Internet Gambling – Threats to children – Special Nature of Computer Ethics. | <b>16</b>                       |
|                 | <b>Total Contact Hrs.</b>                                                                                                                                                                                                                                                                                                                                                                                                                          | <i>*self study</i><br><b>78</b> |

Presentations, Group discussions, Seminar, Quiz, Assignment

**Books for study**

- P. T. Joseph S. J., (2017), *E - Commerce: An Indian Perspective*, 5<sup>th</sup> Edition, PHI.

**Books for Reference**

- Henry Chan, Raymond Lee, Tharam Dillon, Elizabeth Chang, (2011), *E-commerce Fundamentals and Applications*, 1<sup>st</sup> Edition, Wiley India Pvt Ltd.
- Gary P Schneider, (2012), *E-Commerce Strategy, Technology And Implementation*, 9<sup>th</sup> Edition, Engage Learning Pub.

**Mapping**

| CO \ PSO | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|----------|------|------|------|------|------|
| CO1      | 1    | 2    | 1    | 3    | 2    |
| CO2      | 1    | 1    | 1    | 3    | 3    |
| CO3      | 1    | 3    | 1    | 3    | 1    |
| CO4      | 1    | 1    | 1    | 2    | 2    |

Low – 1, Medium – 2, High – 3

| Course Designed by  | Verified by HOD      | Checked by              | Approved by               |
|---------------------|----------------------|-------------------------|---------------------------|
| Name and Signature  | Name and Signature   | CDC                     | COE                       |
| Name: B. Kalaiselvi | Name: K. Vijayakumar | Name: Mr. K. Srinivasan | Name: Dr. R. Muthukumaran |
| Signature:          | Signature:           | Signature:              | Signature:                |

|                        |          |                                                |                                    |             |
|------------------------|----------|------------------------------------------------|------------------------------------|-------------|
| <b>Programme Code:</b> | B.Sc.    | <b>Programme Title:</b>                        | Bachelor of Information Technology |             |
| <b>Course Code:</b>    | 20UIT6E6 | <b>Title</b>                                   | <b>Batch:</b>                      | 2020 - 2023 |
|                        |          | Major Elective – II<br>Artificial Intelligence | <b>Semester:</b>                   | VI          |
| <b>Hrs/Week:</b>       | 6        |                                                | <b>Credits:</b>                    | 5           |

### Course Objective

To embed a deep knowledge about search techniques, reasoning, game playing, expert systems and prolog.

### Course Outcomes

|    |     |                                                                        |
|----|-----|------------------------------------------------------------------------|
| K1 | CO1 | To keep in mind different search strategies for a problem              |
| K2 | CO2 | To understand concepts of semantic net                                 |
| K3 | CO3 | To implement a AI problem to be solved using prolog                    |
| K4 | CO4 | To evaluate different knowledge representation schemes for AI problems |

| Units           | Content                                                                                                                                                                                                                                                                                                                                     | Hrs       |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>Unit I</b>   | <b>Problems and search:</b> AI Techniques-Defining the problem as a State Space Search – Production Systems – Problem Characteristics – Production system Characteristics – Heuristic Search Techniques – Generate and test – Hill Climbing – Best-first Search – Problem Reduction – Constraint Satisfaction – <i>*Mean-Ends Analysis.</i> | <b>15</b> |
| <b>Unit II</b>  | <b>Knowledge Representation:</b> Representations and Mappings- Approaches to Knowledge Representation – Issues in knowledge representation – Representing simple Facts in Logic – Representing Instance and Isa Relationships- Procedural versus Declarative Knowledge – Logic Programming – <i>*Forward versus Backward reasoning.</i>     | <b>16</b> |
| <b>Unit III</b> | <b>Semantic Nets:</b> Frames - Conceptual Dependency - Game Playing – Overview – The minimax search procedure – Adding Alpha-Beta cutoffs.                                                                                                                                                                                                  | <b>15</b> |
| <b>Unit IV</b>  | <b>Expert System :</b> Definition – Characteristics of Expert System – Architecture & Description of Modules – Backward Chaining – Knowledge Acquisition facility. Knowledge Engineering – Expert System Life Cycles – <i>*Expert System Tools.</i>                                                                                         | <b>16</b> |
| <b>Unit V</b>   | <b>Prolog: The</b> Introduction-Converting English to prolog facts and rules-goals-Terminology-Variables-Control structures-Arithmetic operators-Matching in prolog-Backtracking-cuts-Recursion-Lists-Dynamic Databases-I/O Streams-Some aspects specific to LPA Prolog.                                                                    | <b>16</b> |
|                 | <b>Total Contact Hrs.</b> <span style="float: right;"><i>* self study</i></span>                                                                                                                                                                                                                                                            | <b>78</b> |

|                                                                        |
|------------------------------------------------------------------------|
| Presentations, Group discussions, Brain storming, Activity, Case study |
|------------------------------------------------------------------------|

**Books for study**

- Elaine Rich, Kevin Knight, (2009), *Artificial Intelligence*, 3<sup>rd</sup> edition, Tata McGraw Hill Publications.

**Books for Reference**

- Stuart Russell, Peter Norvig, (2009), *Artificial Intelligence: A Modern Approach*, 3<sup>rd</sup> Edition, Pearson New International Edition.
- Er. Rajiv Chopra, (2005), *Artificial Intelligence: A Practical Approach*, 1<sup>st</sup> Edition, S. Chand Publications.

**Mapping**

| CO \ PSO | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|----------|------|------|------|------|------|
| CO1      | 3    | 1    | 2    | 3    | 3    |
| CO2      | 3    | 1    | 1    | 1    | 1    |
| CO3      | 3    | 1    | 2    | 1    | 1    |
| CO4      | 3    | 2    | 3    | 3    | 3    |

Low – 1, Medium – 2, High – 3

| Course Designed by    | Verified by HOD      | Checked by              | Approved by               |
|-----------------------|----------------------|-------------------------|---------------------------|
| Name and Signature    | Name and Signature   | CDC                     | COE                       |
| Name: C.R. Durga devi | Name: K. Vijayakumar | Name: Mr. K. Srinivasan | Name: Dr. R. Muthukumaran |
| Signature:            | Signature:           | Signature:              | Signature:                |

|                        |          |                                          |                                    |             |
|------------------------|----------|------------------------------------------|------------------------------------|-------------|
| <b>Programme Code:</b> | B.Sc.    | <b>Programme Title :</b>                 | Bachelor of Information Technology |             |
| <b>Course Code:</b>    | 20UIT6E7 | <b>Title:</b>                            | <b>Batch :</b>                     | 2020 - 2023 |
|                        |          | Major Elective – III<br>Mobile Computing | <b>Semester :</b>                  | VI          |
| <b>Hrs/Week:</b>       | 6        |                                          | <b>Credits :</b>                   | 5           |

### Course Objective

Understand the various concepts and techniques of WAP, GSM, CDMA, 2G, 3G, etc...

### Course Outcomes (CO)

|           |            |                                                                                                    |
|-----------|------------|----------------------------------------------------------------------------------------------------|
| <b>K1</b> | <b>CO1</b> | To keep in mind the various networks, standards, communication medium, Spread spectrum techniques. |
| <b>K2</b> | <b>CO2</b> | To Understand the basic concepts of wireless networks.                                             |
| <b>K3</b> | <b>CO3</b> | To deploy the mobile applications to the devices.                                                  |
| <b>K4</b> | <b>CO4</b> | To analyze the various wireless networks techniques.                                               |

| Units           | Content                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Hrs       |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>Unit I</b>   | <b>Introduction:</b> Mobility of Bits and Bytes –Wireless The Beginning – Mobile Computing – Dialogue Control – Networks – Middleware and Gateways – Application and services - Security in mobile computing – * <i>Standards</i> _ Why is it necessary – Standard bodies. <b>MOBILE COMPUTING ARCHITECTURE:</b> Architecture for mobile computing – Three-tier architecture – Mobile computing through Internet – Making existing applications mobile enabled | 15        |
| <b>Unit II</b>  | <b>MOBILE COMPUTING THROUGH TELEPHONY:</b> Evaluation of telephony – Multiple access procedures – Mobile computing through telephone – IVR Application – Voice XML – TAPI. <b>EMERGING TECHNOLOGIES:</b> * <i>Blue Tooth</i> – RFID – WiMAX – Mobile IP – IPv6 – Java Card.                                                                                                                                                                                    | 15        |
| <b>Unit III</b> | <b>GSM:</b> Global System for mobile communications – GSM Architecture – GSM Entities – Call routing in GSM – PLMN Interfaces – GSM Addresses and Identifiers – Network Aspects in GSM – GSM Frequency allocations – Authentications and Security. <b>SMS:</b> Strengths – Architecture – SM MT – SM MO – VAS through SMS.                                                                                                                                     | 16        |
| <b>Unit IV</b>  | <b>GPRS:</b> GPRS and packet data network – Architecture – Network Operations – Data services – Applications - Limitations – * <i>Billing and Charging</i> . <b>WAP:</b> WAE – User agent & UAPProf – WML – WSP – WTP – WDP – Gateway. <b>MMS:</b> Architecture – Transaction Flows.                                                                                                                                                                           | 15        |
| <b>Unit V</b>   | <b>CDMA and 3G:</b> Spread spectrum technology. <b>IS 95:</b> Speech and Channel Coding – Architecture – Channel Structure. CDMA vs. GSM – Wireless Data. <b>3G:</b> IMT & CDMA 2000 – Applications on 3G. <b>WIRELESS LAN:</b> Advantages – IEEE 802.11 standards - Types – 802.11 Architecture – Mobility – Deploying – Mobile Ad Hoc networks and sensor networks – Security – WiFi vs. 3G. <b>4G &amp; 5G:</b> Introduction - Architecture.                | 17        |
|                 | <b>Total Contact Hrs</b> <span style="float: right;">*Self Study</span>                                                                                                                                                                                                                                                                                                                                                                                        | <b>78</b> |

Presentation, Seminar, Assignment and Discussion

**Books for study:**

- ❖ Asoke K Talukder, Roopa R Yavagal. (2005), *Mobile Computing*, TMH.

**Web References: (Unit V)**

- ❖ [https://www.cisco.com/c/dam/global/sk\\_sk/assets/expo2011/pdfs/Co\\_mozeme\\_ockavat\\_od\\_L\\_TE\\_Vladimir\\_Settey.pdf](https://www.cisco.com/c/dam/global/sk_sk/assets/expo2011/pdfs/Co_mozeme_ockavat_od_L_TE_Vladimir_Settey.pdf)
- ❖ <https://5g-ppp.eu/wp-content/uploads/2018/01/5G-PPP-5G-Architecture-White-Paper-Jan-2018-v2.0.pdf>

**Books for Reference:**

- ❖ Jochen Schiller, (2008), *Mobile Communication*, 2<sup>nd</sup> Edition, Pearson Education Asia.
- ❖ Christoffer Andersson (2001), *GPRS and 3G Wireless Applications*, John Wiley and son's pub.

**Mapping**

| CO \ PSO | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|----------|------|------|------|------|------|
| CO1      | 2    | 3    | 2    | 3    | 3    |
| CO2      | 2    | 3    | 2    | 3    | 3    |
| CO3      | 3    | 2    | 3    | 3    | 3    |
| CO4      | 3    | 2    | 3    | 3    | 3    |

Low – 1, Medium – 2, High – 3

| Course Designed by | Verified by HOD      | Checked by              | Approved by               |
|--------------------|----------------------|-------------------------|---------------------------|
| Name and Signature | Name and Signature   | CDC                     | COE                       |
| Name: R. Sekar     | Name: K. Vijayakumar | Name: Mr. K. Srinivasan | Name: Dr. R. Muthukumaran |
| Signature:         | Signature:           | Signature:              | Signature:                |

|                        |          |                                                     |                                    |             |
|------------------------|----------|-----------------------------------------------------|------------------------------------|-------------|
| <b>Programme Code:</b> | B.Sc.    | <b>Programme Title:</b>                             | Bachelor of Information Technology |             |
| <b>Course Code:</b>    | 20UIT6E8 | <b>Title</b>                                        | <b>Batch:</b>                      | 2020 - 2023 |
|                        |          | Major Elective – III<br>Software Project Management | <b>Semester:</b>                   | VI          |
| <b>Hrs/Week:</b>       | 6        |                                                     | <b>Credits:</b>                    | 5           |

### Course Objective

To offer management and project evaluation, effort estimation, resource allocation, contract management and software quality.

### Course Outcomes

|    |     |                                                 |
|----|-----|-------------------------------------------------|
| K1 | CO1 | To recollect the basic idea of software project |
| K2 | CO2 | To deduce software cost and effort estimations  |
| K3 | CO3 | To implement resource allocation techniques     |
| K4 | CO4 | To interpret the software quality               |

| Units           | Content                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Hrs       |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>Unit I</b>   | <b>Introduction to Software Project management:</b> Introduction –Importance – Meaning of a Project – Software project versus other types of project – Contract Management and technical project management – Activities covered – plans, methods, and methodologies – some ways of categorizing software projects. * <i>Stepwise: an overview of project planning.</i> <b>Programme Management and Project Evaluation:</b> Programme Management – Managing the Allocation of resources within programmes – strategic programme management – creating a programme – aids to programme management – Benefits Management – Evaluation of Individual projects – technical assessment – cost-benefit analysis - cash flow forecasting – cost-benefit evaluation techniques – risk evaluation. | 16        |
| <b>Unit II</b>  | <b>Software Effort Estimation:</b> Estimation – Problem with over and Under-estimates – basis for software estimating – software effort estimation techniques – Expert judgment – estimating by analogy. <b>Activity Planning:</b> The objectives – planning – Project schedules – project and activities – sequencing and scheduling activities – <b>Network:</b> Planning models – formulating a network model – adding time dimension – forward pass – backward pass. <b>Risk Management:</b> Risk – Categories – Dealing with risk – Risk identification, assessment, planning and management – Evaluating risk to schedule.                                                                                                                                                          | 15        |
| <b>Unit III</b> | <b>Resource Allocation:</b> Introduction - Nature of resources – identifying the resource requirements – scheduling resources – creating critical path – * <i>counting the cost</i> – being specific – publishing the resource schedule – cost schedules – scheduling the sequence. <b>Monitoring and Control:</b> Creating framework – collecting the data – visualizing progress – cost monitoring – earned value analysis – prioritizing monitoring – getting the project back to target – change control.                                                                                                                                                                                                                                                                             | 15        |
| <b>Unit IV</b>  | <b>Managing Contracts:</b> ISO 12207 approach – supply process – types of contract – stages in contract placement, management – acceptance. <b>Managing People and Organizing Terms:</b> understanding behavior – organizational behavior – selecting the right person for the job – instruction in the best methods – Motivation – Working in groups – becoming a team – decision making – Leadership – organizational structures – dispersed and virtual teams - influence of culture – stress – health and safety.                                                                                                                                                                                                                                                                     | 16        |
| <b>Unit V</b>   | <b>Software Quality:</b> The place of software quality in project planning – importance of software quality – defining software quality – ISO 9126 - practical software quality measures – product vs process quality management – external standards – * <i>techniques to help enhance software quality</i> -quality plans. Small Projects: Introduction – Some problems with student projects – content of a project plan – conclusion.                                                                                                                                                                                                                                                                                                                                                 | 16        |
|                 | <b>Total Contact Hrs</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>78</b> |

\* self study

Presentations, Group discussions, Seminar, Quiz, Assignment, Experience Discussion, Brain storming, Activity, Case study

### Books for study

- ❖ Bob Hughes & Mike Cotterell, (2005). *Software Project Management*, 4<sup>th</sup> Edition, PHI Publications

### Books for Reference

- ❖ Pankaj Jalote, (2002), *Software Project Management in Practice*, Pearson Education Asia.
- ❖ Kieron Conway, (2000). *Software Project Management from Concept to Deployment*, Dream Tech Press.

### Mapping

| CO \ PSO | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|----------|------|------|------|------|------|
| CO1      | 3    | 3    | 3    | 2    | 3    |
| CO2      | 3    | 2    | 2    | 2    | 3    |
| CO3      | 3    | 3    | 1    | 2    | 2    |
| CO4      | 1    | 3    | 2    | 2    | 2    |

Low – 1, Medium – 2, High – 3

| Course Designed by  | Verified by HOD      | Checked by              | Approved by               |
|---------------------|----------------------|-------------------------|---------------------------|
| Name and Signature  | Name and Signature   | CDC                     | COE                       |
| Name: V. Prabavathi | Name: K. Vijayakumar | Name: Mr. K. Srinivasan | Name: Dr. R. Muthukumaran |
| Signature:          | Signature:           | Signature:              | Signature:                |

|                        |          |                                             |                                    |             |
|------------------------|----------|---------------------------------------------|------------------------------------|-------------|
| <b>Programme Code:</b> | B.Sc.    | <b>Programme Title :</b>                    | Bachelor of Information Technology |             |
| <b>Course Code:</b>    | 20UIT6E9 | <b>Title:</b>                               | <b>Batch :</b>                     | 2020 - 2023 |
|                        |          | Major Elective III<br>Multimedia Techniques | <b>Semester :</b>                  | VI          |
| <b>Hrs/Week:</b>       | 6        |                                             | <b>Credits :</b>                   | 5           |

### Course Objective

Understand the Multimedia devices like hardware, software, types of authoring tools, and concepts of text, sound, animations and applications, etc.

### Course Outcomes (CO)

|    |     |                                                                                 |
|----|-----|---------------------------------------------------------------------------------|
| K1 | CO1 | To remember the various multimedia techniques, tools, formats and applications. |
| K2 | CO2 | To understand the basic concepts of multimedia building blocks.                 |
| K3 | CO3 | To apply the various concepts in the lab.                                       |
| K4 | CO4 | To analyze the various formats.                                                 |

| Units                    | Content                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Hrs       |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>Unit I</b>            | <b>Introduction:</b> Multimedia Definitions- Elements of Multimedia Systems-Stages of Multimedia project - Multimedia team. <b>Multimedia hardware and software:</b> Macintosh and windows production platforms-Connections-Interface-Memory and storage devices- * <i>Input Devices</i> - Output Hardware - Communication devices.                                                                                                                                                                                                                          | 15        |
| <b>Unit II</b>           | <b>Basic software Tools:</b> Text Editing and word processing tools- OCR software - Painting and Drawing Tools- 3D Modeling and Animation Tools-Image editing tools- –Sound Editing Programs-Animation ,Video and Digital Movie tools. <b>Making Instant Multimedia:</b> Linking multimedia objects- * <i>office Suites (Word, Spreadsheets, Databases and Presentation)</i> . <b>Multimedia Authoring Tools:</b> Types of authoring tools- Card and Page Based Tools-Icon Based authoring tools -Time based authoring tools-Cross Platform authoring notes. | 17        |
| <b>Unit III</b>          | <b>Multimedia Building Blocks: Text:</b> Using text in multimedia- Font editing and design tools- Hypermedia and Hypertext. <b>Sound:</b> MIDI Vs Digital audio- Digital audio –Making MIDI Audio- Audio file Formats- -adding sound to your Multimedia Project. <b>Images:</b> Making still images: Bitmaps-Vector drawing-3d drawing and rendering- Color-image file formats-Macintosh formats-windows formats and cross Platform formats.                                                                                                                 | 16        |
| <b>Unit IV</b>           | <b>Animation:</b> Principles of Animation: Animation techniques- animation File formats. <b>Video:</b> Using video –How video works- Broadcast video standards- shooting and editing video - recording formats- Digital video: Video compression. <b>Assembling and Delivering a project:</b> Planning and costing-Designing and producing-content and talent-Delivering                                                                                                                                                                                     | 16        |
| <b>Unit V</b>            | <b>Multimedia Applications:</b> Multimedia in the real world-multimedia in training and education-multimedia for information and sales (Kiosks) - Multimedia and image processing –multimedia in the office- * <i>Multimedia in the Home</i> .                                                                                                                                                                                                                                                                                                               | 14        |
| <b>Total Contact Hrs</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>78</b> |

*\*Self Study*

Presentation, Seminar, Assignment and Discussion

**Books for study:**

- ❖ Tay Vaughan. (2001). *Multimedia Making it works*. 5<sup>th</sup> Edition. Tata McGraw Hill. (Unit I, II, III, IV).
- ❖ Judith Jeffcoate.(2009), *Multimedia in practice(Technology and Applications)*. Pearson Education, 4<sup>th</sup> Impression, (Unit V).

**Books for Reference:**

- ❖ Ralf Steinmetz & Klara Nahrstedt. (2009). *Multimedia Computing, Communication & Applications*. Pearson Education-Sixth Impression.
- ❖ John E.Koegel Buford (2002), *Multimedia System*, New Delhi, Pearson Education.

**Mapping**

| CO \ PSO | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|----------|------|------|------|------|------|
| CO1      | 2    | 3    | 3    | 3    | 3    |
| CO2      | 2    | 2    | 3    | 3    | 3    |
| CO3      | 2    | 3    | 3    | 3    | 3    |
| CO 3     | 2    | 2    | 3    | 3    | 3    |

Low – 1, Medium – 2, High – 3

| Course Designed by | Verified by HOD      | Checked by              | Approved by               |
|--------------------|----------------------|-------------------------|---------------------------|
| Name and Signature | Name and Signature   | CDC                     | COE                       |
| Name: R. Sekar     | Name: K. Vijayakumar | Name: Mr. K. Srinivasan | Name: Dr. R. Muthukumaran |
| Signature:         | Signature:           | Signature:              | Signature:                |

|                        |          |                                 |                                    |             |
|------------------------|----------|---------------------------------|------------------------------------|-------------|
| <b>Programme Code:</b> | B.Sc.    | <b>Programme Title:</b>         | Bachelor of Information Technology |             |
| <b>Course Code:</b>    | 20UIT622 | <b>Title</b>                    | <b>Batch:</b>                      | 2020 - 2023 |
|                        |          | Lab.- IX Graphics & Multimedia. | <b>Semester:</b>                   | VI          |
| <b>Hrs/Week:</b>       | 5        |                                 | <b>Credits:</b>                    | 3           |

### Course Objective

To understand about various algorithms of computer graphics using C, new innovations in multimedia by using Flash.

### Course Outcomes

|    |     |                                                                            |
|----|-----|----------------------------------------------------------------------------|
| K3 | CO1 | To apply various algorithms using 'C' and animation techniques using Flash |
| K4 | CO2 | To analyze 2D and 3D transformations                                       |
| K5 | CO3 | To verify the results for graphics algorithms                              |

| Content                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Hrs       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <p style="text-align: center;"><b>SAMPLE PROGRAM LIST</b></p> <p><b>Test I</b></p> <ol style="list-style-type: none"> <li>1. Implementation of DDA algorithm.</li> <li>2. Implementation of Bresenham's algorithm.</li> <li>3. Implementation of Mid Point circle algorithm.</li> <li>4. Implement DDA algorithm to draw a polylines.</li> <li>5. Implementation of Translation, Scaling, and Rotation transformations.</li> <li>6. Any three Animations using flash.</li> </ol> <p><b>Test II</b></p> <ol style="list-style-type: none"> <li>7. Implementation of Cohen-Sutherland line clipping algorithm.</li> <li>8. Implement Bresenham's algorithm to draw parallel lines.</li> <li>9. Drawing a globe using circle and ellipse algorithm.</li> <li>10. Creating a Bar Chart.</li> <li>11. Simulate the bouncing of a ball within four walls.</li> <li>12. Any three Animations using flash.</li> </ol> | <b>65</b> |

**Mapping**

| CO \ PSO | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|----------|------|------|------|------|------|
| CO1      | 1    | 3    | 1    | 2    | 2    |
| CO2      | 3    | 2    | 2    | 1    | 1    |
| CO3      | 3    | 2    | 2    | 2    | 2    |

Low – 1, Medium – 2, High – 3

| Course Designed by  | Verified by HOD      | Checked by              | Approved by               |
|---------------------|----------------------|-------------------------|---------------------------|
| Name and Signature  | Name and Signature   | CDC                     | COE                       |
| Name: B. Kalaiselvi | Name: K. Vijayakumar | Name: Mr. K. Srinivasan | Name: Dr. R. Muthukumaran |
| Signature:          | Signature:           | Signature:              | Signature:                |

|                        |          |                         |                                    |             |
|------------------------|----------|-------------------------|------------------------------------|-------------|
| <b>Programme Code:</b> | B.Sc.    | <b>Programme Title:</b> | Bachelor of Information Technology |             |
| <b>Course Code:</b>    | 20UIT623 | <b>Title</b>            | <b>Batch:</b>                      | 2020 - 2023 |
|                        |          | Project                 | <b>Semester:</b>                   | VI          |
| <b>Hrs/Week:</b>       | 4        |                         | <b>Credits:</b>                    | 3           |

### Course Objective

To learn depth knowledge about tools used in software development, web designing & web technologies and understand the usage of front end and back end tools.

### Course Outcomes

|    |     |                                                                |
|----|-----|----------------------------------------------------------------|
| K3 | CO1 | To analyze the system requirements of the application/software |
| K4 | CO2 | To apply various tools in real time applications/software      |
| K5 | CO3 | To verify the developed application with the customer          |

| Content                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Hrs       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <p align="center"><b>Using only the following Elective Tools</b></p> <p><b>Front end, Multimedia &amp; Web based tools:</b></p> <ol style="list-style-type: none"> <li>1. Java &amp; Advanced Java</li> <li>2. Angular &amp; Javascript</li> <li>3. PHP</li> <li>5. C#.NET</li> <li>6. HTML 5.0</li> <li>7. Flash</li> <li>8. Python</li> </ol> <p><b>Back end tools:</b></p> <ol style="list-style-type: none"> <li>1. MySQL</li> <li>2. Oracle 8i &amp; above</li> <li>3. MS Access 2007</li> <li>4. SQL Server 2000 and Above</li> </ol> <ul style="list-style-type: none"> <li>• Internship (System Study) starts from fourth semester.</li> </ul> | 52        |
| <b>Total Contact Hrs</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>52</b> |

### Mapping

| CO \ PSO | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|----------|------|------|------|------|------|
| CO1      | 3    | 3    | 3    | 3    | 3    |
| CO2      | 2    | 2    | 3    | 3    | 3    |
| CO3      | 2    | 3    | 3    | 3    | 3    |

Low – 1, Medium – 2, High – 3

| Course Designed by   | Verified by HOD      | Checked by              | Approved by               |
|----------------------|----------------------|-------------------------|---------------------------|
| Name and Signature   | Name and Signature   | CDC                     | COE                       |
| Name: K. Vijayakumar | Name: K. Vijayakumar | Name: Mr. K. Srinivasan | Name: Dr. R. Muthukumaran |
| Signature:           | Signature:           | Signature:              | Signature:                |

|                        |          |                                                                  |                                    |             |
|------------------------|----------|------------------------------------------------------------------|------------------------------------|-------------|
| <b>Programme Code:</b> | B.Sc.    | <b>Programme Title:</b>                                          | Bachelor of Information Technology |             |
| <b>Course Code:</b>    | 20UIT6S3 | <b>Title</b>                                                     | <b>Batch:</b>                      | 2020 - 2023 |
|                        |          | Skill Based Major Elective Lab. - II<br>DTP software (CorelDraw) | <b>Semester:</b>                   | VI          |
| <b>Hrs/Week:</b>       | 2        |                                                                  | <b>Credits:</b>                    | 2           |

### Course Objective

To learn, apply and create various designing concepts of CorelDraw.

### Course Outcomes

|    |     |                                                             |
|----|-----|-------------------------------------------------------------|
| K3 | CO1 | To apply basic geometric tools for designing.               |
| K4 | CO2 | To analyze various editing tools.                           |
| K5 | CO3 | To perform manipulation of images using filters and layers. |

| Content                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Hrs       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <p style="text-align: center;"><b>SAMPLE PROGRAM LIST</b></p> <ol style="list-style-type: none"> <li>1. Draw the Basic geometric shapes using tools.</li> <li>2. Draw different type of lines using line tools.</li> <li>3. Create an image and manipulate it.</li> <li>4. Perform Image extraction and merging of images</li> <li>5. Animate text using Text tool.</li> <li>6. Create a table then insert Data and highlight it.</li> <li>7. Create image and insert Text on image.</li> <li>8. Draw sunflower and apply editing tools.</li> <li>9. Perform image Filter operations.</li> <li>10. Creating layer and modify layer properties.</li> </ol> | <b>26</b> |
| <b>Total Contact Hrs</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>26</b> |

**Mapping**

| CO \ PSO | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|----------|------|------|------|------|------|
| CO1      | 1    | 2    | 3    | 3    | 3    |
| CO2      | 1    | 3    | 3    | 3    | 2    |
| CO3      | 1    | 3    | 3    | 2    | 2    |

Low – 1, Medium – 2, High – 3

| <b>Course Designed by</b> | <b>Verified by HOD</b>    | <b>Checked by</b>       | <b>Approved by</b>        |
|---------------------------|---------------------------|-------------------------|---------------------------|
| <b>Name and Signature</b> | <b>Name and Signature</b> | <b>CDC</b>              | <b>COE</b>                |
| Name: V. Prabavathi       | Name: K. Vijayakumar      | Name: Mr. K. Srinivasan | Name: Dr. R. Muthukumaran |
| Signature:                | Signature:                | Signature:              | Signature:                |

|                        |          |                                                                  |                                    |             |
|------------------------|----------|------------------------------------------------------------------|------------------------------------|-------------|
| <b>Programme Code:</b> | B.Sc.    | <b>Programme Title :</b>                                         | Bachelor of Information Technology |             |
| <b>Course Code:</b>    | 20UIT6S4 | <b>Title:</b>                                                    | <b>Batch :</b>                     | 2020 - 2023 |
|                        |          | Skill Based Major Elective Lab. - II<br>DTP software (Photoshop) | <b>Semester :</b>                  | VI          |
| <b>Hrs/Week:</b>       | 2        |                                                                  | <b>Credits :</b>                   | 2           |

### Course Objective

To learn, apply and create various editing techniques of Photoshop.

### Course Outcomes (CO)

|    |     |                                                             |
|----|-----|-------------------------------------------------------------|
| K3 | CO3 | To apply basic tools for designing photos.                  |
| K4 | CO4 | To analyze various editing tools.                           |
| K5 | CO5 | To perform manipulation of photos using filters and layers. |

| Content                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Hrs       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <p style="text-align: center;"><b>SAMPLE PROGRAM LIST</b></p> <ol style="list-style-type: none"> <li>1. Perform Scanning and simple image editing.</li> <li>2. Apply Colour change, image extraction and merging of images.</li> <li>3. Create Smoothing of sharp edges.</li> <li>4. Draw and Paint with Colors.</li> <li>5. Placing a Photo inside Text.</li> <li>6. Remove red eyes from a photo.</li> <li>7. Apply Filters and layers.</li> <li>8. Create a PDF-document from MS-Office-programs.</li> </ol> | <b>26</b> |
| <b>Total Contact Hrs</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>26</b> |

**Mapping**

| CO \ PSO | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|----------|------|------|------|------|------|
| CO3      | 2    | 1    | 3    | 3    | 3    |
| CO4      | 1    | 2    | 3    | 3    | 3    |
| CO5      | 3    | 2    | 3    | 3    | 3    |

Low – 1, Medium – 2, High – 3

| <b>Course Designed by</b> | <b>Verified by HOD</b>    | <b>Checked by</b>       | <b>Approved by</b>        |
|---------------------------|---------------------------|-------------------------|---------------------------|
| <b>Name and Signature</b> | <b>Name and Signature</b> | <b>CDC</b>              | <b>COE</b>                |
| Name: V. Prabavathi       | Name: K. Vijayakumar      | Name: Mr. K. Srinivasan | Name: Dr. R. Muthukumaran |
| Signature:                | Signature:                | Signature:              | Signature:                |

### Value Added Courses (Extra Credit)

|                                 |                        |                                              |                                    |     |
|---------------------------------|------------------------|----------------------------------------------|------------------------------------|-----|
| <b>Programme Code:</b>          | B.Sc.                  | <b>Programme Title:</b>                      | Bachelor of Information Technology |     |
| <b>Course Code:</b><br>20UITV02 | Value Added Course - 1 | <b>Title</b>                                 | <b>Batch:</b>                      | Any |
|                                 |                        | <b>Basics of Animation Technology (Lab.)</b> | <b>Semester:</b>                   |     |
| <b>Hrs/Week:</b>                | 2                      |                                              | <b>Credits:</b>                    | 2   |

| Units           | Content                                                                                                                                                                                                 | Hrs       |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>Unit I</b>   | 1. To animate the Butterfly<br>2. To animate the Solar system<br>3. To animate the flag hoisting<br>4. To animate any game play<br>5. To animate traffic control                                        | 10        |
| <b>Unit II</b>  | 6. To animate aquarium<br>7. To animate walking with naturals<br>8. To animate any vehicle<br>9. To animate raining<br>10. To animate musical instrument play                                           | 10        |
| <b>Unit III</b> | 11. To animate the flight land and takeoff<br>12. To animate any cartoon character<br>13. To animate reading a book (flip)<br>14. To animate the wall clock/ digital clock<br>15. To animate the banner | 10        |
|                 | <b>Total Contact Hrs</b>                                                                                                                                                                                | <b>30</b> |

|                                 |                        |                                           |                                    |     |
|---------------------------------|------------------------|-------------------------------------------|------------------------------------|-----|
| <b>Programme Code:</b>          | B.Sc.                  | <b>Programme Title:</b>                   | Bachelor of Information Technology |     |
| <b>Course Code:</b><br>20UITV01 | Value Added Course - 2 | <b>Title</b>                              | <b>Batch:</b>                      | Any |
|                                 |                        | <b>Basics of Block Chain Architecture</b> | <b>Semester:</b>                   |     |
| <b>Hrs/Week:</b>                | 2                      |                                           | <b>Credits:</b>                    |     |

| <b>Units</b>    | <b>Content</b>                                                                                                                                                                                                                                                                                                                                                                                   | <b>Hrs</b> |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| <b>Unit I</b>   | Block Chain – Introduction – Problems with centralized System – Overview – Fundamentals. Bitcoin- Introduction – Transaction life cycle - Block chain2.0 – Smart Contracts. Block in Block chain Architecture - Distributed Consensus - Economics behind Block Chain Consensus.                                                                                                                  | 10         |
| <b>Unit II</b>  | The Chain and the Longest chain – Cryptocurrency to Block chain 2.0 – Permissioned model of Block chain. Cryptographic hash function – Properties – Hash pointer and Merkle tree.                                                                                                                                                                                                                | 8          |
| <b>Unit III</b> | Digital Signature - Public Key Cryptography - A basic cryptocurrency - Creation of coins - Payments and double spending - FORTH – the precursor for Bitcoin scripting - Bitcoin Scripts - Bitcoin P2P Network - Transaction in Bitcoin Network - Block Mining - Block propagation and block relay - Why Consensus - Distributed consensus in open environments - Consensus in a Bitcoin network. | 12         |
|                 | <b>Total Contact Hrs</b> <i>* self study</i>                                                                                                                                                                                                                                                                                                                                                     | <b>30</b>  |

### Advanced Learner's Courses (Extra Credit)

|                        |            |                         |                                    |             |
|------------------------|------------|-------------------------|------------------------------------|-------------|
| <b>Programme Code:</b> | B.Sc.      | <b>Programme Title:</b> | Bachelor of Information Technology |             |
| <b>Course Code:</b>    | 20UITAL501 | <b>Title</b>            | <b>Batch:</b>                      | 2020 - 2023 |
|                        |            | Big Data Analytics      | <b>Semester:</b>                   | V           |
| <b>Hrs/Week:</b>       | Self Study |                         | <b>Credits:</b>                    | 2           |

#### Course Objective

To cultivate programming ability using Pig, clear view on Big data, Hadoop and Machine Learning, Understanding the concepts of MongoDB, Hive, Jasper report

#### Course Outcomes

|    |     |                                                                                             |
|----|-----|---------------------------------------------------------------------------------------------|
| K1 | CO1 | To keep in mind the fundamentals of Big Data.                                               |
| K2 | CO2 | To understand the concepts of Hadoop and Machine Learning                                   |
| K3 | CO3 | To apply concepts and techniques for implementing MongoDB, Hive                             |
| K4 | CO4 | To evaluate the logical thinking in program development using Pig and prepare Jasper report |

| Units           | Content                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Unit I</b>   | <b>Types Of Digital Data:</b> classification of digital data. <b>Introduction to Big Data:</b> Characteristics– Evolution – Definition – Challenges – Big Data Definition – Other Characteristics – Need of Big Data – Traditional Business Intelligence Versus Big Data – Data Warehouse Environment – Hadoop Environment – Big Data Today – Changing Realms Of Big Data. <b>Big Data Analytics:</b> Big Data Analytics – Classification Of Analytics – Greatest Challenges – Top Challenges – Importance – Kind Of Technologies to Meet The Challenges – Data Science – Data Scientist – Terminologies used in Big Data – BASE – Analytics Tools |
| <b>Unit II</b>  | <b>The Big Data Technology Landscape:</b> NoSQL – Hadoop. <b>Introduction to Hadoop:</b> Introduction – Need- RDBMS Versus Hadoop – Distributed Computing Challenges – History – Overview – Use case – Distributors – HDFS – Processing Data with Hadoop – Managing Resources And Applications With Hadoop YARN – Interacting With Hadoop Ecosystem                                                                                                                                                                                                                                                                                                |
| <b>Unit III</b> | <b>Introduction to MongoDB:</b> MongoDB – Terms used in RDBMS and MongoDB – Data types – MongoDB query language                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Unit IV</b>  | <b>Introduction to MapReduce Programming:</b> Introduction – Mapper – Reducer – combiner – Partitioner – Searching – Sorting – Compression. <b>Introduction to Hive:</b> Hive – Architecture – Data Types – File Format – HQL – RCfile Implementation – SerDe – User Defined Function. <b>Introduction to Pig:</b> Pig-Anatomy-Pig On Hadoop-Philosophy-Use case-Pig Latin Overview-Data types-Running-Execution Modes-HDFS Commands-Relational Operators-Eval Function-Complex Datatypes- PiggyBank-UserDefined Functions                                                                                                                         |
| <b>Unit V</b>   | <b>Jasper report Using Jaspersoft:</b> Introduction - Connecting to MongoDB NoSQL DataBase-Connecting to Cassandra NoSQL DB. <b>Introduction to Machine Learning:</b> Introduction-Algorithms. <b>Few Interesting Differences:</b> Data Warehouse and Data Lake-RDBMS and HDFS - HDFS and HBase-Hadoop MapReduce vs. Pig-Hadoop MapReduce and Spark -Pig and Hive. <b>Big Data Trends:</b> Rise of New Age “Data Curators”- CDOs -Dark Data -IOT for ML-Edge Computing-Open Source-Hadoop is Fundamental-Chat Boards-Container(ed)Revolution-Commoditization of Visualization                                                                      |
|                 | <b>Total Contact Hrs</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

|                                                 |
|-------------------------------------------------|
| This course is Self Study for Advanced Learners |
|-------------------------------------------------|

**Books for study**

- ❖ Seema Acharya, Subashini Chellapan, (2019) “Big Data and Analytics”, 2<sup>nd</sup> Edition, Wiley Publications

**Books for Reference**

- ❖ **M. Vijayalakshmi Radha Shankarmani (2016)** “Big Data Analytics”, Kindle Edition, Wiley Publications

**Mapping**

| CO \ PSO | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|----------|------|------|------|------|------|
| CO1      | 1    | 1    | 3    | 1    | 3    |
| CO2      | 3    | 3    | 3    | 2    | 3    |
| CO3      | 2    | 3    | 3    | 2    | 3    |
| CO4      | 3    | 3    | 1    | 1    | 2    |

Low – 1, Medium – 2, High – 3

| Course Designed by    | Verified by HOD      | Checked by              | Approved by               |
|-----------------------|----------------------|-------------------------|---------------------------|
| Name and Signature    | Name and Signature   | CDC                     | COE                       |
| Name: C.R. Durga devi | Name: K. Vijayakumar | Name: Mr. K. Srinivasan | Name: Dr. R. Muthukumaran |
| Signature:            | Signature:           | Signature:              | Signature:                |

|                        |            |                         |                                    |             |
|------------------------|------------|-------------------------|------------------------------------|-------------|
| <b>Programme Code:</b> | B.Sc.      | <b>Programme Title:</b> | Bachelor of Information Technology |             |
| <b>Course Code:</b>    | 20UITAL601 | <b>Title</b>            | <b>Batch:</b>                      | 2020 - 2023 |
|                        |            | Python Programming      | <b>Semester:</b>                   | VI          |
| <b>Hrs/Week:</b>       | Self Study |                         | <b>Credits:</b>                    | 2           |

### Course Objective

To cultivate programming ability on logic development, clear view on Functions, Strings, List, Dictionaries, Tuples, Application areas of python, etc.

### Course Outcomes

|    |     |                                                                                                |
|----|-----|------------------------------------------------------------------------------------------------|
| K1 | CO1 | To keep in mind the fundamentals of Python programming.                                        |
| K2 | CO2 | To understand the concepts of Functions                                                        |
| K3 | CO3 | To apply concepts and techniques for implementing String functions, List, Tuples, Dictionaries |
| K4 | CO4 | To evaluate the logical thinking in program development and apply on various areas             |

| Units           | Content                                                                                                                                                                                                                                                                                                                                      |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Unit I</b>   | <b>Python Basics-I:</b> Introduction-Basic concepts-Statements and indentation -Identifiers, keywords and variables. <b>Python Basics II:</b> Introduction-Data types-Mutable versus Immutable-Typecasting-Input to a python program –Modular Programming and python modules-Strings-Binary Literals-The Zen of python on jupyter. Operators |
| <b>Unit II</b>  | <b>Functions –Part I:</b> Need-Basics-Own function and syntax. <b>Function Part II:</b> Passing variable I - function call- function arguments – Additional note on modules in python-recursions- some special functions.                                                                                                                    |
| <b>Unit III</b> | <b>Flow control. Strings:</b> Creating initializing and accessing elements-Traversing- Operations- Difference between functions. Methods and attribute-sting function versus string methods. <b>List:</b> Basic concept- Creating, traversing and slicing- List functions and methods- Nested list.                                          |
| <b>Unit IV</b>  | <b>Dictionaries:</b> Basics- Dictionary functions and methods – View Object. <b>Tuples:</b> Basic concepts. Numpy, SciPy: Basics- Various operations. Pandas: Basics-Working on files.                                                                                                                                                       |
| <b>Unit V</b>   | <b>Applications of Python:</b> Collecting Information from Twitter – Managing Database using Structured Query Language- Developing Mobile Application for Android                                                                                                                                                                            |
|                 | <b>Total Contact Hrs</b>                                                                                                                                                                                                                                                                                                                     |

|                                                 |
|-------------------------------------------------|
| This course is Self Study for Advanced Learners |
|-------------------------------------------------|

**Books for study**

- ❖ Anurag Gupta, G P Biswas (2020) “Python programming Problem Solving, Packages and Libraries.” Tata McGraw Hill Education Publication (UNIT I – IV)
- ❖ Sheetal Taneja and Naveen Kumar, (2018) “Python programming A Modular Approach with Database, Mobile, and Web Applications“ Pearson India Education Services.(UNIT V)

**Books for Reference**

- ❖ Chris Meyers Allen Downey, Jeffrey Elkner. (2015). *Learning with Python* DreamTech Press, Kindle Edition.

**Mapping**

| CO \ PSO | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|----------|------|------|------|------|------|
| CO1      | 1    | 1    | 3    | 1    | 3    |
| CO2      | 3    | 3    | 3    | 2    | 3    |
| CO3      | 2    | 3    | 3    | 2    | 3    |
| CO4      | 3    | 3    | 1    | 1    | 2    |

Low – 1, Medium – 2, High – 3

| Course Designed by    | Verified by HOD      | Checked by              | Approved by               |
|-----------------------|----------------------|-------------------------|---------------------------|
| Name and Signature    | Name and Signature   | CDC                     | COE                       |
| Name: C.R. Durga devi | Name: K. Vijayakumar | Name: Mr. K. Srinivasan | Name: Dr. R. Muthukumaran |
| Signature:            | Signature:           | Signature:              | Signature:                |