# B.Sc (Computer Science)

# Syllabus

## Program Code: UCS

**2021-2022 onwards**


**MANNAR THIRUMALAI NAICKER COLLEGE**

**(AUTONOMOUS)**

**Re-accredited with "A" Grade by NAAC**

**PASUMALAI, MADURAI – 625 004**

**Eligibility for Admission**

Candidates seeking admission to the B.Sc Degree course must have the Higher Secondary Education, (should have studied Computer Science and Mathematics in HSC) of the Government of Tamil Nadu or any other state or its equivalent qualification.

**Duration of the course**

The duration of the course shall be three academic years comprising six semesters with two semesters in each academic year.

**Subjects of Study**

Part I : Tamil / Company Secretarial Practice and Modern Office Management

Part II : English

Part III :

1. Core Subjects
2. Allied Subjects
3. Electives

Part IV :

1. Non Major Electives (II Year)
2. Skill Based Subjects
3. Environmental Studies - Mandatory Subject
4. Value Education - Mandatory Subject

Part V :

Extension Activities

**Pattern of the question paper for the Continuous Internal Assessment**

**Note: Duration – 1 hour**

**(For Part I, Part II & Part III)**

The components for continuous internal assessment are:

**Part –A**

Four multiple choice questions (answer all) 4 x01= 04 Marks

**Part –B**

Three short answers questions (answer all) 3 x02= 06 Marks

**Part –C**

Two questions (‘either …. or ‘type) 2 x 05=10 Marks

**Part –D**

Two questions out of three 1 x 10 =10 Marks

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Total 30 Marks

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**The scheme of Examination for Part-I, II & III**

The components for continuous internal assessment are:

(60 Marks of two continuous internal assessments will be converted to 15 marks)

| | |
|---|---|
| Two tests and their average | --15 marks |
| Seminar /Group discussion | --5 marks |
| Assignment | --5 marks |
| | --- |
| Total | 25 Marks |
| | --- |

**Pattern of the question paper for the Summative Examinations:**

**Note: Duration- 3 hours**

**Part –A**

Ten multiple choice questions 10 x01 = 10 Marks

No Unit shall be omitted: not more than two questions from each unit.)

**Part –B**

Short answer questions (one question from each unit) 5 x02 = 10 Marks

**Part –C**

Five Paragraph questions (‘either …. or ‘type) 5 x 05 = 25 Marks

(One question from each Unit)

**Part –D**

Three Essay questions out of five 3 x 10 =30 Marks

(One question from each Unit)

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Total 75 Marks

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**Part-IV-** Skill Based Papers / NME:

**The Scheme of Examination for Skill Based Papers: (Except Practical Lab Subjects)**
**Pattern of the questions paper for the continuous Internal Assessment**

**45 MCQs will be asked for each internal assessment tests (**45 x 1=45 Marks**) and converted for 15 marks**

The components for continuous internal assessment are:

| | |
|---|---|
| Two tests and their average | --15 marks |
| Seminar /Group discussion | --5 marks |
| Assignment | --5 marks |
| | --- |
| Total | 25 Marks |
| | --- |

**Summative Examination Pattern**

**Pattern of the Question Paper for Skill Based Papers (External)**

**75 Multiple choice questions will be asked from five units (**75 x 1=75 Marks**)**

**(15MCQ's from each unit)**

**Part-IV- Environmental Studies and Value Education**

**The Scheme of Examination (Environmental Studies and Value Education)**

| | |
|---|---|
| Two tests and their average | --15 marks |
| Project Report | --10 marks***** |
| Total | --25 marks |

***** The students as Individual or Group must visit a local area to document environmental assets – river / forest / grassland / hill / mountain – visit a local polluted site – urban / rural / industrial / agricultural – study of common plants, insects, birds – study of simple ecosystem – pond, river, hill slopes, etc.

**Question Paper Pattern**

**(Internal Assessment)**

**Pattern of the Question Paper for Environmental Studies & Value Education only) (Internal)**

**45 MCQs will be asked for each internal assessment tests (**45 x 1=45 Marks**) and converted for 15 marks**

| | | |
|---|---|---|
| Two tests and their average | -- | 15 marks |
| Project | -- | 10 marks |
| | | --- |
| Total | | 25 Marks |
| | | --- |

**Summative Examination Pattern**

**Pattern of the Question Paper for Environmental Studies & Value Education only) (External)**

**75 Multiple choice questions will be asked from five units (**75 x 1=75 Marks**)**

**(15MCQ's from each unit)**

**Part V Extension Activities: (Maximum Marks: 100)**

1. NCC
2. NSS
3. Physical Education
4. YRC
5. RRC
6. Health & Fitness Club
7. Eco Club
8. Human Rights Club

**Pattern of the Question Paper for (Internal Examination & Summative Examination)**

| | |
|---|---|
| Internal Examinations | - - 40 Marks |
| Summative Examinations | - - 60 Marks |
| | **100** |

**Minimum Marks for a Pass**

40% of the aggregate (Internal +Summative Examinations).

No separate pass minimum for the Internal Examinations.

27 marks out of 75 is the pass minimum for the Summative Examinations.

## Vision

To empower students of Computer Science Department to be technologically adept, innovative, self-motivated and responsible global citizens possessing human values and enable them to contribute in industrial development innovation, high quality technical education and research with the ever-changing world.

## Mission

- To provide a strong theoretical and practical background across the computer science discipline with an emphasis on software development
- To achieve excellence in the field of computing through quality education and equip the skills in computer science that they need to take up real-world challenges
- To strengthen the Industry-Academia interface that will help the graduates to emerge as leaders in academics or an inspiring revolutionary in entrepreneurship.
- To evolve as a center of excellence in the field of Computer Science for developing technically competent professional with ethical values to serve the needs of industry and society

The 12 Graduate Attributes*:

1. (KB) A knowledge base for engineering: Demonstrated competence in university level mathematics, natural sciences, engineering fundamentals, and specialized engineering knowledge appropriate to the program.
2. (PA) Problem analysis: An ability to use appropriate knowledge and skills to identify, formulate, analyze, and solve complex engineering problems in order to reach substantiated conclusions
3. (Inv.) Investigation: An ability to conduct investigations of complex problems by methods that include appropriate experiments, analysis and interpretation of data and synthesis of information in order to reach valid conclusions.
4. (Des.) Design: An ability to design solutions for complex, open-ended engineering problems and to design systems, components or processes that meet specified needs with appropriate attention to health and safety risks, applicable standards, and economic, environmental, cultural and societal considerations.
5. (Tools) Use of engineering tools: An ability to create, select, apply, adapt, and extend appropriate techniques, resources, and modern engineering tools to a range of engineering activities, from simple to complex, with an understanding of the associated limitations.

6. (Team) Individual and teamwork: An ability to work effectively as a member and leader in teams, preferably in a multi-disciplinary setting.
7. (Comm.) Communication skills: An ability to communicate complex engineering concepts within the profession and with society at large. Such ability includes reading, writing, speaking and listening, and the ability to comprehend and write effective reports and design documentation, and to give and effectively respond to clear instructions.
8. (Prof.) Professionalism: An understanding of the roles and responsibilities of the professional engineer in society, especially the primary role of protection of the public and the public interest.
9. (Impacts) Impact of engineering on society and the environment: An ability to analyze social and environmental aspects of engineering activities. Such ability includes an understanding of the interactions that engineering has with the economic, social, health, safety, legal, and cultural aspects of society, the uncertainties in the prediction of such interactions; and the concepts of sustainable design and development and environmental stewardship.
10. (Ethics) Ethics and equity: An ability to apply professional ethics, accountability, and equity.
11. (Econ.) Economics and project management: An ability to appropriately incorporate economics and business practices including project, risk, and change management into the practice of engineering and to understand their limitations.
12. (LL) Life-long learning: An ability to identify and to address their own educational needs in a changing world in ways sufficient to maintain their competence and to allow them to contribute to the advancement of knowledge

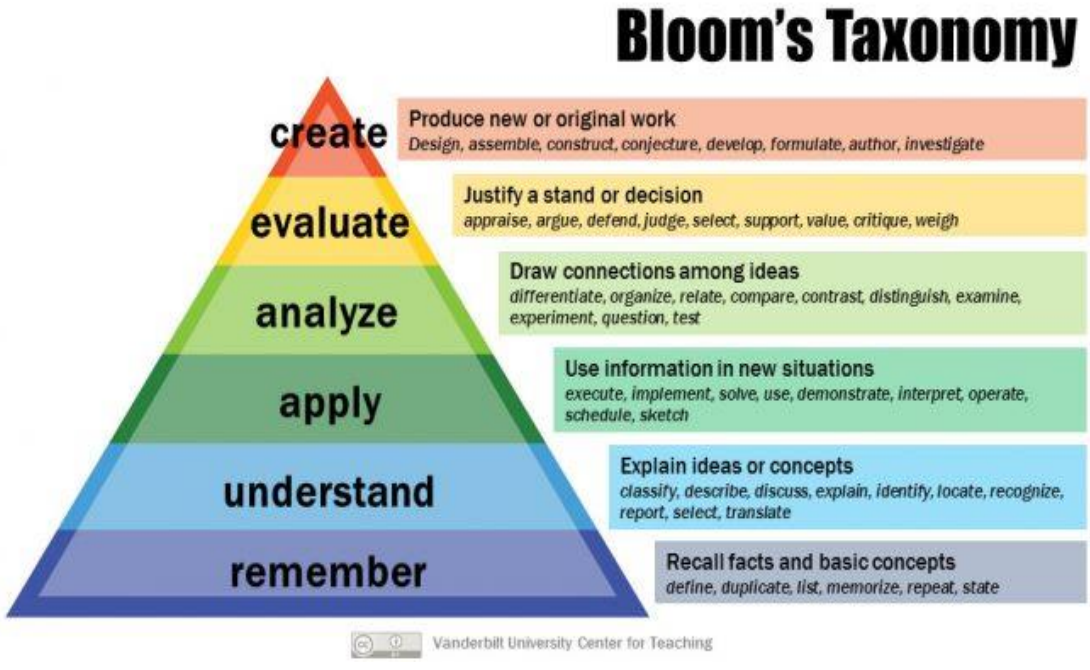
| WA | Graduate Attributes | Caption as |
|---|---|---|
| **1** | Demonstrated competence in university level mathematics, natural sciences, engineering fundamentals, and specialized engineering knowledge appropriate to the program. | **knowledge base** |
| **2** | An ability to use appropriate knowledge and skills to identify, formulate, analyze, and solve complex engineering problems in order to reach substantiated conclusions | **Problem analysis** |
| **4** | An ability to design solutions for complex, open-ended engineering problems and to design systems, components or processes that meet specified needs with appropriate attention to health and safety risks, applicable standards, and economic, environmental, cultural and societal considerations. | **Design** |
| **10** | An ability to apply professional ethics, accountability, and equity. | **Ethics and equity** |
| **3** | An ability to conduct investigations of complex problems by methods that include appropriate experiments, analysis and interpretation of data and synthesis of information in order to reach valid conclusions. | **Investigation** |
| **9** | An ability to analyze social and environmental aspects of engineering activities. Such ability includes an understanding of the interactions that engineering has with the economic, social, health, safety, legal, and cultural aspects of society, the uncertainties in the prediction of such interactions; and the concepts of sustainable design and development and environmental stewardship. | **Impact of engineering on society and the environment** |

| | | |
|---|---|---|
| **6** | An ability to work effectively as a member and leader in teams, preferably in a multi-disciplinary setting. | **Individual and teamwork** |
| **8** | An understanding of the roles and responsibilities of the professional engineer in society, especially the primary role of protection of the public and the public interest. | **Professionalism** |
| **12** | An ability to identify and to address their own educational needs in a changing world in ways sufficient to maintain their competence and to allow them to contribute to the advancement of knowledge | **Life-long learning** |
| **5** | An ability to create, select, apply, adapt, and extend appropriate techniques, resources, and modern engineering tools to a range of engineering activities, from simple to complex, with an understanding of the associated limitations. | **Use of engineering tools** |
| **7** | An ability to communicate complex engineering concepts within the profession and with society at large. Such ability includes reading, writing, speaking and listening, and the ability to comprehend and write effective reports and design documentation, and to give and effectively respond to clear instructions. | **Communication skills** |
| **11** | An ability to appropriately incorporate economics and business practices including project, risk, and change management into the practice of engineering and to understand their limitations. | **Economics and project management** |

| **PROGRAM EDUCATIONAL OBJECTIVES (PEOs)** | |
|---|---|
| **PEO1**: | Graduates of the programme will be employed in the field Computer Science. |
| **PEO2**: | Graduates of the programme will pursue higher studies. |
| **PEO3**: | GraduatesoftheprogrammewillapplynewtechnologiesinComputerSciencetoserve the needs of industry and society. |
| **PEO4**: | GraduatesofprogrammewillhavesuccessfulcareerintechnologyinComputerScience. |
| **PEO5**: | Graduatesoftheprogrammewillhaveskillstodevelopapplicationswithinnovation |
| **PEO6**: | Graduates of the programme will have capable of working in multi-disciplinary environment following ethical values. |

| PO NO | PROGRAMME OUTCOMES (POs) | |
|---|---|---|
| **At the end of the programme, the students will be able to** | | |
| PO – 1 | Demonstrate the knowledge and understanding of Science concepts and its relevant fields. | **Disciplinary Knowledge** |
| PO – 2 | Identify, formulate, analyse complex problems and reach valid conclusions using the methodologies of Science. | **Problem Solving** |
| PO – 3 | Employ critical and analytical thinking in understanding the concepts and apply them in various problems appearing in different branches of Science. | **Analytical Reasoning & Critical Thinking** |
| PO - 4 | Communicate the known concepts effectively within the profession and with any forum | **Communication Skills** |
| **PO - 5** | Function successfully as a member/leader in any team and to apply ethics, accountability and equity in their life. | **Team Work and Moral/Ethical Awareness** |
| **PO - 6** | Use ICT tools in various learning situations, related information sources, suitable software to analyze data and furthermore participating in learning activities throughout life to meet the demands of work place through knowledge /up-skilling / re-skilling | **Digital Literacy & Life-long Learning** |

| **PROGRAM SPECIFIC OUTCOME (PSOs)** | |
|---|---|
| **PSO1**: | Students to have knowledge and expertise in at least one procedure-oriented and object Oriented programming language |
| **PSO2**: | Students to have wide perspective on software development including web based Applications as well as graphic applications. |
| **PSO3**: | Students will be aware of the design principles of Operating Systems specializing on at Least one popular operating System |
| **PSO4**: | Students to have the ability to design and implement to optimal databases using current technologies. |
| **PSO5**: | Students design algorithms as per need by relating the data structure |
| **PSO6**: | Students identify and describe the communication networks technologies In local area networks and the internet and countermeasures for security threats. |



**MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous), MADURAI**
**COMPUTER SCIENCE CURRICULUM**

*(For the student admitted during the academic year 2021-2022 onwards)*

| Course Code | Title of the Course | Hrs | Credits | Maximum Marks | | |
|---|---|---|---|---|---|---|
| | | | | Int | Ext | Total |
| **FIRST SEMESTER** | | | | | | |
| **Part – I** | **Tamil / Alternative Course** | | | | | |
| 21UTAG11 | **இக்காலக் கவிதையும் நாடகமும்** | 6 | 3 | 25 | 75 | 100 |
| **Part – II** | **English** | | | | | |
| 21UENG11 | Communicative English - I | 6 | 3 | 25 | 75 | 100 |
| **Part - III** | **Core Courses** | | | | | |
| 21UCSC11 | Programming in C | 5 | 5 | 25 | 75 | 100 |
| 21UCSCP1 | Programming in C Lab | 4 | 4 | 40 | 60 | 100 |
| **Part III** | **Allied Course** | | | | | |
| 21UMCA11 | Mathematical Foundations | 5 | 4 | 25 | 75 | 100 |
| **Part IV** | **Skill Based Course** | | | | | |
| 21UCSSP1 | Office Automation Lab | 2 | 2 | 40 | 60 | 100 |
| **Part IV** | **Mandatory Course** | | | | | |
| 21UEVG11 | Environmental Studies | 2 | 2 | 25 | 75 | 100 |
| | **Total** | **30** | **23** | **205** | **495** | **700** |
| **SECOND SEMESTER** | | | | | | |
| **Part – I** | **Tamil / Alternative Course** | | | | | |
| 21UTAG21 | **இடைக்கால இலக்கியமும் சிறுகதையும்** | 6 | 3 | 25 | 75 | 100 |
| **Part – II** | **English** | | | | | |
| 21UENG21 | Communicative English -II | 6 | 3 | 25 | 75 | 100 |
| **Part - III** | **Core Courses** | | | | | |
| 21UCSC21 | Object Oriented Programming using C++ | 5 | 5 | 25 | 75 | 100 |
| 21UCSCP2 | Object Oriented Programming using C++ Lab | 4 | 4 | 40 | 60 | 100 |
| **Part III** | **Allied Course** | | | | | |
| 21UMCA21 | Probability and Statistics | 5 | 4 | 25 | 75 | 100 |
| **Part IV** | **Skill Based Course** | | | | | |
| 21UCSSP2 | Multimedia Lab | 2 | 2 | 40 | 60 | 100 |
| 21UVLG21 | **Value Education** | 2 | 2 | 25 | 75 | 100 |
| | **Total** | **30** | **23** | **205** | **495** | **700** |

| THIRD SEMESTER | | | | | | |
|---|---|---|---|---|---|---|
| **Part – I** | **Tamil / Alternative Course** | | | | | |
| 21UTAG31 | **காப்பிய இலக்கியமும் உரைநடையும்** | 6 | 3 | 25 | 75 | 100 |
| **Part – II** | **English** | | | | | |
| 21UENG31 | Communicative English -III | 6 | 3 | 25 | 75 | 100 |
| **Part - III** | **Core Courses** | | | | | |
| 21UCSC31 | Data Structures And Algorithms | 5 | 5 | 25 | 75 | 100 |
| 21UCSCP3 | Data Structures And Algorithms Lab | 4 | 4 | 40 | 60 | 100 |
| **Part III** | **Allied Course** | | | | | |
| 21UMCA31 | Numerical Aptitude | **5** | 4 | 25 | 75 | 100 |
| **Part IV** | **Skill Based Course** | | | | | |
| 21UCSSP3 | Web Design Lab | **2** | 2 | 40 | 60 | 100 |
| **Part IV** | **Non Major Elective Course** | | | | | |
| 21UCSN31 | Multimedia Technologies | 2 | 2 | 25 | 75 | 100 |
| | **Total** | **30** | **23** | **205** | **495** | **700** |
| **FOURTH SEMESTER** | | | | | | |
| **Part – I** | **Tamil / Alternative Course** | | | | | |
| 21UTAG41 | **பண்டைய இலக்கியமும் புதினமும்** | 6 | 3 | 25 | 75 | 100 |
| **Part – II** | **English** | | | | | |
| 21UENG41 | Communicative English -IV | 6 | 3 | 25 | 75 | 100 |
| **Part - III** | **Core Courses** | | | | | |
| 21UCSC41 | Relational Data Base Management System | 5 | 4 | 25 | 75 | 100 |
| 21UCSCP4 | Relational Data Base Management System Lab | 4 | 4 | 40 | 60 | 100 |
| **Part III** | **Allied Course** | | | | | |
| 21UMCA41 | Operations Research | 5 | 4 | 25 | 75 | 100 |
| **Part IV** | **Skill Based Course** | | | | | |
| 21UCSSP4 | Programming in PHP Lab | 2 | 2 | 40 | 60 | 100 |
| **Part IV** | **Non Major Elective Course** | | | | | |
| 21UCSN41 | Web Development | 2 | 2 | 25 | 75 | 100 |
| **Part V** | **Extension Activities** | | | | | |
| 21UEAG40-21UEAG49 | NSS, NCC, YRC | - | 1 | 40 | 60 | 100 |
| | **Total** | **30** | **23** | **245** | **555** | **800** |

| FIFTH SEMESTER | | | | | | |
|---|---|---|---|---|---|---|
| **Part - III** | **Core Courses** | | | | | |
| 21UCSC51 | Advanced Java Programming | 6 | 4 | 25 | 75 | 100 |
| 21UCSC52 | Data Communication and Networking | 6 | 4 | 25 | 75 | 100 |
| 21UCSCP5 | Java Programming Lab | 6 | 4 | 40 | 60 | 100 |
| **Part III** | **Core Elective Course I** | | | | | |
| 21UCSE51 | Operating System Concepts | 5 | 5 | 25 | 75 | 100 |
| 21UCSE52 | Software Engineering | | | | | |
| 21UCSE53 | Object Oriented Analysis and Design | | | | | |
| **Part III** | **Core Elective Course II** | | | | | |
| 21UCSE54 | Cyber Security | 5 | 5 | 25 | 75 | 100 |
| 21UCSE55 | Internet of Things | | | | | |
| 21UCSE56 | Data Mining Techniques | | | | | |
| **Part IV** | **Skill Based Course** | | | | | |
| 21UCSSP5 | R Programming Lab | **2** | **2** | 40 | 60 | 100 |
| | **Total** | **30** | **24** | **180** | **420** | **600** |
| **SIXTH SEMESTER** | | | | | | |
| **Part - III** | **Core Courses** | | | | | |
| 21UCSC61 | C# and .Net Programming | 6 | 4 | 25 | 75 | 100 |
| 21UCSCP6 | C# and .Net Programming Lab | 6 | 4 | 40 | 60 | 100 |
| 21UCSPR1 | Project and Viva Voce | 6 | 4 | 40 | 60 | 100 |
| **Part III** | **Core Elective Course I** | | | | | |
| 21UCSE61 | Cloud Infrastructure and Services | 5 | 5 | 25 | 75 | 100 |
| 21UCSE62 | Machine Learning | | | | | |
| 21UCSE63 | Software Testing and Quality Assurance | | | | | |
| **Part III** | **Core Elective Course II** | | | | | |
| 21UCSE64 | Big Data Analytics | 5 | 5 | 25 | 75 | 100 |
| 21UCSE65 | Open Source Technologies | | | | | |
| 21UCSE66 | Client Server Computing | | | | | |
| **Part IV** | **Skill Based Course** | | | | | |
| 21UCSSP6 | Python Lab | **2** | **2** | 40 | 60 | 100 |
| | **Total** | **30** | **24** | **195** | **405** | **600** |
| | **Grand Total** | **180** | **140** | **1235** | **2865** | **4100** |


FIRST SEMESTER

**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**
**DEPARTMENT OF COMPUTER SCIENCE**
**(For those who joined in 2021-2022 and after)**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Course Name** | **PROGRAMMING IN C** | | | | | | | |
| **Course Code** | **21UCSC11** | | | | | **L** | **P** | **C** |
| **Category** | **Core** | | | | | 5 | - | 5 |
| **Nature of course:** | **EMPLOYABILITY** | ✓ | **SKILL ORIENTED** | ✓ | ENTREPRENEURSHIP | | | |

**Course objectives:**

- To introduce the concepts of computer basics & programming with particular attention to Engineering examples.
- To learn the fundamental programming concepts and methodologies which are essential to building good C programs.
- To practice the fundamental programming methodologies in the C programming language via laboratory experiences.
- To code, document, test, and implement a well-structured, robust computer program using the C programming language.
- To write reusable modules (collections of functions).

| | | |
|---|---|---|
| **Unit: I** | **Introduction** : | 15 Hours |

Generation and Classification of Computers – Basic Organization of a Computer – Number System – Binary – Decimal – Conversion – Problems. Need for Logical Analysis and Thinking – Algorithm – Pseudo Code – Flowchart

| | | |
|---|---|---|
| **Unit: II** | **C Programming Basics** : | 15 Hours |

Problem Formulation – Problem Solving – Introduction to "C" Programming – Fundamentals – Structure of a "C" Program – Compilation and Linking Processes – Constants, Variables – Data types – Expressions Using Operators in "C" – Managing Input and Output Operations – Decision Making and Branching – Looping statements – Solving Simple Scientific and Statistical Problems.

| | | |
|---|---|---|
| **Unit: III** | **Arrays and Strings** : | 15 Hours |

Arrays – Initialization – Declaration – One Dimensional and Two Dimensional Arrays – String – String Operations – String Arrays. Simple programs – Sorting – Searching – Matrix Operations

| | | |
|---|---|---|
| **Unit: IV** | **Functions and Pointers** : | 15 Hours |

Function – Definition of function – Declaration of function – Pass by Value – Pass by Reference – Recursion – Pointers – Definition – Initialization – Pointers and Arrays – Example Problems.

| | | |
|---|---|---|
| **Unit: V** | **Structures and Unions** | 15 Hours |

Introduction – Need for Structure Data Type – Structure Definition – Structure Declaration – Structure within a Structure - Union – Program Using Structures and Unions – Storage Classes – Pre-processor Directives

| | | |
|---|---|---|
| | **Total Lecture Hours** | 75 Hours |

**Books for Study:**

1. Anita Goel & Ajay Mittal, COMPUTER FUNDAMENTALS AND PROGRAMMING IN C, Pearson Noida, 2017

Unit I : Chapter 1 and 2 ,
Unit II : Chapter 2,3,4,and 5,
Unit III : Chapter 6 and 7,
Unit IV : Chapter 6 and 8

| Unit V : Chapter9 and 10 | |
|---|---|
| **Book for References:** | |
| 1. E.Balagurusamy, Programming in ANSI C, Tata McGraw Hill Education Private Limited, Sixth Edition, New Delhi, 2012<br>2. Yashavant Kanetkar, Let Us C, BPB Publications, New Delhi, Tenth Edition, 2010.<br>3. Byron Gottfried, Programming with C, McGraw Hill Education (India) Private Limited, New Delhi, Third Edition, 2014.<br>4. Brain W.Kernigham & Dennis Ritchie, C Programming, Prentice Hall, Second Edition, 1988 | |
| **Web Resources:** | |
| **1. https://www.slideshare.net/AjitNayak20/computer-fundamentals-intro-to-c-programming-module-i**<br>**2. https://www.slideshare.net/avikdhupar/amazing-c**<br>**3. https://www.guru99.com/c-programming-tutorial.html** | |
| **COURSE OUTCOMES:**<br>**At the end of the course the students will be able to** | **K Level** |
| **CO1** Use the concepts for solving scientific and mathematical problems | K3 |
| **CO2** Demonstrate an understanding of computer programming language concepts. | K3 |
| **CO3** Design and develop computer programs, analyses and interprets the concept of pointers, declarations, initialization, operations on pointers and their implementations. | K3 |
| **CO4** Define data types, use them in simple data processing applications and able to describe the concept of array of structures | K4 |
| **CO5** Relate the concepts of programming and develop confidence to learn the C language for life time | K4 |

**CO & PO Mapping:**

| COS | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 |
|---|---|---|---|---|---|---|
| CO 1 | 1 | 3 | 3 | 2 | 2 | 2 |
| CO 2 | 2 | 2 | 3 | 2 | 3 | 1 |
| CO 3 | 2 | 2 | 3 | 3 | 3 | 3 |
| CO 4 | 2 | 2 | 3 | 3 | 3 | 2 |
| CO5 | 3 | 2 | 2 | 3 | 3 | 3 |

***3 –** Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

## LESSON PLAN

| UNIT | SUBJECT NAME | Hrs | Mode |
|---|---|---|---|
| I | Generation and Classification of Computers – Basic Organization of a Computer – Number System – Binary – Decimal – Conversion – Problems. Need for Logical Analysis and Thinking – Algorithm – Pseudo Code – Flowchart | 15 | Chalk & Talk, ICT Kit |
| II | Problem Formulation – Problem Solving – Introduction to "C" Programming – Fundamentals – Structure of a "C" Program – Compilation and Linking Processes – Constants, Variables – Data types – Expressions Using Operators in "C" – Managing Input and Output Operations – Decision Making and Branching – Looping statements – Solving Simple Scientific and Statistical Problems. | 15 | Chalk & Talk, ICT Kit |
| III | Arrays – Initialization – Declaration – One Dimensional and Two Dimensional Arrays – String – String Operations – String Arrays. Simple programs – Sorting – Searching – Matrix Operations. | 15 | Chalk & Talk, ICT Kit |
| IV | Function – Definition of function – Declaration of function – Pass by Value – Pass by Reference – Recursion – Pointers – Definition – Initialization – Pointers and Arrays – Example Problems. | 15 | Chalk & Talk, ICT Kit |
| V | Introduction – Need for Structure Data Type – Structure Definition – Structure Declaration – Structure within a Structure - Union – Program Using Structures and Unions – Storage Classes – Pre-processor Directives | 15 | Chalk & Talk, ICT Kit |

Course Designed by: **Mrs. S. Amutha & Dr.G.Devika**

| Learning Outcome Based Education & Assessment (LOBE)<br>Formative Examination - Blue Print<br>Articulation Mapping – K Levels with Course Outcomes (COs) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Internal** | **Cos** | **K Level** | **Section A** | | **Section B** | | **Section C Either or Choice** | **Section D Open Choice** |
| | | | **MCQs** | | **Short Answers** | | | |
| | | | **No. of. Questions** | **K - Level** | **No. of. Questions** | **K – Level** | | |
| **CI AI** | **CO1** | Up to K3 | 2 | **K1,K2** | 1 | **K1** | **2(K3,K3)** | **1(K3)** |
| | **CO2** | Up to K3 | 2 | **K1,K2** | 2 | **K2** | **2(K3,K3)** | **1(K3)** |
| **CI AII** | **CO3** | Up to K3 | 2 | **K1,K2** | 1 | **K1** | **2(K3,K3)** | **1(K3)** |
| | **CO4** | Up to K4 | 2 | **K1,K2** | 2 | **K2** | **2(K4,K4)** | **1(K4)** |
| **Question Pattern CIA I & II** | | No. of Questions to be asked | **4** | | **3** | | **4** | **2** |
| | | No. of Questions to be answered | **4** | | **3** | | **2** | **1** |
| | | Marks for each question | **1** | | **2** | | **5** | **10** |
| | | Total Marks for each section | **4** | | **6** | | **10** | **10** |

***Note:** It is the decision of the course teacher to ask 2 Questions in any unit under section-B (short answer questions)

| Distribution of Marks with K Level CIA I & CIA II | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **K Level** | **Section A (Multiple Choice Questions)** | **Section B (Short Answer Questions)** | **Section C (Either / Or Choice)** | **Section D (Open Choice)** | **Total Marks** | **% of (Marks without choice)** | **Consolidate of %** |
| **CI A I** | **K1** | 2 | 2 | - | - | 4 | 8 | 20 |
| | **K2** | 2 | 4 | - | - | 6 | 12 | |
| | **K3** | - | - | 20 | 20 | 40 | 80 | 80 |
| | **K4** | - | - | - | - | - | | |
| | **Marks** | 4 | 6 | 20 | 20 | 50 | 100 | **100** |
| **CI A II** | **K1** | 2 | 2 | - | - | 4 | 8 | 20 |
| | **K2** | 2 | 4 | - | - | 6 | 12 | |
| | **K3** | - | - | 10 | 10 | 20 | 40 | 40 |
| | **K4** | - | - | 10 | 10 | 20 | 40 | 40 |
| | **Marks** | 4 | 6 | 20 | 20 | 50 | 100 | **100** |

**K1**- Remembering and recalling facts with specific answers

**K2**- Basic understanding of facts and stating main ideas with general answers

**K3**- Application oriented- Solving Problems

**K4**- Examining, analyzing, presentation and make inferences with evidences

**CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.**

| Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| S.No | COs | K - Level | MCQs | | Short Answers | | Section C (Either / or Choice) | Section D (Open Choice) |
| | | | No. of Questions | K – Level | No. of Questions | K – Level | | |
| 1 | CO1 | K3 | 2 | K1,K2 | 1 | K2 | 2(K3,K3) | 1(K3) |
| 2 | CO2 | K3 | 2 | K1,K2 | 1 | K2 | 2(K3,K3) | 1(K3) |
| 3 | CO3 | K3 | 2 | K1,K2 | 1 | K2 | 2(K3,K3) | 1(K3) |
| 4 | CO4 | K4 | 2 | K1,K2 | 1 | K2 | 2(K4,K4) | 1(K4) |
| 5 | CO5 | K4 | 2 | K1,K2 | 1 | K2 | 2(K4,K4) | 1(K4) |
| No. of Questions to be Asked | | | 10 | | 5 | | 10 | 5 |
| No.of Questions to be answered | | | 10 | | 5 | | 5 | 3 |
| Marks for each question | | | 1 | | 2 | | 5 | 10 |
| Total Marks for each section | | | 10 | | 10 | | 25 | 30 |
| (Figures in parenthesis denotes, questions should be asked with the given K level) | | | | | | | | |

| Distribution of Marks with K Level | | | | | | | |
|---|---|---|---|---|---|---|---|
| K Level | Section A (Multiple Choice Questions) | Section B (Short Answer Questions) | Section C (Either/ or Choice) | Section D ( Open Choice) | Total Marks | % of (Marks without choice) | Consolidated % |
| K1 | 5 | | - | - | 5 | 4 | 16 |
| K2 | 5 | 10 | - | - | 15 | 12 | |
| K3 | - | - | 30 | 30 | 60 | 50 | 50 |
| K4 | - | - | 20 | 20 | 40 | 34 | 34 |
| Marks | 10 | 10 | 50 | 50 | 120 | 100 | 100 |
| NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels. | | | | | | | |

## Summative Examinations - Question Paper – Format

| **Section A (Multiple Choice Questions)**<br>**Answer All Questions** | | | **(10x1=10 marks)** |
|---|---|---|---|
| **Q.No** | **CO** | **K Level** | **Questions** |
| 1 | CO1 | K1 | |
| 2 | CO1 | K2 | |
| 3 | CO2 | K1 | |
| 4 | CO2 | K2 | |
| 5 | CO3 | K1 | |
| 6 | CO3 | K2 | |
| 7 | CO4 | K1 | |
| 8 | CO4 | K2 | |
| 9 | CO5 | K1 | |
| 10 | CO5 | K2 | |
| **Section B (Short Answers)**<br>**Answer All Questions** | | | **(5x2=10 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 11 | CO1 | K2 | |
| 12 | CO2 | K2 | |
| 13 | CO3 | K2 | |
| 14 | CO4 | K2 | |
| 15 | CO5 | K2 | |
| **Section C (Either/Or Type)**<br>**Answer All Questions** | | | **(5 x 5 = 25 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 16) a | CO1 | K3,K3 | |
| 16) b | CO1 | K3,K3 | |
| 17) a | CO2 | K3,K3 | |
| 17) b | CO2 | K3,K3 | |
| 18) a | CO3 | K3,K3 | |
| 18) b | CO3 | K3,K3 | |
| 19) a | CO4 | K4,K4 | |
| 19) b | CO4 | K4,K4 | |
| 20) a | CO5 | K4,K4 | |
| 20) b | CO5 | K4,K4 | |
| **NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels** | | | |
| **Section D (Open Choice)**<br>**Answer Any Three questions** | | | **(3x10=30 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 21 | CO1 | K3 | |
| 22 | CO2 | K3 | |
| 23 | CO3 | K3 | |
| 24 | CO4 | K4 | |
| 25 | CO5 | K4 | |

**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**
**DEPARTMENT OF COMPUTER SCIENCE**
**(For those who joined in 2021-2022 and after)**

| **Course Name** | **PROGRAMMING IN C LAB** | | | | | |
|---|---|---|---|---|---|---|
| **Course Code** | **21UCSCP1** | | | **L** | **P** | **C** |
| **Category** | **Core** | | | - | 4 | 4 |
| **Nature of course:** | EMPLOYABILITY | **SKILL ORIENTED** | ✓ | ENTREPRENEURSHIP | | |

**Course objectives:**

- To develop the basic knowledge of programming fundamentals of C language.
- To apply the technique to solve problems through decision-making and looping statements.
- To explain the arrays concepts.
- To impart the concepts like functions, pointers, structure.
- To experiment with file handling concepts.

| S. No. | List of Programs | Hours |
|---|---|---|
| 1. | Write a C program to find the roots of a Quadratic equation. | 60 |
| 2. | Write a C program to find the Addition and Multiplication of Matrices using arrays. | |
| 3. | Write a C program to generate Pascal's triangle. | |
| 4. | Write a C program to manipulate string in build functions. | |
| 5. | Write a C program to using recursion for swapping of two integers. | |
| 6. | Write a C program to find given string is Palindrome or not. | |
| 7. | Write a C program to find given number is Prime or not | |
| 8. | Write a C program to display student details like Register number, Name, | |
| 9. | Marks, DOB, Aadhar number, Mobile using structure. | |
| 10. | Write a C program to display employee salary payroll using structure. | |
| 11. | Write a C program to maintain an inventory of items in online store. | |
| 12. | .Write a C program using Pointers. | |
| 13. | Write a C program using Union concepts | |
| 14. | Write C programs for time related functions. | |
| 15. | Write programs using C Preprocessor Directives. | |
| 16. | Write a program to open, write, close the text file using files handling C program. | |
| 17. | Write a C Program to implement error handling. | |
| 18. | Write a C program to read name and marks of n number of students and store them in a file. | |
| 19. | Write a C program which copies one file to another file using file handling. | |
| 20. | Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file). | |
| | **Total Hours** | **60** |

**Web Resources:**

https://www.programiz.com/c-programming
https://www.tutorialspoint.com/cprogramming/index.htm
https://www.w3schools.in/c-tutorial/

https://www.programiz.com/c-programming
https://www.guru99.com/c-programming-tutorial.html
https://www.programiz.com/c-programming/c-file-examples
https://fresh2refresh.com/c-programming/c-file-handling/

| COURSE OUTCOMES:<br>At the end of the course the students will be able to | | K Level |
|---|---|---|
| CO1 | Develop solutions to simple computational problems using C programs. | K3 |
| CO2 | Solve problems using conditionals and loops in C. | K3 |
| CO3 | Understand the concepts of Arrays and structure.. | K2 |
| CO4 | Develop C programs by defining functions and pointers | K3 |
| CO5 | Develop C programs using files. | K3 |

**CO & PO Mapping:**

| COS | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 |
|---|---|---|---|---|---|---|
| CO 1 | 3 | 2 | 3 | 2 | 2 | 3 |
| CO 2 | 2 | 3 | 3 | 3 | 3 | 3 |
| CO 3 | 2 | 2 | 2 | 3 | 2 | 3 |
| CO 4 | 3 | 2 | 2 | 3 | 2 | 2 |
| CO5 | 2 | 3 | 2 | 2 | 2 | 2 |

***3 –** Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

## LESSON PLAN

| S. No. | List of Programs | Hrs | Mode |
|---|---|---|---|
| 1. | Write a C program to find the roots of a Quadratic equation. | 60 | Black Board, Lab Demonstration and LCD Projector. |
| 2. | Write a C program to find the Addition and Multiplication of Matrices using arrays. | | |
| 3. | Write a C program to generate Pascal's triangle. | | |
| 4. | Write a C program to manipulate string in build functions. | | |
| 5. | Write a C program to using recursion for swapping of two integers. | | |
| 6. | Write a C program to find given string is Palindrome or not. | | |
| 7. | Write a C program to find given number is Prime or not | | |
| 8. | Write a C program to display student details like Register number, Name, Marks, DOB, Aadhar number, Mobile using structure. | | |
| 9. | Write a C program to display employee salary payroll using structure. | | |
| 10. | Write a C program to maintain an inventory of items in online store. | | |
| 11. | .Write a C program using Pointers. | | |
| 12. | Write a C program using Union concepts | | |
| 13. | Write C programs for time related functions. | | |
| 14. | Write programs using C Preprocessor Directives. | | |
| 15. | Write a program to open, write, close the text file using files handling C program. | | |
| 16. | Write a C Program to implement error handling. | | |
| 17. | Write a C program to read name and marks of n number of students and store them in a file. | | |
| 18. | Write a C program which copies one file to another file using file handling. | | |
| 19. | Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file). | | |
| 20. | | | |

Course Designed by**: Mr. S.R. Mathu Sudhanan & Mrs. S.Amutha**

**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**
**DEPARTMENT OF COMPUTER SCIENCE**
**(For those who joined in 2021-2022 and after)**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Course Name** | **Mathematical Foundations** | | | | | | | |
| **Course Code** | 21UMCA11 | | | | | **L** | **P** | **C** |
| **Category** | Allied | | | | | 5 | - | 4 |
| **Nature of course:** | **EMPLOYABILITY** | ✓ | **SKILL ORIENTED** | ✓ | **ENTREPRENEURSHIP** | | | ✓ |

**Course Objectives:**

- To understand the rank of a matrix and apply it to solving system of linear equations.
- To analyze Eigen values and associated Eigen vectors of a matrix.
- To study the methods of reasoning, which includes algebra of propositions, such as compound propositions, truth tables, and tautologies
- To write and interpret mathematical notation and mathematical definitions
- To acquire a basic idea of graph, various terms associated and matrix representations of graphs, Trees and their properties

| | | |
|---|---|---|
| **Unit: I** | **Matrix Algebra** | 15 |

Introduction - Matrix operations – Inverse of a Square Matrix – Elementary operations and Rank of a Matrix – Simultaneous Linear Equations.

| | | |
|---|---|---|
| **Unit: II** | **Matrix Algebra** | 15 |

Inverse by Partitioning – Eigen values and Eigen vectors( Problems only)

| | | |
|---|---|---|
| **Unit: III** | **Logic** | 15 |

Introduction – TF-statements – Connectives – Atomic and compound statements – Well Formed (Statement) Formulae – Truth table of a Formula – Tautology – Tautological Implications and Equivalence of Formulae

| | | |
|---|---|---|
| **Unit: IV** | **Lattices and Boolean Algebra** | 15 |

Lattices – Some properties of Lattices – New Lattices – Modular and Distributive Lattices – Boolean Algebras – Boolean Polynomials – Karnaugh Graphs (Problems only).

| | | |
|---|---|---|
| **Unit: V** | **Graph Theory** | 15 |

Basic concepts – Matrix Representation of Graphs – Trees – Spanning Trees – Shortest Path Problem (Problems only).

| | | |
|---|---|---|
| | **Total Lecture Hours** | **75 Hrs** |

**Books for Study:**

Dr. M.K. Venkataraman. N. Sridharan. and N. Chandrasekaran.., **"Discrete Mathematics"**, The National Publishing Company, Chennai, 2006.

Unit I - Chapter 6: Pages : 6.1- 6.31
Unit II - Chapter 6: Pages : 6.31- 6.44
Unit III - Chapter 9: Pages : 9.1 – 9.34
Unit IV - Chapter10: Pages :10.1 – 10.70
Unit V - Chapter11: Pages : 11.1 – 11.81

**Books for References:**

1. Trembley. J.P. and Manohar.R., 2001, **Discrete Mathematical Structures with Applications to Compute Science**, Tata McGraw –Hill Publishing Company Ltd, New Delhi.
2. Seymour Lipschutz and Marc Lars Lipson, 2002, **Discrete Mathematics**, Tata McGraw Hill

| | |
|---|---|
| Publishing Company Ltd. New Delhi. | |
| **Web Resources:** | |
| • https://nptel.ac.in/courses/106/106/106106094/<br>• https://nptel.ac.in/courses/111/107/111107058/<br>• https://nptel.ac.in/courses/111/106/111106086/<br>• https://nptel.ac.in/noc/courses/noc18/SEM2/noc18-cs53/ | |
| **Course Outcomes** | **K Level** |
| On the successful completion of the course, the students will be able to | |
| **CO1:** apply the matrix theory to study other branches of mathematics like algebra, vector analysis, cryptography, graph theory etc | **K1** |
| **CO2:** apply the matrix theory to analyze the quantitative and qualitative properties of solutions of mathematical models in biological, ecological systems and in engineering problems | **K1** |
| **CO3:** be conversant with the rules of logic to understand and reason with statements | **K3** |
| **CO4:** Formulate and interpret Boolean logic principles. | **K3** |
| **CO5:** have a strong background of graph theory | **K3** |

**CO & PO Mapping:**

| COS | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 |
|---|---|---|---|---|---|---|
| CO 1 | 3 | 2 | 3 | 2 | 3 | 0 |
| CO 2 | 2 | 3 | 3 | 3 | 2 | 0 |
| CO 3 | 3 | 2 | 2 | 2 | 3 | 0 |
| CO 4 | 3 | 2 | 2 | 3 | 3 | 0 |
| CO5 | 3 | 2 | 3 | 3 | 3 | 0 |

***3 –** Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

## LESSON PLAN

| UNIT | SUBJECT NAME | Hrs | Mode |
|---|---|---|---|
| I | Introduction - Matrix operations – Inverse of a Square Matrix – Elementary operations and Rank of a Matrix – Simultaneous Linear Equations. | 12 | Chalk & Talk, LCD Projector |
| II | Inverse by Partitioning – Eigen values and Eigen vectors ( Problems only) | 12 | Chalk & Talk |
| III | Introduction – TF-statements – Connectives – Atomic and compound statements – Well Formed (Statement) Formulae – Truth table of a Formula – Tautology – Tautological Implications and Equivalence of Formulae | 12 | Chalk & Talk |
| IV | Lattices – Some properties of Lattices – New Lattices – Modular and Distributive Lattices – Boolean Algebras – Boolean Polynomials – Karnaugh Graphs (Problems only). | 12 | Chalk & Talk, LCD Projector |
| V | Basic concepts – Matrix Representation of Graphs – Trees – Spanning Trees – Shortest Path Problem (Problems only). | 12 | Chalk & Talk, Assignment |

Course Designed by**: Mr. P. Palanikumar& Dr. S. Suriyakala**

| Learning Outcome Based Education & Assessment (LOBE)<br>Formative Examination - Blue Print<br>Articulation Mapping – K Levels with Course Outcomes (COs) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Internal** | **Cos** | **K Level** | **Section A** | | **Section B** | | **Section C Either or Choice** | **Section D Open Choice** |
| | | | **MCQs** | | **Short Answers** | | | |
| | | | **No. of. Questions** | **K - Level** | **No. of. Questions** | **K – Level** | | |
| **CI AI** | **CO1** | Up to K3 | 2 | K1,K2 | 1 | K1 | 2 (K2) | 1 K3 |
| | **CO2** | Up to K4 | 2 | K1,K2 | 2 | K2 | 2(K3&K3) | 1 (K4) |
| **CI AII** | **CO3** | Up to K4 | 2 | K1,K2 | 1 | K1 | 2 (K2) | 1 (K3) |
| | **CO4** | Up to K4 | 2 | K1,K2 | 2 | K2 | 2 (K3) | 1 (K4) |
| **Question Pattern CIA I & II** | | No. of Questions to be asked | **4** | | **3** | | **4** | **2** |
| | | No. of Questions to be answered | **4** | | **3** | | **2** | **1** |
| | | Marks for each question | **1** | | **2** | | **5** | **10** |
| | | Total Marks for each section | **4** | | **6** | | **10** | **10** |

***Note:** It is the decision of the course teacher to ask 2 Questions in any unit under section-B (short answer questions)

| Distribution of Marks with K Level CIA I & CIA II | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **K Level** | **Section A (Multiple Choice Questions)** | **Section B (Short Answer Questions)** | **Section C (Either / Or Choice)** | **Section D (Open Choice)** | **Total Marks** | **% of (Marks without choice)** | **Consolidate of %** |
| **CI A I** | **K1** | 2 | 2 | - | - | 4 | 8 | 40 |
| | **K2** | 2 | 4 | 10 | - | 16 | 32 | |
| | **K3** | - | - | 10 | 10 | 10 | 20 | 40 |
| | **K4** | - | - | - | 10 | 10 | 10 | 20 |
| | **K5** | - | - | - | -- | - | - | - |
| | **Marks** | 4 | 6 | 20 | 20 | 50 | 100 | 100 |
| **CI A II** | **K1** | 2 | 2 | - | - | 4 | 8 | 40 |
| | **K2** | 2 | 4 | 10 | - | 16 | 32 | |
| | **K3** | - | - | 10 | 10 | 10 | 20 | 40 |
| | **K4** | - | - | - | 10 | 10 | 10 | 20 |
| | **K5** | - | - | - | -- | - | - | - |
| | **Marks** | 4 | 6 | 20 | 20 | 50 | 100 | 100 |

**K1-** Remembering and recalling facts with specific answers

**K2-** Basic understanding of facts and stating main ideas with general answers

**K3-** Application oriented- Solving Problems

**K4-** Examining, analyzing, presentation and make inferences with evidences

**CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.**

| Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| S.No | COs | K - Level | MCQs | | Short Answers | | Section C (Either / or Choice) | Section D (Open Choice) |
| | | | No. of Questions | K – Level | No. of Question | K – Level | | |
| 1 | CO1 | K1 | 2 | K1 | 1 | K2 | 2 (K3& K3) | 1 (K3) |
| 2 | CO2 | K3 | 2 | K1 | 1 | K2 | 2 (K3&K3) | 1 (K3) |
| 3 | CO3 | K3 | 2 | K1&K2 | 1 | K2 | 2 (K3&K3) | 1 (K3) |
| 4 | CO4 | K4 | 2 | K1&K2 | 1 | K2 | 2 (K4&K4) | 1 (K4) |
| 5 | CO5 | K4 | 2 | K1&K2 | 1 | K2 | 2 (K4&K4) | 1 (K4) |
| No. of Questions to be Asked | | | 10 | | 5 | | 5 | 5 |
| No.of Questions to be answered | | | 10 | | 5 | | 5 | 3 |
| Marks for each question | | | 1 | | 2 | | 5 | 10 |
| Total Marks for each section | | | 10 | | 10 | | 25 | 30 |
| (Figures in parenthesis denotes, questions should be asked with the given K level) | | | | | | | | |

| Distribution of Marks with K Level | | | | | | | |
|---|---|---|---|---|---|---|---|
| K Level | Section A (Multiple Choice Questions) | Section B (Short Answer Questions) | Section C (Either/ or Choice) | Section D ( Open Choice) | Total Marks | % of (Marks without choice) | Consolidated % |
| K1 | 5 | 6 | 10 | - | 19 | 15.83 | 42 |
| K2 | 5 | 4 | 10 | 10 | 31 | 25.83 | |
| K3 | - | - | 20 | 30 | 50 | 41.67 | 42 |
| K4 | - | - | 10 | 10 | 20 | 16.67 | 16 |
| Marks | 10 | 10 | 50 | 50 | 120 | 100 | 100 |
| NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels. | | | | | | | |

## Summative Examinations - Question Paper – Format

| **Section A (Multiple Choice Questions)**<br>**Answer All Questions** | | | **(10x1=10 marks)** |
|---|---|---|---|
| **Q.No** | **CO** | **K Level** | **Questions** |
| 1 | CO1 | K1 | |
| 2 | CO1 | K1 | |
| 3 | CO2 | K1 | |
| 4 | CO2 | K1 | |
| 5 | CO3 | K3 | |
| 6 | CO3 | K3 | |
| 7 | CO4 | K3 | |
| 8 | CO4 | K3 | |
| 9 | CO5 | K3 | |
| 10 | CO5 | K3 | |
| **Section B (Short Answers)**<br>**Answer All Questions** | | | **(5x2=10 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 11 | CO1 | K1 | |
| 12 | CO2 | K1 | |
| 13 | CO3 | K3 | |
| 14 | CO4 | K3 | |
| 15 | CO5 | K3 | |
| **Section C (Either/Or Type)**<br>**Answer All Questions** | | | **(5 x 5 = 25 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 16) a | CO1 | K1 | |
| 16) b | CO1 | K1 | |
| 17) a | CO2 | K1 | |
| 17) b | CO2 | K1 | |
| 18) a | CO3 | K3 | |
| 18) b | CO3 | K3 | |
| 19) a | CO4 | K3 | |
| 19) b | CO4 | K3 | |
| 20) a | CO5 | K3 | |
| 20) b | CO5 | K3 | |
| **NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels** | | | |
| **Section D (Open Choice)**<br>**Answer Any Three questions** | | | **(3x10=30 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 21 | CO1 | K1 | |
| 22 | CO2 | K1 | |
| 23 | CO3 | K3 | |
| 24 | CO4 | K3 | |
| 25 | CO5 | K3 | |

**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**
**DEPARTMENT OF COMPUTER SCIENCE**
**(For those who joined in 2021-2022 and after)**

| | | | | |
|---|---|---|---|---|
| **Course Name** | **OFFICE AUTOMATION LAB** | | | |
| **Course Code** | **21UCSSP1** | **L** | **P** | **C** |
| **Category** | **Skill** | - | 2 | 2 |

| | | | | | |
|---|---|---|---|---|---|
| **Nature of course:** | **EMPLOYABILITY** | ✓ | **SKILL ORIENTED** | ✓ | ENTREPRENEURSHIP |

**Course objectives:**

- To familiarize the students in preparation of documents and presentations with office automation tool
- To make aware of Office automation using MS-Office
- To educate MS-office system, internet operations, online, offline working areas
- To train them to work on the comment based activities in MS-office system
- To make the participants to understand various services based on online and offline surfaces

| S. No. | List of Programs | Hours |
|---|---|---|
| | MS-WORD | 10 |
| 1. | Text Manipulations and Text Formatting | |
| 2. | Usage of Numbering, Bullets, Tools and Headers | |
| 3. | Usage of Spell Check and Find and Replace | |
| 4. | Picture Insertion and Alignment | |
| 5. | Creation of Documents Using Templates | |
| 6. | Creation of Templates | |
| 7. | Mail Merge Concept | |
| 8. | Copying Text and Picture from Excel | |
| 9. | Creation of Tables, Formatting Tables | |
| 10. | Splitting the Screen and Opening Multiple Document, Inserting Symbols in Documents | |
| | MS-EXCEL | |
| 11. | Creation of Worksheet and Entering Information | |
| 12. | Aligning , Editing Data in Cell | |
| 13. | Excel Function (Date , Time, Statistical, Mathematical, Financial Functions) | |
| 14. | Changing of Column Width and Row Height (Column and Range of Column) | |
| 15. | Moving, copying, Inserting and Deleting Rows and Columns | |
| 16. | Formatting Numbers and Other Numeric Formats | |
| 17. | Drawing Borders around Cells | |
| 18. | Creation of Charts Raising Moving | |
| 19. | Changing Chart Type | |
| 20. | Controlling the Appearance of a Chart | |
| | MS-POWER POINT – | |
| 21. | Working with slides | |
| 22. | Creating, saving, closing presentation | |
| 23 | Changing slide layout | |
| 24. | Working fonts and bullets | |

| | | |
|---|---|---|
| 25.<br>26.<br>27.<br>28.<br>30 | Inserting Clipart<br>Working with Clipart<br>Applying Transition and animation effects<br>Add audio file to the slide.<br>Run and Slide Show | |
| | **Total Lecture Hours** | **30** |

| **Course Outcomes** | | **K Level** |
|---|---|---|
| On the successful completion of the course, the students will be able to | | |
| **CO1:** | Acquire knowledge on editor, spreadsheet and presentation software | **K2** |
| **CO2:** | Understand and discuss about the use of Office Package in daily life | **K2** |
| **CO3:** | Give hands on training to the students to create and format documents using MSWord | **K4** |
| **CO4:** | Construct charts in MS-Excel | **K3** |
| **CO5:** | Design presentation with efficient slides | **K4** |

**CO & PO Mapping:**

| COS | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 |
|---|---|---|---|---|---|---|
| **CO 1** | **3** | **3** | **2** | **2** | **2** | **3** |
| **CO 2** | **3** | **2** | **2** | **2** | **1** | **1** |
| **CO 3** | **3** | **3** | **3** | **2** | **2** | **2** |
| **CO 4** | **2** | **2** | **2** | **3** | **2** | **2** |
| **CO5** | **2** | **2** | **3** | **2** | **3** | **2** |

***3 –** Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

## LESSONPLAN

| S. No. | List of Programs | Hrs | Mode |
|---|---|---|---|
| | MS-WORD | 30 | Lab demonstration |
| 1. | Text Manipulations and Text Formatting | | |
| 2. | Usage of Numbering, Bullets, Tools and Headers | | |
| 3. | Usage of Spell Check and Find and Replace | | |
| 4. | Picture Insertion and Alignment | | |
| 5. | Creation of Documents Using Templates | | |
| 6. | Creation of Templates | | |
| 7. | Mail Merge Concept | | |
| 8. | Copying Text and Picture from Excel | | |
| 9. | Creation of Tables, Formatting Tables | | |
| 10. | Splitting the Screen and Opening Multiple Document, Inserting Symbols in Documents | | |
| | MS-EXCEL | | |
| 11. | Creation of Worksheet and Entering Information | | |
| 12. | Aligning , Editing Data in Cell | | |
| 13. | Excel Function (Date , Time, Statistical, Mathematical, Financial Functions) | | |
| 14. | Changing of Column Width and Row Height (Column and Range of Column) | | |
| 15. | Moving, copying, Inserting and Deleting Rows and Columns | | |
| 16. | Formatting Numbers and Other Numeric Formats | | |
| 17. | Drawing Borders around Cells | | |
| 18. | Creation of Charts Raising Moving | | |
| 19. | Changing Chart Type | | |
| 20. | Controlling the Appearance of a Chart | | |
| | MS-POWER POINT – | | |
| 21. | Working with slides | | |
| 22. | Creating, saving, closing presentation | | |
| 23 | Changing slide layout | | |
| 24. | Working fonts and bullets | | |
| 25. | Inserting Clipart | | |
| 26. | Working with Clipart | | |
| 27. | Applying Transition and animation effects | | |
| 28. | Add audio file to the slide. | | |
| 30 | Run and Slide Show | | |

Course Designed by: **Mrs. T.C. Sujitha & Mr. S. Veerapandi**


SECOND SEMESTER

**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**
**DEPARTMENT OF COMPUTER SCIENCE**
**(For those who joined in 2021-2022 and after)**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Course Name** | **OBJECT ORIENTED PROGRAMMING USING C++** | | | | | | | |
| **Course Code** | **21UCSC21** | | | | | **L** | **P** | **C** |
| **Category** | Core | | | | | 5 | - | 5 |
| **Nature of course:** | **EMPLOYABILITY** | ✓ | **SKILLORIENTED** | ✓ | ENTREPRENEURSHIP | | | |

**Course objectives:**

1. To provide exposure to problem solving through programming
2. To practice the fundamental programming methodologies in the C/C++ programming language via laboratory experiences.
3. To write C++ programs using decision making, branching, looping constructs
4. To learn the syntax and semantics of the C++ programming language.
5. To code, document, test, and implement a well-structured, robust computer program using the C/C++ programming language.

| **Unit: I** | **Principles of Object Oriented Programming** : | 15 |
|---|---|---|

Basic concepts of Object–Oriented Programming-Benefits of OOP- Object – Oriented Languages –Applications of OOP Beginning with C++: What is C++? – Applications of C++ - A simple C++ Program – Structure of C++ Program – Compiling and linking- Tokens, Expressions and Control Structures: Tokens –Keywords –Identifiers and Constants - Basic Data Types – User Defined Data Types –Derived Data Types–Operators in C++-Scope Resolution Operator–Member Dereferencing Operator–Manipulators–Special Assignment Expressions –Control Structures

| **Unit: II** | **Functions in C++:** | 15 |
|---|---|---|

The Main Function – Function Prototyping – Call By Reference – Return By Reference – Inline Functions – Default Arguments –Recursion-Function Overloading – Friend and Virtual Functions–Math Library Functions Classes and Objects: Specifying a Class–Defining Member Functions – C ++ Program with Class – Making an Outside Function Inline – Nesting of Member Functions – Memory Allocation for Objects–Static Data Members – Static Member Functions–Arrays of Objects Constructors and Destructors: Constructors –Parameterized Constructors –Destructors

| **Unit: III** | **Operator Overloading and Type Conversions:** | 15 |
|---|---|---|

Defining Operator Overloading – Overloading Unary Operators – Overloading Binary Operators – Rules for operator Overloading Inheritance : Extending Classes: Introduction –Defining Derived Classes–Single Inheritance–Making a Private Member Inheritable – Multilevel Inheritance – Multiple Inheritance –Hierarchical Inheritance–Hybrid Inheritance–Virtual Base Classes– Abstract Classes

| **Unit: IV** | **Exception Handling:** | 15 |
|---|---|---|

Basics of Exception Handling–Exception Handling Mechanism – Throwing Mechanism – Catching Mechanism Manipulating Strings: Introduction–Creating(string) Objects–Manipulating String Objects–Relational Operations–String Characteristics–Accessing Characters in Strings–Comparing and Swapping

| **Unit: V** | **Pointers , Virtual Functions and Polymorphism:** | 15 |
|---|---|---|

Pointers – this Pointer –Polymorphism – Virtual Functions – Pure Virtual Functions Working with Files: Classes for File Stream Operations – Opening and Closing a File –Detecting End- of File – More about Open() : File Modes – Sequential Input and Output Operations –Command–Line

| | | |
|---|---|---|
| Arguments | | |
| | **Total Lecture Hours** | 75 |

**Books for Study:**

1.E.Balagurusamy,Object–Oriented Programming with C++, McGraw Hill Education (India)Private Limited, Chennai,7e
Unit: I
Chapter 1–Sections1.5-1.8
Chapter 2–Sections2.1-2.3,2.6,2.8
Chapter 3– Sections3.1,3.6,3.8,3.14-3.16,3.18,3.21,3.25
Unit: II
Chapter 4– Sections4.2–4.7,4.9-4.12
Chapter 5 – Sections 5.3 -5.13 , 6.2,6.3,6.11
Unit: III
Chapter 7–Sections 7.2–7.4
Chapter 8 – Sections 8.1 -8.11
Unit: IV
Chapter 13–Sections13.2–13.5
Chapter 15 – Sections 15.1 -5.7 Unit: V
Chapter 9– Sections 9.2,9.4,9.5,9.7,9.8
Chapter 11–Sections11.2-11.5,11.7,11.10

**Books for Reference:**

1. D.Ravichandran, "Programming with C++" Tata McGraw Hill, Third Edition ,2012
2. Robert Lafore ,"Object Oriented Programming with C++".
3. GalgotiaPublicationsPvtLtd.,FourthEdition,2002.
4. Herbert Schildt, "C++ The Complete Reference" , Tata McGraw Hill, FourthEdition,2006

**Web Resources:**

1. **https://www.programiz.com/cpp-programming**
2. **https://www.javatpoint.com/cpp-tutorial**

| **Course Outcome** | | **K Level** |
|---|---|---|
| **CO1:** | Learn the fundamental programming concepts and methodologies which are essential to building good C++ programs | **K3** |
| **CO2:** | Code, document, test, and implement a well-structured, robust computer program using the C++ programming language | **K3** |
| **CO3:** | Describe the object-oriented programming approach in connection with C++ | **K3** |
| **CO4:** | Understand concepts like inheritance, polymorphism, pointers and virtual functions | **K4** |
| **CO5:** | Demonstrate the need of files and their operations | **K4** |

**CO & PO Mapping:**

| COS | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 |
|---|---|---|---|---|---|---|
| CO 1 | 2 | 2 | 3 | 1 | 1 | 2 |
| CO 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| CO 3 | 1 | 1 | 2 | 1 | 2 | 1 |
| CO 4 | 3 | 2 | 1 | 2 | 1 | 2 |
| CO5 | 2 | 1 | 2 | 2 | 3 | 1 |

***3 –** Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

## LESSON PLAN

| UNIT | Object Oriented Programming Using C++ | Hrs | Mode |
|---|---|---|---|
| I | Principles of Object Oriented Programming-Beginning with C++: Tokens, Expressions and Control Structures-Operators in C++ - Control Structures | 15 | Chalk and Talk , ICT Tools |
| II | Function in C++–Recursion- Function Overloading- Classes and Objects- Arrays of Objects Constructors and Destructors: Constructors –Parameterized Constructors–Destructors | 15 | Chalk and Talk , ICT Tools |
| III | OperatorOverloadingandTypeConversions-Inheritance:ExtendingClasses –Virtual Base Classes–Abstract Classes | 15 | Chalk and Talk , ICT Tools |
| IV | Exception Handling-Manipulating Strings | 15 | Chalk and Talk , ICT Tools |
| V | Pointers , Virtual Functions and Polymorphism -Working with Files – File Modes–Sequential Input and Output Operations–Command–Line Arguments | 15 | Chalk and Talk , ICT Tools |

**Course Designed by: Mrs. R. Vaitheswari & Dr. G. Devika**

| Learning Outcome Based Education & Assessment (LOBE)<br>Formative Examination - Blue Print<br>Articulation Mapping – K Levels with Course Outcomes (COs) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Internal** | **Cos** | **K Level** | **Section A** | | **Section B** | | **Section C Either or Choice** | **Section D Open Choice** |
| | | | **MCQs** | | **Short Answers** | | | |
| | | | **No. of. Questions** | **K - Level** | **No. of. Questions** | **K – Level** | | |
| **CI AI** | **CO1** | Up to K3 | 2 | **K1,K2** | 1 | **K1** | **2(K3,K3)** | **1(K3)** |
| | **CO2** | Up to K3 | 2 | **K1,K2** | 2 | **K2** | **2(K3,K3)** | **1(K3)** |
| **CI AII** | **CO3** | Up to K3 | 2 | **K1,K2** | 1 | **K1** | **2(K3,K3)** | **1(K3)** |
| | **CO4** | Up to K4 | 2 | **K1,K2** | 2 | **K2** | **2(K4,K4)** | **1(K4)** |
| **Question Pattern CIA I & II** | | No. of Questions to be asked | **4** | | **3** | | **4** | **2** |
| | | No. of Questions to be answered | **4** | | **3** | | **2** | **1** |
| | | Marks for each question | **1** | | **2** | | **5** | **10** |
| | | Total Marks for each section | **4** | | **6** | | **10** | **10** |

***Note:** It is the decision of the course teacher to ask 2 Questions in any unit under section-B (short answer questions)

| Distribution of Marks with K Level CIA I & CIA II | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **K Level** | **Section A (Multiple Choice Questions)** | **Section B (Short Answer Questions)** | **Section C (Either / Or Choice)** | **Section D (Open Choice)** | **Total Marks** | **% of (Marks without choice)** | **Consolidate of %** |
| **CIA I** | **K1** | 2 | 2 | - | - | 4 | 8 | 20 |
| | **K2** | 2 | 4 | - | - | 6 | 12 | |
| | **K3** | - | - | 20 | 20 | 40 | 80 | 80 |
| | **K4** | - | - | - | - | - | | |
| | **Marks** | 4 | 6 | 20 | 20 | 50 | 100 | **100** |
| **CIA II** | **K1** | 2 | 2 | - | - | 4 | 8 | 20 |
| | **K2** | 2 | 4 | - | - | 6 | 12 | |
| | **K3** | - | - | 10 | 10 | 20 | 40 | 40 |
| | **K4** | - | - | 10 | 10 | 20 | 40 | 40 |
| | **Marks** | 4 | 6 | 20 | 20 | 50 | 100 | **100** |

**K1-** Remembering and recalling facts with specific answers

**K2-** Basic understanding of facts and stating main ideas with general answers

**K3-** Application oriented- Solving Problems

**K4-** Examining, analyzing, presentation and make inferences with evidences

**CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.**

| Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| S.No | COs | K - Level | MCQs | | Short Answers | | Section C (Either / or Choice) | Section D (Open Choice) |
| | | | No. of Questions | K – Level | No. of Questions | K – Level | | |
| 1 | CO1 | **K3** | **2** | **K1,K2** | **1** | **K2** | **2(K3,K3)** | **1(K3)** |
| 2 | CO2 | **K3** | **2** | **K1,K2** | **1** | **K2** | **2(K3,K3)** | **1(K3)** |
| 3 | CO3 | **K3** | **2** | **K1,K2** | **1** | **K2** | **2(K3,K3)** | **1(K3)** |
| 4 | CO4 | **K4** | **2** | **K1,K2** | **1** | **K2** | **2(K4,K4)** | **1(K4)** |
| 5 | CO5 | **K4** | **2** | **K1,K2** | **1** | **K2** | **2(K4,K4)** | **1(K4)** |
| No. of Questions to be Asked | | | **10** | | **5** | | **10** | **5** |
| No.of Questions to be answered | | | **10** | | **5** | | **5** | **3** |
| Marks for each question | | | **1** | | **2** | | **5** | **10** |
| Total Marks for each section | | | **10** | | **10** | | **25** | **30** |
| **(Figures in parenthesis denotes, questions should be asked with the given K level)** | | | | | | | | |

| Distribution of Marks with K Level | | | | | | | |
|---|---|---|---|---|---|---|---|
| K Level | Section A (Multiple Choice Questions) | Section B (Short Answer Questions) | Section C (Either/ or Choice) | Section D ( Open Choice) | Total Marks | % of (Marks without choice) | Consolidated % |
| K1 | 5 | | - | - | 5 | 4 | 16 |
| K2 | 5 | 10 | - | - | 15 | 12 | |
| K3 | - | - | 30 | 30 | 60 | 50 | 50 |
| K4 | - | - | 20 | 20 | 40 | 34 | 34 |
| Marks | 10 | 10 | 50 | 50 | 120 | 100 | 100 |
| **NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.** | | | | | | | |

## Summative Examinations - Question Paper – Format

| **Section A (Multiple Choice Questions)**<br>**Answer All Questions** | | | **(10x1=10 marks)** |
|---|---|---|---|
| **Q.No** | **CO** | **K Level** | **Questions** |
| 1 | CO1 | K1 | |
| 2 | CO1 | K2 | |
| 3 | CO2 | K1 | |
| 4 | CO2 | K2 | |
| 5 | CO3 | K1 | |
| 6 | CO3 | K2 | |
| 7 | CO4 | K1 | |
| 8 | CO4 | K2 | |
| 9 | CO5 | K1 | |
| 10 | CO5 | K2 | |
| **Section B (Short Answers)**<br>**Answer All Questions** | | | **(5x2=10 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 11 | CO1 | K2 | |
| 12 | CO2 | K2 | |
| 13 | CO3 | K2 | |
| 14 | CO4 | K2 | |
| 15 | CO5 | K2 | |
| **Section C (Either/Or Type)**<br>**Answer All Questions** | | | **(5 x 5 = 25 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 16) a | CO1 | K3,K3 | |
| 16) b | CO1 | K3,K3 | |
| 17) a | CO2 | K3,K3 | |
| 17) b | CO2 | K3,K3 | |
| 18) a | CO3 | K3,K3 | |
| 18) b | CO3 | K3,K3 | |
| 19) a | CO4 | K4,K4 | |
| 19) b | CO4 | K4,K4 | |
| 20) a | CO5 | K4,K4 | |
| 20) b | CO5 | K4,K4 | |
| **NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels** | | | |
| **Section D (Open Choice)**<br>**Answer Any Three questions** | | | **(3x10=30 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 21 | CO1 | K3 | |
| 22 | CO2 | K3 | |
| 23 | CO3 | K3 | |
| 24 | CO4 | K4 | |
| 25 | CO5 | K4 | |

**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**
**DEPARTMENT OF COMPUTER SCIENCE**
**(For those who joined in 2021-2022 and after)**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Course Name** | **OBJECT ORIENTED PROGRAMMING USING C++-LAB** | | | | | | | |
| **Course Code** | **21UCSCP2** | | | | | **L** | **P** | **C** |
| **Category** | **Core** | | | | | **-** | **4** | **4** |
| **Nature of course:** | **EMPLOYABILITY** | ✓ | **SKILL ORIENTED** | ✓ | ENTREPRENEURSHIP | | | |

**Course objectives:**

- To Enhance programming skills of the students, using Object oriented programming concepts.
- To provide in–depth coverage of object–oriented programming principles and techniques.
- To practice the use of C++ classes and class libraries, arrays, vectors, inheritance and file I/O stream concepts.
- To develop classes for simple applications and Execute well structured C++ programs.
- To use problem solving and program design to generate effective applications.

| S. No. | List of Programs | Hours |
|---|---|---|
| 1. | Simple Programs. | **60** |
| 2. | Program using control structures. | |
| 3. | Program using one dimensional Array | |
| 4. | Program using two dimensional Arrays. | |
| 5. | Program using class and Objects. | |
| 6. | Program using Structure and Union. | |
| 7. | Program using Constructor and overloading constructor. | |
| 8. | Program using Inheritance (Different forms). | |
| 9. | Program using Function Overloading. | |
| 10 | Program using Operator Overloading. | |
| 11. | Program using Pointer Arithmetic. | |
| 12. | Program using Virtual Functions. | |
| 13. | Program using Friend Function and Inline function. | |
| 14. | Program using Exception Handling. | |
| 15. | Program using Stream (File) Operations. | |
| | **Total Lecture Hours** | **60** |

| **Course Outcome** | | **K Level** |
|---|---|---|
| **CO1:** | Learn how to design C++ classes for code reuse. | **K1** |
| **CO2:** | Examine the types of inheritance | **K2** |
| **CO3:** | Implement object oriented programming concepts in C++ | **K3** |
| **CO4:** | Describe the concept of function overloading ,operator overloading, polymorphism | **K4** |
| **CO5:** | Apply the concepts of and principles of the programming language to the real–World problems and solve the problems | **K4** |

**CO & PO Mapping:**

| COS | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 |
|---|---|---|---|---|---|---|
| CO 1 | 1 | 1 | 2 | 1 | 2 | 1 |
| CO 2 | 1 | 1 | 2 | 2 | 3 | 3 |
| CO 3 | 2 | 1 | 2 | 1 | 2 | 2 |
| CO 4 | 3 | 2 | 2 | 1 | 2 | 2 |
| CO5 | 1 | 2 | 2 | 2 | 2 | 3 |

***3 –** Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

**LESSON PLAN**

| S. No | List of Programs | Hours | Mode |
|---|---|---|---|
| 1. | Simple Programs. | **60** | **Lab demonstration** |
| 2. | Program using control structures. | | |
| 3. | Program using one dimensional Array | | |
| 4. | Program using two dimensional Arrays. | | |
| 5. | Program using class and Objects. | | |
| 6. | Program using Structure and Union. | | |
| 7. | Program using Constructor and overloading constructor. | | |
| 8. | Program using Inheritance (Different forms). | | |
| 9. | Program using Function Overloading. | | |
| 10 | Program using Operator Overloading. | | |
| 11. | Program using Pointer Arithmetic. | | |
| 12. | Program using Virtual Functions. | | |
| 13. | Program using Friend Function and Inline function. | | |
| 14. | Program using Exception Handling. | | |
| 15. | Program using Stream (File) Operations. | | |

Course Designed by: **Mr.S.Veerapandi & Mrs. R.Vaitheswari**

**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**
**DEPARTMENT OF COMPUTER SCIENCE**
**(For those who joined in 2021-2022 and after)**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Course Name** | **Probability and Statistics** | | | | | | | |
| **Course Code** | **21UMCA21** | | | | | | **L** | **P** | **C** |
| **Category** | **Allied** | | | | | | 5 | - | 4 |
| **Nature of course:** | **EMPLOYABILITY** | ✓ | **SKILL ORIENTED** | ✓ | **ENTREPRENEURSHIP** | ✓ | | | |

**Course Objectives:**

- To provide students with the foundations of probabilistic and statistical analysis mostly used in varied applications in engineering and science like disease modeling, climate prediction and computer networks etc.
- To Apply laws of probability to concrete problems..

| | | |
|---|---|---|
| **Unit: I** | Measures of Central Tendencies : | 15 |
| Introduction – Arithmetic mean – Partition Values – Mode – Geometric Mean & Harmonic Mean(problems only) | | |
| **Unit: II** | Measures of Dispersion | 15 |
| Introduction – Measures of dispersion(problems only) | | |
| **Unit: III** | Correlation and Regression | 15 |
| Introduction – Correlation – Rank Correlation – Regression | | |
| **Unit: IV** | Probability | 15 |
| Probability- Introduction -Conditional Probability – Mathematical Expectations (Problems only) | | |
| **Unit: V** | Special Distributions | 15 |
| Introduction – Binomial Distribution – Poisson Distribution -Normal Distribution.( Problems only) | | |
| | **Total Lecture Hours** | **75 Hrs** |

**Books for Study:**

Arumugam. S. and Thangapandi Isaac. A., "**Statistics"**, New Gamma Publishing House, Palayamkotai, 2011.

Unit I - Chapter 2: Sections : 2.0 – 2.4
Unit II - Chapter 3: Sections : 3.0 & 3.1(full)
Unit III - Chapter 6: Sections: 6.0-6.3
Unit IV - Chapter11: Sections: 11.0-11.2,
Chapter12 : Section: 12.4
Unit V - Chapter13: Sections: 13.0 – 13.3

**Books for Reference:**

1. Vittal. P.R., **Mathematical Statistics**, Margham Publications, Chennai, 2013.
2. Gupta. S.C. and Kapoor. V.K., "**Fundamentals of Mathematical Statistics**", Eleventh edition, Sultan Chand & sons, New Delhi, 2007.
3. Gupta. S.C. and Kapoor. V.K., "**Elements of Mathematical Statistics**", Third Edition, Sultan Chand & Sons, Educational Publishers, New Delhi, 2015.

**Web Resources:**

https://nptel.ac.in/courses/111/105/111105041/
https://www.classcentral.com/course/swayam-probability-and-statistics-5228

| **Course Outcomes** | **K Level** |
|---|---|
| On the successful completion of the course, the students will be able to | |
| **CO1:** Improve data handling skills and summarize statistical computations. | **K3** |

| | | |
|---|---|---|
| **CO2:** | Determine the relationship between quantitative variables and extend regression Analysis. | **K3** |
| **CO3:** | Recall and apply a comprehensive set of Probability ideas. | **K1** |
| **CO4:** | Find, interpret and analyze the measure of central tendencies, Moment Generating function and Characteristic function of random variables. | **K3** |
| **CO5:** | Relate, Analyze and Demonstrate the knowledge of using various distributions for statistical analysis. | **K2** |

**CO & PO Mapping:**

| COS | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 |
|---|---|---|---|---|---|---|
| **CO 1** | **3** | **2** | **2** | **3** | **3** | **1** |
| **CO 2** | **3** | **3** | **3** | **3** | **2** | **1** |
| **CO 3** | **3** | **3** | **3** | **3** | **2** | **1** |
| **CO 4** | **3** | **2** | **2** | **3** | **3** | **1** |
| **CO5** | **3** | **2** | **3** | **3** | **3** | **1** |

***3 –** Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

## LESSON PLAN

| Unit | Course Name | Hrs | Pedagogy |
|---|---|---|---|
| **I** | Introduction –Measures of Central Tendencies(Proofs of the Theorems are not included – Problems only) | **15** | **Chalk & Board** |
| **II** | Introduction – Measures of Dispersion (Proofs of the Theorems are not included – Problems only) | **15** | **Chalk & Board** |
| **III** | Introduction – Correlation – Rank Correlation – Regression. Introduction- | **15** | **Chalk & Board** |
| **IV** | Probability- Conditional Probability – Mathematical Expectations (Proofs of the Theorems are not included – Problems only) | **15** | **Chalk & Board** |
| **V** | Introduction – Binomial Distribution – Poisson Distribution -Normal Distribution.(Proofs of the Theorems are not included – Problems only) | **15** | **Chalk & Board** |

Course Designed by: **Mrs. H. Sowmiyagowri**

| Learning Outcome Based Education & Assessment (LOBE)<br>Formative Examination - Blue Print<br>Articulation Mapping – K Levels with Course Outcomes (COs) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Internal** | **Cos** | **K Level** | **Section A** | | **Section B** | | **Section C Either or Choice** | **Section D Open Choice** |
| | | | **MCQs** | | **Short Answers** | | | |
| | | | **No. of. Questions** | **K - Level** | **No. of. Questions** | **K – Level** | | |
| **CI AI** | **CO1** | Up to K2 | 2 | K1,K2 | 1 | K1 | 2(K2&K2) | 1 K2 |
| | **CO2** | Up to K3 | 2 | K1,K2 | 2 | K2 | 2(K3&K3) | 1 (K3) |
| **CI AII** | **CO3** | Up to K3 | 2 | K1,K2 | 1 | K1 | 2(K2&K2) | 1 (K2) |
| | **CO4** | Up to K3 | 2 | K1,K2 | 2 | K2 | 2(K3&K3) | 1 (K3) |
| **Question Pattern CIA I & II** | | No. of Questions to be asked | **4** | | **3** | | **4** | **2** |
| | | No. of Questions to be answered | **4** | | **3** | | **2** | **1** |
| | | Marks for each question | **1** | | **2** | | **5** | **10** |
| | | Total Marks for each section | **4** | | **6** | | **10** | **10** |

***Note:** It is the decision of the course teacher to ask 2 Questions in any unit under section-B (short answer questions)

| Distribution of Marks with K Level CIA I & CIA II | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **K Level** | **Section A (Multiple Choice Questions)** | **Section B (Short Answer Questions)** | **Section C (Either / Or Choice)** | **Section D (Open Choice)** | **Total Marks** | **% of (Marks without choice)** | **Consolidate of %** |
| **CIA I** | **K1** | 2 | 2 | - | - | 4 | 8 | 60 |
| | **K2** | 2 | 4 | 10 | 10 | 26 | 52 | |
| | **K3** | - | - | 10 | 10 | 20 | 40 | 40 |
| | **K4** | - | - | - | - | - | - | - |
| | **K5** | - | - | - | -- | - | - | - |
| | **Marks** | 4 | 6 | 20 | 20 | 50 | 100 | 100 |
| **CIA II** | **K1** | 2 | 2 | - | - | 4 | 8 | 60 |
| | **K2** | 2 | 4 | 10 | 10 | 26 | 52 | |
| | **K3** | - | - | 10 | 10 | 20 | 40 | 40 |
| | **K4** | - | - | - | - | - | | - |
| | **K5** | - | - | - | -- | - | - | - |
| | **Marks** | 4 | 6 | 20 | 20 | 50 | 100 | 100 |

**K1**- Remembering and recalling facts with specific answers
**K2**- Basic understanding of facts and stating main ideas with general answers
**K3**- Application oriented- Solving Problems
**K4**- Examining, analyzing, presentation and make inferences with evidences
**CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.**

| Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| S.No | COs | K - Level | MCQs | | Short Answers | | Section C (Either / or Choice) | Section D (Open Choice) |
| | | | No. of Questions | K – Level | No. of Question | K – Level | | |
| 1 | CO 1 | K1 | 2 | K1&K2 | 1 | K1 | 2 (K3&K3) | 1 (K2) |
| 2 | CO 2 | K3 | 2 | K1&K2 | 1 | K1 | 2 (K3&K3) | 1 (K3) |
| 3 | CO 3 | K3 | 2 | K1&K2 | 1 | K2 | 2 (K3&K4) | 1 (K3) |
| 4 | CO 4 | K4 | 2 | K1&K2 | 1 | K2 | 2 (K3&K4) | 1 (K3) |
| 5 | CO 5 | K4 | 2 | K1&K2 | 1 | K2 | 2 (K3&K4) | 1 (K4) |
| No. of Questions to be Asked | | | 10 | | 5 | | 5 | 5 |
| No.of Questions to be answered | | | 10 | | 5 | | 5 | 3 |
| Marks for each question | | | 1 | | 2 | | 5 | 10 |
| Total Marks for each section | | | 10 | | 10 | | 25 | 30 |
| (Figures in parenthesis denotes, questions should be asked with the given K level) | | | | | | | | |

| Distribution of Marks with K Level | | | | | | | |
|---|---|---|---|---|---|---|---|
| K Level | Section A (Multiple Choice Questions) | Section B (Short Answer Questions) | Section C (Either/ or Choice) | Section D ( Open Choice) | Total Marks | % of (Marks without choice) | Consolidated % |
| K1 | 5 | 6 | 10 | - | 19 | 15.83 | 42 |
| K2 | 5 | 4 | 10 | 10 | 31 | 25.83 | |
| K3 | - | - | 20 | 30 | 50 | 41.67 | 42 |
| K4 | - | - | 10 | 10 | 20 | 16.67 | 16 |
| Marks | 10 | 10 | 50 | 50 | 120 | 100 | 100 |
| NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels. | | | | | | | |

## Summative Examinations - Question Paper – Format

| **Section A (Multiple Choice Questions)**<br>**Answer All Questions** | | | **(10x1=10 marks)** |
|---|---|---|---|
| **Q.No** | **CO** | **K Level** | **Questions** |
| 1 | CO1 | K1 | |
| 2 | CO1 | K2 | |
| 3 | CO2 | K1 | |
| 4 | CO2 | K2 | |
| 5 | CO3 | K1 | |
| 6 | CO3 | K2 | |
| 7 | CO4 | K1 | |
| 8 | CO4 | K2 | |
| 9 | CO5 | K1 | |
| 10 | CO5 | K2 | |
| **Section B (Short Answers)**<br>**Answer All Questions** | | | **(5x2=10 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 11 | CO1 | K1 | |
| 12 | CO2 | K1 | |
| 13 | CO3 | K2 | |
| 14 | CO4 | K2 | |
| 15 | CO5 | K2 | |
| **Section C (Either/Or Type)**<br>**Answer All Questions** | | | **(5 x 5 = 25 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 16) a | CO1 | K3,K3 | |
| 16) b | CO1 | K3,K3 | |
| 17) a | CO2 | K3,K3 | |
| 17) b | CO2 | K3,K3 | |
| 18) a | CO3 | K3,K3 | |
| 18) b | CO3 | K3,K3 | |
| 19) a | CO4 | K4,K4 | |
| 19) b | CO4 | K4,K4 | |
| 20) a | CO5 | K4,K4 | |
| 20) b | CO5 | K4,K4 | |
| **NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels** | | | |
| **Section D (Open Choice)**<br>**Answer Any Three questions** | | | **(3x10=30 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 21 | CO1 | K3 | |
| 22 | CO2 | K3 | |
| 23 | CO3 | K3 | |
| 24 | CO4 | K4 | |
| 25 | CO5 | K4 | |

**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**
**DEPARTMENT OF COMPUTER SCIENCE**
**(For those who joined in 2021-2022 and after)**

| Course Name | Multimedia Lab | | | |
|---|---|---|---|---|
| Course Code | 21UCSSP2 | L | P | C |
| Category | Skill | - | 2 | 2 |

| Nature of Course: | EMPLOYABILITY | ✓ | SKILLORIENTED | ✓ | ENTREPRENEURSHIP | ✓ |
|---|---|---|---|---|---|---|

**Course Objectives:**

- To learn the basics and Fundamentals of Multimedia animation.
- To introduce Multimedia components and Tools.
- To understand how Multimedia can be incorporated in real life
- To develop various video and text applications.
- To Design and develop various Multimedia Systems applicable in real time.

| S. No. | List of Programs | Hours |
|---|---|---|
| 1. | Create an animation to show a bouncing ball. | 30 |
| 2. | Create an animation to show a moving stick man. | |
| 3. | Create an animation to show a fainting banana. | |
| 4. | Create an animation to show sunrise and sunset. | |
| 5. | Create an animation to show a disappearing house. | |
| 6. | Create an animation to show two boats sailing in river | |
| 7. | Create an animation to show a scene of cricket match. | |
| 8. | Create an animation to help teach a poem or a song | |
| 9. | Create an animation to show cartoon with a message | |
| 10 | Create an animation on Single Perspective View | |
| 11. | Create an animation for solar system | |
| 12. | Create an animation for cricket | |
| 13. | Create an animation to make a movie showing Shape Tweening. | |
| 14. | Create an animation to make a movie showing Motion Tweening. | |
| 15. | Create an animation to make a movie to a add sound and button to the movie | |
| | **Total Lecture Hours** | **30** |

| COURSE OUTCOMES: | | K Level |
|---|---|---|
| At the end of the course the students will be able to | | |
| **CO1:** | Perform the operations of various multimedia techniques. | **K2** |
| **CO2:** | Ability to know about techniques of image processing | **K3** |
| **CO3:** | Understand the various designing process in multimedia animation | **K4** |
| **CO4:** | Develop an interactive multimedia presentation by using multimedia devices | **K3** |
| **CO5:** | Identify practical aspects in designing latest multimedia applications | **K4** |

**CO & PO Mapping:**

| COS | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 |
|---|---|---|---|---|---|---|
| CO 1 | 3 | 2 | 3 | 2 | 2 | 3 |
| CO 2 | 3 | 3 | 2 | 2 | 3 | 3 |
| CO 3 | 2 | 2 | 1 | 3 | 2 | 1 |
| CO 4 | 3 | 2 | 2 | 3 | 2 | 2 |
| CO5 | 2 | 2 | 2 | 2 | 2 | 3 |

***3 –** Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

## LESSONPLAN

| S. No. | List of Programs | Hrs | Mode |
|---|---|---|---|
| 1. | Create an animation to show a bouncing ball. | 10 | Lab demonstration |
| 2. | Create an animation to show a moving stick man. | | |
| 3. | Create an animation to show a fainting banana. | | |
| 4. | Create an animation to show sunrise and sunset. | | |
| 5. | Create an animation to show a disappearing house. | | |
| 6. | Create an animation to show two boats sailing in river | | |
| 7. | Create an animation to show a scene of cricket match. | | |
| 8. | Create an animation to help teach a poem or a song | | |
| 9. | Create an animation to show cartoon with a message | | |
| 10 | Create an animation on Single Perspective View | | |
| 11. | Create an animation for solar system | | |
| 12. | Create an animation for cricket | | |
| 13. | Create an animation to make a movie showing Shape Tweening. | | |
| 14. | Create an animation to make a movie showing Motion Tweening. | | |
| 15. | Create an animation to make a movie to a add sound and button to the movie | | |

Course Designed by**: Mr.B.Johnson & Dr S.Shaik Parveen**


THIRD SEMESTER

**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**
**DEPARTMENT OF COMPUTER SCIENCE**
**(For those who joined in 2021-2022 and after)**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Course Name** | **DATA STRUCTURES AND ALGORITHMS** | | | | | | | |
| **Course Code** | **21UCSC31** | | | | | **L** | **P** | **C** |
| **Category** | **Core** | | | | | 5 | - | 5 |
| **Nature of course:** | **EMPLOYABILITY** | ✓ | **SKILL ORIENTED** | ✓ | ENTREPRENEURSHIP | | | |

**Course Objectives:**

- The objective of the course is to introduce the fundamentals of Data Structures
- Abstract concepts and how these concepts are useful in problem solving
- Analyze step by step and develop algorithms to solve real world problems
- Implementing various data structures Stacks, Queues, Linked Lists, Trees and Graphs
- Understanding various searching & sorting techniques file structures

| **Unit: I** | **Introduction To Data Structure** | **15 Hours** |
|---|---|---|

**Introduction To Data Structure:** Data Management concepts, Data types – primitive and non-primitive, Types of Data Structures- Linear & Non Linear Data Structures. **Basics - Algorithm Specifications:** Performance Analysis and Measurement -Time and space analysis of algorithms- Average, best and worst case analysis.

| **Unit: II** | **Linear Data Structure** | **15 Hours** |
|---|---|---|

**Stack:** Stack-Definitions & Concepts, Operations On Stacks, Applications of Stacks, Polish Expression, Reverse Polish Expression And Their Compilation, Recursion, Tower of Hanoi, **Queue:** Representation Of Queue, Operations On Queue, Circular Queue, Priority Queue, Array representation of Priority Queue, Double Ended Queue, Applications of Queue, **Linked List:** Singly Linked List, Doubly Linked list, Circular linked list , Linked implementation of Stack, Linked implementation of Queue, Applications of linked list.

| **Unit: III** | **Nonlinear Data Structure** | **15 Hours** |
|---|---|---|

**Nonlinear Data Structure :** Tree-Definitions and Concepts, Representation of binary tree, Binary tree traversal (Inorder, postorder, preorder), Threaded binary tree, Binary search trees, Conversion of General Trees To Binary Trees, Applications Of Trees- **Graph**-Matrix Representation Of Graphs, Elementary Graph operations,Breadth First Search, Depth First Search, Spanning Trees, Shortest path, Minimal spanning tree

| **Unit: IV** | **Sorting and Searching** | **15 Hours** |
|---|---|---|

**Sorting and Searching** -Insertion Sort, Quick Sort, Merge Sort, Heap Sort, Sorting On Several Keys, List and Table Sort, Linear Search, Binary Search.

| **Unit: V** | **Hashing and File Structures** | **15 Hours** |
|---|---|---|

**Hashing And File Structures :** Hashing: The symbol table, Hashing Functions, Collision-Resolution Techniques, **File Structure:** Concepts of fields, records and files, Sequential, Indexed and Relative/Random File Organization, Indexing structure for index files, hashing for direct files, Multi-Key file organization and access methods.

| | **Total Lecture Hours** | **75 Hrs** |
|---|---|---|

**Books for Study:**

1. An Introduction to Data Structures with Applications. by Jean-Paul Tremblay & Paul G. Sorenson Publisher-Tata McGraw Hill.

**Books for References:**

1. Fundamentals of Computer Algorithms by Horowitz, Sahni,Galgotia Pub. 2001 edition
2. Fundamentals of Data Structures in C++-By SartajSahani.

| | |
|---|---|
| 3. Data Structures: A Pseudo-code approach with C -By Gilberg & Forouzan Publisher-Thomson Learning. | |
| **Web Resources:** | |
| 1. Data Structure and Algorithms Tutorial (tutorialspoint.com)<br>2. https://www.cs.bham.ac.uk/~jxb/DSA/dsa.pdf<br>3. https://www.programiz.com/dsa | |
| **Course Outcomes** | **K Level** |
| **At the end of the course the students will be able to** | |
| **CO1** Be able to check the correctness of algorithms using inductive proofs and loop Invariants. | **Upto K3** |
| **CO2** Be able to compare functions using asymptotic analysis and describe the relative merits of worst-, average-, and best-case analysis. | **Upto K3** |
| **CO3** Become familiar with the major graph algorithms and their analyses. Employ graphs to model engineering problems, when appropriate. | **Upto K3** |
| **CO4** Become familiar with a variety of sorting algorithms and their performance Characteristics (eg, running time, stability, space usage) and be able to choose the best one under a variety of requirements. | **Upto K4** |
| **CO5** Be able to understand and identify the performance characteristics of File Structure | **Upto K4** |

**CO & PO Mapping:**

| COS | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 |
|---|---|---|---|---|---|---|
| CO 1 | 3 | 2 | 2 | 2 | 3 | 2 |
| CO 2 | 2 | 2 | 3 | 2 | 2 | 2 |
| CO 3 | 3 | 2 | 3 | 3 | 2 | 2 |
| CO 4 | 2 | 3 | 2 | 2 | 2 | 2 |
| CO5 | 2 | 3 | 2 | 2 | 3 | 3 |

***3 –** Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

## LESSON PLAN

| Unit | DATA STRUCTURES AND ALGORITHMS | Hrs | Pedagogy |
|---|---|---|---|
| I | **Introduction To Data Structure:** Data Management concepts, Data types – primitive and non-primitive, Types of Data Structures- Linear & Non Linear Data Structures. **Basics - Algorithm Specifications:** Performance Analysis and Measurement -Time and space analysis of algorithms- Average, best and worst case analysis | 15 | Chalk & Talk, ICT Kit |
| II | **Stack:** Stack-Definitions & Concepts, Operations On Stacks, Applications of Stacks, Polish Expression, Reverse Polish Expression And Their Compilation, Recursion, Tower of Hanoi, **Queue:** Representation Of Queue, Operations On Queue, Circular Queue, Priority Queue, Array representation of Priority Queue, Double Ended Queue, Applications of Queue, **Linked List:** Singly Linked List, Doubly Linked list, Circular linked list ,Linked implementation of Stack, Linked implementation of Queue, Applications of linked list. | 15 | Chalk & Talk, ICT Kit |
| III | **Nonlinear Data Structure :** Tree-Definitions and Concepts, Representation of binary tree, Binary tree traversal (Inorder, postorder, preorder), Threaded binary tree, Binary search trees, Conversion of General Trees To Binary Trees, Applications Of Trees- **Graph**-Matrix Representation Of Graphs, Elementary Graph operations, Breadth First Search, Depth First Search, Spanning Trees, Shortest path, Minimal spanning tree | 15 | Chalk & Talk, ICT Kit |
| IV | **Sorting and Searching** -Insertion Sort, Quick Sort, Merge Sort, Heap Sort, Sorting On Several Keys, List and Table Sort, Linear Search, Binary Search. | 15 | Chalk & Talk, ICT Kit |
| V | **Hashing And File Structures :** Hashing: The symbol table, Hashing Functions, Collision-Resolution Techniques, **File Structure:** Concepts of fields, records and files, Sequential, Indexed and Relative/Random File Organization, Indexing structure for index files, hashing for direct files, Multi-Key file organization and access methods. | 15 | Chalk & Talk, ICT Kit |

Course Designed by: **Mr. B.Johnson & Mrs.J.Anitha Gracy**

| Learning Outcome Based Education & Assessment (LOBE)<br>Formative Examination - Blue Print<br>Articulation Mapping – K Levels with Course Outcomes (COs) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Internal** | **Cos** | **K Level** | **Section A** | | **Section B** | | **Section C Either or Choice** | **Section D Open Choice** |
| | | | **MCQs** | | **Short Answers** | | | |
| | | | **No. of. Questions** | **K - Level** | **No. of. Questions** | **K – Level** | | |
| **CI AI** | **CO1** | Up to K3 | 2 | **K1,K2** | 1 | **K1** | **2(K3,K3)** | **1(K3)** |
| | **CO2** | Up to K3 | 2 | **K1,K2** | 2 | **K2** | **2(K3,K3)** | **1(K3)** |
| **CI AII** | **CO3** | Up to K3 | 2 | **K1,K2** | 1 | **K1** | **2(K3,K3)** | **1(K3)** |
| | **CO4** | Up to K4 | 2 | **K1,K2** | 2 | **K2** | **2(K4,K4)** | **1(K4)** |
| **Question Pattern CIA I & II** | | No. of Questions to be asked | **4** | | **3** | | **4** | **2** |
| | | No. of Questions to be answered | **4** | | **3** | | **2** | **1** |
| | | Marks for each question | **1** | | **2** | | **5** | **10** |
| | | Total Marks for each section | **4** | | **6** | | **10** | **10** |

***Note:** It is the decision of the course teacher to ask 2 Questions in any unit under section-B (short answer questions)

| Distribution of Marks with K Level CIA I & CIA II | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **K Level** | **Section A (Multiple Choice Questions)** | **Section B (Short Answer Questions)** | **Section C (Either / Or Choice)** | **Section D (Open Choice)** | **Total Marks** | **% of (Marks without choice)** | **Consolidate of %** |
| **CIA I** | **K1** | 2 | 2 | - | - | 4 | 8 | 20 |
| | **K2** | 2 | 4 | - | - | 6 | 12 | |
| | **K3** | - | - | 20 | 20 | 40 | 80 | 80 |
| | **K4** | - | - | - | - | - | | |
| | **Marks** | 4 | 6 | 20 | 20 | 50 | 100 | **100** |
| **CIA II** | **K1** | 2 | 2 | - | - | 4 | 8 | 20 |
| | **K2** | 2 | 4 | - | - | 6 | 12 | |
| | **K3** | - | - | 10 | 10 | 20 | 40 | 40 |
| | **K4** | - | - | 10 | 10 | 20 | 40 | 40 |
| | **Marks** | 4 | 6 | 20 | 20 | 50 | 100 | **100** |

**K1**- Remembering and recalling facts with specific answers
**K2**- Basic understanding of facts and stating main ideas with general answers
**K3**- Application oriented- Solving Problems
**K4**- Examining, analyzing, presentation and make inferences with evidences
**CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.**

| Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| S.No | COs | K - Level | MOQs | | Short Answers | | Section C (Either / or Choice) | Section D (Open Choice) |
| | | | No. of Questions | K – Level | No. of Questions | K – Level | | |
| 1 | CO1 | **K3** | **2** | **K1,K2** | **1** | **K2** | **2(K3,K3)** | **1(K3)** |
| 2 | CO2 | **K3** | **2** | **K1,K2** | **1** | **K2** | **2(K3,K3)** | **1(K3)** |
| 3 | CO3 | **K3** | **2** | **K1,K2** | **1** | **K2** | **2(K3,K3)** | **1(K3)** |
| 4 | CO4 | **K4** | **2** | **K1,K2** | **1** | **K2** | **2(K4,K4)** | **1(K4)** |
| 5 | CO5 | **K4** | **2** | **K1,K2** | **1** | **K2** | **2(K4,K4)** | **1(K4)** |
| No. of Questions to be Asked | | | **10** | | **5** | | **10** | **5** |
| No. of Questions to be answered | | | **10** | | **5** | | **5** | **3** |
| Marks for each question | | | **1** | | **2** | | **5** | **10** |
| Total Marks for each section | | | **10** | | **10** | | **25** | **30** |
| **(Figures in parenthesis denotes, questions should be asked with the given K level)** | | | | | | | | |

| Distribution of Marks with K Level | | | | | | | |
|---|---|---|---|---|---|---|---|
| K Level | Section A (Multiple Choice Questions) | Section B (Short Answer Questions) | Section C (Either/ or Choice) | Section D ( Open Choice) | Total Marks | % of (Marks without choice) | Consolidated % |
| K1 | 5 | | - | - | 5 | 4.16 | **17** |
| K2 | 5 | 10 | - | - | 15 | 12.5 | |
| K3 | - | - | 30 | 30 | 60 | 50 | **50** |
| K4 | - | - | 20 | 20 | 40 | 33.33 | **33** |
| Marks | **10** | **10** | **50** | **50** | **120** | **100** | **100** |
| **NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.** | | | | | | | |

## Summative Examinations - Question Paper – Format

| **Section A (Multiple Choice Questions)**<br>**Answer All Questions** | | | **(10x1=10 marks)** |
|---|---|---|---|
| **Q.No** | **CO** | **K Level** | **Questions** |
| 1 | CO1 | K1 | |
| 2 | CO1 | K2 | |
| 3 | CO2 | K1 | |
| 4 | CO2 | K2 | |
| 5 | CO3 | K1 | |
| 6 | CO3 | K2 | |
| 7 | CO4 | K1 | |
| 8 | CO4 | K2 | |
| 9 | CO5 | K1 | |
| 10 | CO5 | K2 | |
| **Section B (Short Answers)**<br>**Answer All Questions** | | | **(5x2=10 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 11 | CO1 | K2 | |
| 12 | CO2 | K2 | |
| 13 | CO3 | K2 | |
| 14 | CO4 | K2 | |
| 15 | CO5 | K2 | |
| **Section C (Either/Or Type)**<br>**Answer All Questions** | | | **(5 x 5 = 25 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 16) a | CO1 | K3,K3 | |
| 16) b | CO1 | K3,K3 | |
| 17) a | CO2 | K3,K3 | |
| 17) b | CO2 | K3,K3 | |
| 18) a | CO3 | K3,K3 | |
| 18) b | CO3 | K3,K3 | |
| 19) a | CO4 | K4,K4 | |
| 19) b | CO4 | K4,K4 | |
| 20) a | CO5 | K4,K4 | |
| 20) b | CO5 | K4,K4 | |
| **NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels** | | | |
| **Section D (Open Choice)**<br>**Answer Any Three questions** | | | **(3x10=30 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 21 | CO1 | K3 | |
| 22 | CO2 | K3 | |
| 23 | CO3 | K3 | |
| 24 | CO4 | K4 | |
| 25 | CO5 | K4 | |

**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**
**DEPARTMENT OF COMPUTER SCIENCE**
**(For those who joined in 2021-2022 and after)**

| **Course Name** | **DATA STRUCTURES AND ALGORITHMS - LAB** | | | |
|---|---|---|---|---|
| **Course Code** | **21UCSCP3** | **L** | **P** | **C** |
| **Category** | **Core** | - | 4 | 4 |

| **Nature of course:** | EMPLOYABILITY | **SKILL ORIENTED** | ✓ | ENTREPRENEURSHIP |
|---|---|---|---|---|

**Course objectives:**

- To know the real time usage of Data Structures
- To understand basic concepts of Linear and nonlinear data Structures.
- To understand importance of data structures in context of writing efficient programs
- To develop skills to apply appropriate data structures in problem solving
- To Understand the elements handling in various data structures

| **S. No.** | **List of Programs** | **Hours** |
|---|---|---|
| 1.<br>2.<br>3.<br>4.<br>5.<br>6.<br>7.<br>8.<br>9.<br>10.<br>11.<br>12.<br>13.<br>14.<br>15. | Write C++ Program to insert an Element in an Array.<br>Write C++ Program to delete an Element in an Array.<br>Write a C++ Program to sort the elements using Insertion sort.<br>Write a C++ Program to sort the elements using Bubble sort.<br>Write a C++ Program to sort the elements using Selection sort.<br>Write a C++ Program to sort the elements using heap sort.<br>Write a C++ Program to search the elements using linear search.<br>Write a C++ Program to search the elements using binary search.<br>Write a C++ Program to implement QUEUE operations.<br>Write a C++ Program to implement STACK operations.<br>Write a C++ Program to insert, delete and store the elements using linked list.<br>Write a C++ Program to implement Binary Search Trees.<br>Write a C++ Program to implement Tree traversal.<br>Write a C++ Program to implement Sequential file concept.<br>Write a C++ Program to implement Indexed file concept. | **60** |
| | **Total Hours** | **60** |

**Books for References:**

1. The C++ Programming Language: Special Edition.
2. Effective C++: 55 Specific Ways to Improve Your Programs and Designs (3rd Edition)
3. Michael T. Goodrich, Roberto Tamassia, David M. Mount, Data Structures and Algorithms in C++,
ISBN 978-0-470-38327-8, February 2011. Paperback, 736 pages

**Web Resources:**

1. **https://www.tutorialspoint.com/data_structures_algorithms/index.htm**
2. **https://www.digimat.in/nptel/courses/video/106105225/L01.html**
3. **https://www.youtube.com/watch?v=DXuIf4JCvRk**

| COURSE OUTCOMES: | | K Level |
|---|---|---|
| At the end of the course the students will be able to | | |
| CO1 | Infer the basic concepts of Arrays. | K2 |
| CO2 | Summarizing the knowledge of applications of data structures including the ability to implement algorithms for the creation, insertion, deletion, sorting of each data structure. | K3 |
| CO3 | Use the concepts of searching the element in data structures. | K3 |
| CO4 | Sketch the concepts of QUEUE and STACK, Linked list data structure. | K3 |
| CO5 | Classify the concepts of Trees. | K4 |

**CO & PO Mapping:**

| COS | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 |
|---|---|---|---|---|---|---|
| CO 1 | 2 | 2 | 3 | 3 | 1 | 3 |
| CO 2 | 3 | 3 | 2 | 3 | 2 | 3 |
| CO 3 | 2 | 3 | 3 | 2 | 2 | 2 |
| CO 4 | 2 | 2 | 1 | 3 | 3 | 3 |
| CO5 | 3 | 3 | 2 | 1 | 3 | 3 |

***3 –** Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

**LESSON PLAN**

| S. No. | List of Programs | Hours | Mode |
|---|---|---|---|
| 1. | Write C++ Program to insert an Element in an Array. | 60 | Black Board, Lab Demonstration and LCD Projector. |
| 2. | Write C++ Program to delete an Element in an Array. | | |
| 3. | Write a C++ Program to sort the elements using Insertion sort. | | |
| 4. | Write a C++ Program to sort the elements using Bubble sort. | | |
| 5. | Write a C++ Program to sort the elements using Selection sort. | | |
| 6. | Write a C++ Program to sort the elements using heap sort. | | |
| 7. | Write a C++ Program to search the elements using linear search. | | |
| 8. | Write a C++ Program to search the elements using binary search. | | |
| 9. | Write a C++ Program to implement QUEUE operations. | | |
| 10. | Write a C++ Program to implement STACK operations. | | |
| 11. | Write a C++ Program to insert, delete and store the elements using linked list. | | |
| 12. | Write a C++ Program to implement Binary Search Trees. | | |
| 13. | Write a C++ Program to implement Tree traversal. | | |
| 14. | Write a C++ Program to implement Sequential file concept. | | |
| 15. | Write a C++ Program to implement Indexed file concept. | | |
| **Total Hours** | | **60** | |

Course Designed by: **Mr. B.Johnson & Mrs.J.Anitha Gracy**

**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**
**DEPARTMENT OF COMPUTER SCIENCE**
**(For those who joined in 2021-2022 and after)**

| | | | | | |
|---|---|---|---|---|---|
| **Course Name** | **NUMERICAL APTITUDE** | | | | |
| **Course Code** | **21UMCA31** | | **L** | **P** | **C** |
| **Category** | **Allied** | | 5 | - | 4 |
| **Nature of course:** | **EMPLOYABILITY** | **SKILL ORIENTED** | **ENTREPRENURSHIP** | | |

**Course Objectives:**

- To improve the basic mathematical skills and to help students who are preparing for any type of competitive examinations.
- To enrich their knowledge and to develop their logical reasoning thinking ability.
- To compute either speed, distance, or time with 90% accuracy.
- To know and how to use the formula for calculating simple interest.
- To understand how to algebraically manipulate the interest formulas to solve for different variables.

| | | |
|---|---|---|
| **Unit: I** | H.C.F and L.C.M of Numbers - Average | **15 hrs** |
| **Unit: II** | Problems on Ages - Percentage | **15 hrs** |
| **Unit: III** | Ratio and proportions - Time and Distance | **15 hrs** |
| **Unit: IV** | Simple interest- Compound interest | **15 hrs** |
| **Unit: V** | Calendar – Permutations and Combinations | **15 hrs** |
| | **Total Lecture Hours** | **75 hrs** |

**Book for Study:**

**Text Book:** Dr. R. S. Aggarwal, **'Quantitative Aptitude'** S.Chand and company limited, New Delhi, Reprint 2017

Unit I : Chapter: 2 & 6
Unit II : Chapter: 8 & 11
Unit III : Chapter: 13 & 18
Unit IV : Chapter: 22 & 23
Unit V : Chapter: 27 & 30

**Books for Reference:**

1. Abhijit Guha, **"Quantitative Aptitude" for All Competitive Examinations**, McGraw Hill Education (India) Private Limited, 6th Edition, 2017.
2. Dinesh Khattar, **"Quantitative Aptitude" for Competitive Examinations,** Pearson India Education Services Pvt. Ltd., 4 th Edition, 2020.

**Web Resources:**

1. https://www.thinkiit.in/pre-foundation/english/class-10/mental-ability/
2. https://www.indiabix.com/non-verbal-reasoning/questions-and-answers/
3. https://www.slideshare.net/MyPrivateTutor/study-material-for-competitive-exams-verbal-non-verbal-reasoning-mathematics-operation
4. https://bankexamportal.com/study-material/reasoning-verbal/non-verbal-analogy-mcq

| Course Outcomes: | | K Level |
|---|---|---|
| After the completion of the course, Students will be able to | | |
| CO1: | Acquire the knowledge of numbers. | K3 |
| CO2: | Understand the concepts of ratio and proportions. | K3 |
| CO3: | Appear for Competitive Examinations. | K4 |
| CO4: | Find HCF and LCM | K3 |
| CO5: | Understand the difference between ordinary interest and exact interest, and be able to calculate both. | K3 |

**CO & PO Mapping:**

| COS | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 |
|---|---|---|---|---|---|---|
| CO 1 | 2 | 2 | 3 | 3 | 3 | 2 |
| CO 2 | 2 | 3 | 3 | 2 | 3 | 3 |
| CO 3 | 2 | 3 | 2 | 2 | 2 | 2 |
| CO 4 | 3 | 2 | 2 | 2 | 2 | 3 |
| CO5 | 3 | 3 | 2 | 2 | 3 | 3 |

***3 –** Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

**LESSON PLAN**

| UNIT | COURSE NAME | Hrs | Pedagogy |
|---|---|---|---|
| I | H.C.F and L.C.M of Numbers - Average | 15 | Chalk & Talk, PPT |
| II | Problems on Ages - Percentage | 15 | Chalk & Talk, Group Discussion |
| III | Ratio and Proportion - Time and Distance | 15 | Chalk & Talk, LCD |
| IV | Simple interest - Compound interest | 15 | Chalk & Talk, Seminar |
| V | Calendar – Permutations and Combinations | 15 | Chalk & Talk, Seminar |

**Course designed by: Dr. P. Visvanathan** and **Mrs . H. Sowmiya Gowri**

| Learning Outcome Based Education & Assessment (LOBE)<br>Formative Examination - Blue Print<br>Articulation Mapping – K Levels with Course Outcomes (COs) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Internal** | **Cos** | **K Level** | **Section A** | | **Section B** | | **Section C Either or Choice** | **Section D Open Choice** |
| | | | **MCQs** | | **Short Answers** | | | |
| | | | **No. of. Questions** | **K - Level** | **No. of. Questions** | **K – Level** | | |
| **CI AI** | **CO1** | Up to K3 | 2 | K1,K2 | 1 | K2 | 2(K3&K3) | 1 (K3) |
| | **CO2** | Up to K3 | 2 | K2,K2 | 2 | K2 | 2(K3&K3) | 1 (K3) |
| **CI AII** | **CO3** | Up to K4 | 2 | K1,K2 | 1 | K2 | 2(K3&K3) | 1 (K4) |
| | **CO4** | Up to K3 | 2 | K2,K2 | 2 | K2 | 2(K3&K3) | 1 (K3) |
| **Question Pattern CIA I & II** | | No. of Questions to be asked | **4** | | **3** | | **4** | **2** |
| | | No. of Questions to be answered | **4** | | **3** | | **2** | **1** |
| | | Marks for each question | **1** | | **2** | | **5** | **10** |
| | | Total Marks for each section | **4** | | **6** | | **10** | **10** |

***Note:** It is the decision of the course teacher to ask 2 Questions in any unit under section-B (short answer questions)

| Distribution of Marks with K Level CIA I & CIA II | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **K Level** | **Section A (Multiple Choice Questions)** | **Section B (Short Answer Questions)** | **Section C (Either / Or Choice)** | **Section D (Open Choice)** | **Total Marks** | **% of (Marks without choice)** | **Consolidate of %** |
| **CIA I** | **K1** | 1 | - | - | - | 1 | 2 | 20 |
| | **K2** | 3 | 6 | - | - | 9 | 18 | |
| | **K3** | - | - | 20 | 20 | 40 | 80 | 80 |
| | **K4** | - | - | - | - | - | - | - |
| | **K5** | - | - | - | -- | - | - | - |
| | **Marks** | 4 | 6 | 20 | 20 | 50 | 100 | 100 |
| **CIA II** | **K1** | 1 | - | - | - | 1 | 2 | 20 |
| | **K2** | 3 | 6 | - | - | 9 | 18 | |
| | **K3** | - | - | 20 | 10 | 30 | 60 | 60 |
| | **K4** | - | - | - | 10 | 10 | 20 | 20 |
| | **K5** | - | - | - | -- | - | - | - |
| | **Marks** | 4 | 6 | 20 | 20 | 50 | 100 | 100 |

**K1**- Remembering and recalling facts with specific answers
**K2**- Basic understanding of facts and stating main ideas with general answers
**K3**- Application oriented- Solving Problems
**K4**- Examining, analyzing, presentation and make inferences with evidences
**CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.**

| Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| S.No | COs | K - Level | MCQs | | Short Answers | | Section C (Either / or Choice) | Section D (Open Choice) |
| | | | No. of Questions | K – Level | No. of Question | K – Level | | |
| 1 | CO1 | K3 | 2 | K1&K2 | 1 | K1 | 2 (K3& K3) | 1 (K3) |
| 2 | CO2 | K3 | 2 | K1&K2 | 1 | K1 | 2 (K3 &K3) | 1 (K3) |
| 3 | CO3 | K4 | 2 | K1&K2 | 1 | K2 | 2 (K4 &K4) | 1 (K4) |
| 4 | CO4 | K3 | 2 | K1&K2 | 1 | K2 | 2 (K3 &K3) | 1 (K3) |
| 5 | CO5 | K3 | 2 | K1&K2 | 1 | K2 | 2 (K3 &K3) | 1 (K3) |
| No. of Questions to be Asked | | | 10 | | 5 | | 10 | 5 |
| No. of Questions to be answered | | | 10 | | 5 | | 5 | 3 |
| Marks for each question | | | 1 | | 2 | | 5 | 10 |
| Total Marks for each section | | | 10 | | 10 | | 25 | 30 |
| (Figures in parenthesis denotes, questions should be asked with the given K level) | | | | | | | | |

| Distribution of Marks with K Level | | | | | | | |
|---|---|---|---|---|---|---|---|
| K Level | Section A (Multiple Choice Questions) | Section B (Short Answer Questions) | Section C (Either/ or Choice) | Section D ( Open Choice) | Total Marks | % of (Marks without choice) | Consolidated % |
| K1 | 5 | 4 | - | - | 9 | 7.5 | 16 |
| K2 | 5 | 6 | - | - | 11 | 9.17 | |
| K3 | - | - | 40 | 40 | 80 | 66.67 | 67 |
| K4 | - | - | 10 | 10 | 20 | 16.67 | 17 |
| Marks | 10 | 10 | 50 | 50 | 120 | 100 | 100 |
| NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels. | | | | | | | |

## Summative Examinations - Question Paper – Format

| **Section A (Multiple Choice Questions)**<br>**Answer All Questions** | | | **(10x1=10 marks)** |
|---|---|---|---|
| **Q.No** | **CO** | **K Level** | **Questions** |
| 1 | CO1 | K1 | |
| 2 | CO1 | K2 | |
| 3 | CO2 | K1 | |
| 4 | CO2 | K2 | |
| 5 | CO3 | K1 | |
| 6 | CO3 | K2 | |
| 7 | CO4 | K1 | |
| 8 | CO4 | K2 | |
| 9 | CO5 | K1 | |
| 10 | CO5 | K2 | |
| **Section B (Short Answers)**<br>**Answer All Questions** | | | **(5x2=10 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 11 | CO1 | K1 | |
| 12 | CO2 | K1 | |
| 13 | CO3 | K2 | |
| 14 | CO4 | K2 | |
| 15 | CO5 | K2 | |
| **Section C (Either/Or Type)**<br>**Answer All Questions** | | | **(5 x 5 = 25 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 16) a | CO1 | K3 | |
| 16) b | CO1 | K3 | |
| 17) a | CO2 | K3 | |
| 17) b | CO2 | K3 | |
| 18) a | CO3 | K4 | |
| 18) b | CO3 | K4 | |
| 19) a | CO4 | K3 | |
| 19) b | CO4 | K3 | |
| 20) a | CO5 | K3 | |
| 20) b | CO5 | K3 | |
| **NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels** | | | |
| **Section D (Open Choice)**<br>**Answer Any Three questions** | | | **(3x10=30 marks)** |
| Q.No | CO | K Level | Questions |
| 21 | CO1 | K3 | |
| 22 | CO2 | K3 | |
| 23 | CO3 | K4 | |
| 24 | CO4 | K3 | |
| 25 | CO5 | K3 | |

**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**
**DEPARTMENT OF COMPUTER SCIENCE**
**(For those who joined in 2021-2022 and after)**

| **Course Name** | **WEB DESIGN LAB** | | | |
|---|---|---|---|---|
| **Course Code** | **21UCSSP3** | **L** | **P** | **C** |
| **Category** | **Skill** | - | 2 | 2 |

| **Nature of course:** | EMPLOYABILITY | **SKILL ORIENTED** | ✓ | ENTREPRENEURSHIP |
|---|---|---|---|---|

**Course objectives:**

- Be acquainted with elements, Tags and basic structure of HTML files.
- Develop the concept of basic and advanced text formatting.
- Practice the use of multimedia components in HTML documents.
- Designing of webpage-Document Layout, Working with List, Working with Tables.
- Practice Hyper linking, Designing of webpage-Working with Frames, Forms and Controls.

| **S. No.** | **List of Programs** | **Hours** |
|---|---|---|
| 1. | To design a web page using tags in HTML. | |
| 2. | To design a class timetable in web page using HTML | |
| 3. | To create table in a HTML web page using table span attribute. | |
| 4. | To design a web page using ordered/unordered list html tags. | |
| 5. | To design a web page using Nested List. | |
| 6. | To design a webpage that link to other web pages anchor tag. | |
| 7. | To design a webpage in HTML those consist of many frames. | |
| 8. | To design a webpage in HTML that consists of many Nested Frames in a frameset. | |
| 9. | To create a drop down box in webpage using HTML code. | **30** |
| 10. | To design a webpage to display the paragraphs with various | |
| 11. | alignments. | |
| 12. | To create a login form in a HTML webpage. | |
| 13. | To design a HTML web pages using images as a icon and page | |
| 14. | background | |
| 15. | To design a calculator in a web page using HTML Tags. | |
| 16. | To design a Web page for adding style with CSS. | |
| | To develop a Web page to publish in online using CSS. | |
| | To create a Web page with advanced style techniques using CSS. | |
| | **Total Hours** | **30** |

**Books for References:**

1. Thomas A. Powell, HTML& XHTML, TMH, Fourth Edition, Thirteenth Reprint, 2007.
2. N.P. Gopalan and J. Akilandeswari, Web Technology A Developer's Perspective, PHI, Second Printing, July 2008.

**Web Resources:**

1. https://nptel.ac.in/courses/106/105/106105084/
2. https://www.my-mooc.com/en/mooc/html-css-and-javascript/
3. https://www.freecodecamp.org/news/html-and-html5-example/

| COURSE OUTCOMES: | | K Level |
|---|---|---|
| At the end of the course the students will be able to | | |
| CO1 | Demonstrate page layout, color schemes and typography in the designs. | K1 |
| CO2 | Write valid and concise code for webpage | K1 |
| CO3 | Demonstrate knowledge of artistic and design components that are used in the creation of a web site. | K2 |
| CO4 | Design static websites that meet specified needs and interests | K2 |
| CO5 | Select appropriate HTML code from public repositories that enhances the experience of web application design | K2 |

**CO & PO Mapping:**

| COS | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 |
|---|---|---|---|---|---|---|
| CO 1 | 3 | 3 | 3 | 2 | 3 | 3 |
| CO 2 | 2 | 2 | 3 | 3 | 3 | 2 |
| CO 3 | 2 | 2 | 2 | 3 | 2 | 2 |
| CO 4 | 2 | 2 | 2 | 2 | 2 | 2 |
| CO5 | 3 | 2 | 2 | 2 | 2 | 3 |

***3 –** Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

## LESSONPLAN

| S. No. | List of Programs | Hrs | Mode |
|---|---|---|---|
| 1. | To design a web page using tags in HTML. | 30 | Black Board, Lab Demonstration and LCD Projector. |
| 2. | To design a class timetable in web page using HTML | | |
| 3. | To create table in a HTML web page using table span attribute. | | |
| 4. | To design a web page using ordered/unordered list html tags. | | |
| 5. | To design a web page using Nested List. | | |
| 6. | To design a webpage that link to other web pages anchor tag. | | |
| 7. | To design a webpage in HTML those consist of many frames. | | |
| 8. | To design a webpage in HTML that consists of many Nested Frames in a frameset. | | |
| 9. | To create a drop down box in webpage using HTML code. | | |
| 10. | To design a webpage to display the paragraphs with various alignments. | | |
| 11. | To create a login form in a HTML webpage. | | |
| 12. | To design a HTML web pages using images as a icon and page background | | |
| 13. | To design a calculator in a web page using HTML Tags. | | |
| 14. | To design a Web page for adding style with CSS. | | |
| 15. | To develop a Web page to publish in online using CSS. | | |
| 16. | To create a Web page with advanced style techniques using CSS. | | |

Course Designed by: **Mr.S.R.Mathusudhanan & Dr.S.Veerapandi**

**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**
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| | | | | | |
|---|---|---|---|---|---|
| **Course Name** | **MULTIMEDIA TECHNOLOGIES** | | | | |
| **Course Code** | **21UCSN31** | | | **L** | **P** | **C** |
| **Category** | **Non Major Elective Course** | | | 2 | - | 2 |
| **Nature of course:** | EMPLOYABILITY | **SKILL ORIENTED** | ✓ | ENTREPRENEURSHIP | | |

**Course Objectives:**

- To gain the basic knowledge of Content and copyrights Resources for multimedia developers.
- To understand the fundamental concepts of Operating systems and software-Multimedia computer Architecture.
- To understand the purpose of Images and color-Graphics file and application formats.
- To learn Digital video-Digital video data sizing-Video capture and playback systems.
- To learn the basic concepts of HTML and web authoring.

| | | |
|---|---|---|
| **Unit: I** | **INTRODUCTION TO MULTIMEDIA** | **6 Hours** |

Multimedia introduction-multimedia market-Content and copyrights Resources for multimedia developers. Products and Evaluation: Types of products-Evaluation.

| | | |
|---|---|---|
| **Unit: II** | **HARDWARE, OPERATING SYSTEMS AND SOFTWARE:** | **6 Hours** |

Computer Architecture-Computer Architecture standards-Operating systems and software-Multimedia computer Architecture-Software executable and Libraries-Software drivers. Text: Elements of text-Text data files-Using text in multimedia Applications Hypertext.

| | | |
|---|---|---|
| **Unit: III** | **GRAPHICS:** | **6 Hours** |

Elements of graphics-Images and color-Graphics file and application formats-Obtaining images for multimedia use-Using graphics in multimedia applications. Digital audio: Characteristics of sound and digital audio Digital audio systems-MIDI-Audio file formats-Using audio in Multimedia applications-Using audio to enhance other contents-Audio for content delivery.

| | | |
|---|---|---|
| **Unit: IV** | **DIGITAL VIDEO AND ANIMATION:** | **6 Hours** |

Background on video-Characteristics of Digital video-Digital video data sizing-Video capture and playback systems-Computer animations-Using digital video in multimedia applications.

| | | |
|---|---|---|
| **Unit: V** | **MULTIMEDIA AND THE INTERNET:** | **6 Hours** |

The internet-HTML and web authoring-Multimedia considerations for the Internet-Design considerations for the Web pages.

| | | |
|---|---|---|
| | **Total Lecture Hours** | **30 Hrs** |

**Books for Study:**

Multimedia Technology and Applications by David Hillman, Galgotia Publication Pvt Ltd.

**Unit I: Chapter 1,2**
**Unit II: Chapter 3,4**
**Unit III: Chapter 5,6**
**Unit IV: Chapter 7**
**Unit V: Chapter 10**

**Books for References:**

1. Principles of Multimedia - Ranjan Parekh - TMGH, New Delhi - Twelfth Reprint,

| | | |
|---|---|---|
| 2. Fundamental of Multimedia - Ze-Nian Li & M. S. Drew | | |
| **Web Resources:** | | |
| **1. https://www.tutorialspoint.com/multimedia/multimedia_introduction.htm**<br>**2. https://slideplayer.com/slide/12810303/** | | |
| **Course Outcomes** | | **K Level** |
| **At the end of the course the students will be able to** | | |
| **CO1:** | Know the basic resources of multimedia developers | **K2** |
| **CO2:** | Know about Operating systems and Multimedia computer Architecture | **K2** |
| **CO3:** | Understand the concepts graphics-Images and color. | **K2** |
| **CO4:** | Understand about digital video-digital video data sizing-Video capture | **K2** |
| **CO5:** | Understand the usage of Multimedia in Web Page Design | **K2** |

**CO & PO Mapping:**

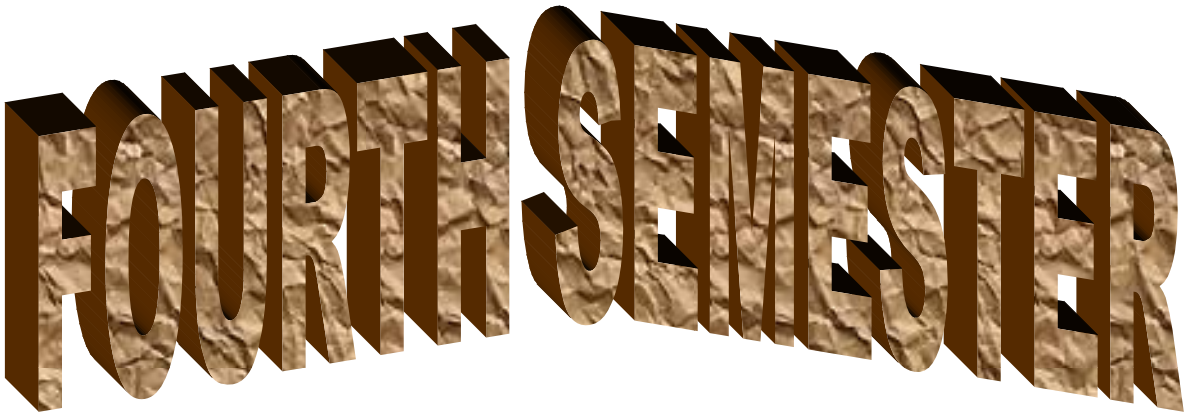
| COS | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 |
|---|---|---|---|---|---|---|
| CO 1 | 2 | 3 | 3 | 3 | 2 | 3 |
| CO 2 | 2 | 2 | 3 | 2 | 3 | 3 |
| CO 3 | 3 | 2 | 3 | 2 | 3 | 3 |
| CO 4 | 3 | 3 | 2 | 3 | 2 | 2 |
| CO5 | 2 | 2 | 3 | 3 | 2 | 3 |

***3 –** Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

## LESSON PLAN

| Unit | MULTIMEDIA TECHNOLOGIES | Hrs | Pedagogy |
|---|---|---|---|
| I | **INTRODUCTION TO MULTIMEDIA:** Multimedia introduction-multimedia market-Content and copyrights Resources for multimedia developers. Products and Evaluation: Types of products-Evaluation. | 6 | Chalk & Talk, ICT Kit |
| II | **HARDWARE, OPERATING SYSTEMS AND SOFTWARE:** Computer Architecture-Computer Architecture standards-Operating systems and software-Multimedia computer Architecture-Software executable and Libraries-Software drivers. Text: Elements of text-Text data files-Using text in multimedia Applications Hypertext. | 6 | Chalk & Talk, ICT Kit |
| III | **GRAPHICS:** Elements of graphics-Images and color-Graphics file and application formats-Obtaining images for multimedia use-Using graphics in multimedia applications. Digital audio: Characteristics of sound and digital audio Digital audio systems-MIDI-Audio file formats-Using audio in Multimedia applications-Using audio to enhance other contents-Audio for content delivery. | 6 | Chalk & Talk, ICT Kit |
| IV | **DIGITAL VIDEO AND ANIMATION:** Background on video-Characteristics of Digital video-Digital video data sizing-Video capture and playback systems-Computer animations-Using digital video in multimedia applications. | 6 | Chalk & Talk, ICT Kit |
| V | **MULTIMEDIA AND THE INTERNET:** The internet-HTML and web authoring-Multimedia considerations for the Internet-Design considerations for the Web pages. | 6 | Chalk & Talk, ICT Kit |

Course Designed by: **Mr.S.R.Mathusudhanan & Mrs. K. Sandya**


FOURTH SEMESTER

**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**
**DEPARTMENT OF COMPUTER SCIENCE**
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| | | | | | |
|---|---|---|---|---|---|
| **Course Name** | **RELATIONAL DATABASE MANAGEMENT SYSTEM** | | | | |
| **Course Code** | **21UCSC41** | | **L** | **P** | **C** |
| **Category** | **Core** | | 5 | - | 4 |
| **Nature of course:** | **EMPLOYABILITY** | ✓ SKILL ORIENTED | ENTREPRENEURSHIP | | |

**Course objectives:**

- To understand the basic concepts of database systems and familiar with database storage structures.
- To develop the logical design of the database using data modeling concepts such as entity-relationship diagrams.
- To understand the relational database design principles.
- To emphasize the importance of normalization in databases.
- To Master the basics of SQL and construct queries using SQL.

| **Unit: I** | **DBMS** | **15 Hours** |
|---|---|---|

**Data, Information and Information Processing:** Introduction – Definition of information, Quality of information. **Files, File organization and file structures:** Introduction – Operations on files – File storage organization – Storage media. **Introduction to Database Management System (DBMS):** Introduction – Why a database – Characteristics of data in a Database – Why DBMS – Types of Data Base Management System.

| **Unit: II** | **RDBMS** | **15 Hours** |
|---|---|---|

**Introduction to Relational Database Management System:** Introduction – RDBMS terminology – The Relational data structure – Relational data manipulation – Codd's rules. **Entity - Relationship (E-R) Modelling:** E-R model – Components of an E-R model – E-R modelling symbols. **Data Normalization:** Introduction – First Normal Form – Second Normal Form – Third Normal Form – Boyce – Codd Normal Form – Fourth Normal Form – Fifth Normal Form – Demoralization.

| **Unit: III** | **Relational algebra & calculus and SQL** | **15 Hours** |
|---|---|---|

**Relational algebra and Relational calculus:** Relational algebra - Relational calculus. **Introduction to Structured Query Language:** Introduction – Characteristics of SQL - Advantages of SQL – SQL data types and Literals – Types of SQL commands – SQL operators – Arithmetic, Comparison operators - Logical operators - Set operators – Operator precedence.

| **Unit: IV** | **SQL Schemas , Sub Queries, Operations and Functions** | **15 Hours** |
|---|---|---|

**Tables, Views and Indexes:** Tables-Views. **Queries and Sub queries**: Queries – Sub queries. **Aggregate functions** – **Joins and Unions:** Joins.

| **Unit: V** | **Cursor and Triggers** | **15 Hours** |
|---|---|---|

**Cursor:** Cursor operations – Cursor positions – Cursor coding guidelines. **Triggers:** Types of triggers – Trigger syntax – Combining Trigger types – Setting inserted values – Enabling / Disabling, Replacing and Dropping Triggers – Advantages and disadvantages of triggers.

| | |
|---|---|
| **Total Lecture Hours** | **75 Hours** |

**Books for Study:**

1. Alexis Leon and Mathews Leon, Database Management Systems, Leon Vikas Publishing, New

Delhi, 1999.
**Unit I:** Chapter 1,3 and 5
**Unit II:** Chapter 7,9 and 11
**Unit III:** Chapter 12 and 14
**Unit IV:** Chapter 15,17,18 and 21
**Unit V:** Chapter 20 and 25

**Book for References:**


1. Abraham Silberschtz, Henry F. Korth, S.Sudershan, Data Base System Concepts, 4th Edition, McGraw Hill International Editions, New Delhi, 2002.
2. Date C.J., An Introduction to Database Systems Vol.1, Narosha Publishing House, New Delhi, 1995.
3. Rob, Coronel, "Database Systems",Seventh Edition, Cengage Learning.
4. Elmasri, R. and S. B. Navathe: Fundamentals of Database Systems (5th Ed.), Addison Wesley, 2007.
5. Jeffrey A. Hoffer, Mary B. Prescott, and Fred R. McFadden. Modern Database Management (8th Ed.). Prentice-Hall, 2007


**Web Resources:**

1. **https://byjus.com/govt-exams/database-management-system-dbms/**
2. **https://www.tutorialspoint.com/sql/sql-rdbms-concepts.htm**
3. **https://www.studytonight.com/dbms/rdbms-concept.php**
4. **https://www.javatpoint.com/dbms-tutorial**
5. **https://www.geeksforgeeks.org/sql-tutorial/**

| **COURSE OUTCOMES:** | | **K Level** |
|---|---|---|
| **At the end of the course the students will be able to** | | |
| **CO1** | Enumerate the underlying concepts of the management of database systems. | Upto K3 |
| **CO2** | Describe the structure and model of the relational database System | Upto K3 |
| **CO3** | Analyze a database based on a data model considering the normalization to a specified level | Upto K3 |
| **CO4** | Construct simple and moderately advanced database queries using Structured Query Language (SQL) | Upto K4 |
| **CO5** | Design multiple tables using group functions, sub queries and Implement cursor and trigger concept for a given scenario | Upto K4 |

**CO & PO Mapping:**

| COS | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 |
|---|---|---|---|---|---|---|
| CO 1 | 3 | 2 | 3 | 2 | 3 | 3 |
| CO 2 | 2 | 2 | 3 | 2 | 1 | 3 |
| CO 3 | 3 | 3 | 3 | 3 | 2 | 3 |
| CO 4 | 2 | 3 | 2 | 2 | 1 | 3 |
| CO5 | 2 | 3 | 2 | 2 | 3 | 3 |

***3 –** Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

## LESSON PLAN

| UNIT | RELATIONAL DATABASE MANAGEMENT SYSTEM | Hrs | Mode |
|---|---|---|---|
| I | Data, Information and Information Processing: Introduction – Definition of information, Quality of information. Files, File organization and file structures: Introduction – Operations on files – File storage organization – Storage media. Introduction to Database Management System (DBMS): Introduction – Why a database – Characteristics of data in a Database – Why DBMS – Types of Data Base Management System. | 15 | Chalk & Talk, ICT Kit |
| II | Introduction to Relational Database Management System: Introduction – RDBMS terminology – The Relational data structure – Relational data manipulation – Codd's rules. Entity - Relationship (E-R) Modelling: E-R model – Components of an E-R model – E-R modelling symbols. Data Normalization: Introduction – First Normal Form – Second Normal Form – Third Normal Form – Boyce – Codd Normal Form – Fourth Normal Form – Fifth Normal Form – Denormalization. | 15 | Chalk & Talk, ICT Kit |
| III | Relational algebra and Relational calculus: Relational algebra - Relational calculus. Introduction to Structured Query Language: Introduction – Characteristics of SQL - Advantages of SQL – SQL data types and Literals – Types of SQL commands – SQL operators – Arithmetic, Comparison operators - Logical operators - Set operators – Operator precedence. | 15 | Chalk & Talk, ICT Kit |
| IV | Tables, Views and Indexes: Tables-Views. Queries and Sub queries: Queries – Sub queries. Aggregate functions – Joins and Unions: Joins. | 15 | Chalk & Talk, ICT Kit |
| V | Cursor: Cursor operations – Cursor positions – Cursor coding guidelines. Triggers: Types of triggers – Trigger syntax – Combining Trigger types – Setting inserted values – Enabling / Disabling, Replacing and Dropping Triggers – Advantages and disadvantages of triggers. | 15 | Chalk & Talk, ICT Kit |

Course Designed by: **Mrs. S.Amutha & Dr.G.Devika**

| Learning Outcome Based Education & Assessment (LOBE)<br>Formative Examination - Blue Print<br>Articulation Mapping – K Levels with Course Outcomes (COs) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Internal** | **Cos** | **K Level** | **Section A** | | **Section B** | | **Section C Either or Choice** | **Section D Open Choice** |
| | | | **MCQs** | | **Short Answers** | | | |
| | | | **No. of. Questions** | **K - Level** | **No. of. Questions** | **K – Level** | | |
| **CI AI** | **CO1** | Up to K3 | 2 | **K1,K2** | 1 | **K1** | **2(K3,K3)** | **1(K3)** |
| | **CO2** | Up to K3 | 2 | **K1,K2** | 2 | **K2** | **2(K3,K3)** | **1(K3)** |
| **CI AII** | **CO3** | Up to K3 | 2 | **K1,K2** | 1 | **K1** | **2(K3,K3)** | **1(K3)** |
| | **CO4** | Up to K4 | 2 | **K1,K2** | 2 | **K2** | **2(K4,K4)** | **1(K4)** |
| **Question Pattern CIA I & II** | | No. of Questions to be asked | **4** | | **3** | | **4** | **2** |
| | | No. of Questions to be answered | **4** | | **3** | | **2** | **1** |
| | | Marks for each question | **1** | | **2** | | **5** | **10** |
| | | Total Marks for each section | **4** | | **6** | | **10** | **10** |

***Note:** It is the decision of the course teacher to ask 2 Questions in any unit under section-B (short answer questions)

| Distribution of Marks with K Level CIA I & CIA II | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **K Level** | **Section A (Multiple Choice Questions)** | **Section B (Short Answer Questions)** | **Section C (Either / Or Choice)** | **Section D (Open Choice)** | **Total Marks** | **% of (Marks without choice)** | **Consolidate of %** |
| **CIA I** | **K1** | 2 | 2 | - | - | 4 | 8 | 20 |
| | **K2** | 2 | 4 | - | - | 6 | 12 | |
| | **K3** | - | - | 20 | 20 | 40 | 80 | 80 |
| | **K4** | - | - | - | - | - | | |
| | **Marks** | 4 | 6 | 20 | 20 | 50 | 100 | **100** |
| **CIA II** | **K1** | 2 | 2 | - | - | 4 | 8 | 20 |
| | **K2** | 2 | 4 | - | - | 6 | 12 | |
| | **K3** | - | - | 10 | 10 | 20 | 40 | 40 |
| | **K4** | - | - | 10 | 10 | 20 | 40 | 40 |
| | **Marks** | 4 | 6 | 20 | 20 | 50 | 100 | **100** |

**K1-** Remembering and recalling facts with specific answers

**K2-** Basic understanding of facts and stating main ideas with general answers

**K3-** Application oriented- Solving Problems

**K4-** Examining, analyzing, presentation and make inferences with evidences

**CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.**

| Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| S.No | COs | K - Level | MOQs | | Short Answers | | Section C (Either / or Choice) | Section D (Open Choice) |
| | | | No. of Questions | K – Level | No. of Questions | K – Level | | |
| 1 | CO1 | **K3** | **2** | **K1,K2** | **1** | **K2** | **2(K3,K3)** | **1(K3)** |
| 2 | CO2 | **K3** | **2** | **K1,K2** | **1** | **K2** | **2(K3,K3)** | **1(K3)** |
| 3 | CO3 | **K3** | **2** | **K1,K2** | **1** | **K2** | **2(K3,K3)** | **1(K3)** |
| 4 | CO4 | **K4** | **2** | **K1,K2** | **1** | **K2** | **2(K4,K4)** | **1(K4)** |
| 5 | CO5 | **K4** | **2** | **K1,K2** | **1** | **K2** | **2(K4,K4)** | **1(K4)** |
| No. of Questions to be Asked | | | **10** | **K1,K2** | **5** | **K2** | **10** | **5** |
| No.of Questions to be answered | | | **10** | **K1,K2** | **5** | **K2** | **5** | **3** |
| Marks for each question | | | **1** | **K1,K2** | **2** | **K2** | **5** | **10** |
| Total Marks for each section | | | **10** | **K1,K2** | **10** | **K2** | **25** | **30** |
| **(Figures in parenthesis denotes, questions should be asked with the given K level)** | | | | | | | | |

| Distribution of Marks with K Level | | | | | | | |
|---|---|---|---|---|---|---|---|
| K Level | Section A (Multiple Choice Questions) | Section B (Short Answer Questions) | Section C (Either/ or Choice) | Section D ( Open Choice) | Total Marks | % of (Marks without choice) | Consolidated % |
| K1 | 5 | | - | - | 5 | 4.16 | **17** |
| K2 | 5 | 10 | - | - | 15 | 12.5 | |
| K3 | - | - | 30 | 30 | 60 | 50 | **50** |
| K4 | - | - | 20 | 20 | 40 | 33.33 | **33** |
| Marks | **10** | **10** | **50** | **50** | **120** | **100** | **100** |
| **NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.** | | | | | | | |

## Summative Examinations - Question Paper – Format

| **Section A (Multiple Choice Questions)**<br>**Answer All Questions** | | | **(10x1=10 marks)** |
|---|---|---|---|
| **Q.No** | **CO** | **K Level** | **Questions** |
| 1 | CO1 | K1 | |
| 2 | CO1 | K2 | |
| 3 | CO2 | K1 | |
| 4 | CO2 | K2 | |
| 5 | CO3 | K1 | |
| 6 | CO3 | K2 | |
| 7 | CO4 | K1 | |
| 8 | CO4 | K2 | |
| 9 | CO5 | K1 | |
| 10 | CO5 | K2 | |
| **Section B (Short Answers)**<br>**Answer All Questions** | | | **(5x2=10 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 11 | CO1 | K2 | |
| 12 | CO2 | K2 | |
| 13 | CO3 | K2 | |
| 14 | CO4 | K2 | |
| 15 | CO5 | K2 | |
| **Section C (Either/Or Type)**<br>**Answer All Questions** | | | **(5 x 5 = 25 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 16) a | CO1 | K3,K3 | |
| 16) b | CO1 | K3,K3 | |
| 17) a | CO2 | K3,K3 | |
| 17) b | CO2 | K3,K3 | |
| 18) a | CO3 | K3,K3 | |
| 18) b | CO3 | K3,K3 | |
| 19) a | CO4 | K4,K4 | |
| 19) b | CO4 | K4,K4 | |
| 20) a | CO5 | K4,K4 | |
| 20) b | CO5 | K4,K4 | |
| **NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels** | | | |
| **Section D (Open Choice)**<br>**Answer Any Three questions** | | | **(3x10=30 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 21 | CO1 | K3 | |
| 22 | CO2 | K3 | |
| 23 | CO3 | K3 | |
| 24 | CO4 | K4 | |
| 25 | CO5 | K4 | |

**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**
**DEPARTMENT OF COMPUTER SCIENCE**
**(For those who joined in 2021-2022 and after)**

| | | | | |
|---|---|---|---|---|
| **Course Name** | **RELATIONAL DATABASE MANAGEMENT SYSTEMS LAB** | | | |
| **Course Code** | **21UCSCP4** | **L** | **P** | **C** |
| **Category** | **Core** | - | 4 | 4 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Nature of course:** | **EMPLOYABILITY** | ✓ | **SKILL ORIENTED** | ✓ | **ENTREPRENEURSHIP** | ✓ |

**Course objectives:**

- To provide a sound introduction to the creation of problem statements from real life situations.
- To give a good formal foundation on the relational model of data and usage of Relational Algebra.
- To introduce the concepts of basic SQL as a universal Database language.
- To enhance knowledge of advanced SQL topics like embedded SQL, procedures connectivity through JDBC.
- To enable the design of an efficient database using normalization concepts

| S. No. | List of Programs | Hours |
|---|---|---|
| 1 | DDL and DML Commands with Examples | 60 |
| 2 | Key Constrains-Normalization | |
| 3 | Aggregate functions | |
| 4 | Joins | |
| 5 | Views | |
| 6 | Index | |
| 7 | SQL Queries | |
| 8 | PL/ SQL | |
| 9 | Exception handling | |
| 10 | Triggers | |
| 11 | Cursors | |
| 12 | Subprograms-procedure PL/ SQL | |
| 13 | Functions of PL/ SQL | |
| 14 | Packages | |
| | **Total Hours** | **60** |

**Web Resources:**

1. https://www.tutorialspoint.com/sql/sql-overview.htm
2. https://www.w3schools.com/sql/
3. https://www.javatpoint.com/dbms-sql-introduction
4. https://www.geeksforgeeks.org/sql-tutorial/
5. https://www.bing.com/videos/search?q=sql&qpvt=sql&FORM=VDRE

| **COURSE OUTCOMES:** At the end of the course the students will be able to | | **K Level** |
|---|---|---|
| **CO1** | Use data manipulation language to query, update and manage a database | **Upto K3** |
| **CO2** | Describe the fundamental elements of relational database management systems | **K2,K3** |
| **CO3** | Analyze the database using queries to retrieve records | **K3** |
| **CO4** | Create views to satisfy the user's changing requirements | **K4** |

| | | |
|---|---|---|
| **CO5** | Apply PL/SQL for processing data base. | **K3** |

**CO & PO Mapping:**

| COS | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 |
|---|---|---|---|---|---|---|
| CO 1 | 3 | 2 | 2 | 2 | 3 | 2 |
| CO 2 | 2 | 2 | 2 | 2 | 3 | 2 |
| CO 3 | 3 | 2 | 2 | 2 | 2 | 2 |
| CO 4 | 2 | 2 | 2 | 2 | 2 | 3 |
| CO5 | 2 | 3 | 3 | 3 | 2 | 2 |

***3 –** Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

## LESSONPLAN

| S. No. | List of Programs | Hrs | Mode |
|---|---|---|---|
| 1. | DDL and DML Commands with Examples | 60 | Black Board, Lab Demonstration and LCD Projector. |
| 2. | Key Constrains-Normalization | | |
| 3. | Aggregate functions | | |
| 4. | Joins | | |
| 5. | Views | | |
| 6. | Index | | |
| 7. | SQL Queries | | |
| 8. | PL/ SQL | | |
| 9. | Exception handling | | |
| 10. | Triggers | | |
| 11. | Cursors | | |
| 12. | Subprograms-procedure PL/ SQL | | |
| 13. | Functions of PL/ SQL | | |
| 14. | Packages | | |

Course Designed by **: Mrs. S.Amutha & Dr. S. Shaik Parveen**

**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**
**DEPARTMENT OF COMPUTER SCIENCE**
**(For those who joined in 2021-2022 and after)**

| | | | | | |
|---|---|---|---|---|---|
| **Course Name** | **OPERATIONS RESEARCH** | | | | |
| **Course Code** | **21UMCA41** | | **L** | **P** | **C** |
| **Category** | **ALLIED** | | 5 | - | 5 |
| **Nature of course:** | **EMPLOYABILITY** | SKILL ORIENTED | ENTREPRENURSHIP | | |

**COURSE OBJECTIVES:**

- To illustrate linear problem, special forms and game theory.
- To evaluate game theory and linear problems.
- To compare different types of methods in solving linear problem
- To solve linear programming problem.
- To design real life problem into a linear problem.

| | | |
|---|---|---|
| **Unit: I** | | 15 |

Linear Programming Problem - Mathematical formulation of the problem – Solution by Graphical Method, The Simplex method and Method of penalty (Big M Method only).

| | | |
|---|---|---|
| **Unit: II** | | 15 |

Duality – Dual Simplex Method- Problems.

| | | |
|---|---|---|
| **Unit: III** | | 15 |

Transportation problem – Mathematical form – Initial solutions by all methods – MODI method for both balanced and unbalanced TP- The Assignment Problem.

| | | |
|---|---|---|
| **Unit: IV** | | 15 |

Game theory – Two Person Zero Sum Game – saddle point – Game with saddle point – Solution of game by using formula, Graphical method, Method of Dominance and LPP method.

| | | |
|---|---|---|
| **Unit: V** | | 15 |

Sequencing – Replacement Problem

| | | |
|---|---|---|
| | **Total Lecture Hours** | 75 |

**Books for Study:**

Kanti Swarup , P.K. Gupta and Man Mohan, **Operations Research** Sultan Chand and Sons Publications, New Delhi, Reprint 2006.

Unit I - Chapter 2 Section 2.2
Chapter 3 Section 3.1 to 3.5
Chapter 4 Section 4.1 to 4.4

Unit II - Chapter 5: Section 5.1 to 5.4 and 5.7

| |
|---|
| Unit III - Chapter 10: Section 10.1 to 10.5, 10.8 to 10.11 and 10.14<br><br>Chapter11: Section 11.1 to 11.4<br>Unit IV - Chapter17: Section 17.1 to 17.7<br>Unit V - Chapter 12: Section 12.1 to 12.5<br>Chapter 18: Section 18.1 & 18.2 |
| **Books for References:**<br>1.Dr.S.Arumugam and ISAAC, **Topics in Operations Research -Linear Programming**,New Gamma Publishing House, Palayamkottai, June 2012.<br>2.P.R.Vital and V.Malini, **Operations Research**, Margham Publications, Chennai, 2002.<br>3.Hamdy A.Taha – **Operations Research, An Introduction**, 8th Edition , Prentice-Hall India ,2006. |
| **Web Resources** |
| **1. https://mrcet.com/downloads/digital_notes/ME/IV%20year/Operations%20Research.pdf**<br>**2.http://lipas.uwasa.fi/~tsottine/lecture_notes/or.pdf**<br>**3. https://mrcet.com/downloads/digital_notes/ME/IV%20year/Operations%20Research.pdf** |

| **COURSE OUTCOME** | | **K Level** |
|---|---|---|
| **On the successful completion of the course, the students will be able to** | | |
| **CO1:** | Solve linear programming problems by various methods | **K3** |
| **CO2:** | Analyze different environments that needs decision using duality concepts to find solution. | **K4** |
| **CO3:** | Develop the solution to Transportation and Assignment Problem | **K3** |
| **CO4:** | Explain the game theory problems | **K4** |
| **CO5:** | Solve replacement and sequencing problem | **K3** |

**CO & PO Mapping:**

| COS | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 |
|---|---|---|---|---|---|---|
| CO 1 | 2 | 2 | 3 | 3 | 3 | 2 |
| CO 2 | 2 | 2 | 3 | 2 | 3 | 3 |
| CO 3 | 2 | 3 | 2 | 2 | 3 | 2 |
| CO 4 | 2 | 2 | 2 | 3 | 2 | 2 |
| CO5 | 3 | 3 | 2 | 2 | 3 | 3 |

***3 –** Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

## LESSON PLAN

| UNIT | SUBJECT NAME | Hrs | Pedagogy |
|---|---|---|---|
| I | Linear Programming Problem - Mathematical formulation of the problem – Solution by Graphical Method, The Simplex method and Method of penalty (Big M Method only). | 15 | Chalk & Talk |
| II | Duality – Dual simplex method- Problems. | 15 | Chalk & Talk |
| III | Transportation problem – Mathematical form – Initial solutions by all methods – MODI method for both balanced and unbalanced TP- The assignment problem. | 15 | Chalk & Talk |
| IV | Game theory – Two person zero sum game – saddle point – Game with saddle point – Solution of game by using formula, graphical method, method of dominance and LPP method. | 15 | Chalk & Talk |
| V | Sequencing – Replacement Problem | 15 | Chalk & Talk |

**Course Designed by:**
**Dr. A. Arivuchelvam,** Assistant Professor **& Dr, P. Chitradevi,** Assistant Professor

**Learning Outcome Based Education & Assessment (LOBE)**
**Formative Examination - Blue Print**
**Articulation Mapping – K Levels with Course Outcomes (COs)**

| Internal | Cos | K Level | Section A | | Section B | | Section C Either or Choice | Section D Open Choice |
|---|---|---|---|---|---|---|---|---|
| | | | MCQs | | Short Answers | | | |
| | | | No. of. Questions | K - Level | No. of. Questions | K - Level | | |
| CIAI | CO1 | Upto K3 | 2 | K1&K2 | 1 | K1 | 2 | 1 |
| | CO2 | Upto K4 | 2 | K1&K2 | 2 | K2 | 2 | 1 |
| CIAII | CO3 | Upto K3 | 2 | K1&K2 | 1 | K2 | 2 | 1 |
| | CO4 | Upto K4 | 2 | K1&K2 | 2 | K2 | 2 | 1 |
| Question Pattern CIA I & II | | No. of Questions to be asked | 4 | | 3 | | 4 | 2 |
| | | No. of Questions to be answered | 4 | | 3 | | 2 | 1 |
| | | Marks for each question | 1 | | 2 | | 5 | 10 |
| | | Total Marks for each section | 4 | | 6 | | 10 | 10 |

| Distribution of Marks with K Level CIA I & CIA II | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | K Level | Section A (Multiple Choice Questions) | Section B (Short Answer Questions) | Section C (Either / Or Choice) | Section D (Open Choice) | Total Marks | % of (Marks without choice) | Consolidate of % |
| CIA I | K1 | 2 | 2 | | | 4 | 5 | 20 |
| | K2 | 2 | 4 | | | 6 | 12 | |
| | K3 | | | 10 | 10 | 20 | 40 | 40 |
| | K4 | | | 10 | 10 | 20 | 40 | 40 |
| | Marks | 4 | 6 | 20 | 20 | 50 | 100 | 100 |
| CIA II | K1 | 2 | 2 | | | 4 | 8 | 20 |
| | K2 | 2 | 4 | | | 6 | 12 | |
| | K3 | | | 10 | 10 | 20 | 40 | 40 |
| | K4 | | | 10 | 10 | 20 | 40 | 40 |
| | Marks | 4 | 6 | 20 | 20 | 50 | 100 | 100 |

**K1**- Remembering and recalling facts with specific answers
**K2**- Basic understanding of facts and stating main ideas with general answers
**K3**- Application oriented- Solving Problems
**K4**- Examining, analyzing, presentation and make inferences with evidences
**CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.**

| Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| S.No | COs | K - Level | MCQs | | Short Answers | | Section C (Either / or Choice) | Section D (Open Choice) |
| | | | No. of Questions | K – Level | No. of Question | K – Level | | |
| 1 | CO1 | Upto K3 | 2 | K1&K2 | 1 | K1 | 2(K2&K2) | 1(K3) |
| 2 | CO2 | Upto K4 | 2 | K1&K2 | 1 | K1 | 2(K3&K3) | 1(K4) |
| 3 | CO3 | Upto K3 | 2 | K1&K2 | 1 | K2 | 2(K2&K2) | 1(K3) |
| 4 | CO4 | Upto K4 | 2 | K1&K2 | 1 | K2 | 2(K3&K3) | 1(K4) |
| 5 | CO5 | Upto K3 | 2 | K1&K2 | 1 | K2 | 2(K2&K2) | 1(K3) |
| No. of Questions to be Asked | | | 10 | | 5 | | 10 | 5 |
| No. of Questions to be answered | | | 10 | | 5 | | 5 | 3 |
| Marks for each question | | | 1 | | 2 | | 5 | 10 |
| Total Marks for each section | | | 10 | | 10 | | 25 | 30 |
| (Figures in parenthesis denotes, questions should be asked with the given K level) | | | | | | | | |

| Distribution of Marks with K Level | | | | | | | |
|---|---|---|---|---|---|---|---|
| **K Level** | **Section A (Multiple Choice Questions)** | **Section B (Short Answer Questions)** | **Section C (Either/ or Choice)** | **Section D ( Open Choice)** | **Total Marks** | **% of (Marks without choice)** | **Consolidated %** |
| K1 | 5 | 4 | | | 9 | 7.5 | **42** |
| K2 | 5 | 6 | 30 | | 41 | 34.1 | |
| K3 | | | 20 | 30 | 50 | 41.7 | **42** |
| K4 | | | | 20 | 20 | 16.7 | **16** |
| Marks | 10 | 10 | 50 | 50 | 120 | 100 | **100** |
| **NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.** | | | | | | | |

## Summative Examinations - Question Paper – Format

| **Section A (Multiple Choice Questions)**<br>**Answer All Questions** | | | **(10x1=10 marks)** |
|---|---|---|---|
| **Q.No** | **CO** | **K Level** | **Questions** |
| 1 | CO1 | K1 | |
| 2 | CO1 | K2 | |
| 3 | CO2 | K1 | |
| 4 | CO2 | K2 | |
| 5 | CO3 | K1 | |
| 6 | CO3 | K2 | |
| 7 | CO4 | K1 | |
| 8 | CO4 | K2 | |
| 9 | CO5 | K1 | |
| 10 | CO5 | K2 | |
| **Section B (Short Answers)**<br>**Answer All Questions** | | | **(5x2=10 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 11 | CO1 | K1 | |
| 12 | CO2 | K1 | |
| 13 | CO3 | K2 | |
| 14 | CO4 | K2 | |
| 15 | CO5 | K2 | |
| **Section C (Either/Or Type)**<br>**Answer All Questions** | | | **(5 x 5 = 25 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 16) a | CO1 | K2 | |
| 16) b | CO1 | K2 | |
| 17) a | CO2 | K3 | |
| 17) b | CO2 | K3 | |
| 18) a | CO3 | K2 | |
| 18) b | CO3 | K2 | |
| 19) a | CO4 | K3 | |
| 19) b | CO4 | K3 | |
| 20) a | CO5 | K2 | |
| 20) b | CO5 | K2 | |
| **NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels** | | | |
| **Section D (Open Choice)**<br>**Answer Any Three questions** | | | **(3x10=30 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 21 | CO1 | K3 | |
| 22 | CO2 | K4 | |
| 23 | CO3 | K3 | |
| 24 | CO4 | K4 | |
| 25 | CO5 | K3 | |

**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**
**DEPARTMENT OF COMPUTER SCIENCE**
**(For those who joined in 2021-2022 and after)**

| | | | | |
|---|---|---|---|---|
| **Course Name** | **PROGRAMMING IN PHP LAB** | | | |
| **Course Code** | **21UCSSP4** | **L** | **P** | **C** |
| **Category** | **Skill** | - | 2 | 2 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Nature of course:** | **EMPLOYABILITY** | ✓ | **SKILL ORIENTED** | ✓ | **ENTREPRENEURSHIP** | ✓ |

**Course objectives:**

- To understand the principles of creating an effective dynamic web page, including the consideration of information architecture.
- To Understanding of server side scripting with PHP language.
- To develop an ability to design and implement static and dynamic website
- To Learn basics of database driven web applications
- To practice to configure the Apache webserver to run the web applications

| S. No. | List of Programs | Hours |
|---|---|---|
| 1. | Write a PHP Program to display message | 30 |
| 2. | Write a PHP Program to perform Arithmetic Operation | |
| 3. | Write a PHP Program to perform String Operation | |
| 4. | Write a PHP Program to validate Name, Email and Password and display error messages. | |
| 5. | Write a PHP Program to insert a record in MySQL Database. | |
| 6. | Write a PHP Program to view the record in database | |
| 7. | Write a PHP Program to sort a record by using Order By clause | |
| 8. | Write a PHP Program to delete and update a record in MySQL | |
| 9. | Write a PHP program to start a PHP Session. | |
| 10. | Write a PHP program to display current date-time. | |
| 11. | Write a PHP Program to perform include Function | |
| | **Total Hours** | **30** |

**Web Resources:**

1. https://www.javatpoint.com/php-programs
2. https://www.w3schools.com/php/php_examples.asp
3. https://www.geeksforgeeks.org/php/

| COURSE OUTCOMES: | | K Level |
|---|---|---|
| At the end of the course the students will be able to | | |
| CO1 | Defining dynamic web pages with good aesthetic sense of designing and latest technical know-how's. | Upto K2 |
| CO2 | Summarizing various database tasks by applying MYSQL database tool | Upto K2 |
| CO3 | Determining the insights of PHP programming tools and implement complete application over the web. | Upto K2 |
| CO4 | Examining the important PHP functions for designing dynamic web pages and communicate database using MYSQL. | Upto K2 |
| CO5 | Experimenting well-formed web documents and implement web service using apache Web Server | Upto K2 |

**CO & PO Mapping:**

| COS | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 |
|---|---|---|---|---|---|---|
| CO 1 | 2 | 3 | 1 | 2 | 2 | 2 |
| CO 2 | 3 | 2 | 2 | 3 | 2 | 3 |
| CO 3 | 1 | 3 | 3 | 2 | 3 | 3 |
| CO 4 | 3 | 2 | 2 | 2 | 3 | 2 |
| CO5 | 2 | 3 | 2 | 3 | 1 | 3 |

***3 –** Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

## LESSONPLAN

| S. No. | List of Programs | Hrs | Mode |
|---|---|---|---|
| 1.<br>2.<br>3.<br>4.<br>5.<br>6.<br>7.<br>8.<br>9.<br>10.<br>11 | Write a PHP Program to display message<br>Write a PHP Program to perform Arithmetic Operation<br>Write a PHP Program to perform String Operation<br>Write a PHP Program to validate Name, Email and Password and display error messages.<br>Write a PHP Program to insert a record in MySQL Database.<br>Write a PHP Program to view the record in database<br>Write a PHP Program to sort a record by using Order By clause<br>Write a PHP Program to delete and update a record in MySQL<br>Write a PHP program to start a PHP Session.<br>Write a PHP program to display current date-time.<br>Write a PHP Program to perform include Function | **30** | **Black Board, Lab Demonstration and LCD Projector.** |

Course Designed by **: Dr. S.Veerapandi & Dr. S. Shaik Parveen**

**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**
**DEPARTMENT OF COMPUTER SCIENCE**
**(For those who joined in 2021-2022 and after)**

| | | | | |
|---|---|---|---|---|
| **Course Name** | **WEB DEVELOPMENT** | | | |
| **Course Code** | **21UCSN41** | **L** | **P** | **C** |
| **Category** | **Non Major Elective Course** | 2 | - | 2 |

| | | | | |
|---|---|---|---|---|
| **Nature of Course:** | **EMPLOYABILITY** | **SKILL ORIENTED** | ✓ | **ENTREPRENEURSHIP** |

**Course Objectives:**

- Understand the concepts of Internet & Networking
- Comprehend the concepts of Internet Technologies
- Apply HTML basic concepts to design a static web site
- Apply some advanced HTML tags to improve the web appearance.
- Understand the Frame concepts to divide the web page

| | | |
|---|---|---|
| **Unit: I** | **INTERNET BASICS - I** | **6 Hours** |

Introduction to the Internet - Computers in Business, Networking, Internet, E-mail, Resource Sharing, Gopher, World Wide Web, Usenet, Telnet, Bulletin Board Service, Wide Area Information Service.

| | | |
|---|---|---|
| **Unit: II** | **INTERNET BASICS - 2** | **6 Hours** |

Internet Technologies - Modem, Internet Addressing, Physical Connections, Telephone Lines - Internet Browsers : Internet Explorer, Netscape Navigator and Google Chrome

| | | |
|---|---|---|
| **Unit: III** | **HTML - I** | **6 Hours** |

Introduction to HTML - History of HTML, HTML Documents, Anchor Tag, Hyper Links - Head and Body Sections - Header Section - Title, Prologue, Links, Colorful Web Page, Comment Lines.

| | | |
|---|---|---|
| **Unit: IV** | **HTML - 2** | **6 Hours** |

Designing the Body Section - Heading Printing, Aligning the Headings, Horizontal Rule, Paragraph, Tab Settings, Lists, Unordered Lists, Ordered Lists.

| | | |
|---|---|---|
| **Unit: V** | **HTML - 3** | **6 Hours** |

Table Handling Tables, Tables Creation in HTML - #Frames# – Frameset Definition, Frame Definition, Nested Framesets.

| | | |
|---|---|---|
| | **Total Lecture Hours** | **30 Hrs** |

**Books for Study:**

**1. C. Xavier, World Wide Web Design with HTML, TMH, 19th Reprint, 2008.**

UNIT I : Chapter 1 Sections 1.1 - 1.11
UNIT II : Chapters 2 Sections 2.1 – 2.4, 3.1, 3.2
UNIT III : Chapters 4 Sections 4.1 – 4.6, 5.1 – 5.6
UNIT IV : Chapters 6 Sections 6.1 – 6.5, 7.1 – 7.4
UNIT V : Chapters 8 Sections 8.1 – 8.3, 10.1 – 10.3

**Books for References:**

1. Thomas A. Powell, HTML& XHTML, TMH, Fourth Edition, Thirteenth Reprint, 2007.
2. N.P. Gopalan and J. Akilandeswari, Web Technology A Developer's Perspective, PHI, Second Printing, July 2008.

**Web Resources:**

1. https://www.w3schools.com/html/
2. https://edu.gcfglobal.org/en/internetbasics/

| Course Outcomes | | K Level |
|---|---|---|
| At the end of the course the students will be able to | | |
| CO1: | Remember concepts of Internet Technologies | K2 |
| CO2: | Know the uses of text formatting tags | K2 |
| CO3: | Understand usage List and tables tags | K2 |
| CO4: | Understand the concepts of Table Tags | K2 |
| CO5: | Understand the usage Frame and Frameset Tags | K2 |

**CO & PO Mapping:**

| COS | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 |
|---|---|---|---|---|---|---|
| CO 1 | 2 | 3 | 3 | 3 | 3 | 2 |
| CO 2 | 2 | 2 | 3 | 2 | 3 | 3 |
| CO 3 | 3 | 2 | 3 | 2 | 3 | 3 |
| CO 4 | 3 | 3 | 3 | 3 | 2 | 3 |
| CO5 | 2 | 2 | 2 | 3 | 2 | 3 |

***3 –** Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

## LESSON PLAN

| Unit | WEB DESIGN | Hrs | Pedagogy |
|---|---|---|---|
| I | Introduction to the Internet - Computers in Business, Networking, Internet, E-mail, Resource Sharing, Gopher, World Wide Web, Usenet, Telnet, Bulletin Board Service, Wide Area Information Service. | 6 | Chalk & Talk, ICT Kit |
| II | Internet Technologies - Modem, Internet Addressing, Physical Connections, Telephone Lines - Internet Browsers : Internet Explorer, Netscape Navigator and Google Chrome. | 6 | Chalk & Talk, ICT Kit |
| III | Introduction to HTML - History of HTML, HTML Documents, Anchor Tag, Hyper Links - Head and Body Sections - Header Section - Title, Prologue, Links, Colorful Web Page, Comment Lines. | 6 | Chalk & Talk, ICT Kit |
| IV | Designing the Body Section - Heading Printing, Aligning the Headings, Horizontal Rule, Paragraph, Tab Settings, Lists, Unordered Lists, Ordered Lists. | 6 | Chalk & Talk, ICT Kit |
| V | Table Handling Tables, Tables Creation in HTML .Frames, Frameset Definition, Frame Definition, Nested Framesets. | 6 | Chalk & Talk, ICT Kit |

Course Designed by: **Mr.S.Veerapandi & Mrs. J. Anitha Gracy**


FIFTH SEMESTER

**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**
**DEPARTMENT OF COMPUTER SCIENCE**
**(For those who joined in 2021-2022 and after)**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Course Name** | **ADVANCED JAVA PROGRAMMING** | | | | | | | |
| **Course Code** | **21UCSC51** | | | | | **L** | **P** | **C** |
| **Category** | **Core** | | | | | 6 | - | 4 |
| **Nature of course:** | **EMPLOYABILITY** | ✓ | **SKILL ORIENTED** | ✓ | **ENTREPRENURSHIP** | | | ✓ |

**Course Objectives:**

- To know the real time usage of JDBC
- To understand basic concepts of servlet and JSP
- To understand importance of RMI
- To develop skills to apply to real time environment
- To get knowledge of Java Annotation Processors and Java Agent Basics

| **Unit: I** | **Classes and Interfaces** | **18** |
|---|---|---|

Classes and Interfaces: Introduction –Interfaces – marker Interfaces –Functional interfaces, default and static methods – Abstract classes – Immutable classes – Anonymous classes – Visibility – Inheritance and Multiple Inheritance – Encapsulation – Final classes and methods.

| **Unit: II** | **Methods and General Programming Guidelines** | **18** |
|---|---|---|

Methods: Method Signatures – Methods body – Method overloading and overriding – Inlining – Recursion – Method References – Immutability

| **Unit: III** | **Exceptions & Thread and Thread Groups** | **18** |
|---|---|---|

Exceptions: Exceptions and when to use – Checked and unchecked exceptions – using try –with-resources – Exceptions and lambdas – Standard Java exceptions . Threads and Thread Groups – Concurrency, synchronization and Immutability

| **Unit: IV** | **Dynamics Language Support and API** | **18** |
|---|---|---|

Dynamics languages support: Dynamic Languages Support – Scripting API - JavaScript on JVM – Groovy on JVM – Ruby on JVM – Python on JVM – Using Scripting API.

| **Unit: V** | **Java Annotation Processors and Java Agent Basics** | **18** |
|---|---|---|

Java Compiler API: Java Compiler API – Annotation Processors – Element Scanners – Java Compiler Tree API.

| | **Total Lecture Hours** | **90 Hrs** |
|---|---|---|

**Books for Study:**

1. ANDRIY REDKO ADVANCED JAVA Preparing you for Java Mastery
   Unit – I - Chapters: 3 - 3.1 to 3.13

| |
|---|
| Unit – II - Chapters: 6 - 6.1 to 6.9<br>Unit – III - Chapters: 8 - 8.1 to 8.6<br>- Chapters: 9 - 9.1 to 9.3<br>Unit – IV - Chapters: 12 - 12.1 to 12.8<br>Unit – V - Chapters: 13 - 13.1 to 13.5 |
| **Books for References:** |
| 1. **Uttam K. roy " Advanced Java Programming, OXFORD Publishers**<br>2. **A.A. Puntambekar " Advanced Java Programming , TECHNICAL PUBLICATIONS** |
| **Web Resources:** |
| **1. https://www.javatpoint.com/advanced-java-books-in-2021**<br>**2. https://www.javacodegeeks.com/2015/09/advanced-java.html** |

| **Course Outcomes** | | |
|---|---|---|
| **CO1:** | Summarize the classes and Interfaces in advanced JAVA | **K3** |
| **CO2:** | Develop and understand the methods , Strings and immutability | **K3** |
| **CO3:** | Apply the concepts of Exceptions and Thread Groups | **K3** |
| **CO4:** | Implement the Dynamics language support and getting more knowledge of API | **K4** |
| **CO5:** | Put in practice Java agent and learn a java annotation processors | **K4** |

**CO & PO Mapping:**

| COS | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 |
|---|---|---|---|---|---|---|
| CO 1 | 3 | 2 | 2 | 2 | 2 | 3 |
| CO 2 | 1 | 3 | 2 | 2 | 3 | 3 |
| CO 3 | 3 | 1 | 3 | 2 | 2 | 3 |
| CO 4 | 2 | 3 | 2 | 3 | 1 | 3 |
| CO5 | 2 | 3 | 3 | 2 | 1 | 3 |

***3 –** Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

## LESSON PLAN

| Unit | Advanced Java Programming | Hrs | Pedagogy |
|---|---|---|---|
| I | Classes and Interfaces: Introduction –Interfaces – marker Interfaces – Functional interfaces, default and static methods – Abstract classes – Immutable classes – Anonymous classes – Visibility – Inheritance and Multiple Inheritance – Encapsulation – Final classes and methods | 15 | Lecture, Chalk, PPT, ICT |
| II | Methods: Method Signatures – Methods body – Method overloading and overriding – Inlining – Recursion – Method References – Immutability | 15 | Lecture, Chalk, PPT, ICT |
| III | Exceptions: Exceptions and when to use – Checked and unchecked exceptions – using try –with- resources – Exceptions and lambdas – Standard Java exceptions . Threads and Thread Groups – Concurrency, synchronization and Immutability | 15 | Lecture, Chalk, PPT, ICT |
| IV | Dynamics languages support: Dynamic Languages Support – Scripting API - JavaScript on JVM – Groovy on JVM – Ruby on JVM – Python on JVM – Using Scripting API. | 15 | Lecture, Chalk, PPT, ICT |
| V | Java Compiler API: Java Compiler API – Annotation Processors – Element Scanners – Java Compiler Tree API.. | 15 | Lecture, Chalk, PPT, ICT |

**Course Designed by: Mr.J.Rajkumar& Dr.S,Veerapandi**

**Learning Outcome Based Education & Assessment (LOBE)**
**Formative Examination - Blue Print**
**Articulation Mapping – K Levels with Course Outcomes (COs)**

| Internal | Cos | K Level | Section A MCQs | | Section B Short Answers | | Section C Either or Choice | Section D Open Choice |
|---|---|---|---|---|---|---|---|---|
| | | | No. of. Questions | K - Level | No. of. Questions | K - Level | | |
| CI AI | CO1 | K3 | 2 | K1,K2 | 1 | K2 | 2(K3,K3) | 1(K3) |
| | CO2 | K3 | 2 | K1,K2 | 2 | K2 | 2(K3,K3) | 1(K3) |
| CI AII | CO3 | K3 | 2 | K1,K2 | 1 | K2 | 2(K3,K3) | 1(K3) |
| | CO4 | K4 | 2 | K1,K2 | 2 | K2 | 2(K4,K4) | 1(K4) |
| Question Pattern CIA I & II | | No. of Questions to be asked | 4 | | 3 | | 4 | 2 |
| | | No. of Questions to be answered | 4 | | 3 | | 2 | 1 |
| | | Marks for each question | 1 | | 2 | | 5 | 10 |
| | | Total Marks for each section | 4 | | 6 | | 10 | 10 |

| Distribution of Marks with K Level CIA I & CIA II | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **K Level** | **Section A (Multiple Choice Questions)** | **Section B (Short Answer Questions)** | **Section C (Either / Or Choice)** | **Section D (Open Choice)** | **Total Marks** | **% of (Marks without choice)** | **Consolidate of %** |
| **CIA I** | **K1** | 2 | | - | - | 2 | 4 | 20 |
| | **K2** | 2 | 6 | - | - | 8 | 16 | |
| | **K3** | - | - | 20 | 20 | 40 | 80 | 80 |
| | **K4** | - | - | - | - | - | | |
| | **Marks** | 4 | 6 | 20 | 20 | 50 | 100 | **100** |
| **CIA II** | **K1** | 2 | | - | - | 2 | 4 | 20 |
| | **K2** | 2 | 6 | - | - | 8 | 16 | |
| | **K3** | - | - | 10 | 10 | 20 | 40 | 40 |
| | **K4** | - | - | 10 | 10 | 20 | 40 | 40 |
| | **Marks** | 4 | 6 | 20 | 20 | 50 | | **100** |

**K1**- Remembering and recalling facts with specific answers
**K2**- Basic understanding of facts and stating main ideas with general answers
**K3**- Application oriented- Solving Problems
**K4**- Examining, analyzing, presentation and make inferences with evidences
**CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.**

| Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **S. No** | **COs** | **K - Level** | **MCQs** | | **Short Answers** | | **Section C (Either / or Choice)** | **Section D (Open Choice)** |
| | | | **No. of Questions** | **K – Level** | **No. of Question** | **K – Level** | | |
| 1 | CO1 | **K3** | **2** | **K1,K2** | **1** | **K2** | **2(K3,K3)** | **1(K3)** |
| 2 | CO2 | **K3** | **2** | **K1,K2** | **1** | **K2** | **2(K3,K3)** | **1(K3)** |
| 3 | CO3 | **K3** | **2** | **K1,K2** | **1** | **K2** | **2(K3,K3)** | **1(K3)** |
| 4 | CO4 | **K4** | **2** | **K1,K2** | **1** | **K2** | **2(K4,K4)** | **1(K4)** |
| 5 | CO5 | **K4** | **2** | **K1,K2** | **1** | **K2** | **2(K4,K4)** | **1(K4)** |
| No. of Questions to be Asked | | | **10** | | **5** | | **10** | **5** |
| No. of Questions to be answered | | | **10** | | **5** | | **5** | **3** |
| Marks for each question | | | **1** | | **2** | | **5** | **10** |
| Total Marks for each section | | | **10** | | **10** | | **25** | **30** |
| **(Figures in parenthesis denotes, questions should be asked with the given K level)** | | | | | | | | |

| Distribution of Marks with K Level | | | | | | | |
|---|---|---|---|---|---|---|---|
| **K Level** | **Section A (Multiple Choice Questions)** | **Section B (Short Answer Questions)** | **Section C (Either/ or Choice)** | **Section D ( Open Choice)** | **Total Marks** | **% of (Marks without choice)** | **Consolidated %** |
| K1 | 5 | | - | - | 5 | 4.17 | 17 |
| K2 | 5 | 10 | - | - | 15 | 12.5 | |
| K3 | - | - | 30 | 30 | 60 | 50 | 50 |
| K4 | - | - | 20 | 20 | 40 | 33.33 | 33 |
| Marks | 10 | 10 | 50 | 50 | 120 | 100 | 100 |
| **NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.** | | | | | | | |

## Summative Examinations - Question Paper – Format

| **Section A (Multiple Choice Questions)**<br>**Answer All Questions** | | | **(10x1=10 marks)** |
|---|---|---|---|
| **Q. No** | **CO** | **K Level** | **Questions** |
| 1 | CO1 | K1 | |
| 2 | CO1 | K2 | |
| 3 | CO2 | K1 | |
| 4 | CO2 | K2 | |
| 5 | CO3 | K1 | |
| 6 | CO3 | K2 | |
| 7 | CO4 | K1 | |
| 8 | CO4 | K2 | |
| 9 | CO5 | K1 | |
| 10 | CO5 | K2 | |
| **Section B (Short Answers)**<br>**Answer All Questions** | | | **(5x2=10 marks)** |
| **Q. No** | **CO** | **K Level** | **Questions** |
| 11 | CO1 | K2 | |
| 12 | CO2 | K2 | |
| 13 | CO3 | K2 | |
| 14 | CO4 | K2 | |
| 15 | CO5 | K2 | |
| **Section C (Either/Or Type)**<br>**Answer All Questions** | | | **(5 x 5 = 25 marks)** |
| **Q. No** | **CO** | **K Level** | **Questions** |
| 16) a | CO1 | K3 | |
| 16) b | CO1 | K3 | |
| 17) a | CO2 | K3 | |
| 17) b | CO2 | K3 | |
| 18) a | CO3 | K3 | |
| 18) b | CO3 | K3 | |
| 19) a | CO4 | K4 | |
| 19) b | CO4 | K4 | |
| 20) a | CO5 | K4 | |
| 20) b | CO5 | K4 | |
| **NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels** | | | |
| **Section D (Open Choice)**<br>**Answer Any Three questions** | | | **(3x10=30 marks)** |
| **Q. No** | **CO** | **K Level** | **Questions** |
| 21 | CO1 | K3 | |
| 22 | CO2 | K3 | |
| 23 | CO3 | K3 | |
| 24 | CO4 | K4 | |
| 25 | CO5 | K4 | |

**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**
**DEPARTMENT OF COMPUTER SCIENCE**
**(For those who joined in 2021-2022 and after)**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Course Name** | **DATA COMMUNICATION AND NETWORKING** | | | | | | | |
| **Course Code** | **21UCSC52** | | | | | **L** | **P** | **C** |
| **Category** | **Core** | | | | | 6 | - | 4 |
| **Nature of course:** | **EMPLOYABILITY** | ✓ | **SKILL ORIENTED** | ✓ | **ENTREPRENURSHIP** | | | ✓ |

**Course Objectives:**

- To introduce the fundamental types of computer networks.
- To include learning about computer network organization
- To understand the data communication and computer networks, and gaining practical experience in installation, monitoring, and troubleshooting of current LAN systems.
- To demonstrate the TCP/IP & OSI model merits & demerits.
- To know the role of various protocols in Networking.

| | | |
|---|---|---|
| **Unit: I** | **Introduction:** | 15 |

**Introduction:** Data communications– Networks –Network Types– Protocols and Standards - **Network Models:** Layered tasks – The OSI Model - TCP/IP Protocol Suite.

| | | |
|---|---|---|
| **Unit: II** | **Transmission Media** | 15 |

Transmission Media: Guided media- Unguided media: Wireless-**Wireless WANs**:–Cellular Telephony-Satellite Networks.

| | | |
|---|---|---|
| **Unit: III** | **Data Link Layer: Error Detection and Correction:** | 15 |

Introduction – Block Coding- Linear Block Codes- Cyclic Codes. Codes – Checksum –**Data Link Control:** Framing– Flow and error control-HDLC– Point –To-Point Protocol

| | | |
|---|---|---|
| **Unit: IV** | **Network Layer:** | 15 |

**Network Layer:** IPV4 Addresses- IPV6 Addresses **-Unicast Routing:** Introduction- Unicast Routing Protocols-**Multicast Routing:** Introduction- Multicast Protocols-IGMP.

| | | |
|---|---|---|
| **Unit: V** | **Cryptography and Network Security** | 15 |

**Cryptography and Network Security:** Introduction–Symmetric key Cryptography - Asymmetric key Cryptography, Security Services-Message Confidentiality.

| | | |
|---|---|---|
| | **Total Lecture Hours** | 75 |

**Books for Study:**

1. Behrouz A.Forouzan, Data Communications and Networking, TataMcGraw Hill Education Private Limited, New Delhi, Fourth Edition, 2007.
   Unit I : Chapter 1 – 1.1, 1.2, 1.4 Chapter 2 –2.1- 2.2,2.4
   Unit II : Chapter 7 – 7.1,7.2,7.3 Chapter 16 –16.2,16.3
   Unit III : Chapter 10 –10.1-10.5 Chapter 11 –11.1-11.2,11.6,11.7
   Unit IV : Chapter 19- 19.1,19.2,Chapter 22- 22.3-22.4 Chapter 21- 21.3.
   Unit V : Chapter 30- 30.1,30.2-30.3 Chapter 31-31.1,31.2

**Books for References:**

1. Andrew S.Tanenbaum, Computer Network, Prentice Hall of India, New Delhi, Fifth Edition, 2014.
2. PrakashC.Gupta, Data Communications & Computer Networks, Prentice Hall of India, New Delhi, Third Edition, 2006.

3. William Stallings, Data and Computer Communications, Prentice Hall of India, New Delhi, Seventh Edition, 2004.

**Web Resources:**

1. https://www.journals.elsevier.com/computer-networks
2. https://www.tutorialspoint.com/computer_fundamentals/computer_networking.html
3. https://www.guru99.com/types-of-computer-network.html

| Course Outcomes | | K Level |
|---|---|---|
| CO1: | Explain about building blocks of Computer Network, Components and Transmission media. | K3 |
| CO2: | Demonstrate the Functionalities and Protocols in the layers of ISO/OSI Network Model. | K3 |
| CO3: | Make use of the Data link layer protocols in Error detection and correction. | K3 |
| CO4: | Apply Suitable Routing Strategies for a given network and choose appropriate access control, congestion control and congestion avoidance technique for given Traffic scenario | K4 |
| CO5: | Assess the functions of Application layer Paradigms and Protocols and design for the real time applications. | K4 |

**CO & PO Mapping:**

| COS | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 |
|---|---|---|---|---|---|---|
| CO 1 | 1 | 2 | 2 | 2 | 3 | 3 |
| CO 2 | 2 | 2 | 2 | 2 | 3 | 3 |
| CO 3 | 3 | 1 | 2 | 3 | 2 | 3 |
| CO 4 | 2 | 3 | 2 | 3 | 1 | 3 |
| CO5 | 3 | 3 | 2 | 2 | 1 | 3 |

***3 –** Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

## LESSON PLAN

| UNIT | Data Communication and Networking | Hrs | Mode |
|---|---|---|---|
| I | **Introduction:** Data communications– Networks –Network Types– Protocols and Standards -**Network Models:** Layered tasks – The OSI Model - TCP/IP Protocol Suite. | 15 | Lecture, Chalk, PPT, ICT |
| II | Transmission Media: Guided media- Unguided media: Wireless- **Wireless WANs**:–Cellular Telephony-Satellite Networks. | 15 | Lecture, Chalk, PPT, ICT |
| III | Introduction – Block Coding- Linear Block Codes- Cyclic Codes. Codes – Checksum –**Data Link Control:** Framing– Flow and error control- HDLC– Point –To-Point Protocol | 15 | Lecture, Chalk, PPT, ICT |
| IV | **Network Layer:** IPV4 Addresses- IPV6 Addresses -**Unicast Routing:** Introduction- Unicast Routing Protocols-**Multicast Routing:** Introduction- Multicast Protocols-IGMP. | 15 | Lecture, Chalk, PPT, ICT |
| V | **Cryptography and Network Security:** Introduction–Symmetric key Cryptography - Asymmetric key Cryptography, Security Services- Message Confidentiality. | 15 | Lecture, Chalk, PPT, ICT |

**Course Designed by: Dr.S.Veerapandi & Mr.J.Rajkumar**

**Learning Outcome Based Education & Assessment (LOBE)**
**Formative Examination - Blue Print**
**Articulation Mapping – K Levels with Course Outcomes (COs)**

| Internal | Cos | K Level | Section A | | Section B | | Section C Either or Choice | Section D Open Choice |
|---|---|---|---|---|---|---|---|---|
| | | | MCQs | | Short Answers | | | |
| | | | No. of. Questions | K - Level | No. of. Questions | K - Level | | |
| CI AI | CO1 | K3 | 2 | K1,K2 | 1 | K2 | 2(K3,K3) | 2(K3) |
| | CO2 | K3 | 2 | K1,K2 | 2 | K2 | 2(K3,K3) | 1(K3) |
| CI AII | CO3 | K3 | 2 | K1,K2 | 1 | K2 | 2(K3,K3) | 1(K3) |
| | CO4 | K4 | 2 | K1,K2 | 2 | K2 | 2(K4,K4) | 2(K4) |
| Question Pattern CIA I & II | | No. of Questions to be asked | 4 | | 3 | | 4 | 3 |
| | | No. of Questions to be answered | 4 | | 3 | | 2 | 2 |
| | | Marks for each question | 1 | | 2 | | 5 | 20 |
| | | Total Marks for each section | 4 | | 6 | | 10 | 20 |

| Distribution of Marks with K Level CIA I & CIA II | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **K Level** | **Section A (Multiple Choice Questions)** | **Section B (Short Answer Questions)** | **Section C (Either / Or Choice)** | **Section D (Open Choice)** | **Total Marks** | **% of (Marks without choice)** | **Consolidate of %** |
| **CIA I** | **K1** | 2 | 2 | - | -- | 4 | 6 | **17** |
| | **K2** | 2 | 4 | - | - | 6 | 11 | |
| | **K3** | - | - | 20 | 30 | 50 | 50 | **83** |
| | **K4** | - | - | - | - | - | - | **-** |
| | **Marks** | 4 | 6 | 20 | 30 | 60 | 100 | **100** |
| **CIA II** | **K1** | 2 | 2 | - | -- | 4 | 6 | **17** |
| | **K2** | 2 | 4 | - | - | 6 | 11 | |
| | **K3** | - | - | 10 | 10 | 20 | 33.33 | **33** |
| | **K4** | - | - | 10 | 20 | 30 | 50 | **50** |
| | **Marks** | 4 | 6 | 20 | 30 | 60 | 100 | **100** |

**K1**- Remembering and recalling facts with specific answers
**K2**- Basic understanding of facts and stating main ideas with general answers
**K3**- Application oriented- Solving Problems
**K4**- Examining, analyzing, presentation and make inferences with evidences
**CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.**

| Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **S. No** | **COs** | **K - Level** | **MCQs** | | **Short Answers** | | **Section C (Either / or Choice)** | **Section D (Open Choice)** |
| | | | **No. of Questions** | **K – Level** | **No. of Question** | **K – Level** | | |
| 1 | CO1 | **K3** | **2** | **K1,K2** | **1** | **K2** | **2(K3,K3)** | **1(K3)** |
| 2 | CO2 | **K3** | **2** | **K1,K2** | **1** | **K2** | **2(K3,K3)** | **1(K3)** |
| 3 | CO3 | **K3** | **2** | **K1,K2** | **1** | **K2** | **2(K3,K3)** | **1(K3)** |
| 4 | CO4 | **K4** | **2** | **K1,K2** | **1** | **K2** | **2(K4,K4)** | **1(K4)** |
| 5 | CO5 | **K4** | **2** | **K1,K2** | **1** | **K2** | **2(K4,K4)** | **1(K4)** |
| No. of Questions to be Asked | | | **10** | **K1,K2** | **5** | **K2** | **10** | **5** |
| No. of Questions to be answered | | | **10** | **K1,K2** | **5** | **K2** | **5** | **3** |
| Marks for each question | | | **1** | **K1,K2** | **2** | **K2** | **5** | **10** |
| Total Marks for each section | | | **10** | **K1,K2** | **10** | **K2** | **25** | **30** |
| **(Figures in parenthesis denotes, questions should be asked with the given K level)** | | | | | | | | |

| Distribution of Marks with K Level | | | | | | | |
|---|---|---|---|---|---|---|---|
| **K Level** | **Section A (Multiple Choice Questions)** | **Section B (Short Answer Questions)** | **Section C (Either/ or Choice)** | **Section D ( Open Choice)** | **Total Marks** | **% of (Marks without choice)** | **Consolidated %** |
| K1 | 5 | | - | - | 5 | 4 | **16** |
| K2 | 5 | 10 | - | - | 15 | 12 | |
| K3 | - | - | 30 | 30 | 60 | 50 | **50** |
| K4 | - | - | 20 | 20 | 40 | 34 | **34** |
| Marks | **10** | **10** | **50** | **50** | **120** | **100** | **100** |
| **NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.** | | | | | | | |

## Summative Examinations - Question Paper – Format

| **Section A (Multiple Choice Questions)**<br>**Answer All Questions** | | | **(10x1=10 marks)** |
|---|---|---|---|
| **Q. No** | **CO** | **K Level** | **Questions** |
| 1 | CO1 | K1 | |
| 2 | CO1 | K2 | |
| 3 | CO2 | K1 | |
| 4 | CO2 | K2 | |
| 5 | CO3 | K1 | |
| 6 | CO3 | K2 | |
| 7 | CO4 | K1 | |
| 8 | CO4 | K2 | |
| 9 | CO5 | K1 | |
| 10 | CO5 | K2 | |
| **Section B (Short Answers)**<br>**Answer All Questions** | | | **(5x2=10 marks)** |
| **Q. No** | **CO** | **K Level** | **Questions** |
| 11 | CO1 | K2 | |
| 12 | CO2 | K2 | |
| 13 | CO3 | K2 | |
| 14 | CO4 | K2 | |
| 15 | CO5 | K2 | |
| **Section C (Either/Or Type)**<br>**Answer All Questions** | | | **(5 x 5 = 25 marks)** |
| **Q. No** | **CO** | **K Level** | **Questions** |
| 16) a | CO1 | K3 | |
| 16) b | CO1 | K3 | |
| 17) a | CO2 | K3 | |
| 17) b | CO2 | K3 | |
| 18) a | CO3 | K3 | |
| 18) b | CO3 | K3 | |
| 19) a | CO4 | K4 | |
| 19) b | CO4 | K4 | |
| 20) a | CO5 | K4 | |
| 20) b | CO5 | K4 | |
| **NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels** | | | |
| **Section D (Open Choice)**<br>**Answer Any Three questions** | | | **(3x10=30 marks)** |
| **Q. No** | **CO** | **K Level** | **Questions** |
| 21 | CO1 | K3 | |
| 22 | CO2 | K3 | |
| 23 | CO3 | K3 | |
| 24 | CO4 | K4 | |
| 25 | CO5 | K4 | |

**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**
**DEPARTMENT OF COMPUTER SCIENCE**
**(For those who joined in 2021-2022 and after)**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Course Name** | **JAVA PROGRAMMING LAB** | | | | | | | |
| **Course Code** | **21UCSCP5** | | | | | **L** | **P** | **C** |
| **Category** | **Core** | | | | | - | 6 | 4 |
| **Nature of course:** | **EMPLOYABILITY** | ✓ | **SKILL ORIENTED** | ✓ | **ENTREPRENURSHIP** | | | ✓ |

**Course objectives:**

- To know the real time usage of JDBC
- To understand basic concepts of servlet and JSP
- To understand importance of RMI
- To develop skills to apply to real time environment
- Students will be able to Facilitates experiential learning.

| S. No. | List of Programs | Hours |
|---|---|---|
| 1. | A Program to execute select query using JDBC | 90 |
| 2. | A simple servlet that just generates plain text | |
| 3. | A Program which displays cookie id | |
| 4. | A program for basic arithmetic functions using JSP | |
| 5. | A Program to display a String using JSP | |
| 6. | A program to generates plain text using Java Beans | |
| 7. | A Program on Stock Market using RMI | |
| 8. | Implement an Application that creates your Server using RMI | |
| 9. | Write a Java program to create an Applet that displays student information and also set foreground and backgrounds. | |
| 10. | Write a Java Program to create an applet that scrolls a message from left to right? | |
| 11. | Write a Java program to demonstrate the key event handlers | |
| 12. | Write a Java program to create buttons with different borders? | |
| 13. | Write a servlet program to create a simple servlet and test it? | |
| 14. | Write a Java program to create a bean that display employee name, salary, designation and company? | |
| 15. | write a Java program to implement a JList where we can select multiple courses and display them in Text area | |
| | **Total Hours** | **90** |

**Books for References:**

1. SurabhiKakar " Java Programming", WILEY Edition

**Web Resources:**

1. **https://www.javatpoint.com/java-tutorial**
2. **https://www.geeksforgeeks.org/java/**
3. **https://www.w3schools.com/java/java_getstarted.asp**

| Course Outcomes | | K Level |
|---|---|---|
| **CO1:** | Infer the concepts of JDBC. | **K3** |
| **CO2:** | Summarizing the knowledge of JSP and Java Beans | **K3** |
| **CO3:** | Use the concepts of RMI and its important. | **K3** |
| **CO4:** | Sketch the concepts of Jilts and make good programming skills | **K3** |
| **CO5:** | Implement the concept of java and applying real time environment | **K4** |

**CO & PO Mapping:**

| COS | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 |
|---|---|---|---|---|---|---|
| **CO 1** | **2** | **2** | **3** | **3** | **1** | **3** |
| **CO 2** | **2** | **3** | **2** | **2** | **2** | **3** |
| **CO 3** | **2** | **2** | **3** | **2** | **2** | **3** |
| **CO 4** | **2** | **2** | **1** | **3** | **3** | **3** |
| **CO5** | **2** | **3** | **2** | **1** | **3** | **3** |

***3 –** Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

**LESSONPLAN**

| S. No. | Java Programming Lab | Hours | Mode |
|---|---|---|---|
| | A Program to execute select query using JDBC | 90 | Lab Demonstration and LCD Projector. |
| 1. | A simple servlet that just generates plain text | | |
| 2. | A Program which displays cookie id | | |
| 3. | A program for basic arithmetic functions using JSP | | |
| 4. | A Program to display a String using JSP | | |
| 5. | A program to generates plain text using Java Beans | | |
| 6. | A Program on Stock Market using RMI | | |
| 7. | Implement an Application that creates your Server using RMI | | |
| 8. | Write a Java program to create an Applet that displays student information | | |
| 9. | and also set foreground and backgrounds. | | |
| 10. | Write a Java Program to create an applet that scrolls a message from left to right? | | |
| 11. | Write a Java program to demonstrate the key event handlers | | |
| 12. | Write a Java program to create buttons with different borders? | | |
| 13. | Write a servlet program to create a simple servlet and test it? | | |
| 14. | Write a Java program to create a bean that display employee name, salary, designation and company? | | |
| 15. | write a Java program to implement a JList where we can select multiple courses and display them in Text area | | |
| | **Total Hours** | **90** | |

**Course Designed by: Mr.J.Rajkumar& Dr.S,Veerapandi**

**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**
**DEPARTMENT OF COMPUTER SCIENCE**
**(For those who joined in 2021-2022 and after)**

| | | | | |
|---|---|---|---|---|
| **Course Name** | **OPERATING SYSTEM CONCEPTS** | | | |
| **Course Code** | **21UCSE51** | **L** | **P** | **C** |
| **Category** | **Core Elective** | 5 | - | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Nature of course:** | **EMPLOYABILITY** | ✓ | **SKILL ORIENTED** | ✓ | **ENTREPRENURSHIP** | ✓ |

**Course Objectives:**

- To learn a basic knowledge of Advanced operating systems,
- To provide the users a convenient interface to use the computer system.
- To gain knowledge on Distributed operating system concepts that includes architecture
- To act as an intermediary between the hardware and its users
- To make the users easier to access and use other resources.

| | | |
|---|---|---|
| **Unit: I** | **Introduction and Design approaches** | **15** |

Introduction: Advanced Operating System – Function of an Operating System: Resource Management -User friendliness – Design Approaches: Layered Approach

| | | |
|---|---|---|
| **Unit: II** | **Types of Advanced Operating System** | **15** |

Types of Advanced Operating Systems: Distributed and Multiprocessor operating systems – Database and Real-time operating system

| | | |
|---|---|---|
| **Unit: III** | **Process and Critical Section** | **15** |

Concept of a Process – Process Life Cycle – Serial Processes – Concurrent processes – the Critical Section Problem: Critical Section – A solution to the problem of mutual exclusion – Semaphore

| | | |
|---|---|---|
| **Unit: IV** | **Other Synchronization Problems** | **15** |

Other Synchronization Problems: Monitor - Characteristics of monitors – Advantages Monitors - Serializer – Monitors vs Serializers. Path Expressions: Sequencing – Selection – Concurrency.

| | | |
|---|---|---|
| **Unit: V** | **Distributed Operating System and Remote Procedure Call** | **15** |

Distributed Operating System: Architecture of a Distributed Systems – Issues in Distributed Operating System – The message passing model – Remote Procedure Call.

| | | |
|---|---|---|
| | **Total Lecture Hours** | **75 Hrs** |

**Books for Study:**

1.MukeshSinghal and Niranjan G. Shivaratri, "Advanced Concepts in Operating Systems – Distributed, Database, and Multiprocessor Operating Systems", Tata McGraw-Hill, 2001.

**Books for References:**

1. I.A.Dhotre "Advanced Operating Systems" TECHNICAL PUBLICATIONS
2. MUKESH SINGHAL & NIRANJAN G. SHIVARATRI " Advanced Concepts in Operating Systems", Indian Edition

| Web Resources: | | |
|---|---|---|
| 1.https://www.geeksforgeeks.org/operating-systems/<br>2. https://www.javatpoint.com/latest-operating-systems | | |
| **Course Outcomes** | | **K Level** |
| **CO1:** | Describe the general architecture of computers | **K3** |
| **CO2:** | Describe the structures for operating systems | **K3** |
| **CO3:** | Analyze theory and implementation of processes | **K3** |
| **CO4:** | Understand the high level structure of concepts | **K4** |
| **CO5:** | Understand and get more knowledge of Distributed Operating system and Remote Procedure Call | **K4** |

**CO & PO Mapping:**

| COS | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 |
|---|---|---|---|---|---|---|
| **CO 1** | 1 | 2 | 3 | 2 | 3 | 3 |
| **CO 2** | 2 | 3 | 2 | 2 | 2 | 3 |
| **CO 3** | 3 | 3 | 2 | 2 | 1 | 3 |
| **CO 4** | 3 | 2 | 3 | 1 | 2 | 3 |
| **CO5** | 2 | 2 | 3 | 2 | 2 | 3 |

***3 –** Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

## LESSON PLAN

| Unit | Operating System Concepts | Hrs | Pedagogy |
|---|---|---|---|
| **I** | Introduction: Advanced Operating System – Function of an Operating System: Resource Management -User friendliness – Design Approaches: Layered Approach | 15 | Chalk &Talk, ICT Kit |
| **II** | Types of Advanced Operating Systems: Distributed and Multiprocessor operating systems – Database and Real-time operating system.. | 15 | Chalk &Talk, ICT Kit |
| **III** | Concept of a Process – Process Life Cycle – Serial Processes – Concurrent processes – the Critical Section Problem: Critical Section – A solution to the problem of mutual exclusion – Semaphore | 15 | Chalk &Talk, ICT Kit |
| **IV** | Monitor - Characteristics of monitors – Advantages Monitors - Serializer – Monitors vs Serializers. | 15 | Chalk & Talk, ICT Kit |
| **V** | Distributed Operating System: Architecture of a Distributed Systems – Issues in Distributed Operating System – The message passing model – Remote Procedure Call | 15 | Chalk & Talk, ICT Kit |

**Course Designed by: Mr.J.Rajkumar & Dr.S. Veerapandi**

| Learning Outcome Based Education & Assessment (LOBE)<br>Formative Examination - Blue Print<br>Articulation Mapping – K Levels with Course Outcomes (COs) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Internal** | **Cos** | **K Level** | **Section A** | | **Section B** | | **Section C Either or Choice** | **Section D Open Choice** |
| | | | **MCQs** | | **Short Answers** | | | |
| | | | **No. of. Questions** | **K - Level** | **No. of. Questions** | **K - Level** | | |
| **CI AI** | **CO1** | Up to K3 | 2 | **K1,K2** | 1 | **K2** | **2(K3,K3)** | **1(K3)** |
| | **CO2** | Up to K3 | 2 | **K1,K2** | 2 | **K2** | **2(K3,K3)** | **1(K3)** |
| **CI AII** | **CO3** | Up to K3 | 2 | **K1,K2** | 1 | **K2** | **2(K3,K3)** | **1(K3)** |
| | **CO4** | Up to K4 | 2 | **K1,K2** | 2 | **K2** | **2(K4,K4)** | **1(K4)** |
| **Question Pattern CIA I & II** | | No. of Questions to be asked | **4** | | **3** | | **4** | **2** |
| | | No. of Questions to be answered | **4** | | **3** | | **2** | **1** |
| | | Marks for each question | **1** | | **2** | | **5** | **10** |
| | | Total Marks for each section | **4** | | **6** | | **10** | **10** |

| Distribution of Marks with K Level CIA I & CIA II | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **K Level** | **Section A (Multiple Choice Questions)** | **Section B (Short Answer Questions)** | **Section C (Either / Or Choice)** | **Section D (Open Choice)** | **Total Marks** | **% of (Marks without choice)** | **Consolidate of %** |
| **CIA I** | **K1** | 2 | | - | - | 2 | 4 | 20 |
| | **K2** | 2 | 6 | - | - | 8 | 16 | |
| | **K3** | - | - | 20 | 20 | 40 | 80 | 80 |
| | **K4** | - | - | - | - | - | | |
| | **Marks** | 4 | 6 | 20 | 20 | 50 | 100 | **100** |
| **CIA II** | **K1** | 2 | | - | - | 2 | 4 | 20 |
| | **K2** | 2 | 6 | - | - | 8 | 16 | |
| | **K3** | - | - | 10 | 10 | 20 | 40 | 40 |
| | **K4** | - | - | 10 | 10 | 20 | 40 | 40 |
| | **Marks** | 4 | 6 | 20 | 20 | 50 | | **100** |

**K1**- Remembering and recalling facts with specific answers
**K2**- Basic understanding of facts and stating main ideas with general answers
**K3**- Application oriented- Solving Problems
**K4**- Examining, analyzing, presentation and make inferences with evidences
**CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.**

| Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| S.No | COs | K - Level | MCQs | | Short Answers | | Section C (Either / or Choice) | Section D (Open Choice) |
| | | | No. of Questions | K – Level | No. of Question | K – Level | | |
| 1 | CO1 | K3 | 2 | K1,K2 | 1 | K2 | 2(K3,K3) | 1(K3) |
| 2 | CO2 | K3 | 2 | K1,K2 | 1 | K2 | 2(K3,K3) | 1(K3) |
| 3 | CO3 | K3 | 2 | K1,K2 | 1 | K2 | 2(K3,K3) | 1(K3) |
| 4 | CO4 | K4 | 2 | K1,K2 | 1 | K2 | 2(K4,K4) | 1(K4) |
| 5 | CO5 | K4 | 2 | K1,K2 | 1 | K2 | 2(K4,K4) | 1(K4) |
| No. of Questions to be Asked | | | 10 | | 5 | | 10 | 5 |
| No. of Questions to be answered | | | 10 | | 5 | | 5 | 3 |
| Marks for each question | | | 1 | | 2 | | 5 | 10 |
| Total Marks for each section | | | 10 | | 10 | | 25 | 30 |
| (Figures in parenthesis denotes, questions should be asked with the given K level) | | | | | | | | |

| Distribution of Marks with K Level | | | | | | | |
|---|---|---|---|---|---|---|---|
| K Level | Section A (Multiple Choice Questions) | Section B (Short Answer Questions) | Section C (Either/ or Choice) | Section D ( Open Choice) | Total Marks | % of (Marks without choice) | Consolidated % |
| K1 | 5 | | - | - | 5 | 4.17 | 17 |
| K2 | 5 | 10 | - | - | 15 | 12.5 | |
| K3 | - | - | 30 | 30 | 60 | 50 | 50 |
| K4 | - | - | 20 | 20 | 40 | 33.33 | 33 |
| Marks | 10 | 10 | 50 | 50 | 120 | 100 | 100 |
| NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels. | | | | | | | |

## Summative Examinations - Question Paper – Format

| **Section A (Multiple Choice Questions)**<br>**Answer All Questions** | | | **(10x1=10 marks)** |
|---|---|---|---|
| **Q.No** | **CO** | **K Level** | **Questions** |
| 1 | CO1 | K1 | |
| 2 | CO1 | K2 | |
| 3 | CO2 | K1 | |
| 4 | CO2 | K2 | |
| 5 | CO3 | K1 | |
| 6 | CO3 | K2 | |
| 7 | CO4 | K1 | |
| 8 | CO4 | K2 | |
| 9 | CO5 | K1 | |
| 10 | CO5 | K2 | |
| **Section B (Short Answers)**<br>**Answer All Questions** | | | **(5x2=10 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 11 | CO1 | K2 | |
| 12 | CO2 | K2 | |
| 13 | CO3 | K2 | |
| 14 | CO4 | K2 | |
| 15 | CO5 | K2 | |
| **Section C (Either/Or Type)**<br>**Answer All Questions** | | | **(5 x 5 = 25 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 16) a | CO1 | K3 | |
| 16) b | CO1 | K3 | |
| 17) a | CO2 | K3 | |
| 17) b | CO2 | K3 | |
| 18) a | CO3 | K3 | |
| 18) b | CO3 | K3 | |
| 19) a | CO4 | K4 | |
| 19) b | CO4 | K4 | |
| 20) a | CO5 | K4 | |
| 20) b | CO5 | K4 | |
| **NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels** | | | |
| **Section D (Open Choice)**<br>**Answer Any Three questions** | | | **(3x10=30 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 21 | CO1 | K3 | |
| 22 | CO2 | K3 | |
| 23 | CO3 | K3 | |
| 24 | CO4 | K4 | |
| 25 | CO5 | K4 | |

**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**
**DEPARTMENT OF COMPUTER SCIENCE**
**(For those who joined in 2021-2022 and after)**

| | | | | |
|---|---|---|---|---|
| **Course Name** | **SOFTWARE ENGINEERING** | | | |
| **Course Code** | **21UCSE52** | **L** | **P** | **C** |
| **Category** | **Core Elective** | 5 | - | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Nature of course:** | **EMPLOYABILITY** | ✓ | **SKILL ORIENTED** | ✓ | **ENTREPRENURSHIP** | ✓ |

**Course Objectives:**

- To understand the nature of software development and software life cycle process models, agile software development, SCRUM and other agile practices.
- To explain methods of capturing, specifying, visualizing and analyzing software requirements.
- To understand concepts and principles of software design and user-centric approach and principles of effective user interfaces.
- To know the basics of testing and understanding the concept of software quality assurance and software configuration management process.
- To gain the knowledge of how Analysis, Design, Implementation, Testing and Maintenance Processes are conducted in a software project.

| | | |
|---|---|---|
| **Unit I** | **Introduction to Software Engineering**: | **1**5 |

The Evolving role of Software – Software – The changing Nature of Software – Legacy software. **A Generic View of Process**: Software Engineering-A Process framework-The Capability Maturity Model Integration (CMMI)-**Process Models:** Prescriptive Models -The Waterfall Model – Incremental Process Models– Evolutionary Process Models.

| | | |
|---|---|---|
| **Unit II** | **Requirements Engineering:** | **15** |

Requirements engineering tasks – Initiating the requirements Engineering Process- Eliciting Requirements - Negotiating Requirements – Validating Requirements. **Building the Analysis Models** –Requirement analysis-Scenario-Based Modeling- Flow-Oriented Modeling-Creating a Behavioral Model.

| | | |
|---|---|---|
| **Unit:III** | **Design Engineering**: | **15** |

Design Process and Design Quality-Design Concepts-The Design Model. **Creating an Architectural Design:** Software Architecture-Data Design-Architectural Design-Mapping Data Flow into a Software Architecture.

| | | |
|---|---|---|
| **Unit:IV** | **Testing Strategies:** | **15** |

A strategic approach to Software Testing-Test strategies for Conventional Software- Validation testing –System testing –**Testing Tactics:** Software Testing fundamentals- Black-box and White Box Texting-,White Box Testing, Basic Path testing-Control Structure Testing-Black Box Testing.

| | | |
|---|---|---|
| **Unit:V** | **Estimation:** | **15** |

**Estimation:** Observations on Estimation-Resource-Software Project Estimation-Decomposition Techniques-Empirical Estimation Models-**Quality Management:** Quality Concepts-Software Quality Assurance – Software Reviews-Formal Technical Reviews.

| | | |
|---|---|---|
| | **Total Lecture Hours** | **75 Hrs** |

**Books for Study:**

1. R.S. Pressman, **Software Engineering**: A Practitioner's Approach, McGraw Hill Education (India) Private Limited, Sixth Edition, New Delhi, 2010.

Unit I: Chapter 1-Section 1.1-1.4,
Chapter 2 - Section 2.1-2.3,

| |
|---|
| Chapter 3- Section 3.1-3.4<br>Unit II: Chapter 7- Section 7.2-7.4,7.7,7.8,<br>Chapter 8- Section 8.1,8.5, 8.6, 8.8<br>Unit III: Chapter 9- Section 9.2-9.4,<br>Chapter 10- Section 10.1,10.2,10.4,10.6<br>Unit IV: Chapter 13- Section 13.1, 13.3, 13.5, 13.6,<br>Chapter 14- Section 14.1-14.6<br>Unit V: Chapter 15- Section 15.1,15.3-15.7<br>Chapter 23- Section 23.1,23.4-23.7 |
| **Books for References:** |
| 1. Richard Fairley, SoftwareEngineering,Tata McGraw Hill,2016<br>2. Ian Sommerville, Software Engineering, 8th Edition, Pearson Education, 2008.<br>3. Software Engineering principles and practice- Waman S Jawadekar, The Mc Graw-Hill Companies, 2007. |
| **Web Resources:** |
| 1. **https://www.geeksforgeeks.org/software-engineering/**<br>2. **https://www.guru99.com/software-engineering-tutorial.html**<br>3. **https://www.tutorialride.com/software-engineering/software-engineering-tutorial.html** |

| **Course Outcomes** | | **K Level** |
|---|---|---|
| **CO1:** | Explain about software engineering life cycle and process model in software development. | **K3** |
| **CO2:** | Prepare the SRS, Design document, Project plan of a given software system. | **K3** |
| **CO3:** | Apply Project Management and Requirement analysis, Principles to S/W project development. | **K3** |
| **CO4:** | Analyze the cost estimate and problem complexity using various estimation techniques | **K4** |
| **CO5:** | Assess SQA in software projects through various testing strategies with product metrics. | **K4** |

**CO & PO Mapping:**

| COS | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 |
|---|---|---|---|---|---|---|
| CO 1 | 3 | 1 | 2 | 2 | 3 | 3 |
| CO 2 | 2 | 2 | 3 | 2 | 2 | 3 |
| CO 3 | 2 | 1 | 3 | 3 | 2 | 3 |
| CO 4 | 2 | 3 | 2 | 2 | 2 | 3 |
| CO5 | 1 | 3 | 2 | 2 | 3 | 3 |

***3 –** Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

## LESSON PLAN

| Unit | Software Engineering | Hrs | Pedagogy |
|---|---|---|---|
| I | **Introduction to Software Engineering**: The Evolving role of Software Software, The changing Nature of Software Legacy software **A Generic View of Process**: Software Engineering A Process framework The Capability Maturity Model Integration (CMMI) **Process Models:** Prescriptive Models, The Waterfall Model , Incremental Process Models, Evolutionary Process Models. | 15 | **Chalk & Talk, ICT Kit** |
| II | **Requirements Engineering:** Requirements engineering tasks, Initiating the requirements Engineering Process, Eliciting Requirements, Negotiating Requirements, Validating Requirements. **Building the Analysis Models** –Requirement analysis, Scenario-Based Modeling, Flow-Oriented Modeling, Creating a Behavioral Model. | 15 | **Chalk & Talk, ICT Kit** |
| III | **Design Engineering**: Design Process and Design Quality, Design Concepts-The Design Model, **Creating an Architectural Design:** Software Architecture,Data Design-Architectural Design, Mapping Data Flow into a Software Architecture. | 15 | **Chalk & Talk, ICT Kit** |
| IV | **Testing Strategies:** A strategic approach to Software Testing, Test strategies for Conventional Software, Validation testing , System testing **Testing Tactics:** Software Testing fundamentals, Black-box and White Box Texting, White Box Testing, Basic Path testing, Control Structure Testing, Black Box Testing. | 15 | **Chalk & Talk, ICT Kit** |
| V | **Estimation:** Observations on Estimation-Resource-Software Project Estimation-Decomposition Techniques-Empirical Estimation Models-**Quality Management:** Quality Concepts-Software Quality Assurance – Software Reviews-Formal Technical Reviews. | 15 | **Chalk &Talk, ICT Kit** |

**Course Designed by: Dr.S.Veerapandi &Mr.J.Rajkumar**

| Learning Outcome Based Education & Assessment (LOBE)<br>Formative Examination - Blue Print<br>Articulation Mapping – K Levels with Course Outcomes (COs) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Internal | Cos | K Level | Section A | | Section B | | Section C Either or Choice | Section D Open Choice |
| | | | MCQs | | Short Answers | | | |
| | | | No. of. Questions | K - Level | No. of. Questions | K - Level | | |
| CI AI | CO1 | Up to K3 | 2 | K1,K2 | 1 | K2 | 2(K3,K3) | 1(K3) |
| | CO2 | Up to K3 | 2 | K1,K2 | 2 | K2 | 2(K3,K3) | 1(K3) |
| CI AII | CO3 | Up to K3 | 2 | K1,K2 | 1 | K2 | 2(K3,K3) | 1(K3) |
| | CO4 | Up to K4 | 2 | K1,K2 | 2 | K2 | 2(K4,K4) | 1(K4) |
| Question Pattern CIA I & II | | No. of Questions to be asked | 4 | | 3 | | 4 | 2 |
| | | No. of Questions to be answered | 4 | | 3 | | 2 | 1 |
| | | Marks for each question | 1 | | 2 | | 5 | 10 |
| | | Total Marks for each section | 4 | | 6 | | 10 | 10 |

| Distribution of Marks with K Level CIA I & CIA II | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | K Level | Section A (Multiple Choice Questions) | Section B (Short Answer Questions) | Section C (Either / Or Choice) | Section D (Open Choice) | Total Marks | % of (Marks without choice) | Consolidate of % |
| CIA I | K1 | 2 | | - | - | 2 | 4 | 20 |
| | K2 | 2 | 6 | - | - | 8 | 16 | |
| | K3 | - | - | 20 | 20 | 40 | 80 | 80 |
| | K4 | - | - | - | - | - | | |
| | Marks | 4 | 6 | 20 | 20 | 50 | 100 | **100** |
| CIA II | K1 | 2 | | - | - | 2 | 4 | 20 |
| | K2 | 2 | 6 | - | - | 8 | 16 | |
| | K3 | - | - | 10 | 10 | 20 | 40 | 40 |
| | K4 | - | - | 10 | 10 | 20 | 40 | 40 |
| | Marks | 4 | 6 | 20 | 20 | 50 | | **100** |

**K1**- Remembering and recalling facts with specific answers
**K2**- Basic understanding of facts and stating main ideas with general answers
**K3**- Application oriented- Solving Problems
**K4**- Examining, analyzing, presentation and make inferences with evidences
**CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.**

| Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| S.No | COs | K - Level | MCQs | | Short Answers | | Section C (Either / or Choice) | Section D (Open Choice) |
| | | | No. of Questions | K – Level | No. of Question | K – Level | | |
| 1 | CO1 | **K3** | **2** | **K1,K2** | **1** | **K2** | **2(K3,K3)** | **1(K3)** |
| 2 | CO2 | **K3** | **2** | **K1,K2** | **1** | **K2** | **2(K3,K3)** | **1(K3)** |
| 3 | CO3 | **K3** | **2** | **K1,K2** | **1** | **K2** | **2(K3,K3)** | **1(K3)** |
| 4 | CO4 | **K4** | **2** | **K1,K2** | **1** | **K2** | **2(K4,K4)** | **1(K4)** |
| 5 | CO5 | **K4** | **2** | **K1,K2** | **1** | **K2** | **2(K4,K4)** | **1(K4)** |
| No. of Questions to be Asked | | | **10** | | **5** | | **10** | **5** |
| No.of Questions to be answered | | | **10** | | **5** | | **5** | **3** |
| Marks for each question | | | **1** | | **2** | | **5** | **10** |
| Total Marks for each section | | | **10** | | **10** | | **25** | **30** |
| **(Figures in parenthesis denotes, questions should be asked with the given K level)** | | | | | | | | |

| Distribution of Marks with K Level | | | | | | | |
|---|---|---|---|---|---|---|---|
| K Level | Section A (Multiple Choice Questions) | Section B (Short Answer Questions) | Section C (Either/ or Choice) | Section D ( Open Choice) | Total Marks | % of (Marks without choice) | Consolidated % |
| K1 | 5 | | - | - | 5 | 4.17 | 17 |
| K2 | 5 | 10 | - | - | 15 | 12.5 | |
| K3 | - | - | 30 | 30 | 60 | 50 | 50 |
| K4 | - | - | 20 | 20 | 40 | 33.33 | 33 |
| Marks | 10 | 10 | 50 | 50 | 120 | 100 | 100 |
| **NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.** | | | | | | | |

## Summative Examinations - Question Paper – Format

| **Section A (Multiple Choice Questions)**<br>**Answer All Questions** | | | **(10x1=10 marks)** |
|---|---|---|---|
| **Q.No** | **CO** | **K Level** | **Questions** |
| 1 | CO1 | K1 | |
| 2 | CO1 | K2 | |
| 3 | CO2 | K1 | |
| 4 | CO2 | K2 | |
| 5 | CO3 | K1 | |
| 6 | CO3 | K2 | |
| 7 | CO4 | K1 | |
| 8 | CO4 | K2 | |
| 9 | CO5 | K1 | |
| 10 | CO5 | K2 | |
| **Section B (Short Answers)**<br>**Answer All Questions** | | | **(5x2=10 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 11 | CO1 | K2 | |
| 12 | CO2 | K2 | |
| 13 | CO3 | K2 | |
| 14 | CO4 | K2 | |
| 15 | CO5 | K2 | |
| **Section C (Either/Or Type)**<br>**Answer All Questions** | | | **(5 x 5 = 25 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 16) a | CO1 | K3 | |
| 16) b | CO1 | K3 | |
| 17) a | CO2 | K3 | |
| 17) b | CO2 | K3 | |
| 18) a | CO3 | K3 | |
| 18) b | CO3 | K3 | |
| 19) a | CO4 | K4 | |
| 19) b | CO4 | K4 | |
| 20) a | CO5 | K4 | |
| 20) b | CO5 | K4 | |
| **NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels** | | | |
| **Section D (Open Choice)**<br>**Answer Any Three questions** | | | **(3x10=30 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 21 | CO1 | K3 | |
| 22 | CO2 | K3 | |
| 23 | CO3 | K3 | |
| 24 | CO4 | K4 | |
| 25 | CO5 | K4 | |

**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**
**DEPARTMENT OF COMPUTER SCIENCE**
**(For those who joined in 2021-2022 and after)**

| | | | | |
|---|---|---|---|---|
| **Course Name** | **OBJECT ORIENTED ANALYSIS AND DESIGN** | | | |
| **Course Code** | **21UCSE53** | **L** | **P** | **C** |
| **Category** | **Core Elective** | 5 | - | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Nature of course:** | **EMPLOYABILITY** | ✓ | **SKILL ORIENTED** | ✓ | **ENTREPRENURSHIP** | |

**Course Objectives:**

- To understand the Object-based view of Systems
- To introduce various designing techniques and methods for object oriented
- To give clear idea on implementing design with UML diagram
- To inculcate necessary skills to handle complexity in software design
- To perform analysis with real time system

| | | |
|---|---|---|
| **Unit: I** | **OVERVIEW** | **15** |

An overview – Object basics- Objects-Attributes- Object state and properties – Behavior – Methods – Messages – Encapsulation and Information hiding – Class hierarchy – Polymorphism- Object Relationships and Associations – Aggregations- Advanced Topics – Software Development Process-Building a High Quality Software.

| | | |
|---|---|---|
| **Unit: II** | **METHODOLOGY AND UML** | **15** |

Introduction – Survey – Rumbugh, Booch, Jacobson methods –Unified Approach – Introduction to Unified Modeling Language - UML diagrams – Class Diagram – Usecase Diagrams – Dynamic Modeling

| | | |
|---|---|---|
| **Unit: III** | **OBJECT ORIENTED ANALYSIS** | **15** |

Identifying Usecase – Business Object Analysis - Usecase Model – Developing Effective Documentation – Classification: Approaches for Identifying Classes-Noun Phrase Approach-Common Class Pattern Approach-Classes, Responsibilities and Collaborators

| | | |
|---|---|---|
| **Unit: IV** | **OBJECT ORIENTED DESIGN** | **15** |

Object Oriented Design Process – Object Oriented Design Axions – Corollaries – Designing Classes: The Process- Class Visibility – Refining Attributes –Designing Methods and Protocols – Object Store and Persistence – Object Oriented Database Management Systems – User Interface Design as a Creative Process- Designing View Layer Classes.

| | | |
|---|---|---|
| **Unit: V** | **SOFTWARE QUALITY** | **15** |

Quality Assurance Tests– Testing Strategies – Object Orientation Testing – Test cases – Test Plan – Continuous Testing- Myer's Debugging principles - Usability testing – User Satisfaction Test

| | | |
|---|---|---|
| | **Total Lecture Hours** | **75Hrs** |

**Books for Study:**

**1.**Ali Bahrami, "Object Oriented System Development", McGraw Hill International Edition, 2009

**Books for References:**

**1.**Craig Larman, Applying UML and Patterns, 2nd Edition, Pearson, 2002.

2.Grady Booch, James Rumbaugh, Ivar Jacobson, "The Unified Modeling Language User Guide", Addison Wesley Long man, 1999.

3.Bernd Bruegge, Allen H. Dutoit, Object Oriented Software Engineering using UML, Patterns and Java, Pearson 2004

| Web Resources: | |
|---|---|
| 1. https://www.geeksforgeeks.org/object-oriented-analysis-and-design/<br>2. https://www.tutorialspoint.com/object_oriented_analysis_design/index.htm<br>3. https://www.youtube.com/watch?v=m1M8H0jK9Cw | |
| **Course Outcomes** | **K Level** |
| **CO1:** | Design and implement software employing the principles of encapsulation, information hiding, abstraction, and polymorphism, | **K3** |
| **CO2:** | Ability to abstract object-based views for generic software systems. | **K3** |
| **CO3:** | Ability to deliver robust software components | **K3** |
| **CO4:** | Use frameworks, classes, and methods from standard libraries in problem solutions, | **K4** |
| **CO5:** | Ability to analyze and model software specifications. | **K4** |

**CO & PO Mapping:**

| COS | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 |
|---|---|---|---|---|---|---|
| CO 1 | 1 | 2 | 3 | 2 | 3 | 3 |
| CO 2 | 3 | 2 | 2 | 2 | 2 | 3 |
| CO 3 | 2 | 3 | 1 | 2 | 2 | 3 |
| CO 4 | 1 | 2 | 2 | 3 | 3 | 3 |
| CO5 | 2 | 2 | 3 | 2 | 2 | 3 |

***3 –** Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

## LESSON PLAN

| Unit | Object Oriented Analysis and Design | Hrs | Pedagogy |
|---|---|---|---|
| **I** | **OVERVIEW :** An overview – Object basics- Objects-Attributes-Object state and properties – Behavior – Methods – Messages – Encapsulation and Information hiding – Class hierarchy – Polymorphism- Object Relationships and Associations – Aggregations-Advanced Topics – Software Development Process-Building a High Quality Software. | **15** | Chalk & Talk, ICT Tool |
| **II** | METHODOLOGY AND UML Introduction – Survey – Rumbugh, Booch, Jacobson methods –Unified Approach – Introduction to Unified Modeling Language - UML diagrams – Class Diagram – Usecase Diagrams – Dynamic Modeling. | **15** | Chalk & Talk, ICT Tool |
| **III** | OBJECT ORIENTED ANALYSIS Identifying Usecase – Business Object Analysis - Usecase Model – Developing Effective Documentation – Classification: Approaches for Identifying Classes-Noun Phrase Approach-Common Class Pattern Approach-Classes, Responsibilities and Collaborators | **15** | Chalk & Talk, ICT Tool |
| **IV** | OBJECT ORIENTED DESIGN Object Oriented Design Process – Object Oriented Design Axions – Corollaries – Designing Classes: The Process- Class Visibility – Refining Attributes –Designing Methods and Protocols – Object Store and Persistence – Object Oriented Database Management Systems – User Interface Design as a Creative Process-Designing View Layer Classes. | **15** | Chalk & Talk, ICT Tool |
| **V** | SOFTWARE QUALITY: Quality Assurance Tests– Testing Strategies – Object Orientation Testing – Test cases – Test Plan – Continuous Testing- Myer's Debugging principles - Usability testing – User Satisfaction Test | **15** | Chalk & Talk, ICT Tool |

**Course Designed by: Dr.G.Devika & Mrs.S.Amutha**

| Learning Outcome Based Education & Assessment (LOBE)<br>Formative Examination - Blue Print<br>Articulation Mapping – K Levels with Course Outcomes (COs) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Internal** | **Cos** | **K Level** | **Section A** | | **Section B** | | **Section C Either or Choice** | **Section D Open Choice** |
| | | | **MCQs** | | **Short Answers** | | | |
| | | | **No. of. Questions** | **K - Level** | **No. of. Questions** | **K - Level** | | |
| **CIA I** | **CO1** | Up to K3 | 2 | **K1,K2** | 1 | **K2** | **2(K3,K3)** | **1(K3)** |
| | **CO2** | Up to K3 | 2 | **K1,K2** | 2 | **K2** | **2(K3,K3)** | **1(K3)** |
| **CIA II** | **CO3** | Up to K3 | 2 | **K1,K2** | 1 | **K2** | **2(K3,K3)** | **1(K3)** |
| | **CO4** | Up to K4 | 2 | **K1,K2** | 2 | **K2** | **2(K4,K4)** | **1(K4)** |
| **Question Pattern CIA I & II** | | No. of Questions to be asked | **4** | | **3** | | **4** | **2** |
| | | No. of Questions to be answered | **4** | | **3** | | **2** | **1** |
| | | Marks for each question | **1** | | **2** | | **5** | **10** |
| | | Total Marks for each section | **4** | | **6** | | **10** | **10** |

| Distribution of Marks with K Level CIA I & CIA II | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **K Level** | **Section A (Multiple Choice Questions)** | **Section B (Short Answer Questions)** | **Section C (Either / Or Choice)** | **Section D (Open Choice)** | **Total Marks** | **% of (Marks without choice)** | **Consolidate of %** |
| **CIA I** | **K1** | 2 | | - | - | 2 | 4 | 20 |
| | **K2** | 2 | 6 | - | - | 8 | 16 | |
| | **K3** | - | - | 20 | 20 | 40 | 80 | 80 |
| | **K4** | - | - | - | - | - | | |
| | **Marks** | 4 | 6 | 20 | 20 | 50 | 100 | **100** |
| **CIA II** | **K1** | 2 | | - | - | 2 | 4 | 20 |
| | **K2** | 2 | 6 | - | - | 8 | 16 | |
| | **K3** | - | - | 10 | 10 | 20 | 40 | 40 |
| | **K4** | - | - | 10 | 10 | 20 | 40 | 40 |
| | **Marks** | 4 | 6 | 20 | 20 | 50 | | **100** |

**K1**- Remembering and recalling facts with specific answers
**K2**- Basic understanding of facts and stating main ideas with general answers
**K3**- Application oriented- Solving Problems
**K4**- Examining, analyzing, presentation and make inferences with evidences
**CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.**

| Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| S.No | COs | K - Level | MCQs | | Short Answers | | Section C (Either / or Choice) | Section D (Open Choice) |
| | | | No. of Questions | K – Level | No. of Question | K – Level | | |
| 1 | CO1 | **K3** | **2** | **K1,K2** | **1** | **K2** | **2(K3,K3)** | **1(K3)** |
| 2 | CO2 | **K3** | **2** | **K1,K2** | **1** | **K2** | **2(K3,K3)** | **1(K3)** |
| 3 | CO3 | **K3** | **2** | **K1,K2** | **1** | **K2** | **2(K3,K3)** | **1(K3)** |
| 4 | CO4 | **K4** | **2** | **K1,K2** | **1** | **K2** | **2(K4,K4)** | **1(K4)** |
| 5 | CO5 | **K4** | **2** | **K1,K2** | **1** | **K2** | **2(K4,K4)** | **1(K4)** |
| No. of Questions to be Asked | | | **10** | | **5** | | **10** | **5** |
| No.of Questions to be answered | | | **10** | | **5** | | **5** | **3** |
| Marks for each question | | | **1** | | **2** | | **5** | **10** |
| Total Marks for each section | | | **10** | | **10** | | **25** | **30** |
| **(Figures in parenthesis denotes, questions should be asked with the given K level)** | | | | | | | | |

| Distribution of Marks with K Level | | | | | | | |
|---|---|---|---|---|---|---|---|
| **K Level** | **Section A (Multiple Choice Questions)** | **Section B (Short Answer Questions)** | **Section C (Either/ or Choice)** | **Section D ( Open Choice)** | **Total Marks** | **% of (Marks without choice)** | **Consolidated %** |
| K1 | 5 | | - | - | 5 | 4.17 | 17 |
| K2 | 5 | 10 | - | - | 15 | 12.5 | |
| K3 | - | - | 30 | 30 | 60 | 50 | 50 |
| K4 | - | - | 20 | 20 | 40 | 33.33 | 33 |
| Marks | 10 | 10 | 50 | 50 | 120 | 100 | 100 |
| **NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.** | | | | | | | |

## Summative Examinations - Question Paper – Format

| **Section A (Multiple Choice Questions)**<br>**Answer All Questions** | | | **(10x1=10 marks)** |
|---|---|---|---|
| **Q.No** | **CO** | **K Level** | **Questions** |
| 1 | CO1 | K1 | |
| 2 | CO1 | K2 | |
| 3 | CO2 | K1 | |
| 4 | CO2 | K2 | |
| 5 | CO3 | K1 | |
| 6 | CO3 | K2 | |
| 7 | CO4 | K1 | |
| 8 | CO4 | K2 | |
| 9 | CO5 | K1 | |
| 10 | CO5 | K2 | |
| **Section B (Short Answers)**<br>**Answer All Questions** | | | **(5x2=10 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 11 | CO1 | K2 | |
| 12 | CO2 | K2 | |
| 13 | CO3 | K2 | |
| 14 | CO4 | K2 | |
| 15 | CO5 | K2 | |
| **Section C (Either/Or Type)**<br>**Answer All Questions** | | | **(5 x 5 = 25 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 16) a | CO1 | K3 | |
| 16) b | CO1 | K3 | |
| 17) a | CO2 | K3 | |
| 17) b | CO2 | K3 | |
| 18) a | CO3 | K3 | |
| 18) b | CO3 | K3 | |
| 19) a | CO4 | K4 | |
| 19) b | CO4 | K4 | |
| 20) a | CO5 | K4 | |
| 20) b | CO5 | K4 | |
| **NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels** | | | |
| **Section D (Open Choice)**<br>**Answer Any Three questions** | | | **(3x10=30 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 21 | CO1 | K3 | |
| 22 | CO2 | K3 | |
| 23 | CO3 | K3 | |
| 24 | CO4 | K4 | |
| 25 | CO5 | K4 | |

**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**
**DEPARTMENT OF COMPUTER SCIENCE**
**(For those who joined in 2021-2022 and after)**

| | | | | |
|---|---|---|---|---|
| **Course Name** | **CYBER SECURITY** | | | |
| **Course Code** | **21UCSE54** | **L** | **P** | **C** |
| **Category** | **Elective** | 5 | - | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Nature of course:** | **EMPLOYABILITY** | ✓ | **SKILL ORIENTED** | ✓ | **ENTREPRENURSHIP** | ✓ |

**Course Objectives:**

- To introduce the Essentials of Cyber Security.
- To understanding of cyber crime wireless devices.
- To analyze the security in Digital devices, tools and techniques for cyber security.
- Discuss the fundamental ideas of public-key cryptography.
- To understand the legal perspectives of cyber crime and its organization implications.

| **Unit: I** | **Introduction To Cyber Crime** | **15 Hours** |
|---|---|---|

Introduction to Cybercrime - Introduction· Cybercrime: Definition and Origins of the Word-Cybercrime and Information Security- Who are Cybercriminals? - Classifications of Cybercrimes-Cybercrime: The Legal Perspectives-Cybercrimes: An Indian Perspective-Cybercrime and the Indian ITA 2000-A Global Perspective on Cybercrimes-Cybercrime Era: Survival Mantra for the Netizens.

| **Unit: II** | **Cyber Crime :Mobile and Wireless Devices** | **15 Hours** |
|---|---|---|

Introduction – Proliferation of Mobile and Wireless Devices –Trends in Mobility-Credit Card Frauds in Mobile and Wireless Computing Era-Security Challenges posed by Mobile Devices-Authentication Service Security-attacks on Mobile /Cell phones –Mobile Devices: Security Implications for Organizations.

| **Unit: III** | **Cybercrimes and Cyber security : The Legal Perspectives** | **15 Hours** |
|---|---|---|

Introduction –Proxy servers and Anonymizers – Phishing –Password Cracking- Virus and Worms – Trojan Horses and Backdoors–Dos and DDos Attacks-SQL Injection –Attacks on Wireless Networks.

| **Unit: IV** | **Cybercrimes and Cyber security : The Legal Perspectives** | **15 Hours** |
|---|---|---|

Introduction-Why do we need cyber laws-The Indian IT Act-Challenges to Indian Law and Cybercrime Scenario in India- Digital Signatures and the Indian IT Act-Cyber crime and Punishment –Cyber law, Technology and students: Indian Scenario. Understanding Computer Forensics: Introduction – Digital Forensics Science-Cyberforensics and Digital Evidence-Challenges in Computer Forensics- Special Tools and Techniques.

| **Unit: V** | **Cyber Security : Organizational Implications** | **15 Hours** |
|---|---|---|

Introduction-Cost of Cybercrimes and IPR issues –Security and Privacy implications from cloud computing-Social Media Marketing –Protecting People's Privacy in Organization – Incident Handling –Media and Asset Protection-importance of endpoint security in Organizations.

**Cybercrime**: **Illustrations, Examples and Mini-cases:** Introduction-Real life Examples- Mini-cases-Illustrations of Financial Frauds in Cyber Domain-Digital Signature Related Crime Scenarios.

| | **Total Lecture Hours** | **75 Hrs** |
|---|---|---|

**Books for Study:**

1. Nina Godbole and Sunit Belapore; "Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives", Wiley Publications, 2011.

**Books for References:**

1. Cyber Security Essentials 2011 – James Graham, Richard Howard and Ryan Olson –Auerbach Publications, CRC press, 2011.
2. Cyber Crime Impact in the New Millennium, by R. C Mishra , Auther Press. Edition 2010.
3. Cyber Laws: Intellectual Property & E-Commerce Security by Kumar K, Dominant Publishers.
4. Network Security Bible, Eric Cole, Ronald Krutz, James W. Conley, 2nd Edition, Wiley India Pvt. Ltd

**Web Resources:**

1. https://www.uou.ac.in/sites/default/files/slm/Introduction-cyber-security.pdf
2. https://www.lkouniv.ac.in/site/writereaddata/siteContent/20200413150518205 0sanjana_mal_law_IPR_and_Cyber_law.pdf
3. https://mrcet.com/pdf/Lab%20Manuals/IT/CYBER%20SECURITY%20(R18A0521).pdf
4. https://www.drishtiias.com/pdf/1591476911-cyber-security.pdf
5. https://www.cybok.org/media/downloads/CyBOK-version-1.0.pdf

| Course Outcomes | | K Level |
|---|---|---|
| CO1: | Know the sources of information on cyber crime and crimes in India and its IT Act | K3 |
| CO2: | Understanding security and privacy for mobile and wireless devices | K3 |
| CO3: | Know the sources of cyber threats and impact of threat intelligence along with threat detection methods. | K3 |
| CO4: | Learn and Understand the Indian laws related to cyber security. Understand the concept to managing Forensic Data and Study the Forensic analysis of storage media and web. | K4 |
| CO5: | Know the Security and Privacy implications from cloud computing-Social Media Marketing –Protecting People's Privacy in Organization .Study the money laundering controls by analyzing mini-cases. | K4 |

**CO & PO Mapping:**

| COS | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 |
|---|---|---|---|---|---|---|
| CO 1 | 2 | 2 | 2 | 2 | 3 | 3 |
| CO 2 | 2 | 2 | 3 | 2 | 2 | 3 |
| CO 3 | 2 | 1 | 3 | 3 | 2 | 3 |
| CO 4 | 2 | 3 | 2 | 2 | 2 | 3 |
| CO5 | 1 | 3 | 2 | 2 | 3 | 3 |

***3 –** Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

## LESSON PLAN

| Unit | Cyber Security | Hrs | Pedagogy |
|---|---|---|---|
| I | Introduction to Cybercrime - Introduction· Cybercrime: Definition and Origins of the Word- Cybercrime and Information Security- Who are Cybercriminals? - Classifications of Cybercrimes- Cybercrime: The Legal Perspectives-Cybercrimes: An Indian Perspective-Cybercrime and the Indian ITA 2000-A Global Perspective on Cybercrimes-Cybercrime Era: Survival Mantra for the Netizens. | 15 | Chalk & Talk, ICT Kit |
| II | Introduction – Proliferation of Mobile and Wireless Devices –Trends in Mobility-Credit Card Frauds in Mobile and Wireless Computing Era-Security Challenges posed by Mobile Devices-Authentication Service Security-attacks on Mobile /Cell phones –Mobile Devices: Security Implications for Organizations. | 15 | Chalk & Talk, ICT Kit |
| III | Introduction –Proxy servers and Anonymizers – Phishing –Password Cracking- Virus and Worms –Trojan Horses and Backdoors–Dos and DDos Attacks-SQL Injection –Attacks on Wireless Networks. | 15 | Chalk & Talk, ICT Kit |
| IV | Introduction-Why do we need cyber laws-The Indian IT Act-Challenges to Indian Law and Cybercrime Scenario in India- Digital Signatures and the Indian IT Act-Cyber crime and Punishment –Cyber law, Technology and students: Indian Scenario. Understanding Computer Forensics: Introduction – Digital Forensics Science-Cyberforensics and Digital Evidence-Challenges in Computer Forensics- Special Tools and Techniques | 15 | Chalk & Talk, ICT Kit |
| V | Introduction-Cost of Cybercrimes and IPR issues –Security and Privacy implications from cloud computing-Social Media Marketing –Protecting People's Privacy in Organization – Incident Handling –Media and Asset Protection-importance of endpoint security in Organizations.<br>Cybercrime: Illustrations, Examples and Mini-cases: Introduction-Real life Examples- Mini-cases-Illustrations of Financial Frauds in Cyber Domain-Digital Signature Related Crime Scenarios | 15 | Chalk & Talk, ICT Kit |

**Course Designed by: N.Hemavathi & Mr.M.Selvakumar**

| Learning Outcome Based Education & Assessment (LOBE)<br>Formative Examination - Blue Print<br>Articulation Mapping – K Levels with Course Outcomes (COs) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Internal** | **Cos** | **K Level** | **Section A** | | **Section B** | | **Section C Either or Choice** | **Section D Open Choice** |
| | | | **MCQs** | | **Short Answers** | | | |
| | | | **No. of. Questions** | **K - Level** | **No. of. Questions** | **K - Level** | | |
| **CIAI** | **CO1** | Up to K3 | 2 | **K1,K2** | 1 | **K2** | **2(K3,K3)** | **1(K3)** |
| | **CO2** | Up to K3 | 2 | **K1,K2** | 2 | **K2** | **2(K3,K3)** | **1(K3)** |
| **CIAII** | **CO3** | Up to K3 | 2 | **K1,K2** | 1 | **K2** | **2(K3,K3)** | **1(K3)** |
| | **CO4** | Up to K4 | 2 | **K1,K2** | 2 | **K2** | **2(K4,K4)** | **1(K4)** |
| **Question Pattern CIA I & II** | | No. of Questions to be asked | **4** | | **3** | | **4** | **2** |
| | | No. of Questions to be answered | **4** | | **3** | | **2** | **1** |
| | | Marks for each question | **1** | | **2** | | **5** | **10** |
| | | Total Marks for each section | **4** | | **6** | | **10** | **10** |

| Distribution of Marks with K Level CIA I & CIA II | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **K Level** | **Section A (Multiple Choice Questions)** | **Section B (Short Answer Questions)** | **Section C (Either / Or Choice)** | **Section D (Open Choice)** | **Total Marks** | **% of (Marks without choice)** | **Consolidate of %** |
| **CIA I** | **K1** | 2 | | - | - | 2 | 4 | 20 |
| | **K2** | 2 | 6 | - | - | 8 | 16 | |
| | **K3** | - | - | 20 | 20 | 40 | 80 | 80 |
| | **K4** | - | - | - | - | - | | |
| | **Marks** | 4 | 6 | 20 | 20 | 50 | 100 | **100** |
| **CIA II** | **K1** | 2 | | - | - | 2 | 4 | 20 |
| | **K2** | 2 | 6 | - | - | 8 | 16 | |
| | **K3** | - | - | 10 | 10 | 20 | 40 | 40 |
| | **K4** | - | - | 10 | 10 | 20 | 40 | 40 |
| | **Marks** | 4 | 6 | 20 | 20 | 50 | | **100** |

**K1**- Remembering and recalling facts with specific answers
**K2**- Basic understanding of facts and stating main ideas with general answers
**K3**- Application oriented- Solving Problems
**K4**- Examining, analyzing, presentation and make inferences with evidences
**CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.**

| Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| S.No | COs | K - Level | MCQs | | Short Answers | | Section C (Either / or Choice) | Section D (Open Choice) |
| | | | No. of Questions | K – Level | No. of Question | K – Level | | |
| 1 | CO1 | **K3** | **2** | **K1,K2** | **1** | **K2** | **2(K3,K3)** | **1(K3)** |
| 2 | CO2 | **K3** | **2** | **K1,K2** | **1** | **K2** | **2(K3,K3)** | **1(K3)** |
| 3 | CO3 | **K3** | **2** | **K1,K2** | **1** | **K2** | **2(K3,K3)** | **1(K3)** |
| 4 | CO4 | **K4** | **2** | **K1,K2** | **1** | **K2** | **2(K4,K4)** | **1(K4)** |
| 5 | CO5 | **K4** | **2** | **K1,K2** | **1** | **K2** | **2(K4,K4)** | **1(K4)** |
| No. of Questions to be Asked | | | **10** | | **5** | | **10** | **5** |
| No.of Questions to be answered | | | **10** | | **5** | | **5** | **3** |
| Marks for each question | | | **1** | | **2** | | **5** | **10** |
| Total Marks for each section | | | **10** | | **10** | | **25** | **30** |
| **(Figures in parenthesis denotes, questions should be asked with the given K level)** | | | | | | | | |

| Distribution of Marks with K Level | | | | | | | |
|---|---|---|---|---|---|---|---|
| **K Level** | **Section A (Multiple Choice Questions)** | **Section B (Short Answer Questions)** | **Section C (Either/ or Choice)** | **Section D ( Open Choice)** | **Total Marks** | **% of (Marks without choice)** | **Consolidated %** |
| K1 | 5 | | - | - | 5 | 4.17 | 17 |
| K2 | 5 | 10 | - | - | 15 | 12.5 | |
| K3 | - | - | 30 | 30 | 60 | 50 | 50 |
| K4 | - | - | 20 | 20 | 40 | 33.33 | 33 |
| Marks | 10 | 10 | 50 | 50 | 120 | 100 | 100 |
| **NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.** | | | | | | | |

## Summative Examinations - Question Paper – Format

| **Section A (Multiple Choice Questions)**<br>**Answer All Questions** | | | **(10x1=10 marks)** |
|---|---|---|---|
| **Q.No** | **CO** | **K Level** | **Questions** |
| 1 | CO1 | K1 | |
| 2 | CO1 | K2 | |
| 3 | CO2 | K1 | |
| 4 | CO2 | K2 | |
| 5 | CO3 | K1 | |
| 6 | CO3 | K2 | |
| 7 | CO4 | K1 | |
| 8 | CO4 | K2 | |
| 9 | CO5 | K1 | |
| 10 | CO5 | K2 | |
| **Section B (Short Answers)**<br>**Answer All Questions** | | | **(5x2=10 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 11 | CO1 | K2 | |
| 12 | CO2 | K2 | |
| 13 | CO3 | K2 | |
| 14 | CO4 | K2 | |
| 15 | CO5 | K2 | |
| **Section C (Either/Or Type)**<br>**Answer All Questions** | | | **(5 x 5 = 25 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 16) a | CO1 | K3 | |
| 16) b | CO1 | K3 | |
| 17) a | CO2 | K3 | |
| 17) b | CO2 | K3 | |
| 18) a | CO3 | K3 | |
| 18) b | CO3 | K3 | |
| 19) a | CO4 | K4 | |
| 19) b | CO4 | K4 | |
| 20) a | CO5 | K4 | |
| 20) b | CO5 | K4 | |
| **NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels** | | | |
| **Section D (Open Choice)**<br>**Answer Any Three questions** | | | **(3x10=30 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 21 | CO1 | K3 | |
| 22 | CO2 | K3 | |
| 23 | CO3 | K3 | |
| 24 | CO4 | K4 | |
| 25 | CO5 | K4 | |

**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**
**DEPARTMENT OF COMPUTER SCIENCE**
**(For those who joined in 2021-2022 and after)**

| | | | | |
|---|---|---|---|---|
| **Course Name** | **INTERNET OF THINGS** | | | |
| **Course Code** | **21UCSE55** | **L** | **P** | **C** |
| **Category** | **Core Elective** | 5 | - | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Nature of course:** | **EMPLOYABILITY** | ✓ | **SKILL ORIENTED** | ✓ | **ENTREPRENURSHIP** | ✓ |

**Course Objectives:**

- To understand the communication technologies in IoT .
- To know the IoT protocols and web of things.
- To know the various applications of IoT.
- To understand building blocks of Internet of Things and characteristics.
- To define the infrastructure for supporting IoT deployments.

| | | |
|---|---|---|
| **Unit: I** | Introduction | **15** |

Introduction to Internet of things: Introduction to Internet of things– Definition & Characteristics of IoT - Physical Design of IoT – Things in IoT - IoT protocols. Logical Design of IoT :IoT Functional blocks- IoT communication Models- IoT communication APIs. IoT Enabling Technologies – Wireless Sensor Networks- Cloud Computing- Big data Analysis – Communication Protocols – Embedded systems. IoT Level-1 IoT Level-2 IoT Level -3 IoT Level-4 IoT Level-5 IoT Level -6

| | | |
|---|---|---|
| **Unit: II** | Domain Specific IoTs: | **15** |

Domain Specific IoTs: Introduction – Home Automation- Smart Lighting- Smart Appliances- Intrusion Detection-Smoke/ Gas Detectors. Cities– Smart Parking- Smart Lighting- Smart roads– Structural Health Monitoring – Surveillance – Emergency Response. Environment – Weather Monitoring- Air Pollution Monitoring - Noise Pollution Monitoring - Forest Fire Detection – River Floods Detection- Energy- Retail- Logistics-Agriculture

| | | |
|---|---|---|
| **Unit: III** | IoT and M2M | **15** |

**IoT and M2M :** Introduction – M2M – Difference between IoT and M2M – SDN and NFV for IoT – Software Defined Networking – Network Function Virtualization – **IoT System Management with NETCONF – YANG** – Need for IoT Systems Management – Simple Network Management Protocol (SNMP) – Limitations of SNMP – Network Operator Requirements – NETCONF – YANG – IoT Systems Management with NETCONF – YANG.

| | | |
|---|---|---|
| **Unit: IV** | IoT Design Methodology | **15** |

Introduction - IoT Design Methodology – Introduction – IoT Design Methodology – Purpose &Requirements Specification – Process Specification – Domain Model Specification – Information Model Specification – Service Specifications – IoT Level Specification – Functional View Specifications – Operational View Specifications – Device & Component Integration – Application Development

| | | |
|---|---|---|
| **Unit: V** | Data Analytics for IoT | **15** |

Apache Hadoop-Apache OozeApache SparkApache Storm- Using Apache Storm for Real Time Data analytics

| | | |
|---|---|---|
| | **Total Lecture Hours** | **75 Hrs** |

**Books for Study:**

| |
|---|
| 1.ArshdeepBahga , Vijay Madisetti, Internet of Things - A Hands on Approach University Press (India)Private Limited,New Delhi,2014 |
| **Books for References:** |
| **1.** Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, StamatisKarnouskos, David Boyle, "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1 st Edition, Academic Press, 2014.<br>2. Francis da Costa, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1st Edition, A Press Publications, 2013. |
| **Web Resources:** |
| **1. https://www.edureka.co/blog/iot-tutorial/**<br>**2. https://www.gangboard.com/blog/iot-tutorial/**<br>**3. https://www.cs.ucy.ac.cy/courses/EPL422/slides19/Topic10b-IoT_intro.pdf** |

| **Course Outcomes** | | **K Level** |
|---|---|---|
| **CO1:** | Describe and explain about IoT, Physical and Logical design of IoT, IoT levels, domainspecific IoTs | **K3** |
| **CO2:** | Determine physical and logic design of IoT. | **K3** |
| **CO3:** | Compare Physical and Logical IoT, different levels and domain specific IoTs. | **K3** |
| **CO4:** | Conclude the importance of IoT, Physical and Logical IoT, IoT levels, domain specific IoTs. | **K4** |
| **CO5:** | Design and develop Physical and Logical IoT, IoT deployment templates. | **K4** |

**CO & PO Mapping:**

| COS | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 |
|---|---|---|---|---|---|---|
| CO 1 | 2 | 2 | 3 | 2 | 2 | 3 |
| CO 2 | 1 | 3 | 2 | 2 | 3 | 3 |
| CO 3 | 2 | 2 | 3 | 2 | 2 | 3 |
| CO 4 | 3 | 1 | 3 | 1 | 3 | 3 |
| CO5 | 3 | 3 | 2 | 2 | 1 | 3 |

***3 –** Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

## LESSON PLAN

| Unit | Internet of Things | Hrs | Pedagogy |
|---|---|---|---|
| I | Introduction to Internet of things: Introduction to Internet of things– Definition & Characteristics of IoT - Physical Design of IoT – Things in IoT - IoT protocols. Logical Design of IoT :IoT Functional blocks- IoT communication Models- IoT communication APIs. IoT Enabling Technologies – Wireless Sensor Networks- Cloud Computing- Big data Analysis – Communication Protocols – Embedded systems. IoT Level-1 IoT Level-2 IoT Level -3 IoT Level-4 IoT Level-5 IoT Level -6 | 15 | Chalk&Talk, ICTKit |
| II | IoT and M2M : Introduction – M2M – Difference between IoT and M2M – SDN and NFV for IoT – Software Defined Networking – Network Function Virtualization – IoT System Management with NETCONF – YANG – Need for IoT Systems Management – Simple Network Management Protocol (SNMP) – Limitations of SNMP – Network Operator Requirements – NETCONF – YANG – IoT Systems Management with NETCONF – YANG. | 15 | Chalk&Talk, ICTKit |
| III | IoT and M2M : Introduction – M2M – Difference between IoT and M2M – SDN and NFV for IoT – Software Defined Networking – Network Function Virtualization – IoT System Management with NETCONF – YANG – Need for IoT Systems Management – Simple Network Management Protocol (SNMP) – Limitations of SNMP – Network Operator Requirements – NETCONF – YANG – IoT Systems Management with NETCONF – YANG. | 15 | Chalk&Talk, ICTKit |
| IV | Introduction - IoT Design Methodology – Introduction – IoT Design Methodology – Purpose &Requirements Specification – Process Specification – Domain Model Specification – Information Model Specification – Service Specifications – IoT Level Specification – Functional View Specifications – Operational View Specifications – Device & Component Integration – Application Development | 15 | Chalk&Talk,ICT Kit |
| V | Apache Hadoop-Apache OozeApache SparkApache Storm-Using Apache Storm for Real Time Data analytics | 15 | Chalk&Talk, ICTKit |

**Course Designed by: Dr.G.Devika & Mrs.S.Amutha**

| Learning Outcome Based Education & Assessment (LOBE)<br>Formative Examination - Blue Print<br>Articulation Mapping – K Levels with Course Outcomes (COs) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Internal** | **Cos** | **K Level** | **Section A** | | **Section B** | | **Section C Either or Choice** | **Section D Open Choice** |
| | | | **MCQs** | | **Short Answers** | | | |
| | | | **No. of. Questions** | **K - Level** | **No. of. Questions** | **K - Level** | | |
| **CIAI** | **CO1** | Up to K3 | 2 | **K1,K2** | 1 | **K2** | **2(K3,K3)** | **1(K3)** |
| | **CO2** | Up to K3 | 2 | **K1,K2** | 2 | **K2** | **2(K3,K3)** | **1(K3)** |
| **CIAII** | **CO3** | Up to K3 | 2 | **K1,K2** | 1 | **K2** | **2(K3,K3)** | **1(K3)** |
| | **CO4** | Up to K4 | 2 | **K1,K2** | 2 | **K2** | **2(K4,K4)** | **1(K4)** |
| **Question Pattern CIA I & II** | | No. of Questions to be asked | **4** | | **3** | | **4** | **2** |
| | | No. of Questions to be answered | **4** | | **3** | | **2** | **1** |
| | | Marks for each question | **1** | | **2** | | **5** | **10** |
| | | Total Marks for each section | **4** | | **6** | | **10** | **10** |

| Distribution of Marks with K Level CIA I & CIA II | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **K Level** | **Section A (Multiple Choice Questions)** | **Section B (Short Answer Questions)** | **Section C (Either / Or Choice)** | **Section D (Open Choice)** | **Total Marks** | **% of (Marks without choice)** | **Consolidate of %** |
| **CIA I** | **K1** | 2 | | - | - | 2 | 4 | 20 |
| | **K2** | 2 | 6 | - | - | 8 | 16 | |
| | **K3** | - | - | 20 | 20 | 40 | 80 | 80 |
| | **K4** | - | - | - | - | - | | |
| | **Marks** | 4 | 6 | 20 | 20 | 50 | 100 | **100** |
| **CIA II** | **K1** | 2 | | - | - | 2 | 4 | 20 |
| | **K2** | 2 | 6 | - | - | 8 | 16 | |
| | **K3** | - | - | 10 | 10 | 20 | 40 | 40 |
| | **K4** | - | - | 10 | 10 | 20 | 40 | 40 |
| | **Marks** | 4 | 6 | 20 | 20 | 50 | | **100** |

**K1**- Remembering and recalling facts with specific answers
**K2**- Basic understanding of facts and stating main ideas with general answers
**K3**- Application oriented- Solving Problems
**K4**- Examining, analyzing, presentation and make inferences with evidences
**CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.**

| Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| S.No | COs | K - Level | MCQs | | Short Answers | | Section C (Either / or Choice) | Section D (Open Choice) |
| | | | No. of Questions | K – Level | No. of Question | K – Level | | |
| 1 | CO1 | **K3** | **2** | **K1,K2** | **1** | **K2** | **2(K3,K3)** | **1(K3)** |
| 2 | CO2 | **K3** | **2** | **K1,K2** | **1** | **K2** | **2(K3,K3)** | **1(K3)** |
| 3 | CO3 | **K3** | **2** | **K1,K2** | **1** | **K2** | **2(K3,K3)** | **1(K3)** |
| 4 | CO4 | **K4** | **2** | **K1,K2** | **1** | **K2** | **2(K4,K4)** | **1(K4)** |
| 5 | CO5 | **K4** | **2** | **K1,K2** | **1** | **K2** | **2(K4,K4)** | **1(K4)** |
| No. of Questions to be Asked | | | **10** | | **5** | | **10** | **5** |
| No.of Questions to be answered | | | **10** | | **5** | | **5** | **3** |
| Marks for each question | | | **1** | | **2** | | **5** | **10** |
| Total Marks for each section | | | **10** | | **10** | | **25** | **30** |
| **(Figures in parenthesis denotes, questions should be asked with the given K level)** | | | | | | | | |

| Distribution of Marks with K Level | | | | | | | |
|---|---|---|---|---|---|---|---|
| K Level | Section A (Multiple Choice Questions) | Section B (Short Answer Questions) | Section C (Either/ or Choice) | Section D ( Open Choice) | Total Marks | % of (Marks without choice) | Consolidated % |
| K1 | 5 | | - | - | 5 | 4.17 | 17 |
| K2 | 5 | 10 | - | - | 15 | 12.5 | |
| K3 | - | - | 30 | 30 | 60 | 50 | 50 |
| K4 | - | - | 20 | 20 | 40 | 33.33 | 33 |
| Marks | 10 | 10 | 50 | 50 | 120 | 100 | 100 |
| **NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.** | | | | | | | |

## Summative Examinations - Question Paper – Format

| **Section A (Multiple Choice Questions)**<br>**Answer All Questions** | | | **(10x1=10 marks)** |
|---|---|---|---|
| **Q.No** | **CO** | **K Level** | **Questions** |
| 1 | CO1 | K1 | |
| 2 | CO1 | K2 | |
| 3 | CO2 | K1 | |
| 4 | CO2 | K2 | |
| 5 | CO3 | K1 | |
| 6 | CO3 | K2 | |
| 7 | CO4 | K1 | |
| 8 | CO4 | K2 | |
| 9 | CO5 | K1 | |
| 10 | CO5 | K2 | |
| **Section B (Short Answers)**<br>**Answer All Questions** | | | **(5x2=10 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 11 | CO1 | K2 | |
| 12 | CO2 | K2 | |
| 13 | CO3 | K2 | |
| 14 | CO4 | K2 | |
| 15 | CO5 | K2 | |
| **Section C (Either/Or Type)**<br>**Answer All Questions** | | | **(5 x 5 = 25 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 16) a | CO1 | K3,K3 | |
| 16) b | CO1 | K3,K3 | |
| 17) a | CO2 | K3,K3 | |
| 17) b | CO2 | K3,K3 | |
| 18) a | CO3 | K3,K3 | |
| 18) b | CO3 | K3,K3 | |
| 19) a | CO4 | K4,K4 | |
| 19) b | CO4 | K4,K4 | |
| 20) a | CO5 | K4,K4 | |
| 20) b | CO5 | K4,K4 | |
| **NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels** | | | |
| **Section D (Open Choice)**<br>**Answer Any Three questions** | | | **(3x10=30 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 21 | CO1 | K3 | |
| 22 | CO2 | K3 | |
| 23 | CO3 | K3 | |
| 24 | CO4 | K4 | |
| 25 | CO5 | K4 | |

**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**
**DEPARTMENT OF COMPUTER SCIENCE**
**(For those who joined in 2021-2022 and after)**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Course Name** | **DATA MINING TECHNIQUES** | | | | | | | |
| **Course Code** | **21UCSE56** | | | | | **L** | **P** | **C** |
| **Category** | **Core Elective** | | | | | 5 | - | 5 |
| **Nature of course:** | **EMPLOYABILITY** | ✓ | **SKILL ORIENTED** | ✓ | **ENTREPRENEURSHIP** | | | ✓ |

**Course Objectives:**

- Know the Data Mining principles, techniques and discover the knowledge imbibed in the high dimensional system.
- Prepare evaluation criteria for clustering methods.
- Study algorithms for finding the hidden interesting patterns in data in real life.
- Expose the students to the concepts of Data warehousing Architecture, implementation and analyze the various models.
- Study the overview of Web Mining, Text Mining and develop application tools

| **Unit: I** | **Introduction To Data Mining** | **15 Hours** |
|---|---|---|

**Introduction To Data Mining:** Introduction-What is Data Mining?-Definition-KDD vs Data Mining-DBMS vs DM-DM Techniques-Other Mining Problems-Issues and challenges in DM-DM Application Areas-DM Applications-Case Studies.

| **Unit: II** | **Data Warehousing** | **15 Hours** |
|---|---|---|

**Data Warehousing:** Introduction- Data Warehouse Architecture-Dimensional Modelling-Aggregate Function- OLAP Operations-ROLAP-MOLAP-Cube Computation-Multiway simultaneous Aggregation-Cloud Data Warehousing

| **Unit: III** | **Association Rules** | **15 Hours** |
|---|---|---|

**Association Rules:** Introduction- Association Rule Methods to discover Association Rules-Apriori Algorithm-Partition Algorithm-Pincer-Search Algorithm- FP-tree Growth Algorithm-Rapid Association Rule Mining - Border Algorithm-Association Rules with Item Constraints

| **Unit: IV** | **Clustering Techniques** | **15 Hours** |
|---|---|---|

**Clustering Techniques:** Clustering Paradigms-Partitioning Algorithms-K-Medoid Algorithms-CLARA-CLARANS **Decision Trees:** What is Decision Tree? –Tree construction Principle-Decision Tree Construction Algorithms- CART-ID3Decision Tree Construction with Presorting.

| **Unit: V** | **Web Mining** | **15 Hours** |
|---|---|---|

**Web Mining:** Introduction- Web Mining-Web Content Mining- Web Structure Mining-Web usage Mining-Text Mining- Text Clustering

| | **Total Lecture Hours** | **75 Hrs** |
|---|---|---|

**Books for Study:**

2. Data Mining Techniques,Arun K Pujari,4th Edition,2017

**Books for References:**


4. Data Mining Concepts & Technologies, Jiawei Han, Michelinekamber, Morgan KaufmannSecond Edition, 2005.
5. Data Mining, VikramPudi,P.Radha Krishna, Oxford University Press, First Edition, 2009.
6. Data Warehousing – ReemaThareja Oxford University Press – 2009.
7. Insight into Data Mining Theory and Practice – K.p. Soman, ShyamDiwakar, V.Ajay,

| | |
|---|---|
| Prentice Hall of India – 2008 | |
| **Web Resources:** | |
| **1.https://www.w3schools.com/**<br>**2.https://www.javatpoint.com/data-warehouse**<br>**3.https://nptel.ac.in/courses/106/105/106105174/** | |
| **Course Outcomes** | **K Level** |
| **CO1** Understand the functionality of the various data mining and data warehousing component. | **K3** |
| **CO2** Appreciate the strengths and limitations of various data mining and data warehousing models | **K3** |
| **CO3** Explain the analyzing techniques of various data | **K3** |
| **CO4** Describe different methodologies used in data mining and data ware housing | **K4** |
| **CO5** Compare different approaches of the data warehousing and data mining with various technologies. | **K4** |

**CO & PO Mapping:**

| COS | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 |
|---|---|---|---|---|---|---|
| CO 1 | 1 | 1 | 3 | 3 | 3 | 3 |
| CO 2 | 2 | 2 | 3 | 2 | 2 | 3 |
| CO 3 | 2 | 3 | 3 | 2 | 1 | 3 |
| CO 4 | 3 | 2 | 3 | 1 | 2 | 3 |
| CO5 | 2 | 3 | 3 | 2 | 2 | 3 |

***3 –** Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

## LESSON PLAN

| Unit | Data Mining Techniques | Hrs | Pedagogy |
|---|---|---|---|
| I | **Introduction To Data Mining:** Introduction-What is Data Mining?-Definition-KDD vs Data Mining-DBMS vs DM-DM Techniques-Other Mining Problems-Issues and challenges in DM-DM Application Areas-DM Applications-Case Studies. | 15 | Chalk & Talk, ICT Kit |
| II | **Data Warehousing:** Introduction- Data Warehouse Architecture-Dimensional Modelling-Aggregate Function- OLAP Operations-ROLAP-MOLAP-Cube Computation-Multiway simultaneous Aggregation-Cloud Data Warehousing | 15 | Chalk & Talk, ICT Kit |
| III | **Association Rules:** Introduction- Association Rule Methods to discover Association Rules-Apriori Algorithm-Partition Algorithm-Pincer-Search Algorithm- FP-tree Growth Algorithm-Rapid Association Rule Mining - Border Algorithm-Association Rules with Item Constraints. | 15 | Chalk & Talk, ICT Kit |
| IV | **Clustering Techniques:** Clustering Paradigms-Partitioning Algorithms-K-Medoid Algorithms-CLARA-CLARANS **Decision Trees:** What is Decision Tree? –Tree construction Principle-Decision Tree Construction Algorithms- CART-ID3Decision Tree Construction with Presorting | 15 | Chalk & Talk, ICT Kit |
| V | **Web Mining:** Introduction- Web Mining-Web Content Mining- Web Structure Mining-Web usage Mining-Text Mining- Unstructured Text - Text Clustering | 15 | Chalk & Talk, ICT Kit |

**Course Designed by: Mrs.K.Sandya &Mrs.C.D.Balapriya**

| Learning Outcome Based Education & Assessment (LOBE)<br>Formative Examination - Blue Print<br>Articulation Mapping – K Levels with Course Outcomes (COs) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Internal** | **Cos** | **K Level** | **Section A** | | **Section B** | | **Section C Either or Choice** | **Section D Open Choice** |
| | | | **MCQs** | | **Short Answers** | | | |
| | | | **No. of. Questions** | **K - Level** | **No. of. Questions** | **K - Level** | | |
| **CIAI** | **CO1** | Up to K3 | 2 | **K1,K2** | 1 | **K2** | **2(K3,K3)** | **1(K3)** |
| | **CO2** | Up to K3 | 2 | **K1,K2** | 2 | **K2** | **2(K3,K3)** | **1(K3)** |
| **CIAII** | **CO3** | Up to K3 | 2 | **K1,K2** | 1 | **K2** | **2(K3,K3)** | **1(K3)** |
| | **CO4** | Up to K4 | 2 | **K1,K2** | 2 | **K2** | **2(K4,K4)** | **1(K4)** |
| **Question Pattern CIA I & II** | | No. of Questions to be asked | **4** | | **3** | | **4** | **2** |
| | | No. of Questions to be answered | **4** | | **3** | | **2** | **1** |
| | | Marks for each question | **1** | | **2** | | **5** | **10** |
| | | Total Marks for each section | **4** | | **6** | | **10** | **10** |

| Distribution of Marks with K Level CIA I & CIA II | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **K Level** | **Section A (Multiple Choice Questions)** | **Section B (Short Answer Questions)** | **Section C (Either / Or Choice)** | **Section D (Open Choice)** | **Total Marks** | **% of (Marks without choice)** | **Consolidate of %** |
| **CIA I** | **K1** | 2 | | - | - | 2 | 4 | 20 |
| | **K2** | 2 | 6 | - | - | 8 | 16 | |
| | **K3** | - | - | 20 | 20 | 40 | 80 | 80 |
| | **K4** | - | - | - | - | - | | |
| | **Marks** | 4 | 6 | 20 | 20 | 50 | 100 | **100** |
| **CIA II** | **K1** | 2 | | - | - | 2 | 4 | 20 |
| | **K2** | 2 | 6 | - | - | 8 | 16 | |
| | **K3** | - | - | 10 | 10 | 20 | 40 | 40 |
| | **K4** | - | - | 10 | 10 | 20 | 40 | 40 |
| | **Marks** | 4 | 6 | 20 | 20 | 50 | | **100** |

**K1**- Remembering and recalling facts with specific answers
**K2**- Basic understanding of facts and stating main ideas with general answers
**K3**- Application oriented- Solving Problems
**K4**- Examining, analyzing, presentation and make inferences with evidences
**CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.**

| Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| S.No | COs | K - Level | MCQs | | Short Answers | | Section C (Either / or Choice) | Section D (Open Choice) |
| | | | No. of Questions | K – Level | No. of Question | K – Level | | |
| 1 | CO1 | **K3** | **2** | **K1,K2** | **1** | **K2** | **2(K3,K3)** | **1(K3)** |
| 2 | CO2 | **K3** | **2** | **K1,K2** | **1** | **K2** | **2(K3,K3)** | **1(K3)** |
| 3 | CO3 | **K3** | **2** | **K1,K2** | **1** | **K2** | **2(K3,K3)** | **1(K3)** |
| 4 | CO4 | **K4** | **2** | **K1,K2** | **1** | **K2** | **2(K4,K4)** | **1(K4)** |
| 5 | CO5 | **K4** | **2** | **K1,K2** | **1** | **K2** | **2(K4,K4)** | **1(K4)** |
| No. of Questions to be Asked | | | **10** | | **5** | | **10** | **5** |
| No.of Questions to be answered | | | **10** | | **5** | | **5** | **3** |
| Marks for each question | | | **1** | | **2** | | **5** | **10** |
| Total Marks for each section | | | **10** | | **10** | | **25** | **30** |
| **(Figures in parenthesis denotes, questions should be asked with the given K level)** | | | | | | | | |

| Distribution of Marks with K Level | | | | | | | |
|---|---|---|---|---|---|---|---|
| K Level | Section A (Multiple Choice Questions) | Section B (Short Answer Questions) | Section C (Either/ or Choice) | Section D ( Open Choice) | Total Marks | % of (Marks without choice) | Consolidated % |
| K1 | 5 | | - | - | 5 | 4.17 | 17 |
| K2 | 5 | 10 | - | - | 15 | 12.5 | |
| K3 | - | - | 30 | 30 | 60 | 50 | 50 |
| K4 | - | - | 20 | 20 | 40 | 33.33 | 33 |
| Marks | 10 | 10 | 50 | 50 | 120 | 100 | 100 |
| **NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.** | | | | | | | |

## Summative Examinations - Question Paper – Format

| **Section A (Multiple Choice Questions)**<br>**Answer All Questions** | | | **(10x1=10 marks)** |
|---|---|---|---|
| **Q.No** | **CO** | **K Level** | **Questions** |
| 1 | CO1 | K1 | |
| 2 | CO1 | K2 | |
| 3 | CO2 | K1 | |
| 4 | CO2 | K2 | |
| 5 | CO3 | K1 | |
| 6 | CO3 | K2 | |
| 7 | CO4 | K1 | |
| 8 | CO4 | K2 | |
| 9 | CO5 | K1 | |
| 10 | CO5 | K2 | |
| **Section B (Short Answers)**<br>**Answer All Questions** | | | **(5x2=10 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 11 | CO1 | K2 | |
| 12 | CO2 | K2 | |
| 13 | CO3 | K2 | |
| 14 | CO4 | K2 | |
| 15 | CO5 | K2 | |
| **Section C (Either/Or Type)**<br>**Answer All Questions** | | | **(5 x 5 = 25 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 16) a | CO1 | K3 | |
| 16) b | CO1 | K3 | |
| 17) a | CO2 | K3 | |
| 17) b | CO2 | K3 | |
| 18) a | CO3 | K3 | |
| 18) b | CO3 | K3 | |
| 19) a | CO4 | K4 | |
| 19) b | CO4 | K4 | |
| 20) a | CO5 | K4 | |
| 20) b | CO5 | K4 | |
| **NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels** | | | |
| **Section D (Open Choice)**<br>**Answer Any Three questions** | | | **(3x10=30 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 21 | CO1 | K3 | |
| 22 | CO2 | K3 | |
| 23 | CO3 | K3 | |
| 24 | CO4 | K4 | |
| 25 | CO5 | K4 | |

**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**
**DEPARTMENT OF COMPUTER SCIENCE**
**(For those who joined in 2021-2022 and after)**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Course Name** | **R PROGRAMMING LAB** | | | | | | | |
| **Course Code** | **21UCSSP5** | | | | | **L** | **P** | **C** |
| **Category** | **Skill** | | | | | - | 2 | 2 |
| **Nature of course:** | **EMPLOYABILITY** | ✓ | **SKILL ORIENTED** | ✓ | **ENTREPRENEURSHIP** | | | ✓ |

**Course objectives:**

- To import a variety of data formats into R using R Studio.
- To introduce the concepts of programming with examples.
- To learn the fundamental programming concepts and methodologies which are essential to building good R programs.
- To understand the fundamental syntax of R through readings, practice exercises, demonstrations, and writing R code.
- To apply critical programming language concept such as data types, iteration, Control structure, functions, and Boolean operators by writing R programs and through examples.

| S. No. | List of Programs | Hours |
|---|---|---|
| 1. | Learn all the basics of R-Programming (Data types, Variables, Operators etc.) . | **30** |
| 2. | Making operations on if-else statements in R. | |
| 3. | Creating programs on For loop in R. | |
| 4. | Creating programs on While loop in R. | |
| 5. | Write an R program to calculate a Fibonacci series. | |
| 6. | Write an R program to create a bar plot . | |
| 7. | Implement different data structures in R (Vectors, Lists, Data Frames) | |
| 8. | Creating matrix and manipulation matrix in R . | |
| 9. | Create a data set and do statistical analysis on the data using R. | |
| 10. | Perform the various operations on lists in R . | |
| 11. | Presentation using Text, animation, images, media . | |
| 12. | Creating a graph in a PowerPoint slides. | |
| | **Total Hours** | **30** |

**Books for Study:**

1. Cotton, R., Learning R: a step by step function guide to data analysis. 1st edition. O'reilly Media Inc.

**Books for References:**

1. Gardener, M. Beginning R: The statistical programming language, 2017, WILEY.
2. Lawrence, M., & Verzani, J. Programming Graphical User Interfaces in R, 2016,CRC Press.

**Web Resources:**

1. https://www.tutorialspoint.com/r/r_tutorial.pdf
2. FULL R PROGRAMMING METERIAL_2.pdf (stmarysguntur.com)
3. https://www.jnec.org/labmanuals/it/te/sem1/R-lab.pdf
4. https://www.r-project.org
5. https://www.slideshare.net/GRajendra/r-programming-lab-manual

| Course Outcomes | | K Level |
|---|---|---|
| CO1 | Construct the programming logic using R Packages. | K3 |
| CO2 | Differentiate the Data types for developing programs. | K3 |
| CO3 | Show the installation of R Programming Environment. | K3 |
| CO4 | Analyze the datasets using R programming capabilities. | K3 |
| CO5 | Classify the use of different R Data Structures | K4 |

**CO & PO Mapping:**

| COS | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 |
|---|---|---|---|---|---|---|
| CO 1 | 3 | 2 | 2 | 2 | 2 | 3 |
| CO 2 | 2 | 2 | 2 | 3 | 2 | 3 |
| CO 3 | 1 | 3 | 2 | 2 | 3 | 3 |
| CO 4 | 3 | 3 | 2 | 1 | 2 | 3 |
| CO5 | 1 | 3 | 3 | 3 | 1 | 3 |

***3 –** Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

## LESSONPLAN

| S. No. | R Programming Lab | Hours | Mode |
|---|---|---|---|
| 1.<br>2.<br>3.<br>4.<br>5.<br>6.<br>7.<br>8.<br>9.<br>10.<br>11.<br>12. | Learn all the basics of R-Programming (Data types, Variables, Operators etc.) .<br>Making operations on if-else statements in R.<br>Creating programs on For loop in R.<br>Creating programs on While loop in R.<br>Write an R program to calculate a Fibonacci series.<br>Write an R program to create a bar plot.<br>Implement different data structures in R (Vectors, Lists, Data Frames)<br>Creating matrix and manipulation matrix in R.<br>Create a data set and do statistical analysis on the data using R.<br>Perform the various operations on lists in R.<br>Presentation using Text, animation, images, media.<br>Creating a graph in a PowerPoint slides. | 30 | Black Board, Lab Demonstration and LCD Projector. |
| | **Total Hours** | **30** | |

Course Designed by: **Mrs.P.Rajeswari & MRs.K.Sandya**


SIXTH SEMESTER

**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**
**DEPARTMENT OF COMPUTER SCIENCE**
**(For those who joined in 2021-2022 and after)**

| | | | | |
|---|---|---|---|---|
| **Course Name** | **C# AND .NET PROGRAMMING** | | | |
| **Course Code** | **21UCSC61** | **L** | **P** | **C** |
| **Category** | **Core** | 6 | - | 4 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Nature of course:** | **EMPLOYABILITY** | ✓ | **SKILL ORIENTED** | ✓ | **ENTREPRENURSHIP** | ✓ |

**Course Objectives:**

- To get complete knowledge of MS.NET Framework and its internals.
- To develop deep understanding of C# language features.
- To build strong concepts of OOP's and implement the same in C#.
- To create and manage strings, arrays, structures, and enumerators using .NET framework library.
- To build GUI applications using .NET Framework and WinForms API.

| | | |
|---|---|---|
| **Unit: I** | **INTRODUCTION TO C#** | **20** |

Introducing C# - Understanding .NET: The C# Environment – Overview of C# - Literals, Variables and DataTypes – Operators and Expressions – Decision Making and Branching - Decision Making and Looping.

| | | |
|---|---|---|
| **Unit: II** | **ARRAYS AND STRINGS** | **15** |

Methods in C# - Handling Arrays – Manipulating Strings – Structures and Enumerations.

| | | |
|---|---|---|
| **Unit: III** | **INTRODUCTION TO OOPS** | **20** |

Classes and Objects – Inheritances and Polymorphism-Interface: Multiple Inheritance

| | | |
|---|---|---|
| **Unit: IV** | **DELEGATES AND EXCEPTION HANDLING** | **15** |

Delegates and Events -Managing errors and exception

| | | |
|---|---|---|
| **Unit: V** | **APPLICATION DEVELOPMENT** | **20** |

Windows Forms and Web-Based Application Development on .NET

| | | |
|---|---|---|
| | **Total Lecture Hours** | **90 Hrs.** |

**Books for Study:**

1. Balagurusamy. E, Programming in C #, Tata McGraw Hill, New Delhi, Fourth Edition, 2004.
   Unit I - Chapters1to7
   Unit II - Chapters8to11
   Unit III - Chapters12to14
   Unit IV - Chapters16,18
   Unit V - Chapter 20

**Books for References:**

1. Rober Powell, Richard Weeks, C# and .NET Framework, Tech Media Publication, New Delhi,2008.
2. Jesse Liberty, Programming C#, O'REILLY, Fourth Edition, 2005.
3. Mathew Macdonald, The Complete Reference ASP.NET, Tata McGraw Hill Publishing Pvt Ltd., 2008.

**Web Resources:**

1. https://www.guru99.com›net-framework

| |
|---|
| 2. https://docs.microsoft.com›en-us›dotnet<br>3. https://www.c-sharpcorner.com<br>4. https://spoken-tutorial.org/tutorial-search/?search_foss=Python+3.4.3&search_language=English |

| Course Outcomes | | K Level |
|---|---|---|
| CO1: | **Understand** code solutions and compile C# projects within the .NET framework. | K3 |
| CO2: | **Design** and **develop** professional console and window-based .NET application | K3 |
| CO3: | **Demonstrate** knowledge of object-oriented concepts Design user experience and functional requirements C#.NET application. | K3 |
| CO4: | **Construct** classes, methods, and assessors, and instantiate objects. | K4 |
| CO5: | **Understand** and **implement** string manipulation, events, and exception handling within .NET application environment. | K4 |

**CO & PO Mapping:**

| COS | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 |
|---|---|---|---|---|---|---|
| CO 1 | 3 | 1 | 2 | 2 | 3 | 3 |
| CO 2 | 2 | 2 | 3 | 1 | 3 | 3 |
| CO 3 | 3 | 2 | 1 | 3 | 2 | 3 |
| CO 4 | 1 | 3 | 2 | 2 | 3 | 3 |
| CO5 | 2 | 2 | 2 | 2 | 3 | 3 |

***3 –** Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

## LESSON PLAN

| Unit | C# And .Net Programming | Hrs | Pedagogy |
|---|---|---|---|
| I | Introducing C# - Understanding .NET: The C# Environment –Overview of C# - Literals, Variables and Data Types – Operators and Expressions – Decision Making and Branching - Decision Making and Looping. | 20 | Chalk & Talk, ICT Kit |
| II | Methods in C# - Handling Arrays – Manipulating Strings-Structures and Enumerations. | 15 | Chalk & Talk, ICT Kit |
| III | Classes and Objects – Inheritances and Polymorphism-Interface: Multiple Inheritance | 20 | Chalk & Talk, ICT Kit |
| IV | Delegates and Events -Managing errors and exception | 15 | Chalk & Talk, ICT Kit |
| V | Windows Forms and Web-Based Application Development on .NET | 20 | Chalk & Talk, ICT Kit |

Course Designed by: Mrs.**S.Amutha & Dr.G.Devika**

| Learning Outcome Based Education & Assessment (LOBE)<br>Formative Examination - Blue Print<br>Articulation Mapping – K Levels with Course Outcomes (COs) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Internal** | **Cos** | **K Level** | **Section A** | | **Section B** | | **Section C Either or Choice** | **Section D Open Choice** |
| | | | **MCQs** | | **Short Answers** | | | |
| | | | **No. of. Questions** | **K - Level** | **No. of. Questions** | **K - Level** | | |
| **CIA I** | **CO1** | Up to K3 | 2 | **K1,K2** | 1 | **K2** | **2(K3,K3)** | **1(K3)** |
| | **CO2** | Up to K3 | 2 | **K1,K2** | 2 | **K2** | **2(K3,K3)** | **1(K3)** |
| **CIA II** | **CO3** | Up to K3 | 2 | **K1,K2** | 1 | **K2** | **2(K3,K3)** | **1(K3)** |
| | **CO4** | Up to K4 | 2 | **K1,K2** | 2 | **K2** | **2(K4,K4)** | **1(K4)** |
| **Question Pattern CIA I & II** | | No. of Questions to be asked | **4** | | **3** | | **4** | **2** |
| | | No. of Questions to be answered | **4** | | **3** | | **2** | **1** |
| | | Marks for each question | **1** | | **2** | | **5** | **10** |
| | | Total Marks for each section | **4** | | **6** | | **10** | **10** |

| Distribution of Marks with K Level CIA I & CIA II | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **K Level** | **Section A (Multiple Choice Questions)** | **Section B (Short Answer Questions)** | **Section C (Either / Or Choice)** | **Section D (Open Choice)** | **Total Marks** | **% of (Marks without choice)** | **Consolidate of %** |
| **CIA I** | **K1** | 2 | | - | - | 2 | 4 | 20 |
| | **K2** | 2 | 6 | - | - | 8 | 16 | |
| | **K3** | - | - | 20 | 20 | 40 | 80 | 80 |
| | **K4** | - | - | - | - | - | | |
| | **Marks** | 4 | 6 | 20 | 20 | 50 | 100 | **100** |
| **CIA II** | **K1** | 2 | | - | - | 2 | 4 | 20 |
| | **K2** | 2 | 6 | - | - | 8 | 16 | |
| | **K3** | - | - | 10 | 10 | 20 | 40 | 40 |
| | **K4** | - | - | 10 | 10 | 20 | 40 | 40 |
| | **Marks** | 4 | 6 | 20 | 20 | 50 | | **100** |

**K1**- Remembering and recalling facts with specific answers
**K2**- Basic understanding of facts and stating main ideas with general answers
**K3**- Application oriented- Solving Problems
**K4**- Examining, analyzing, presentation and make inferences with evidences
**CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.**

| Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| S.No | COs | K - Level | MCQs | | Short Answers | | Section C (Either / or Choice) | Section D (Open Choice) |
| | | | No. of Questions | K – Level | No. of Question | K – Level | | |
| 1 | CO1 | **K3** | **2** | **K1,K2** | **1** | **K2** | **2(K3,K3)** | **1(K3)** |
| 2 | CO2 | **K3** | **2** | **K1,K2** | **1** | **K2** | **2(K3,K3)** | **1(K3)** |
| 3 | CO3 | **K3** | **2** | **K1,K2** | **1** | **K2** | **2(K3,K3)** | **1(K3)** |
| 4 | CO4 | **K4** | **2** | **K1,K2** | **1** | **K2** | **2(K4,K4)** | **1(K4)** |
| 5 | CO5 | **K4** | **2** | **K1,K2** | **1** | **K2** | **2(K4,K4)** | **1(K4)** |
| No. of Questions to be Asked | | | **10** | | **5** | | **10** | **5** |
| No.of Questions to be answered | | | **10** | | **5** | | **5** | **3** |
| Marks for each question | | | **1** | | **2** | | **5** | **10** |
| Total Marks for each section | | | **10** | | **10** | | **25** | **30** |
| **(Figures in parenthesis denotes, questions should be asked with the given K level)** | | | | | | | | |

| Distribution of Marks with K Level | | | | | | | |
|---|---|---|---|---|---|---|---|
| K Level | Section A (Multiple Choice Questions) | Section B (Short Answer Questions) | Section C (Either/ or Choice) | Section D ( Open Choice) | Total Marks | % of (Marks without choice) | Consolidated % |
| K1 | 5 | | - | - | 5 | 4.17 | 17 |
| K2 | 5 | 10 | - | - | 15 | 12.5 | |
| K3 | - | - | 30 | 30 | 60 | 50 | 50 |
| K4 | - | - | 20 | 20 | 40 | 33.33 | 33 |
| Marks | 10 | 10 | 50 | 50 | 120 | 100 | 100 |
| **NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.** | | | | | | | |

## Summative Examinations - Question Paper – Format

| **Section A (Multiple Choice Questions)**<br>**Answer All Questions** | | | **(10x1=10 marks)** |
|---|---|---|---|
| **Q.No** | **CO** | **K Level** | **Questions** |
| 1 | CO1 | K1 | |
| 2 | CO1 | K2 | |
| 3 | CO2 | K1 | |
| 4 | CO2 | K2 | |
| 5 | CO3 | K1 | |
| 6 | CO3 | K2 | |
| 7 | CO4 | K1 | |
| 8 | CO4 | K2 | |
| 9 | CO5 | K1 | |
| 10 | CO5 | K2 | |
| **Section B (Short Answers)**<br>**Answer All Questions** | | | **(5x2=10 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 11 | CO1 | K2 | |
| 12 | CO2 | K2 | |
| 13 | CO3 | K2 | |
| 14 | CO4 | K2 | |
| 15 | CO5 | K2 | |
| **Section C (Either/Or Type)**<br>**Answer All Questions** | | | **(5 x 5 = 25 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 16) a | CO1 | K3 | |
| 16) b | CO1 | K3 | |
| 17) a | CO2 | K3 | |
| 17) b | CO2 | K3 | |
| 18) a | CO3 | K3 | |
| 18) b | CO3 | K3 | |
| 19) a | CO4 | K4 | |
| 19) b | CO4 | K4 | |
| 20) a | CO5 | K4 | |
| 20) b | CO5 | K4 | |
| **NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels** | | | |
| **Section D (Open Choice)**<br>**Answer Any Three questions** | | | **(3x10=30 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 21 | CO1 | K3 | |
| 22 | CO2 | K3 | |
| 23 | CO3 | K3 | |
| 24 | CO4 | K4 | |
| 25 | CO5 | K4 | |

**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**
**DEPARTMENT OF COMPUTER SCIENCE**
**(For those who joined in 2021-2022 and after)**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Course Name** | **C# AND .NET PROGRAMMING LAB** | | | | | | | |
| **Course Code** | **21UCSCP6** | | | | | **L** | **P** | **C** |
| **Category** | **Core** | | | | | - | 6 | 4 |
| **Nature of course:** | **EMPLOYABILITY** | ✓ | **SKILL ORIENTED** | ✓ | **ENTREPRENURSHIP** | | | ✓ |

**Course objectives:**

- To gain the ability to implement the algorithms in C#.net, VB.net and ASP.net.
- To know about windows, Web and Console Applications.
- Students will be able to Facilitates experiential learning.
- To build strong concepts of OOP's and implement the same in C#.
- To create and manage strings, arrays, structures, and enumerators using .NET framework library.

| S. No. | List of Programs | Hours |
|---|---|---|
| 1. | Basic C# programs | **90** |
| 2. | Classes and objects | |
| 3. | Inheritance | |
| 4. | Operator overloading | |
| 5. | Threading | |
| 6. | Events and delegates | |
| 7. | Working with windows forms controls | |
| 8. | Validating data | |
| 9. | Creating custom dialog box and designing an MDI application with menu | |
| 10. | Retrieving Data from Database & Working with Disconnected Environment | |
| | **Total Hours** | **90** |

**Books for Study:**

1. Balagurusamy. E, Programming in C #, Tata McGraw Hill, New Delhi, Fourth Edition, 2004.

**Books for References:**

1. Rober Powell, Richard Weeks, C# and .NET Framework, Tech Media Publication, NewDelhi,2008.
2. Jesse Liberty, Programming C#, O'REILLY, Fourth Edition, 2005.
3. Mathew Macdonald, The Complete Reference ASP.NET, Tata McGraw Hill Publishing Pvt Ltd., 2008.

| Web Resources: |
|---|
| 1. https://www.guru99.com›net-framework<br>2. https://docs.microsoft.com›en-us›dotnet<br>3. https://www.c-sharpcorner.com<br>4. https://spoken-tutorial.org/tutorial-search/?search_foss=Python+3.4.3&search_language=English |

| Course Outcomes | | K Level |
|---|---|---|
| CO1: | Display proficiency in C# by building stand-alone applications in the .NET framework using C# | K3 |
| CO2: | Create distributed data-driven applications using the .NET Framework, C#, SQL Server and ADO.NET | K3 |
| CO3: | Apply the syntax of basic C# programming constructs. | K3 |
| CO4: | Create web-based distributed applications using C#, ASP.NET, SQL Server and ADO.NET | K3 |
| CO5: | Understand the concept of Web Applications. | K4 |

**CO & PO Mapping:**

| COS | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 |
|---|---|---|---|---|---|---|
| CO 1 | 2 | 2 | 3 | 3 | 1 | 3 |
| CO 2 | 2 | 2 | 2 | 3 | 2 | 3 |
| CO 3 | 1 | 3 | 3 | 2 | 2 | 3 |
| CO 4 | 2 | 2 | 1 | 3 | 3 | 3 |
| CO5 | 3 | 2 | 2 | 1 | 3 | 3 |

***3 –** Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

## LESSONPLAN

| S. No. | C# And .Net Programming Lab | Hours | Mode |
|---|---|---|---|
| 1. | Basic C# programs | 90 | Black Board, Lab Demonstration and LCD Projector. |
| 2. | Classes and objects | | |
| 3. | Inheritance | | |
| 4. | Operator overloading | | |
| 5. | Threading | | |
| 6. | Events and delegates | | |
| 7. | Working with windows forms controls | | |
| 8. | Validating data | | |
| 9. | Creating custom dialog box and designing an MDI application with menu | | |
| 10. | Retrieving Data from Database & Working with Disconnected Environment | | |
| | **Total Hours** | **90** | |

**Course Designed by: Mrs.S.Amutha &Dr.G.Devika**

**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**
**DEPARTMENT OF COMPUTER SCIENCE**
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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Course Name** | **PROJECT AND VIVA VOCE** | | | | | | | |
| **Course Code** | **21UCSPR1** | | | | | **L** | **P** | **C** |
| **Category** | **Core** | | | | | - | 6 | 4 |
| **Nature of course:** | **EMPLOYABILITY** | ✓ | **SKILL ORIENTED** | ✓ | **ENTREPRENURSHIP** | | | ✓ |

**COURSE OBJECTIVES:**

- To develop an ability to design and implement a software.
- To select individually Commercial or Technical Project based on Application Development Technologies.
- To know the technologies they can develop the software.
- To Facilitates experiential learning.
- To do Real time projects.

| | | |
|---|---|---|
| | ➢ Title<br>➢ Synopsis<br>➢ Introduction<br>➢ Module description<br>➢ Existing and proposed system<br>➢ Data Flow Diagram<br>➢ System Flow Diagram<br>➢ Entity Relationship Diagram<br>➢ Form Design<br>➢ Database Design<br>➢ Testing<br>➢ Implementation<br>➢ Form Design | **90 Hours** |
| | **Total Lecture Hours** | **90 Hours** |

**Books for Study:**

**1.** Rober Powell, Richard Weeks, C# and .NET Framework, Tech Media Publication, New Delhi, 2008.

**Books for Reference:**

1. Mike Holcombe, "Running an Agile Software Development Project" Wiley, 2008
2. Laura M. Leventhal, Julie A. Barnes "Usability Engineering: Process, Products, and Examples,", Pearson/Prentice Hall, 2008
3. Adrienne Watt ,"Project Management", BCcampus, 2014
4. Jones, Evidence-based Software Engineering, Knowledge Software, 2020

**Web Reference:**

1. **https://www.upgrad.com/blog/web-development-project-ideas-for-beginners/**
2. **https://www.geeksforgeeks.org/web-development-project-ideas/**
3. **https://raddevon.com/articles/10-great-web-development-learning-project-ideas/**
4. **https://www.edx.org/course/project-management-for-development**
5. **https://spoken-tutorial.org/tutorial-search/?search_foss=Python+3.4.3&search_language=English**

| Course Outcomes: | | K Level |
|---|---|---|
| At the end of the Course the students will be able to | | |
| CO1 | Design and implement a software with a good aesthetic sense of designing and latest technical know-how's. | K3 |
| CO2 | Project one that involves practical work for understanding and solving problems in the field of computing. | K3 |
| CO3 | Familiar with any software and develop tools | K4 |
| CO4 | Develop a software or application using languages. | K4 |
| CO5 | Document the application with implementation. | K4 |

**CO & PO Mapping:**

| COS | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 |
|---|---|---|---|---|---|---|
| CO 1 | 2 | 2 | 3 | 2 | 2 | 3 |
| CO 2 | 2 | 2 | 2 | 2 | 3 | 3 |
| CO 3 | 2 | 1 | 2 | 2 | 3 | 3 |
| CO 4 | 2 | 3 | 2 | 3 | 1 | 3 |
| CO5 | 3 | 2 | 2 | 2 | 2 | 3 |

***3 –** Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

## LESSON PLAN

| Module | Project And Viva Voce | Hrs | Mode |
|---|---|---|---|
| I | • Title<br>• Synopsis<br>• Introduction | 18 | Practical |
| II | • Module description<br>• Existing and proposed system | 18 | Practical |
| III | • Data Flow Diagram<br>• System Flow Diagram<br>• Entity Relationship Diagram | 18 | Practical |
| IV | • Form Design<br>• Database Design | 18 | Practical |
| V | • Testing<br>• Implementation | 18 | Practical Presentation |

**Course Designed by:Dr.G.Devika& Mrs.S.Amutha**

**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**
**DEPARTMENT OF COMPUTER SCIENCE**
**(For those who joined in 2021-2022 and after)**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Course Name** | **CLOUD INFRASTRUCTURE AND SERVICES** | | | | | | | |
| **Course Code** | **21UCSE61** | | | | | **L** | **P** | **C** |
| **Category** | **Core Elective** | | | | | **5** | **-** | **5** |
| **Nature of course:** | **EMPLOYABILITY** | ✓ | **SKILL ORIENTED** | ✓ | **ENTREPRENEURSHIP** | | | ✓ |

**Course Objectives:**

- To learn how to use Cloud Services.
- To implement Virtualization concepts.
- Broadly educate to know the impact of engineering on legal and societal issues involved.
- To learn Aneka programming.
- Propose the various applications in the Cloud.

| **Unit: I** | **Introduction** | **15 Hours** |
|---|---|---|

**Introduction:** Cloud computing at a glance, Historical Developments, Building Cloud Computing Environments, Computing Platforms and Technologies.
**Principles of Parallel and Distributed Computing:** Eras of Computing, Parallel Vs Distributed computing, Elements of ParallelComputing, Elements of Distributed Computing, Technologies for Distributed Computing.

| **Unit: II** | **Virtualization, & Cloud Computing Architecture** | **15 Hours** |
|---|---|---|

**Virtualization:** Introduction, Characteristics of Virtualized Environments, Taxonomy of Virtualization Techniques, Virtualizationand Cloud Computing, Pros and Cons of Virtualization, Technology Examples.
**Cloud Computing Architecture:** Introduction, Cloud reference model, Types of clouds, Economics of the cloud, open challenges.

| **Unit: III** | **Aneka & Concurrent Computing** | **15 Hours** |
|---|---|---|

**Aneka: Cloud Application Platform:** Framework Overview, Anatomy of the Aneka Container, Building Aneka Clouds, Cloudprogramming and Management.
**Concurrent Computing: Thread Programming :** Introducing Parallelism for Single machine Computation, Programming Application with Threads, Multithreading with Aneka, Programming Applications with Aneka Threads.

| **Unit: IV** | **High- Throughput Computing & Data Intensive Computing** | **15 Hours** |
|---|---|---|

**High- Throughput Computing: Task Programming:** Task Computing, Task-based Application Models, Aneka Task-BasedProgramming.
**Data Intensive Computing: Map-Reduce Programming:** Whatis Data-IntensiveComputing, Technologies for Data-Intensive Computing, Aneka MapReduce Programming.

| **Unit: V** | **Cloud Platforms & Cloud Applications** | **15 Hours** |
|---|---|---|

**Cloud Platforms in Industry:** Amazon Web Services, GoogleAppEngine, Microsoft Azure, Observations.
**Cloud Applications:** Scientific Applications, Business and ConsumerApplications.
**Advanced Topics in Cloud Computing:** Energy Efficiency in Clouds, Market Based Management of Clouds , Federated Clouds/InterCloud, Third Party Cloud Services.

| | **Total Lecture Hours** | **75 Hrs** |
|---|---|---|

**Books for Study:**

1. Rajkumar Buyya, Christian Vecchiola, S.Thamarai Selvi, " Mastering Cloud Computing Foundations and Applications Programming ", Mc Graw Hill Education, 2013.

Unit I - Chapter 1(Full), Chapter 2(full)
Unit II - Chapter 3(full), Chapter 4(full).
Unit III - Chapter 5(Full), Chapter 6(Full)
Unit IV - Chapter 7(Full), Chapter 8(Full).
Univ V – Chapter 9(Full), Chapter 10(Full)

**Books for References:**

1.Michael Miller, "Cloud Computing", Pearson Education, New
2.Haley Beard, Cloud Computing Best Practices for Managing and MeasuringProcesses for On- demand Computing, Applications and Data Centers in theCloud with SLAs, Emereo Pty Limited, July 2008.
3.Cloud Application Architectures, George Reese, ISBN: 8184047142,Shroff/O' Reilly, 2009.

**Web Resources:**

1. **https://www.w3schools.com/**
2. **https://www.javatpoint.com/cloud-computing-tutorial**
3. **https://www.simplilearn.com/cloud-computing-tutorial-video**
4. **https://onlinecourses.nptel.ac.in/noc21_cs14/**

| **Course Outcomes** | | **K Level** |
|---|---|---|
| **CO1** | Understand the functionality of the various cloud and services provided by them. | **K3** |
| **CO2** | Appreciate the strengths and limitations of various cloud models with Virtualization | **K3** |
| **CO3** | Explain and implementation of task Scheduling algorithms. | **K3** |
| **CO4** | Describe different methodologies used in cloud and cloud services. | **K4** |
| **CO5** | Build a private cloud | **K4** |

**CO & PO Mapping:**

| COS | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 |
|---|---|---|---|---|---|---|
| CO 1 | 3 | 2 | 2 | 2 | 3 | 2 |
| CO 2 | 2 | 2 | 3 | 2 | 2 | 2 |
| CO 3 | 3 | 2 | 3 | 3 | 2 | 2 |
| CO 4 | 2 | 3 | 2 | 2 | 2 | 2 |
| CO5 | 2 | 3 | 2 | 2 | 3 | 3 |

***3 –** Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

## LESSON PLAN

| Unit | Cloud Infrastructure And Services | Hrs | Pedagogy |
|---|---|---|---|
| I | **Introduction:** Cloud computing at a glance, Historical Developments, Building Cloud Computing Environments, Computing Platforms and Technologies. **Principles of Parallel and Distributed Computing:** Eras of Computing, Parallel Vs Distributed computing, Elements of ParallelComputing, Elements of Distributed Computing, Technologies for Distributed Computing. | 15 | Chalk & Talk, ICT Kit |
| II | **Virtualization:** Introduction, Characteristics of Virtualized Environments, Taxonomy of Virtualization Techniques, Virtualization and Cloud Computing, Pros and Cons of Virtualization,Technology Examples **Cloud Computing Architecture:** Introduction, Cloud reference model, Types of clouds, Economics of the cloud, open challenges. | 15 | Chalk & Talk, ICT Kit |
| III | **Aneka: Cloud Application Platform:** Framework Overview, Anatomy of the Aneka Container, Building Aneka Clouds, Cloud programming and Management. **Concurrent Computing: Thread Programming :** Introducing Parallelism for Single machine Computation, Programming Application with Threads, Multithreading with Aneka, ProgrammingApplications with Aneka Threads. | 15 | Chalk & Talk, ICT Kit |
| IV | **High- Throughput Computing: Task Programming:** Task Computing, Task-based Application Models, Aneka Task-Based Programming. **Data Intensive Computing: Map-Reduce Programming:** Whatis Data-IntensiveComputing, Technologies for Data-Intensive Computing, Aneka MapReduce Programming. | 15 | Chalk & Talk, ICT Kit |
| V | **High- Throughput Computing: Task Programming:** Task Computing, Task-based Application Models, Aneka Task-Based Programming. **Data Intensive Computing: Map-Reduce Programming:** Whatis Data-IntensiveComputing, Technologies for Data-Intensive Computing, Aneka MapReduce Programming. | 15 | Chalk & Talk, ICT Kit |

**Course Designed by Mrs. K.Sandya &Mrs.P.Rajeswari**

| Learning Outcome Based Education & Assessment (LOBE)<br>Formative Examination - Blue Print<br>Articulation Mapping – K Levels with Course Outcomes (COs) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Internal | Cos | K Level | Section A | | Section B | | Section C Either or Choice | Section D Open Choice |
| | | | MCQs | | Short Answers | | | |
| | | | No. of. Questions | K - Level | No. of. Questions | K - Level | | |
| CIAI | CO1 | Up to K3 | 2 | K1,K2 | 1 | K2 | 2(K3,K3) | 1(K3) |
| | CO2 | Up to K3 | 2 | K1,K2 | 2 | K2 | 2(K3,K3) | 1(K3) |
| CIAII | CO3 | Up to K3 | 2 | K1,K2 | 1 | K2 | 2(K3,K3) | 1(K3) |
| | CO4 | Up to K4 | 2 | K1,K2 | 2 | K2 | 2(K4,K4) | 1(K4) |
| Question Pattern CIA I & II | | No. of Questions to be asked | 4 | | 3 | | 4 | 2 |
| | | No. of Questions to be answered | 4 | | 3 | | 2 | 1 |
| | | Marks for each question | 1 | | 2 | | 5 | 10 |
| | | Total Marks for each section | 4 | | 6 | | 10 | 10 |

| Distribution of Marks with K Level CIA I & CIA II | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | K Level | Section A (Multiple Choice Questions) | Section B (Short Answer Questions) | Section C (Either / Or Choice) | Section D (Open Choice) | Total Marks | % of (Marks without choice) | Consolidate of % |
| CIA I | K1 | 2 | | - | - | 2 | 4 | 20 |
| | K2 | 2 | 6 | - | - | 8 | 16 | |
| | K3 | - | - | 20 | 20 | 40 | 80 | 80 |
| | K4 | - | - | - | - | - | | |
| | Marks | 4 | 6 | 20 | 20 | 50 | 100 | **100** |
| CIA II | K1 | 2 | | - | - | 2 | 4 | 20 |
| | K2 | 2 | 6 | - | - | 8 | 16 | |
| | K3 | - | - | 10 | 10 | 20 | 40 | 40 |
| | K4 | - | - | 10 | 10 | 20 | 40 | 40 |
| | Marks | 4 | 6 | 20 | 20 | 50 | | **100** |

**K1**- Remembering and recalling facts with specific answers
**K2**- Basic understanding of facts and stating main ideas with general answers
**K3**- Application oriented- Solving Problems
**K4**- Examining, analyzing, presentation and make inferences with evidences
**CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.**

| Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| S.No | COs | K - Level | MCQs | | Short Answers | | Section C (Either / or Choice) | Section D (Open Choice) |
| | | | No. of Questions | K – Level | No. of Question | K – Level | | |
| 1 | CO1 | **K3** | **2** | **K1,K2** | **1** | **K2** | **2(K3,K3)** | **1(K3)** |
| 2 | CO2 | **K3** | **2** | **K1,K2** | **1** | **K2** | **2(K3,K3)** | **1(K3)** |
| 3 | CO3 | **K3** | **2** | **K1,K2** | **1** | **K2** | **2(K3,K3)** | **1(K3)** |
| 4 | CO4 | **K4** | **2** | **K1,K2** | **1** | **K2** | **2(K4,K4)** | **1(K4)** |
| 5 | CO5 | **K4** | **2** | **K1,K2** | **1** | **K2** | **2(K4,K4)** | **1(K4)** |
| No. of Questions to be Asked | | | **10** | | **5** | | **10** | **5** |
| No.of Questions to be answered | | | **10** | | **5** | | **5** | **3** |
| Marks for each question | | | **1** | | **2** | | **5** | **10** |
| Total Marks for each section | | | **10** | | **10** | | **25** | **30** |
| **(Figures in parenthesis denotes, questions should be asked with the given K level)** | | | | | | | | |

| Distribution of Marks with K Level | | | | | | | |
|---|---|---|---|---|---|---|---|
| K Level | Section A (Multiple Choice Questions) | Section B (Short Answer Questions) | Section C (Either/ or Choice) | Section D ( Open Choice) | Total Marks | % of (Marks without choice) | Consolidated % |
| K1 | 5 | | - | - | 5 | 4.17 | 17 |
| K2 | 5 | 10 | - | - | 15 | 12.5 | |
| K3 | - | - | 30 | 30 | 60 | 50 | 50 |
| K4 | - | - | 20 | 20 | 40 | 33.33 | 33 |
| Marks | 10 | 10 | 50 | 50 | 120 | 100 | 100 |
| **NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.** | | | | | | | |

## Summative Examinations - Question Paper – Format

| **Section A (Multiple Choice Questions)**<br>**Answer All Questions** | | | **(10x1=10 marks)** |
|---|---|---|---|
| **Q.No** | **CO** | **K Level** | **Questions** |
| 1 | CO1 | K1 | |
| 2 | CO1 | K2 | |
| 3 | CO2 | K1 | |
| 4 | CO2 | K2 | |
| 5 | CO3 | K1 | |
| 6 | CO3 | K2 | |
| 7 | CO4 | K1 | |
| 8 | CO4 | K2 | |
| 9 | CO5 | K1 | |
| 10 | CO5 | K2 | |
| **Section B (Short Answers)**<br>**Answer All Questions** | | | **(5x2=10 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 11 | CO1 | K2 | |
| 12 | CO2 | K2 | |
| 13 | CO3 | K2 | |
| 14 | CO4 | K2 | |
| 15 | CO5 | K2 | |
| **Section C (Either/Or Type)**<br>**Answer All Questions** | | | **(5 x 5 = 25 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 16) a | CO1 | K3 | |
| 16) b | CO1 | K3 | |
| 17) a | CO2 | K3 | |
| 17) b | CO2 | K3 | |
| 18) a | CO3 | K3 | |
| 18) b | CO3 | K3 | |
| 19) a | CO4 | K4 | |
| 19) b | CO4 | K4 | |
| 20) a | CO5 | K4 | |
| 20) b | CO5 | K4 | |
| **NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels** | | | |
| **Section D (Open Choice)**<br>**Answer Any Three questions** | | | **(3x10=30 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 21 | CO1 | K3 | |
| 22 | CO2 | K3 | |
| 23 | CO3 | K3 | |
| 24 | CO4 | K4 | |
| 25 | CO5 | K4 | |

**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**
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| | | | | |
|---|---|---|---|---|
| **Course Name** | **MACHINE LEARNING** | | | |
| **Course Code** | **21UCSE62** | **L** | **P** | **C** |
| **Category** | **Core Elective** | 5 | - | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Nature of course:** | **EMPLOYABILITY** | ✓ | **SKILL ORIENTED** | ✓ | **ENTREPRENURSHIP** | ✓ |

**Course Objectives:**

- To know the basic concepts and techniques of Machine Learning.
- To understand the Supervised and Unsupervised learning techniques.
- To study the various probability based learning techniques.
- To understand the Bayesian Concept learning techniques.
- To understand the supervised learning techniques using classification and Regression method.

| **Unit: I** | **Introduction to Machine Learning** | **15** |
|---|---|---|

**Introduction**– What is Machine Learning?-Types of Machine Learning-Applications of Machine Learning-Tools in Machine Learning-Issues in Machine Learning.
Preparing to Model: Introduction-Machine Learning Activities-Basic Types of Data in Machine Learning-Exploring Structure of Data-Data Quality and Remediation-Data Pre-Processing**.**

| **Unit: II** | **Modelling and Evaluation** | **15** |
|---|---|---|

Selecting a Model-Training a Model (for Supervised Learning)-Model Representation and Interpretability-Evaluating Performance of a Model-Improving Performance of a Model.
**Basics of Feature Engineering:**Feature Transformation-Feature Subset Selection

| **Unit: III** | **Overview of Probability** | **15** |
|---|---|---|

Importance of Statistical Tools in Machine Learning-Concept of Probability-Frequentist and Bayesian Interpretation-Random Variables-Some Common Discrete Distributions-Some Common Continuous Distributions-Multiple Random Variables-Central Limit Theorem-Hypothesis Testing-Monte Carlo Approximation.

| **Unit: IV** | **Bayesian Concept Learning** | **15** |
|---|---|---|

Why Bayesian Methods are Important?-Bayes' Theorem-Bayes' Theorem and Concept Learning-Bayesian Belief Network.
**Supervised Learning:** Classification Model-Classification Learning Steps-Common Classification Algorithms.

| **Unit: V** | **Supervised Learning and Unsupervised Learning** | **15** |
|---|---|---|

**Supervised Learning: Regression:** Introduction-Common Regression Algorithms.
**Un Supervised Learning:**Introduction-Unsupervisedvs Supervised Learning-Application of Unsupervised Learning-Clustering-Finding Pattern using Association Rule

| | **Total Lecture Hours** | **75Hrs** |
|---|---|---|

**Books for Study:**

1.SaikatDutt, Subramanian Chandramouli,AmitKumarDas,"MachineLearning",Pearson,2019.

**Books for References:**

1. StephenMarsland,"MachineLearning–AnAlgorithmicPerspective",SecondEdition.
2. ChapmanandHall/CRCMachineLearningandPatternRecognitionSeries,2014.
3. EthemAlpaydin,"IntroductiontoMachineLearning3e(AdaptiveComputationandMachineLearningSeries)",

ThirdEdition,MITPress,2014.
4. JasonBell,"Machinelearning–HandsonforDevelopersandTechnicalProfessionals",FirstEdition,Wiley,2014.

**Web Resources:**

1. **www.geeksforgeeks.org/machine-learning/**
2. **www.tutorialspoint.com/machine_learning/index.htm**
3. **https://hackr.io/blog/best-machine-learning-books**
4. **https://jonathan-hui.medium.com/machine-learning-graphical-model-b68b0c27a749**

| **Course Outcomes** | | **K Level** |
|---|---|---|
| **CO1:** | Understand the basic concepts and techniques of MachineLearning. | **K3** |
| **CO2:** | Apply different model on datasets and design suitable problem solutions. | **K3** |
| **CO3:** | Study the various probability based learning techniques | **K3** |
| **CO4:** | Apply specific supervised machine learning techniques for a particular Problem | **K4** |
| **CO5:** | Understand the Supervised and Unsupervised learning techniques | **K4** |

**CO & PO Mapping:**

| COS | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 |
|---|---|---|---|---|---|---|
| CO 1 | 1 | 3 | 3 | 3 | 3 | 2 |
| CO 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| CO 3 | 2 | 3 | 2 | 2 | 1 | 2 |
| CO 4 | 3 | 2 | 3 | 1 | 2 | 1 |
| CO5 | 2 | 2 | 3 | 2 | 2 | 1 |

***3 –** Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

## LESSON PLAN

| Unit | Machine Learning | Hrs | Pedagogy |
|---|---|---|---|
| I | Introduction– What is Machine Learning?-Types of Machine Learning-Applications of Machine Learning-Tools in Machine Learning-Issues in Machine Learning.<br>**Preparing to Model:**Introduction-Machine Learning Activities-Basic Types of Data in Machine Learning-Exploring Structure of Data-Data Quality and Remediation-Data Pre-Processing. | **15** | **Chalk &Talk,PPT** |
| II | Selecting a Model-Training a Model (for Supervised Learning)-Model Representation and Interpretability-Evaluating Performance of a Model-Improving Performance of a Model.<br>**Basics of Feature Engineering:**Feature Transformation-Feature Subset Selection | **15** | **Chalk &Talk,PPT** |
| III | Importance of Statistical Tools in Machine Learning-Concept of Probability-Frequentist and Bayesian Interpretation-Random Variables-Some Common Discrete Distributions-Some Common Continuous Distributions-Multiple Random Variables-Central Limit Theorem-Hypothesis Testing-Monte Carlo Approximation | **15** | **Chalk &Talk,PPT** |
| IV | Why Bayesian Methods are Important?-Bayes' Theorem-Bayes' Theorem and Concept Learning-Bayesian Belief Network.<br>**Supervised Learning:** Classification Model-Classification Learning Steps-Common Classification Algorithms. | **15** | **Chalk &Talk,PPT** |
| V | **Supervised Learning: Regression:** Introduction-Common Regression Algorithms.<br>**Un Supervised Learning:**Introduction-Unsupervisedvs Supervised Learning-Application of Unsupervised Learning-Clustering-Finding Pattern using Association Rule | **15** | **Chalk &Talk,PPT** |

**Course Designed by: Mrs.P.Rajeswari, & Mrs.K.Sandya**

| Learning Outcome Based Education & Assessment (LOBE)<br>Formative Examination - Blue Print<br>Articulation Mapping – K Levels with Course Outcomes (COs) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Internal** | **Cos** | **K Level** | **Section A** | | **Section B** | | **Section C Either or Choice** | **Section D Open Choice** |
| | | | **MCQs** | | **Short Answers** | | | |
| | | | **No. of. Questions** | **K - Level** | **No. of. Questions** | **K - Level** | | |
| **CIAI** | **CO1** | Up to K3 | 2 | **K1,K2** | 1 | **K2** | **2(K3,K3)** | **1(K3)** |
| | **CO2** | Up to K3 | 2 | **K1,K2** | 2 | **K2** | **2(K3,K3)** | **1(K3)** |
| **CIAII** | **CO3** | Up to K3 | 2 | **K1,K2** | 1 | **K2** | **2(K3,K3)** | **1(K3)** |
| | **CO4** | Up to K4 | 2 | **K1,K2** | 2 | **K2** | **2(K4,K4)** | **1(K4)** |
| **Question Pattern CIA I & II** | | No. of Questions to be asked | **4** | | **3** | | **4** | **2** |
| | | No. of Questions to be answered | **4** | | **3** | | **2** | **1** |
| | | Marks for each question | **1** | | **2** | | **5** | **10** |
| | | Total Marks for each section | **4** | | **6** | | **10** | **10** |

| Distribution of Marks with K Level CIA I & CIA II | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **K Level** | **Section A (Multiple Choice Questions)** | **Section B (Short Answer Questions)** | **Section C (Either / Or Choice)** | **Section D (Open Choice)** | **Total Marks** | **% of (Marks without choice)** | **Consolidate of %** |
| **CIA I** | **K1** | 2 | | - | - | 2 | 4 | 20 |
| | **K2** | 2 | 6 | - | - | 8 | 16 | |
| | **K3** | - | - | 20 | 20 | 40 | 80 | 80 |
| | **K4** | - | - | - | - | - | | |
| | **Marks** | 4 | 6 | 20 | 20 | 50 | 100 | **100** |
| **CIA II** | **K1** | 2 | | - | - | 2 | 4 | 20 |
| | **K2** | 2 | 6 | - | - | 8 | 16 | |
| | **K3** | - | - | 10 | 10 | 20 | 40 | 40 |
| | **K4** | - | - | 10 | 10 | 20 | 40 | 40 |
| | **Marks** | 4 | 6 | 20 | 20 | 50 | | **100** |

**K1**- Remembering and recalling facts with specific answers
**K2**- Basic understanding of facts and stating main ideas with general answers
**K3**- Application oriented- Solving Problems
**K4**- Examining, analyzing, presentation and make inferences with evidences
**CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.**

| Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| S.No | COs | K - Level | MCQs | | Short Answers | | Section C (Either / or Choice) | Section D (Open Choice) |
| | | | No. of Questions | K – Level | No. of Question | K – Level | | |
| 1 | CO1 | **K3** | **2** | **K1,K2** | **1** | **K2** | **2(K3,K3)** | **1(K3)** |
| 2 | CO2 | **K3** | **2** | **K1,K2** | **1** | **K2** | **2(K3,K3)** | **1(K3)** |
| 3 | CO3 | **K3** | **2** | **K1,K2** | **1** | **K2** | **2(K3,K3)** | **1(K3)** |
| 4 | CO4 | **K4** | **2** | **K1,K2** | **1** | **K2** | **2(K4,K4)** | **1(K4)** |
| 5 | CO5 | **K4** | **2** | **K1,K2** | **1** | **K2** | **2(K4,K4)** | **1(K4)** |
| No. of Questions to be Asked | | | **10** | | **5** | | **10** | **5** |
| No.of Questions to be answered | | | **10** | | **5** | | **5** | **3** |
| Marks for each question | | | **1** | | **2** | | **5** | **10** |
| Total Marks for each section | | | **10** | | **10** | | **25** | **30** |
| **(Figures in parenthesis denotes, questions should be asked with the given K level)** | | | | | | | | |

| Distribution of Marks with K Level | | | | | | | |
|---|---|---|---|---|---|---|---|
| K Level | Section A (Multiple Choice Questions) | Section B (Short Answer Questions) | Section C (Either/ or Choice) | Section D ( Open Choice) | Total Marks | % of (Marks without choice) | Consolidated % |
| K1 | 5 | | - | - | 5 | 4.17 | 17 |
| K2 | 5 | 10 | - | - | 15 | 12.5 | |
| K3 | - | - | 30 | 30 | 60 | 50 | 50 |
| K4 | - | - | 20 | 20 | 40 | 33.33 | 33 |
| Marks | 10 | 10 | 50 | 50 | 120 | 100 | 100 |
| **NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.** | | | | | | | |

## Summative Examinations - Question Paper – Format

| **Section A (Multiple Choice Questions)**<br>**Answer All Questions** | | | **(10x1=10 marks)** |
|---|---|---|---|
| **Q.No** | **CO** | **K Level** | **Questions** |
| 1 | CO1 | K1 | |
| 2 | CO1 | K2 | |
| 3 | CO2 | K1 | |
| 4 | CO2 | K2 | |
| 5 | CO3 | K1 | |
| 6 | CO3 | K2 | |
| 7 | CO4 | K1 | |
| 8 | CO4 | K2 | |
| 9 | CO5 | K1 | |
| 10 | CO5 | K2 | |
| **Section B (Short Answers)**<br>**Answer All Questions** | | | **(5x2=10 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 11 | CO1 | K2 | |
| 12 | CO2 | K2 | |
| 13 | CO3 | K2 | |
| 14 | CO4 | K2 | |
| 15 | CO5 | K2 | |
| **Section C (Either/Or Type)**<br>**Answer All Questions** | | | **(5 x 5 = 25 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 16) a | CO1 | K3 | |
| 16) b | CO1 | K3 | |
| 17) a | CO2 | K3 | |
| 17) b | CO2 | K3 | |
| 18) a | CO3 | K3 | |
| 18) b | CO3 | K3 | |
| 19) a | CO4 | K4 | |
| 19) b | CO4 | K4 | |
| 20) a | CO5 | K4 | |
| 20) b | CO5 | K4 | |
| **NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels** | | | |
| **Section D (Open Choice)**<br>**Answer Any Three questions** | | | **(3x10=30 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 21 | CO1 | K3 | |
| 22 | CO2 | K3 | |
| 23 | CO3 | K3 | |
| 24 | CO4 | K4 | |
| 25 | CO5 | K4 | |

**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**
**DEPARTMENT OF COMPUTER SCIENCE**
**(For those who joined in 2021-2022 and after)**

| | | | | |
|---|---|---|---|---|
| **Course Name** | **SOFTWARE TESTING AND QUALITY ASSURANCE** | | | |
| **Course Code** | **21UCSE63** | **L** | **P** | **C** |
| **Category** | **Core Elective** | 5 | - | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Nature of course:** | **EMPLOYABILITY** | ✓ | **SKILL ORIENTED** | ✓ | **ENTREPRENURSHIP** | ✓ |

**Course Objectives:**

- To Introduce the basic concepts of software testing
- To learn the types of bugs, testing levels with which the student can very well identify a bug and correct as when it happen
- To understand the knowledge on transaction flow testing and data flow testing techniques so that the flow of the program is tested as well.
- To learn the domain testing, path testing and logic based testing to explore the testing process easier.
- To understand the concept of Testing and State Graphs.

| **Unit: I** | **Testing Objectives and Overview** | **15 Hours** |
|---|---|---|

Testing Objectives and Overview: Software structure and Software testing Dichotomies – A model for testing Component testing – Integration testing testing – Regression testing Production testing.

| **Unit: II** | **The Taxonomy of Bugs** | **15 Hours** |
|---|---|---|

The Taxonomy of Bugs: Mistakes, bugs and failures – Flow Graphs and Path Testing: Path testing Basics Flow Graph – Arrive at Test Paths Instrumentation – Application of path testing

| **Unit: III** | **Transaction Flow Testing** | **15 Hours** |
|---|---|---|

Transaction Flow Testing: Control flow chart and structure, Data and Transaction testing Software functionality and Transactions Basics of Data flow testing – usage – Data Flow Dynamic Anomaly detection – Data Flow graph testing Techniques – Strategies for Data flow testing – Test strategies – Application of Data flow testing.

| **Unit: IV** | **Domain testing:** | **15 Hours** |
|---|---|---|

Domain testing: Boundary value analysis – Equivalent partitioning - Boundary value analysis vs Equivalent partitioning – I/O Domain testing – Comparison testing – Domains and Interface testing – Domains and testability. Paths, Path Products and Regular Expression: Concepts – Procedure – Application – Regular Expression and Flow Anomaly Detection.

| **Unit: V** | **Logic Based testing** | **15 Hours** |
|---|---|---|

Logic Based testing: Decision tables – Decision tables in Functional testing – Decision tables in Structural testing – Predicates and relational operators – Boolean algebra – Test case Design using Boolean algebra – Prime implicants. States, State Graphs and Transaction Testing: Object oriented systems and State graphs – State graph – General Properties – Good/Bad State Graph – Bugs in State graph – The Role of State graph – Strategies for State Graph based testing – State graph based test design- An example – Testability tips.

| | **Total Lecture Hours** | **75 Hrs** |
|---|---|---|

**Books for Study:**

1. ArunkumarKhannur, Software Testing – Techniques and Applications, Pearson, New Delhi, 2011.

**Books for References:**

1. Boris Beizer, Software Testing Techniques, Dream Tech Press, New Delhi, 2005.

2. Aditya Mathur.P, Foundations of Software Testing, 2 nd Edition, Pearson Education, New Delhi, 2013.
3. Nina S. Godbole, Software Quality Assurance: Principles and Practice, 1st Edition, Alpha Science, United Kingdom, 2004

**Web Resources:**

1. https://ebooks.lpude.in/computer_application/mca/term_3/DCAP503_SOFTWARE_TESTING AND_QUALITY_ASSURANCE.pdf
2. https://www.techbooster.co.in/images/mydock/b271553252e6b05e41bb6f116bf29628.pdf
3. https://www.cs.purdue.edu/homes/apm/FoundationsBookSecondEdition/Slides/ConsolidatedSlides.pdf
4. https://mrcet.com/downloads/digital_notes/CSE/III%20Year/Software%20Testing%20Methodologies.pdf

| Course Outcomes | | K Level |
|---|---|---|
| CO1: | Understand the Software Structure and Software Testing Models | K3 |
| CO2: | Understand and identify various software testing bugs and correcting them after knowing the consequences of the bug | K3 |
| CO3: | Understand and identify various software testing problems, and solve these problems by designing and selecting software test models, criteria, strategies, and methods. | K3 |
| CO4: | Analysis of Domain Values, Partitioning, Comparison in Testing a software to detect the flow of Anomalies | K4 |
| CO5: | Performing Functional Testing using Control flow and transaction Flow graphs. | K4 |

**CO & PO Mapping:**

| COS | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 |
|---|---|---|---|---|---|---|
| CO 1 | 2 | 3 | 1 | 2 | 3 | 3 |
| CO 2 | 2 | 2 | 3 | 2 | 2 | 3 |
| CO 3 | 3 | 2 | 2 | 2 | 2 | 3 |
| CO 4 | 1 | 3 | 2 | 2 | 3 | 3 |
| CO5 | 1 | 3 | 2 | 2 | 3 | 3 |

***3 –** Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

## LESSON PLAN

| Unit | Software Testing and Quality Assurance | Hrs | Pedagogy |
|---|---|---|---|
| I | Testing Objectives and Overview: Software structure and Software testing Dichotomies – A model for testing Component testing – Integration testing testing – Regression testing Production testing. | 15 | Chalk & Talk, ICT Kit |
| II | The Taxonomy of Bugs: Mistakes, bugs and failures – Flow Graphs and Path Testing: Path testing Basics Flow Graph – Arrive at Test Paths Instrumentation – Application of path testing | 15 | Chalk & Talk, ICT Kit |
| III | Transaction Flow Testing: Control flow chart and structure, Data and Transaction testing Software functionality and Transactions Basics of Data flow testing – usage – Data Flow Dynamic Anomaly detection – Data Flow graph testing Techniques – Strategies for Data flow testing – Test strategies – Application of Data flow testing | 15 | Chalk & Talk, ICT Kit |
| IV | Domain testing: Boundary value analysis – Equivalent partitioning - Boundary value analysis vs Equivalent partitioning – I/O Domain testing – Comparison testing – Domains and Interface testing – Domains and testability. Paths, Path Products and Regular Expression: Concepts – Procedure – Application – Regular Expression and Flow Anomaly Detection. | 15 | Chalk & Talk, ICT Kit |
| V | Logic Based testing: Decision tables – Decision tables in Functional testing – Decision tables in Structural testing – Predicates and relational operators – Boolean algebra – Test case Design using Boolean algebra – Prime implicants. States, State Graphs and Transaction Testing: Object oriented systems and State graphs – State graph – General Properties – Good/Bad State Graph – Bugs in State graph – The Role of State graph – Strategies for State Graph based testing – State graph based test design- An example – Testability tips. | 15 | Chalk & Talk, ICT Kit |

**Course Designed by: N.Hemavathi &Mr.M.Selvakumar**

| Learning Outcome Based Education & Assessment (LOBE)<br>Formative Examination - Blue Print<br>Articulation Mapping – K Levels with Course Outcomes (COs) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Internal** | **Cos** | **K Level** | **Section A** | | **Section B** | | **Section C Either or Choice** | **Section D Open Choice** |
| | | | **MCQs** | | **Short Answers** | | | |
| | | | **No. of. Questions** | **K - Level** | **No. of. Questions** | **K - Level** | | |
| **CIA I** | **CO1** | Up to K3 | 2 | **K1,K2** | 1 | **K2** | **2(K3,K3)** | **1(K3)** |
| | **CO2** | Up to K3 | 2 | **K1,K2** | 2 | **K2** | **2(K3,K3)** | **1(K3)** |
| **CIA II** | **CO3** | Up to K3 | 2 | **K1,K2** | 1 | **K2** | **2(K3,K3)** | **1(K3)** |
| | **CO4** | Up to K4 | 2 | **K1,K2** | 2 | **K2** | **2(K4,K4)** | **1(K4)** |
| **Question Pattern CIA I & II** | | No. of Questions to be asked | **4** | | **3** | | **4** | **2** |
| | | No. of Questions to be answered | **4** | | **3** | | **2** | **1** |
| | | Marks for each question | **1** | | **2** | | **5** | **10** |
| | | Total Marks for each section | **4** | | **6** | | **10** | **10** |

| Distribution of Marks with K Level CIA I & CIA II | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **K Level** | **Section A (Multiple Choice Questions)** | **Section B (Short Answer Questions)** | **Section C (Either / Or Choice)** | **Section D (Open Choice)** | **Total Marks** | **% of (Marks without choice)** | **Consolidate of %** |
| **CIA I** | **K1** | 2 | | - | - | 2 | 4 | 20 |
| | **K2** | 2 | 6 | - | - | 8 | 16 | |
| | **K3** | - | - | 20 | 20 | 40 | 80 | 80 |
| | **K4** | - | - | - | - | - | | |
| | **Marks** | 4 | 6 | 20 | 20 | 50 | 100 | **100** |
| **CIA II** | **K1** | 2 | | - | - | 2 | 4 | 20 |
| | **K2** | 2 | 6 | - | - | 8 | 16 | |
| | **K3** | - | - | 10 | 10 | 20 | 40 | 40 |
| | **K4** | - | - | 10 | 10 | 20 | 40 | 40 |
| | **Marks** | 4 | 6 | 20 | 20 | 50 | | **100** |

**K1**- Remembering and recalling facts with specific answers
**K2**- Basic understanding of facts and stating main ideas with general answers
**K3**- Application oriented- Solving Problems
**K4**- Examining, analyzing, presentation and make inferences with evidences
**CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.**

| Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| S.No | COs | K - Level | MCQs | | Short Answers | | Section C (Either / or Choice) | Section D (Open Choice) |
| | | | No. of Questions | K – Level | No. of Question | K – Level | | |
| 1 | CO1 | **K3** | **2** | **K1,K2** | **1** | **K2** | **2(K3,K3)** | **1(K3)** |
| 2 | CO2 | **K3** | **2** | **K1,K2** | **1** | **K2** | **2(K3,K3)** | **1(K3)** |
| 3 | CO3 | **K3** | **2** | **K1,K2** | **1** | **K2** | **2(K3,K3)** | **1(K3)** |
| 4 | CO4 | **K4** | **2** | **K1,K2** | **1** | **K2** | **2(K4,K4)** | **1(K4)** |
| 5 | CO5 | **K4** | **2** | **K1,K2** | **1** | **K2** | **2(K4,K4)** | **1(K4)** |
| No. of Questions to be Asked | | | **10** | | **5** | | **10** | **5** |
| No.of Questions to be answered | | | **10** | | **5** | | **5** | **3** |
| Marks for each question | | | **1** | | **2** | | **5** | **10** |
| Total Marks for each section | | | **10** | | **10** | | **25** | **30** |
| **(Figures in parenthesis denotes, questions should be asked with the given K level)** | | | | | | | | |

| Distribution of Marks with K Level | | | | | | | |
|---|---|---|---|---|---|---|---|
| K Level | Section A (Multiple Choice Questions) | Section B (Short Answer Questions) | Section C (Either/ or Choice) | Section D ( Open Choice) | Total Marks | % of (Marks without choice) | Consolidated % |
| K1 | 5 | | - | - | 5 | 4.17 | 17 |
| K2 | 5 | 10 | - | - | 15 | 12.5 | |
| K3 | - | - | 30 | 30 | 60 | 50 | 50 |
| K4 | - | - | 20 | 20 | 40 | 33.33 | 33 |
| Marks | 10 | 10 | 50 | 50 | 120 | 100 | 100 |
| **NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.** | | | | | | | |

## Summative Examinations - Question Paper – Format

| **Section A (Multiple Choice Questions)**<br>**Answer All Questions** | | | **(10x1=10 marks)** |
|---|---|---|---|
| **Q.No** | **CO** | **K Level** | **Questions** |
| 1 | CO1 | K1 | |
| 2 | CO1 | K2 | |
| 3 | CO2 | K1 | |
| 4 | CO2 | K2 | |
| 5 | CO3 | K1 | |
| 6 | CO3 | K2 | |
| 7 | CO4 | K1 | |
| 8 | CO4 | K2 | |
| 9 | CO5 | K1 | |
| 10 | CO5 | K2 | |
| **Section B (Short Answers)**<br>**Answer All Questions** | | | **(5x2=10 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 11 | CO1 | K2 | |
| 12 | CO2 | K2 | |
| 13 | CO3 | K2 | |
| 14 | CO4 | K2 | |
| 15 | CO5 | K2 | |
| **Section C (Either/Or Type)**<br>**Answer All Questions** | | | **(5 x 5 = 25 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 16) a | CO1 | K3 | |
| 16) b | CO1 | K3 | |
| 17) a | CO2 | K3 | |
| 17) b | CO2 | K3 | |
| 18) a | CO3 | K3 | |
| 18) b | CO3 | K3 | |
| 19) a | CO4 | K4 | |
| 19) b | CO4 | K4 | |
| 20) a | CO5 | K4 | |
| 20) b | CO5 | K4 | |
| **NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels** | | | |
| **Section D (Open Choice)**<br>**Answer Any Three questions** | | | **(3x10=30 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 21 | CO1 | K3 | |
| 22 | CO2 | K3 | |
| 23 | CO3 | K3 | |
| 24 | CO4 | K4 | |
| 25 | CO5 | K4 | |

**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**
**DEPARTMENT OF COMPUTER SCIENCE**
**(For those who joined in 2021-2022 and after)**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Course Name** | **BIG DATA ANALYTICS** | | | | | | | |
| **Course Code** | **21UCSE64** | | | | | **L** | **P** | **C** |
| **Category** | **Core Elective** | | | | | 5 | - | 5 |
| **Nature of course:** | **EMPLOYABILITY** | ✓ | **SKILL ORIENTED** | ✓ | **ENTREPRENEURSHIP** | | | ✓ |

**Course Objectives:**

- To provide an overview of an exciting growing field of big data analytics.
- To introduce the tools required to manage and analyze big data like Hadoop, NoSqlMap Reduce.
- To teach the fundamental techniques and principles in achieving big data analytics withscalability and streaming capability.
- To enable students to have skills that will help them to solve complex real-world problemsin for decision support.
- To understand the concept of MongoDB.

| **Unit: I** | **Introduction to Big Data** | **15 Hours** |
|---|---|---|

**Introduction to Big Data:**
Characteristics of Data – Evolution of Big Data – Definition of Big Data Challenges in Big Data – Big Data definition – Other characteristics of Data Need of Big Data – Traditional Business Intelligence (BI) vs Big Data – A typical Data Warehouse environment – A typical Hadoop environment – Newthings - Changes - Realms of Big Data **Types of Digital Data:** Classification of Digital Data**.**

| **Unit: II** | **Big Data Analytics** | **15 Hours** |
|---|---|---|

**Big Data Analytics:** Big Data Analytics – Classification of Analytics – Greatest challenges that prevent business from capitalizing on Big Data – Top challenges facing Big Data – Importance of Big Data Analytics – Data Science – Data Scientist – Terminologies used in Big Data Environment – BASE – Analytics tool.

| **Unit: III** | **The Big Data Technology Landscape** | **15 Hours** |
|---|---|---|

**The Big Data Technology Landscape:** NoSQL – Types of NoSQL Database – Need of NoSQL? – Advantages of NoSQL – Use of NoSQL in Industry – SQL vsNoSQL – Comparison of SQL, NoSQL and NewSQL. **Hadoop:** Features of Hadoop – Advantages of Hadoop – Overview of Hadoop – Hadoop distribution – Hadoopvs SQL – Integrated Hadoop System – Cloud-Based Hadoop Solutions.

| **Unit: IV** | **Introduction to Hadoop** | **15 Hours** |
|---|---|---|

**Introduction to Hadoop:** Introducing Hadoop – Need of Hadoop – Need of RDBMS – RDBMS vsHadoop – Distributed computing challenges – History of Hadoop – Hadoop overview – Use case of Hadoop – Hadoop distribution –HDFS – Processing data with Hadoop – Managing resources and Application with Hadoop YARN – Interacting with Hadoop Ecosystem

| **Unit: V** | **Introduction to MangoDB & Machine Learning** | **15 Hours** |
|---|---|---|

**Introduction to MangoDB:** What is MangoDB – Why MangoDB – Terms used in RDBMS and MangoDB – Data types in MangoDB -MangoDB querylanguage.
**Introduction to Machine Learning:** Introduction – Machine Learning Definition – Machine Learning Algorithms – Regression Model – Linear Regression – Clustering – Collaborative Filtering – Association Rule Mining – Decision Tree.

| | | |
|---|---|---|
| | **Total Lecture Hours** | **75 Hrs** |

**Books for Study:**

**1.** Seema Acharya, Subhashini Chellappan, Big Data and Analytics, Wiley, 2015, New Delhi.
Unit I - Chapter 1(Full), Chapter 2.1 To 2.7, 2.9 To 2.13
Unit II - Chapter 3.2,3.5 To 3.8,3.10 To 3.14.

Unit III - Chapter 4(Full).

Unit IV- Chapter 5(Full)

Unit V- Chapter 6(Full), Chapter 12(Full).

**Books for References:**

**1.** DT Editorial Services, Big Data, Black book, Ninth Edition, Dreamtech, 2016, New Delhi.

**2.** Michael Minelli, Michele Chambers, AmbigaDhiraj, Big Data, Big Analytics, Wiley, 2016,New Delhi.

**3.** Field Cady, The Data Science Handbook, Wiley, 1st Edition, 2017.

**Web Resources:**

**Related Online Contents (MOOC, SWAYAM, NPTEL, Websites etc.)**

**1.https://www.slideshare.net/mohitsainirke/big-data-lecture-notes**
**2.https://www.ntnu.no/iie/fag/big/lessons/lesson1.pdf**
**3.https://www.tutorialspoint.com/big_data_analytics/big_data_analytics_pdf_version.htm**

| **Course Outcomes** | | **K Level** |
|---|---|---|
| **CO1** | Understand the key issues in big data management and its associated applications in intelligent business and scientific computing. | **K3** |
| **CO2** | Acquire fundamental enabling techniques and scalable algorithms like Hadoop, Map Reduce and NO SQL in big data analytics. | **K3** |
| **CO3** | Interpret business models and scientific computing paradigms, and apply software tools for big data analytics. | **K3** |
| **CO4** | Achieve adequate perspectives of big data analytics in various applications like recommender systems, social media applications etc. | **K4** |
| **CO5** | Ability to understand and apply scaling up machine learning techniques and associated computing techniques and technologies | **K4** |

**CO & PO Mapping:**

| COS | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 |
|---|---|---|---|---|---|---|
| CO 1 | 3 | 1 | 2 | 2 | 3 | 3 |
| CO 2 | 2 | 2 | 3 | 2 | 2 | 3 |
| CO 3 | 2 | 2 | 3 | 2 | 2 | 3 |
| CO 4 | 2 | 3 | 2 | 2 | 2 | 3 |
| CO5 | 2 | 3 | 2 | 2 | 2 | 3 |

***3 –** Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

## LESSON PLAN

| Unit | Big Data Analytics | Hrs | Pedagogy |
|---|---|---|---|
| I | **Introduction to Big Data:** Characteristics of Data – Evolution of Big Data – Definition of Big Data Challenges in Big Data – Big Data definition – Other characteristics of Data<br>Need of Big Data – Traditional Business Intelligence (BI) vs Big Data – A typical Data Warehouse environment – A typical Hadoop environment – Newthings - Changes - Realms of Big Data.<br>**Types of Digital Data:** Classification of Digital Data**.** | 15 | **Chalk & Talk, ICT Kit** |
| II | **Big Data Analytics:** Big Data Analytics – Classification of Analytics – Greatest challenges that prevent business from capitalizing on Big Data – Top challenges facing Big Data – Importance of Big Data Analytics – Data Science – Data Scientist – Terminologies used in Big Data Environment – BASE –Analytics tool. | 15 | **Chalk & Talk, ICT Kit** |
| III | **The Big Data Technology Landscape:** NoSQL – Types of NoSQL Database – Need of NoSQL? – Advantages of NoSQL – Use of NoSQL in Industry – SQL vsNoSQL – Comparison of SQL, NoSQL and NewSQL.<br>**Hadoop:** Features of Hadoop – Advantages of Hadoop – Overview of Hadoop – Hadoop distribution – Hadoopvs SQL – Integrated Hadoop System – Cloud-Based Hadoop Solutions. | 15 | **Chalk & Talk, ICT Kit** |
| IV | **Introduction to Hadoop:** Introducing Hadoop – Need of Hadoop – Need of RDBMS – RDBMS vsHadoop – Distributed computing challenges – History of Hadoop – Hadoop overview – Use case of Hadoop – Hadoop distribution –HDFS – Processing data with Hadoop – Managing resources and Application with Hadoop YARN – Interacting with Hadoop Ecosystem | 15 | **Chalk & Talk, ICT Kit** |
| V | **Introduction to MangoDB:** What is MangoDB – Why MangoDB – Terms used in RDBMS and MangoDB – Data types in MangoDB - MangoDB querylanguage. **Introduction to Machine Learning:** Introduction – Machine Learning Definition – Machine Learning Algorithms – Regression Model – Linear Regression – Clustering – Collaborative Filtering – Association Rule Mining – Decision Tree. | 15 | **Chalk & Talk, ICT Kit** |

**Course Designed byMrs.K.Sandya & Mrs.P,Rajeswari**

| Learning Outcome Based Education & Assessment (LOBE)<br>Formative Examination - Blue Print<br>Articulation Mapping – K Levels with Course Outcomes (COs) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Internal** | **Cos** | **K Level** | **Section A** | | **Section B** | | **Section C Either or Choice** | **Section D Open Choice** |
| | | | **MCQs** | | **Short Answers** | | | |
| | | | **No. of. Questions** | **K - Level** | **No. of. Questions** | **K - Level** | | |
| **CIA I** | **CO1** | Up to K3 | 2 | **K1,K2** | 1 | **K2** | **2(K3,K3)** | **1(K3)** |
| | **CO2** | Up to K3 | 2 | **K1,K2** | 2 | **K2** | **2(K3,K3)** | **1(K3)** |
| **CIA II** | **CO3** | Up to K3 | 2 | **K1,K2** | 1 | **K2** | **2(K3,K3)** | **1(K3)** |
| | **CO4** | Up to K4 | 2 | **K1,K2** | 2 | **K2** | **2(K4,K4)** | **1(K4)** |
| **Question Pattern CIA I & II** | | No. of Questions to be asked | **4** | | **3** | | **4** | **2** |
| | | No. of Questions to be answered | **4** | | **3** | | **2** | **1** |
| | | Marks for each question | **1** | | **2** | | **5** | **10** |
| | | Total Marks for each section | **4** | | **6** | | **10** | **10** |

| Distribution of Marks with K Level CIA I & CIA II | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **K Level** | **Section A (Multiple Choice Questions)** | **Section B (Short Answer Questions)** | **Section C (Either / Or Choice)** | **Section D (Open Choice)** | **Total Marks** | **% of (Marks without choice)** | **Consolidate of %** |
| **CIA I** | **K1** | 2 | | - | - | 2 | 4 | 20 |
| | **K2** | 2 | 6 | - | - | 8 | 16 | |
| | **K3** | - | - | 20 | 20 | 40 | 80 | 80 |
| | **K4** | - | - | - | - | - | | |
| | **Marks** | 4 | 6 | 20 | 20 | 50 | 100 | **100** |
| **CIA II** | **K1** | 2 | | - | - | 2 | 4 | 20 |
| | **K2** | 2 | 6 | - | - | 8 | 16 | |
| | **K3** | - | - | 10 | 10 | 20 | 40 | 40 |
| | **K4** | - | - | 10 | 10 | 20 | 40 | 40 |
| | **Marks** | 4 | 6 | 20 | 20 | 50 | | **100** |

**K1**- Remembering and recalling facts with specific answers
**K2**- Basic understanding of facts and stating main ideas with general answers
**K3**- Application oriented- Solving Problems
**K4**- Examining, analyzing, presentation and make inferences with evidences
**CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.**

| Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| S.No | COs | K - Level | MCQs | | Short Answers | | Section C (Either / or Choice) | Section D (Open Choice) |
| | | | No. of Questions | K – Level | No. of Question | K – Level | | |
| 1 | CO1 | **K3** | **2** | **K1,K2** | **1** | **K2** | **2(K3,K3)** | **1(K3)** |
| 2 | CO2 | **K3** | **2** | **K1,K2** | **1** | **K2** | **2(K3,K3)** | **1(K3)** |
| 3 | CO3 | **K3** | **2** | **K1,K2** | **1** | **K2** | **2(K3,K3)** | **1(K3)** |
| 4 | CO4 | **K4** | **2** | **K1,K2** | **1** | **K2** | **2(K4,K4)** | **1(K4)** |
| 5 | CO5 | **K4** | **2** | **K1,K2** | **1** | **K2** | **2(K4,K4)** | **1(K4)** |
| No. of Questions to be Asked | | | **10** | | **5** | | **10** | **5** |
| No.of Questions to be answered | | | **10** | | **5** | | **5** | **3** |
| Marks for each question | | | **1** | | **2** | | **5** | **10** |
| Total Marks for each section | | | **10** | | **10** | | **25** | **30** |
| **(Figures in parenthesis denotes, questions should be asked with the given K level)** | | | | | | | | |

| Distribution of Marks with K Level | | | | | | | |
|---|---|---|---|---|---|---|---|
| **K Level** | **Section A (Multiple Choice Questions)** | **Section B (Short Answer Questions)** | **Section C (Either/ or Choice)** | **Section D ( Open Choice)** | **Total Marks** | **% of (Marks without choice)** | **Consolidated %** |
| K1 | 5 | | - | - | 5 | 4.17 | 17 |
| K2 | 5 | 10 | - | - | 15 | 12.5 | |
| K3 | - | - | 30 | 30 | 60 | 50 | 50 |
| K4 | - | - | 20 | 20 | 40 | 33.33 | 33 |
| Marks | 10 | 10 | 50 | 50 | 120 | 100 | 100 |
| **NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.** | | | | | | | |

## Summative Examinations - Question Paper – Format

| **Section A (Multiple Choice Questions)**<br>**Answer All Questions** | | | **(10x1=10 marks)** |
|---|---|---|---|
| **Q.No** | **CO** | **K Level** | **Questions** |
| 1 | CO1 | K1 | |
| 2 | CO1 | K2 | |
| 3 | CO2 | K1 | |
| 4 | CO2 | K2 | |
| 5 | CO3 | K1 | |
| 6 | CO3 | K2 | |
| 7 | CO4 | K1 | |
| 8 | CO4 | K2 | |
| 9 | CO5 | K1 | |
| 10 | CO5 | K2 | |
| **Section B (Short Answers)**<br>**Answer All Questions** | | | **(5x2=10 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 11 | CO1 | K2 | |
| 12 | CO2 | K2 | |
| 13 | CO3 | K2 | |
| 14 | CO4 | K2 | |
| 15 | CO5 | K2 | |
| **Section C (Either/Or Type)**<br>**Answer All Questions** | | | **(5 x 5 = 25 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 16) a | CO1 | K3 | |
| 16) b | CO1 | K3 | |
| 17) a | CO2 | K3 | |
| 17) b | CO2 | K3 | |
| 18) a | CO3 | K3 | |
| 18) b | CO3 | K3 | |
| 19) a | CO4 | K4 | |
| 19) b | CO4 | K4 | |
| 20) a | CO5 | K4 | |
| 20) b | CO5 | K4 | |
| **NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels** | | | |
| **Section D (Open Choice)**<br>**Answer Any Three questions** | | | **(3x10=30 marks)** |
| **Q.No** | **CO** | **K Level** | **Questions** |
| 21 | CO1 | K3 | |
| 22 | CO2 | K3 | |
| 23 | CO3 | K3 | |
| 24 | CO4 | K4 | |
| 25 | CO5 | K4 | |

**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**
**DEPARTMENT OF COMPUTER SCIENCE**
**(For those who joined in 2021-2022 and after)**

| | | | | |
|---|---|---|---|---|
| **Course Name** | **OPEN SOURCE TECHNOLOGIES** | | | |
| **Course Code** | **21UCSE65** | **L** | **P** | **C** |
| **Category** | **Core Elective** | 5 | - | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Nature of course:** | **EMPLOYABILITY** | ✓ | **SKILL ORIENTED** | ✓ | **ENTREPRENURSHIP** | ✓ |

**Course Objectives:**

- To know the basic concept and Techniques Client Server computing.
- To provide a basic idea of Open source technology, their software development process to understand the role and future of open source software in the industry.
- To understand the concepts of open source technology ethics.
- To recognize the benefits and features of Open Source Technology and to interpret, contrast and compare open source products among themselves.
- To understand the concept of Open Source Technology Ethics.

| | | |
|---|---|---|
| **Unit: I** | **Introduction to Open Source Technologies** | **15** |

Introduction–WhyOpenSource–OpenSource–Principles,StandardsRequirements,Successes –Free Software–FOSS–Internet Application Projects

| | | |
|---|---|---|
| **Unit: II** | **Open Source Technology Methodologies** | **15** |

**Open Source Technology Methodologies**: Open source – Initiatives, Principles, Methodologies, Philosophy, Platform, Freedom, OSSD, Licenses–Copyright, Copy left, Patent, Zero Marginal Technologies, Income generation opportunities, Internalization.

| | | |
|---|---|---|
| **Unit: III** | **Case Studies of Linux, Mozilla(Firebox)** | **15** |

CaseStudies–Apache,BSD,Linux,Mozilla(Firefox),Wikipedia,Joomla,GCC,OpenOffice.

| | | |
|---|---|---|
| **Unit: IV** | **Open Source Technology Hardware and Design** | **15** |

Open Source Project –Starting, Maintaining –Open Source – Hardware, Design, Teaching & Media.

| | | |
|---|---|---|
| **Unit: V** | **Open Source Technology Ethics** | **15** |

Open Source Ethics – Open Vs Closed Source – Government – Ethics – Impact of Open Source Technology–Shared Software–Shared Source.

| | | |
|---|---|---|
| | **Total Lecture Hours** | **75 Hrs** |

**Books for Study:**

**1.**KailashVadera,BhavyeshGandhi,"*OpenSourceTechnology*",LaxmiPublicationsPvtLtd2012,1stEdition.

**Books for References:**

2. Fadi P.Deekand James A.M.McHugh, "*Open Source: Technology and Policy*", Cambridge Universities Press 2007.
2. Open Source Technology, Kalash Yadera, Bhabesh Gandhi, Lakshmi Publications Pvt Ltd., First Edition, 2019.
3. Introduction to open source system, Naira Shah, Orange Books Publication, First Edition, 2021.

**Web Resources:**

1. **https://www.coursera.org/learn/open-source-software-development-methods**
2. **https://www.slideshare.net/priyakb532/open-source-technology-37688490**

| | |
|---|---|
| 3. | https://www.slideserve.com/zeke/an-introduction-to-open-source-software-powerpoint-ppt-presentation |

| Course Outcomes | | K Level |
|---|---|---|
| CO1: | Understand the students about Open Source Technology method | K3 |
| CO2: | Implement Open Source Method using Principles and Platforms | K3 |
| CO3: | Do Case Study of Apache, Linux, | K3 |
| CO4: | Understand Open Source Design and Hardware. | K4 |
| CO5: | Know Open Source ETHICS. | K4 |

**CO & PO Mapping:**

| COS | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 |
|---|---|---|---|---|---|---|
| CO 1 | 1 | 2 | 2 | 3 | 3 | 3 |
| CO 2 | 2 | 3 | 2 | 2 | 2 | 3 |
| CO 3 | 3 | 3 | 2 | 2 | 1 | 3 |
| CO 4 | 3 | 2 | 3 | 1 | 2 | 3 |
| CO5 | 2 | 3 | 3 | 2 | 3 | 3 |

***3 –** Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

**LESSON PLAN**

| Unit | Open Source Technologies | Hrs | Pedagogy |
|---|---|---|---|
| I | Introduction – Why Open Source – Open Source –Principles, Standards Requirements,Successes –Free Software–FOSS–Internet Application Projects | 15 | Chalk & Talk, ICT Kit |
| II | Open Source Technology Methodologies: Open source – Initiatives, Principles, Methodologies, Philosophy, Platform, Freedom, OSSD,Licenses–Copyright, Copyleft, Patent, Zero Marginal Technologies, Incomegenerationopportunities,Internalization | 15 | Chalk & Talk, ICT Kit |
| III | CaseStudies –Apache, BSD, Linux, Mozilla(Firefox), Wikipedia, Joomla, GCC,OpenOffice. | 15 | Chalk & Talk, ICT Kit |
| IV | Open Source Project –Starting, Maintaining –Open Source – Hardware, Design, Teaching & Media | 15 | Chalk & Talk, ICT Kit |
| V | Open Source Ethics – Open Vs Closed Source – Government – Ethics – Impact of Open Source Technology–Shared Software–Shared Source. | 15 | Chalk & Talk, ICT Kit |

**Course Designed by: Mr.M.Selvakumar & Mrs. N.Hemavathi**

| Learning Outcome Based Education & Assessment (LOBE)<br>Formative Examination - Blue Print<br>Articulation Mapping – K Levels with Course Outcomes (COs) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Internal** | **Cos** | **K Level** | **Section A** | | **Section B** | | **Section C Either or Choice** | **Section D Open Choice** |
| | | | **MCQs** | | **Short Answers** | | | |
| | | | **No. of. Questions** | **K - Level** | **No. of. Questions** | **K - Level** | | |
| **CIA I** | **CO1** | Up to K3 | 2 | **K1,K2** | 1 | **K2** | **2(K3,K3)** | **1(K3)** |
| | **CO2** | Up to K3 | 2 | **K1,K2** | 2 | **K2** | **2(K3,K3)** | **1(K3)** |
| **CIA II** | **CO3** | Up to K3 | 2 | **K1,K2** | 1 | **K2** | **2(K3,K3)** | **1(K3)** |
| | **CO4** | Up to K4 | 2 | **K1,K2** | 2 | **K2** | **2(K4,K4)** | **1(K4)** |
| **Question Pattern CIA I & II** | | No. of Questions to be asked | **4** | | **3** | | **4** | **2** |
| | | No. of Questions to be answered | **4** | | **3** | | **2** | **1** |
| | | Marks for each question | **1** | | **2** | | **5** | **10** |
| | | Total Marks for each section | **4** | | **6** | | **10** | **10** |

| Distribution of Marks with K Level CIA I & CIA II | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **K Level** | **Section A (Multiple Choice Questions)** | **Section B (Short Answer Questions)** | **Section C (Either / Or Choice)** | **Section D (Open Choice)** | **Total Marks** | **% of (Marks without choice)** | **Consolidate of %** |
| **CIA I** | **K1** | 2 | | - | - | 2 | 4 | 20 |
| | **K2** | 2 | 6 | - | - | 8 | 16 | |
| | **K3** | - | - | 20 | 20 | 40 | 80 | 80 |
| | **K4** | - | - | - | - | - | | |
| | **Marks** | 4 | 6 | 20 | 20 | 50 | 100 | **100** |
| **CIA II** | **K1** | 2 | | - | - | 2 | 4 | 20 |
| | **K2** | 2 | 6 | - | - | 8 | 16 | |
| | **K3** | - | - | 10 | 10 | 20 | 40 | 40 |
| | **K4** | - | - | 10 | 10 | 20 | 40 | 40 |
| | **Marks** | 4 | 6 | 20 | 20 | 50 | | **100** |

**K1**- Remembering and recalling facts with specific answers
**K2**- Basic understanding of facts and stating main ideas with general answers
**K3**- Application oriented- Solving Problems
**K4**- Examining, analyzing, presentation and make inferences with evidences
**CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.**

| Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| S. No | COs | K - Level | MCQs | | Short Answers | | Section C (Either / or Choice) | Section D (Open Choice) |
| | | | No. of Questions | K – Level | No. of Question | K – Level | | |
| 1 | CO1 | K3 | 2 | K1,K2 | 1 | K2 | 2(K3,K3) | 1(K3) |
| 2 | CO2 | K3 | 2 | K1,K2 | 1 | K2 | 2(K3,K3) | 1(K3) |
| 3 | CO3 | K3 | 2 | K1,K2 | 1 | K2 | 2(K3,K3) | 1(K3) |
| 4 | CO4 | K4 | 2 | K1,K2 | 1 | K2 | 2(K4,K4) | 1(K4) |
| 5 | CO5 | K4 | 2 | K1,K2 | 1 | K2 | 2(K4,K4) | 1(K4) |
| No. of Questions to be Asked | | | 10 | | 5 | | 10 | 5 |
| No. of Questions to be answered | | | 10 | | 5 | | 5 | 3 |
| Marks for each question | | | 1 | | 2 | | 5 | 10 |
| Total Marks for each section | | | 10 | | 10 | | 25 | 30 |
| (Figures in parenthesis denotes, questions should be asked with the given K level) | | | | | | | | |

| Distribution of Marks with K Level | | | | | | | |
|---|---|---|---|---|---|---|---|
| K Level | Section A (Multiple Choice Questions) | Section B (Short Answer Questions) | Section C (Either/ or Choice) | Section D ( Open Choice) | Total Marks | % of (Marks without choice) | Consolidated % |
| K1 | 5 | | - | - | 5 | 4.17 | 17 |
| K2 | 5 | 10 | - | - | 15 | 12.5 | |
| K3 | - | - | 30 | 30 | 60 | 50 | 50 |
| K4 | - | - | 20 | 20 | 40 | 33.33 | 33 |
| Marks | 10 | 10 | 50 | 50 | 120 | 100 | 100 |
| **NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.** | | | | | | | |

## Summative Examinations - Question Paper – Format

| **Section A (Multiple Choice Questions)**<br>**Answer All Questions** | | | **(10x1=10 marks)** |
|---|---|---|---|
| **Q. No** | **CO** | **K Level** | **Questions** |
| 1 | CO1 | K1 | |
| 2 | CO1 | K2 | |
| 3 | CO2 | K1 | |
| 4 | CO2 | K2 | |
| 5 | CO3 | K1 | |
| 6 | CO3 | K2 | |
| 7 | CO4 | K1 | |
| 8 | CO4 | K2 | |
| 9 | CO5 | K1 | |
| 10 | CO5 | K2 | |
| **Section B (Short Answers)**<br>**Answer All Questions** | | | **(5x2=10 marks)** |
| **Q. No** | **CO** | **K Level** | **Questions** |
| 11 | CO1 | K2 | |
| 12 | CO2 | K2 | |
| 13 | CO3 | K2 | |
| 14 | CO4 | K2 | |
| 15 | CO5 | K2 | |
| **Section C (Either/Or Type)**<br>**Answer All Questions** | | | **(5 x 5 = 25 marks)** |
| **Q. No** | **CO** | **K Level** | **Questions** |
| 16) a | CO1 | K3 | |
| 16) b | CO1 | K3 | |
| 17) a | CO2 | K3 | |
| 17) b | CO2 | K3 | |
| 18) a | CO3 | K3 | |
| 18) b | CO3 | K3 | |
| 19) a | CO4 | K4 | |
| 19) b | CO4 | K4 | |
| 20) a | CO5 | K4 | |
| 20) b | CO5 | K4 | |
| **NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels** | | | |
| **Section D (Open Choice)**<br>**Answer Any Three questions** | | | **(3x10=30 marks)** |
| **Q. No** | **CO** | **K Level** | **Questions** |
| 21 | CO1 | K3 | |
| 22 | CO2 | K3 | |
| 23 | CO3 | K3 | |
| 24 | CO4 | K4 | |
| 25 | CO5 | K4 | |

**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**
**DEPARTMENT OF COMPUTER SCIENCE**
**(For those who joined in 2021-2022 and after)**

| | | | | |
|---|---|---|---|---|
| **Course Name** | **CLIENT SERVER COMPUTING** | | | |
| **Course Code** | **21UCSE66** | **L** | **P** | **C** |
| **Category** | **Core Elective** | 5 | - | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Nature of course:** | **EMPLOYABILITY** | ✓ | **SKILL ORIENTED** | ✓ | **ENTREPRENURSHIP** | ✓ |

**Course Objectives:**

- To know the basic concept and Techniques Client Server computing.
- To understand the Components of client/server computing.
- To know about Client Hardware and Software, Server Hardware and Environment.
- To learn Server Operating Systems and Server Requirements.
- To know Data Management and Access Tools and Server Architecture.

| | | |
|---|---|---|
| **Unit: I** | **Overview of Client/Server Applications** | **15** |

**Overview of Client/Server Computing**-Query language architecture -Original client/server application -Distribution of processing in client/server model -Growth in installed micros and LANs-Centralized and decentralized control -Evolution of Client/Server Computing-Capacities of processors

| | | |
|---|---|---|
| **Unit: II** | **Overview of Client/Server Applications** | **15** |

**Overview of Client/Server Applications**-Components of client/server computing-Client/server division of duties-Classes of client/server applications-The foundation for electronic communication-Understanding client/server computing-Representative system configuration-Components of an open systems environment.

| | | |
|---|---|---|
| **Unit: III** | | **15** |

**Client Hardware and Software**-possible software a client machine-sample GUI screen-X window system architecture-**Client Requirements**-Basic principles of effective **GUI** design-**API** libraries for each **GUI** environment-Open Interface architecture-Business specific server-Cross business server-Application server-Data server and compute server-**Server Environment**-Eight categories of server software

| | | |
|---|---|---|
| **Unit: IV** | **Server Operating systems** | **15** |

**Server Operating systems-OS/2 2.0** supported interface and application-**OS/2 2.0** layered architecture-Windows **NT** supported interfaces and applications-**server requirments**-Two phase commit-Locking rules-Comparison of Microsoft's **ODBC** and proprietary database access-How remote procedure calls work.

| | | |
|---|---|---|
| **Unit: V** | **Server Data Management and Access Tools** | **15** |

Microsoft **SQL** Server architecture-Netware **SQL** architecture-**SYBASE** Open Client/Server architecture-**Overview of Networking**-Protocols and interfaces-Open Systems Interconnection Model-LAN software functionality TCP/IP architecture-System Network architecture model-Point-to-point and multi drop networks-star, bus, and ring topologies.

| | | |
|---|---|---|
| | **Total Lecture Hours** | **75 Hrs** |

**Books for Study:**

**Client/Server Computing, Dawna Travis Dewire,** Tata McGraw-Hill Edition 2003, Fourteenth reprint 2010.

**Books for References:**

1. Client Server Computing, Dr.Munesh C.Trivedi, Khanna Publishing house, Second Edition,

2014.
2. An Introduction to Client Server Computing, Subash Chandra Yadav, Sanjay Kumar Singh, 2016.
3. Client Server Computing, Dr.S.T.Deepa, Mrs.T.Yegammai, Charulatha Publication, 2019.

**Web Resources:**

1. **https://www.tutorialspoint.com/Client-Server-Computing**
2. **https://www.google.co.in/search?tbo=p&tbm=bks&q=inauthor:%22Dawna+Travis+Dewire%22**
3. **https://www.tutorialspoint.com/Client-Server-Computing**

| **Course Outcomes** | | **K Level** |
|---|---|---|
| **CO1:** | Overview of Client/Server Computing Technology | **K3** |
| **CO2:** | Understanding the Client/Server Application | **K3** |
| **CO3:** | Understanding the Client Hardware and Software Client Requirements | **K3** |
| **CO4:** | Overview Server Operating System Server Requirements | **K4** |
| **CO5:** | Types of Networks Server Data Management and Access Tools Overview of Networking | **K4** |

**CO & PO Mapping:**

| COS | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 |
|---|---|---|---|---|---|---|
| **CO 1** | 1 | 1 | 3 | 3 | 3 | 3 |
| **CO 2** | 2 | 2 | 3 | 2 | 2 | 3 |
| **CO 3** | 3 | 3 | 1 | 2 | 2 | 3 |
| **CO 4** | 2 | 3 | 3 | 1 | 2 | 3 |
| **CO5** | **2** | **2** | **3** | **2** | **3** | 3 |

***3 –** Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

## LESSON PLAN

| Unit | Client Server Computing | Hrs | Pedagogy |
|---|---|---|---|
| I | **Overview of Client/Server Applications**-Components of client/server computing-Client/server division of duties-Classes of client/server applications-The foundation for electronic communication-Understanding client/server computing-Representative system configuration-Components of an open systems environment. | 15 | Chalk & Talk, ICT Kit |
| II | **Overview of Client/Server Applications**-Components of client/server computing-Client/server division of duties-Classes of client/server applications-The foundation for electronic communication-Understanding client/server computing-Representative system configuration-Components of an open systems environment. | 15 | Chalk & Talk, ICT Kit |
| III | **Client Hardware and Software**-possible software a client machine-sample GUI screen-X window system architecture-**Client Requirements**-Basic principles of effective **GUI** design-**API** libraries for each **GUI** environment-Open Interface architecture-Business specific server-Cross business server-Application server-Data server and compute server-**Server Environment**-Eight categories of server software | 15 | Chalk & Talk, ICT Kit |
| IV | **Server Operating systems**-**OS/2 2.0** supported interface and application-**OS/2 2.0** layered architecture-Windows **NT** supported interfaces and applications-**server requirments**-Two phase commit-Locking rules-Comparison of Microsoft's **ODBC** and proprietary database access-How remote procedure calls work | 15 | Chalk & Talk, ICT Kit |
| V | Microsoft **SQL** Server architecture-Netware **SQL** architecture-**SYBASE** Open Client/Server architecture-**Overview of Networking**-Protocols and interfaces-Open Systems Interconnection Model-LAN software functionality TCP/IP architecture-System Network architecture model-Point-to-point and multi drop networks-star, bus, and ring topologies. | 15 | Chalk & Talk, ICT Kit |

**Course Designed by: Mr. M. Selvakumar & Mrs. N. Hemavathi**

| Learning Outcome Based Education & Assessment (LOBE)<br>Formative Examination - Blue Print<br>Articulation Mapping – K Levels with Course Outcomes (COs) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Internal** | **Cos** | **K Level** | **Section A** | | **Section B** | | **Section C Either or Choice** | **Section D Open Choice** |
| | | | **MCQs** | | **Short Answers** | | | |
| | | | **No. of. Questions** | **K - Level** | **No. of. Questions** | **K - Level** | | |
| **CIAI** | **CO1** | Up to K3 | 2 | **K1,K2** | 1 | **K2** | **2(K3,K3)** | **1(K3)** |
| | **CO2** | Up to K3 | 2 | **K1,K2** | 2 | **K2** | **2(K3,K3)** | **1(K3)** |
| **CIAII** | **CO3** | Up to K3 | 2 | **K1,K2** | 1 | **K2** | **2(K3,K3)** | **1(K3)** |
| | **CO4** | Up to K4 | 2 | **K1,K2** | 2 | **K2** | **2(K4,K4)** | **1(K4)** |
| **Question Pattern CIA I & II** | | No. of Questions to be asked | **4** | | **3** | | **4** | **2** |
| | | No. of Questions to be answered | **4** | | **3** | | **2** | **1** |
| | | Marks for each question | **1** | | **2** | | **5** | **10** |
| | | Total Marks for each section | **4** | | **6** | | **10** | **10** |

| Distribution of Marks with K Level CIA I & CIA II | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **K Level** | **Section A (Multiple Choice Questions)** | **Section B (Short Answer Questions)** | **Section C (Either / Or Choice)** | **Section D (Open Choice)** | **Total Marks** | **% of (Marks without choice)** | **Consolidate of %** |
| **CIA I** | **K1** | 2 | | - | - | 2 | 4 | 20 |
| | **K2** | 2 | 6 | - | - | 8 | 16 | |
| | **K3** | - | - | 20 | 20 | 40 | 80 | 80 |
| | **K4** | - | - | - | - | - | | |
| | **Marks** | 4 | 6 | 20 | 20 | 50 | 100 | **100** |
| **CIA II** | **K1** | 2 | | - | - | 2 | 4 | 20 |
| | **K2** | 2 | 6 | - | - | 8 | 16 | |
| | **K3** | - | - | 10 | 10 | 20 | 40 | 40 |
| | **K4** | - | - | 10 | 10 | 20 | 40 | 40 |
| | **Marks** | 4 | 6 | 20 | 20 | 50 | | **100** |

**K1**- Remembering and recalling facts with specific answers
**K2**- Basic understanding of facts and stating main ideas with general answers
**K3**- Application oriented- Solving Problems
**K4**- Examining, analyzing, presentation and make inferences with evidences
**CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.**

| Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| S. No | COs | K - Level | MCQs | | Short Answers | | Section C (Either / or Choice) | Section D (Open Choice) |
| | | | No. of Questions | K – Level | No. of Question | K – Level | | |
| 1 | CO1 | **K3** | **2** | **K1,K2** | **1** | **K2** | **2(K3,K3)** | **1(K3)** |
| 2 | CO2 | **K3** | **2** | **K1,K2** | **1** | **K2** | **2(K3,K3)** | **1(K3)** |
| 3 | CO3 | **K3** | **2** | **K1,K2** | **1** | **K2** | **2(K3,K3)** | **1(K3)** |
| 4 | CO4 | **K4** | **2** | **K1,K2** | **1** | **K2** | **2(K4,K4)** | **1(K4)** |
| 5 | CO5 | **K4** | **2** | **K1,K2** | **1** | **K2** | **2(K4,K4)** | **1(K4)** |
| No. of Questions to be Asked | | | **10** | | **5** | | **10** | **5** |
| No. of Questions to be answered | | | **10** | | **5** | | **5** | **3** |
| Marks for each question | | | **1** | | **2** | | **5** | **10** |
| Total Marks for each section | | | **10** | | **10** | | **25** | **30** |
| **(Figures in parenthesis denotes, questions should be asked with the given K level)** | | | | | | | | |

| Distribution of Marks with K Level | | | | | | | |
|---|---|---|---|---|---|---|---|
| K Level | Section A (Multiple Choice Questions) | Section B (Short Answer Questions) | Section C (Either/ or Choice) | Section D ( Open Choice) | Total Marks | % of (Marks without choice) | Consolidated % |
| K1 | 5 | | - | - | 5 | 4.17 | 17 |
| K2 | 5 | 10 | - | - | 15 | 12.5 | |
| K3 | - | - | 30 | 30 | 60 | 50 | 50 |
| K4 | - | - | 20 | 20 | 40 | 33.33 | 33 |
| Marks | 10 | 10 | 50 | 50 | 120 | 100 | 100 |
| **NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.** | | | | | | | |

## Summative Examinations - Question Paper – Format

| **Section A (Multiple Choice Questions)**<br>**Answer All Questions** | | | **(10x1=10 marks)** |
|---|---|---|---|
| **Q. No** | **CO** | **K Level** | **Questions** |
| 1 | CO1 | K1 | |
| 2 | CO1 | K2 | |
| 3 | CO2 | K1 | |
| 4 | CO2 | K2 | |
| 5 | CO3 | K1 | |
| 6 | CO3 | K2 | |
| 7 | CO4 | K1 | |
| 8 | CO4 | K2 | |
| 9 | CO5 | K1 | |
| 10 | CO5 | K2 | |
| **Section B (Short Answers)**<br>**Answer All Questions** | | | **(5x2=10 marks)** |
| **Q. No** | **CO** | **K Level** | **Questions** |
| 11 | CO1 | K2 | |
| 12 | CO2 | K2 | |
| 13 | CO3 | K2 | |
| 14 | CO4 | K2 | |
| 15 | CO5 | K2 | |
| **Section C (Either/Or Type)**<br>**Answer All Questions** | | | **(5 x 5 = 25 marks)** |
| **Q. No** | **CO** | **K Level** | **Questions** |
| 16) a | CO1 | K3 | |
| 16) b | CO1 | K3 | |
| 17) a | CO2 | K3 | |
| 17) b | CO2 | K3 | |
| 18) a | CO3 | K3 | |
| 18) b | CO3 | K3 | |
| 19) a | CO4 | K4 | |
| 19) b | CO4 | K4 | |
| 20) a | CO5 | K4 | |
| 20) b | CO5 | K4 | |
| **NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels** | | | |
| **Section D (Open Choice)**<br>**Answer Any Three questions** | | | **(3x10=30 marks)** |
| **Q. No** | **CO** | **K Level** | **Questions** |
| 21 | CO1 | K3 | |
| 22 | CO2 | K3 | |
| 23 | CO3 | K3 | |
| 24 | CO4 | K4 | |
| 25 | CO5 | K4 | |

**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)**
**DEPARTMENT OF COMPUTER SCIENCE**
**(For those who joined in 2021-2022 and after)**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Course Name** | **PYTHON LAB** | | | | | | | |
| **Course Code** | **21UCSSP6** | | | | | **L** | **P** | **C** |
| **Category** | **Skill** | | | | | - | 2 | 2 |
| **Nature of course:** | **EMPLOYABILITY** | ✓ | **SKILL ORIENTED** | ✓ | **ENTREPRENEURSHIP** | | | ✓ |

**Course objectives:**

- Recall the basics of OOP and translate the variables in Python.
- Manipulate the variables and statements using Loops, Function, and Strings.
- Choose the method to reduce source code metrics with exception.
- Create a program using OOP and additional features of Python.
- Simplify the code by utilize the control statement and Modules.

| S. No. | List of Programs | Hours |
|---|---|---|
| 1. | To display student details. | |
| 2. | To demonstrate working with dictionaries in python. | |
| 3. | To Write a program that inputs a text file. The program should print all of the unique words in the file in alphabetical order. | |
| 4. | To write a Program that takes command line arguments (word count). | |
| 5. | To perform read and write operations on a file. | |
| 6. | To write a program to implementing electricity billing. | |
| 7. | To display a calculator. | |
| 8. | To convert Kilometers to Miles. | |
| 9. | To find addition of two matrix using for loop. | |
| 10. | To construct star (*) pattern using loop. | |
| | **Total Hours** | **60** |

**Books for study**

1. E.Balagurusamy,“ Problem Solving and Python Programming”, McGraw Hill Education Private Limited, India, First Edition, 2018.

**Books for References:**


1. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist”, 2nd Edition, Green Tea Press, 2015.
2. Charles Dierbach, "Introduction to Computer Science Using Python", 1st Edition, Wiley India Pvt Ltd.
3. Wesley J Chun, “Core Python Applications Programming”, 3rd Edition, Pearson Education India, 2015.
4. Roberto Tamassia, Michael H Goldwasser, Michael T Goodrich, “Data Structures and Algorithms in

Python", 1st Edition, Wiley India Pvt Ltd, 2016.
5. ReemaThareja, "Python Programming using problem solving approach", Oxford University press, 2017.

**Web Resources:**

1. **https://studyglance.in/labprograms/pythondisplay.php**
2. **https://studyglance.in/labprograms/pythonlabprograms.php**
3. **https://www.practicepython.org/**

| **Course Outcomes** | | **K Level** |
|---|---|---|
| **CO1:** | Explain basic principles of Python programming language | **K3** |
| **CO2:** | Explain basic principles of Python programming language | **K3** |
| **CO3:** | Implement database and GUI applications. | **K3** |
| **CO4:** | Be able to do basic programming in python | **K4** |
| **CO5:** | Gain knowledge on CGI | **K4** |

**CO & PO Mapping:**

| COS | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 |
|---|---|---|---|---|---|---|
| CO 1 | 2 | 2 | 3 | 3 | 1 | 3 |
| CO 2 | 3 | 3 | 2 | 3 | 2 | 3 |
| CO 3 | 2 | 3 | 3 | 2 | 2 | 3 |
| CO 4 | 2 | 2 | 1 | 3 | 3 | 3 |
| CO5 | 3 | 3 | 2 | 1 | 3 | 3 |

***3 –** Advanced Application; **2 –** Intermediate Development; **1 -** Introductory Level

## LESSON PLAN

| S. No. | List of Programs | Hours | Mode |
|---|---|---|---|
| 1. | To display student details. | 60 | Black Board, Lab Demonstration and LCD Projector. |
| 2. | To demonstrate working with dictionaries in python. | | |
| 3. | To Write a program that inputs a text file. The program should print all of the unique words in the file in alphabetical order. | | |
| 4. | To write a Program that takes command line arguments (word count). | | |
| 5. | To perform read and write operations on a file. | | |
| 6. | To write a program to implementing electricity billing. | | |
| 7. | To display a calculator. | | |
| 8. | To convert Kilometers to Miles. | | |
| 9. | To find addition of two matrix using for loop. | | |
| 10. | To construct star (*) pattern using loop. | | |
| | **Total Hours** | **60** | |

**Course Designed by: K. Sandya & Mrs. P. Rajeswari**