



SOURASHTRA COLLEGE, MADURAI – 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

B.Sc. COMPUTER SCIENCE (CLOUD COMPUTING AND CYBER SECURITY) – SYLLABUS

(Under CBCS based on OBE) (with effect from 2023 – 2024)

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DEPARTMENT PROFILE:

The Department of Computer Science was established in the year 1987 – 88 with B.Sc. Computer Science programme. Then it was initiated in the Self– Finance Stream in the year 1997 – 1998. The Department has been producing young graduates and they are well – placed in India and abroad. Cloud computing is powerful and expansive and will continue to grow in the future and provide many benefits. Cloud technologies include artificial intelligence, machine learning, edge computing, virtual desktops, automation, SASE, and disaster recovery. Cyber Security is the intricate practice of protecting systems, mobile devices, data, networks, and programs from cyber– attacks, or any unauthorized access. So, **B.Sc. Computer Science with Cloud Computing and Cyber Security** is started in the academic year 2023 – 2024. The Department has adequate infrastructure with a well– equipped Computer Laboratory, a well stacked Department Library, well– furnished class rooms, a separate room for power point presentation with a LCD Projector.

VISION:

To Ignite and nurture young learners to provide a sustainable, humane, and research– centric educational platform in the domain of Cloud Computing and Cyber Security for building a robust, resilient, and attack– free digital universe.

MISSION:

- To provide committed and competent faculty and educational infrastructure to impart the theoretical and practical foundation of Cloud Computing and Cyber Security in the emanating youth.
- To provide industry– ready graduates with research instinct imbibed for the sustainable development of young learners
- To build collaborative and teamwork– centric project– oriented learning environment, to address global challenges whilst preserving human and ethical values.
- To encourage young minds to educate society to restore nationwide human safety and security in digital world.

Signature of the Chairman



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DISTRIBUTION OF CREDITS (UG PROGRAMME)

PART	SEM	COURSES	NO.OF COURSES	HOURS	CREDITS	TOTAL CREDITS
I	I-IV	LANGUAGE	4	6	3	12
II	I-IV	ENGLISH	4	6	3	12
III	I-VI	CORE	17	4-6	3-4	66
III	I-IV	ALLIED	4	4	4	16
III	V, VI	ELECTIVE	3	5	4-5	13
IV	I-IV	SKILL BASED SUBJECT(SBS)	6	2	2	12
IV	I	VALUE EDUCATION	1	2	2	2
IV	II	ENVIRONMENTAL STUDIES	1	2	2	2
IV	III, IV	NON-MAJOR ELECTIVE(NME)	2	2	2	4
V	IV	EXT. ACTIVITY	1	0	1	1
TOTAL CREDITS						140

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PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO 1	To make the students successful in their professional careers, including entrepreneurship using their knowledge in Computer Science and Applications.
PEO 2	To help the students continue to learn and adopt latest technologies to solve real life problems.
PEO 3	To motivate the students pursue research and higher education.
PEO 4	To inculcate in students professional and ethical attitude, communication skills, teamwork skills, multi – disciplinary approach and an ability to relate computer Science issues with social awareness.
PEO 5	To prepare students to excel in post graduate programmes in Computer Science or to succeed in computing industry profession through quality education.

UNDERGRADUATE (UG) PROGRAMME OUTCOMES (POs)

Undergraduate (B.A., B.Sc., B.Com., B.C.A., B.B.A., etc.) is a 3– year degree programme with 6 semesters consisting the following Programme Outcomes (POs) under various criteria including critical thinking, problem solving, effective communication, societal/ citizenship/ ethical credibility, sustainable growth and employable abilities.

PO 1	Critical Thinking: Intellectual exploration of knowledge towards actions in clear and rational manner by understanding the logical connections between ideas and decisions.
PO 2	Problem Solving: Understanding the task/ problem followed by planning and narrow execution strategy that effectively provides the solution.
PO 3	Effective Communication: Knowledge dissemination by oral and verbal mechanisms to the various components of our society.
PO 4	Societal/ Citizenship/ Ethical Credibility: Realization of various value systems/ moral dimensions and demonstrate the empathetic social concern as well as equity in all the decisions, executions and actions.
PO 5	Environmental Concern and Sustainable Growth: Understanding the emerging environmental challenges and provide the possible contribution in sustainable development that integrates environment, economy and employment.
PO 6	Skill Development and Employable Abilities: Adequate training in relevant skill sector and creating employable abilities among the under graduates.

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PROGRAMME SPECIFIC OUTCOMES (PSOs)

On completion of **B.Sc. Computer Science (Cloud Computing and Cyber Security)** Programme, the students are expected to

PSO 1	think in a critical and logical based manner. Equip with Computer science technical ability, problem solving skills, creative talent and power of communication necessary for various forms of employment
PSO 2	become familiar with suitable software tools of Computer Science and industrial applications to handle issues and solve problems in Mathematics or Statistics and real– time application related sciences.
PSO 3	know when there is a need for information, to be able to identify, locate, evaluate, and effectively use that information for the issue or problem at hand.
PSO 4	understand, formulate, develop programming model with logical approaches to and address issues arising in social science, business and other contexts.
PSO 5	acquire good knowledge and understanding to solve specific theoretical and applied problems in advanced areas of Computer science and Industrial statistics, get adequate exposure to global and local concerns that provides platform for further exploration into multi– dimensional aspects of Computing sciences.
PSO 6	receive sufficient knowledge and skills enabling them to undertake further studies in Computer Science or Applications or Information Technology and its allied areas on multiple disciplines linked with Computer Science, develop a range of generic skills helpful in employment, internships & societal activities.

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B.Sc. COMPUTER SCIENCE (CLOUD COMPUTING AND CYBER SECURITY) – I YEAR COURSE STRUCTURE – I SEMESTER

S No	CODE	Subject	Hrs./ Week	Exam (Hrs.)	CA	SE	Total Marks	Credits
1.	21UACT11	Part – I: Tamil – கவிதையும் சிறுகதையும்	6	3	25	75	100	3
	21UACH11	Hindi – Hindi – I						
	21UACS11	Sanskrit – Sanskrit – I						
2.	21UACE11	Part – II: English – English For Enrichment – I	6	3	25	75	100	3
3.	23UCDC11	Part – III: Core – 1: Programming in C	4	3	25	75	100	4
4.	23UCDCP1	Part – III: Core – 2: Lab – I: Programming in C	6	3	40	60	100	4
5.	23UCDA11	Part – III: Allied – 1: Mathematical Foundations – I	4	3	25	75	100	4
6.	23UCDS11	Part – IV: SBS – 1: Lab – II: PC Assembling, Trouble Shooting and System Management	2	3	40	60	100	2
7.	21UACVE1	Part – IV: Value Education	2	3	25	75	100	2
Total			30				700	22

COURSE STRUCTURE – II SEMESTER

S No	CODE	Subject	Hrs./ Week	Exam (Hrs.)	CA	SE	Total Marks	Credits
1.	21UACT21	Part – I: Tamil – செய்யுளும் புதினமும்	6	3	25	75	100	3
	21UACH21	Hindi – Hindi – II						
	21UACS21	Sanskrit – Sanskrit – II						
2.	21UACE21	Part – II: English – English For Enrichment – II	6	3	25	75	100	3
3.	23UCDC21	Part – III: Core – 3: Java Programming	4	3	25	75	100	4
4.	23UCDCP2	Part – III: Core – 4: Lab – III: Java Programming	6	3	40	60	100	4
5.	23UCDA21	Part – III: Allied – 2: Mathematical Foundations – II	4	3	25	75	100	4
6.	23UCDS21	Part – IV: SBS – 2: Lab – IV: Linux and Shell Programming	2	3	40	60	100	2
7.	21UACES1	Part – IV: Environmental Studies	2	3	25	75	100	2
Total			30					22

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COURSE STRUCTURE – I SEMESTER

S No	CODE	Subject	Hrs./ Week	Exam (Hrs.)	CA	SE	Total Marks	Credits
1.	21UACT11	Part – I: Tamil – கவிதையும் சிறுகதையும்	6	3	25	75	100	3
	21UACH11	Hindi – Hindi – I						
	21UACS11	Sanskrit – Sanskrit – I						
2.	21UACE11	Part – II: English – English For Enrichment – I	6	3	25	75	100	3
3.	23UCDC11	Part – III: Core – 1: Programming in C	4	3	25	75	100	4
4.	23UCDCP1	Part – III: Core – 2: Lab – I: Programming in C	6	3	40	60	100	4
5.	23UCDA11	Part – III: Allied – 1: Mathematical Foundations – I	4	3	25	75	100	4
6.	23UCDS11	Part – IV: SBS – 1: Lab– II: PC Assembling, Trouble Shooting and System Management	2	3	40	60	100	2
7.	21UACVE1	Part – IV: Value Education	2	3	25	75	100	2
		Total	30				700	22

CA – Class Assessment (Internal)

SE – Summative Examination

SBS – Skill Based Subject

T – Theory

P – Practical

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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
23UCDC11	PROGRAMMING IN C	CORE – 1	4	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	I	25	75	100

NATURE OF COURSE	Employability <input checked="" type="checkbox"/>	Skill Oriented <input checked="" type="checkbox"/>	Entrepreneurship <input type="checkbox"/>
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COURSE DESCRIPTION:

This course provides the fundamental knowledge of a programming language and its features which enhances the user to write general purpose application programs.

COURSE OBJECTIVES:

- To introduce and form a firm foundation in programming
- To stress the importance of clarity, simplicity and the efficiency in writing programs

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcome	Knowledge Level (According to Bloom's Taxonomy)
CO1	identify the basic concepts needed for program development	Upto K3
CO2	apply the basic concepts and develop program to find solutions for simple problems	Upto K3
CO3	design programs to solve complex problems by using suitable control statements	Upto K3
CO4	analyze the problem and design efficient program using functions	Upto K3
CO5	use array and structure to handle volume of data	Upto K3

K1 – KNOWLEDGE (REMEMBERING), K2– UNDERSTANDING, K3– APPLICATION

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PROGRAMMING IN C

UNIT – I:

Overview of C: History of C – Importance of C – Basic Structure of C Programs – Programming Style – Character Set – C Tokens – Keywords and Identifiers – Constants, Variables and Data Types – Declaration of Variables – Defining Symbolic Constants – Declaring a variable as a constant – overflow and underflow of data.

Operators and Expressions: Arithmetic, relational, logical, assignment operators – increment and decrement operators, conditional operators, bitwise operators, special operators – **Arithmetic Expressions** – Evaluation of Expressions – Precedence of Arithmetic Operators – Type Conversions in Expressions – Operator Precedence and Associativity – Mathematical functions.

UNIT – II:

Managing I/O Operations: Reading and Writing a Character – Formatted Input, Output – Decision Making & Branching: if statement – if else statement – nesting of if else statements – else if ladder – switch statement – the ?: operator – goto statement – the while statement – do statement – the for statement – jumps in loops.

UNIT – III:

Arrays: One– Dimensional Arrays – Declaration, Initialization – Two– Dimensional Arrays – Multi– dimensional Arrays – Dynamic Arrays Initialization.

Strings: Declaration, Initialization of string variables – reading and writing strings – string handling functions.

UNIT – IV:

User– defined functions: Need – multi– function programs – elements of user defined functions – definition – return values and their types – function calls, declaration, category – all types of arguments and return values – nesting of functions – recursion – passing arrays, strings to functions – scope visibility and life time of variables.

Structures and Unions: Defining a structure – declaring a structure variable – accessing structure members – initialization – copying and comparing – operation on individual members – array of structures – arrays within structures – structures within structures – structures and functions –unions– size of structures – bit fields.

UNIT – V:

Pointers : Understanding Pointers, Accessing the address of a variable – declaring, initialization of pointer variables – accessing a variable through its pointer – chain of pointers– pointer increments and scale factors – pointers and character strings – pointers as function arguments – pointers and structures.

Files: Defining, opening, closing a file – IO Operations on files – Error handling during IO operations – command line arguments.

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TEXT BOOKS:

1. *Programming in ANSI C*, E. Balagurusamy, 7th Edition, Tata Mc Graw Hill Publishing Company, 2017.

REFERENCE BOOKS:

1. *Programming with C*, Schaum's Outline Series, Gottfried, Tata McGraw Hill, 2006.
2. *Programming with ANSI and Turbo C*, Ashok N. Kamthane, Pearson Education, 2006.

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	–	–	–	–	–
CO2	–	2	1	–	–	2
CO3	2	–	–	–	–	–
CO4	2	–	2	3	–	1
CO5	2	2	2	3	2	1

3. Advanced Application 2. Intermediate Development 1. Introductory Level

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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
23UCDCP1	LAB: PROGRAMMING IN C	CORE – 2 LAB – I	–	6	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	I	40	60	100

NATURE OF COURSE	Employability <input checked="" type="checkbox"/>	Skill Oriented <input checked="" type="checkbox"/>	Entrepreneurship <input type="checkbox"/>
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COURSE DESCRIPTION:

This course is designed to develop logic and programming skills through immersion in the fundamentals of C which enhances the user to write general purpose application programs in C.

COURSE OBJECTIVES:

- To develop logics which will help them to create programs, applications in C.
- To enhance the analyzing and problem solving skills and use the same for writing programs in C.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcome	Knowledge Level (According to Bloom's Taxonomy)
CO1	Understand basic Structure of the C-PROGRAMMING, declaration and usage of variables	Upto K3
CO2	Manage I/O operations in your C program	Upto K3
CO3	Control the sequence of the program and give logical outputs	Upto K3
CO4	Apply code reusability with functions and pointers	Upto K3
CO5	Understand the basics of file handling mechanisms	Upto K3

K1 – KNOWLEDGE (REMEMBERING), K2– UNDERSTANDING, K3– APPLICATION

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LAB: PROGRAMMING IN C

Section A:

1. Write a C Program to find the sum of digit
2. Write a C Program to check whether a given number is Armstrong or not
3. Write a C Program to check whether a given number is Prime or not
4. Write a C Program to generate the Fibonacci series
5. Write a C Program to display the given number is Adam number or not
6. Write a C Program to print reverse of the given number and string
7. Write a C Program to find minimum and maximum of '_n' numbers using array
8. Write a C Program to arrange the given number in ascending order
9. Write a C Program to add, subtract and multiply two matrices
10. Write a C Program to calculate NCR and NPR

Section B:

11. Write a C Program to find the grade of a student using else if ladder
12. Write a C Program to implement the various string handling functions
13. Write a C Program to create an integer file and display the even numbers only
14. Write a C Program to calculate quadratic equation using switch– case
15. Write a C Program to implement the various string handling function
16. Write a C Program to generate student mark list using array of structures
17. Write a C Program to create and process the student mark list using file
18. Write a C Program to create and process pay bill using file
19. Write a C Program to create and process inventory control using file
20. Write a C Program to create and process electricity bill using file

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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
23UCDA11	MATHEMATICAL FOUNDATIONS - I	ALLIED – 1	4	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	I	25	75	100

NATURE OF COURSE	Employability <input checked="" type="checkbox"/>	Skill Oriented <input type="checkbox"/>	Entrepreneurship <input type="checkbox"/>
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COURSE DESCRIPTION:

This course provides the fundamental knowledge of Mathematical foundations like Logic, Relations, Counting, Graph Theory and Matrices.

COURSE OBJECTIVES:

- To impart knowledge on solving problems using Logic
- To give the basic ideas about Relation
- To teach the basic concepts of Counting
- To give the basic concepts of Graph Theory and its applications
- To solve various problems using Matrices

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcome	Knowledge Level (According to Bloom's Taxonomy)
CO1	discuss the idea of Proposition, Predicates and Quantifiers	Upto K3
CO2	identify the basic concepts of Relations	Upto K3
CO3	explain the basic concepts of Pigeonhole principle, Permutation, Combination and applications of Recurrence relations.	Upto K3
CO4	acquire knowledge about the basic concepts of Graph Theory and its applications	Upto K3
CO5	find Eigen values and Eigen vectors using matrix concept	Upto K3

K1 – KNOWLEDGE (REMEMBERING), K2– UNDERSTANDING, K3– APPLICATION

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MATHEMATICAL FOUNDATIONS – I

UNIT – I: The Foundations: Logic and Proofs

Propositional logic – Applications of Propositional logic – Propositional equivalences – (Exclude Propositional satisfiability, Applications of satisfiability, Solving satisfiability problems, and its related problems) – Predicates and Quantifiers – Rules of inference.

UNIT – II: Relations

Relations and their properties – Representing relations – Closures of relations – Partial orderings (Theorems statement only; Exclude lexicographic ordering – Exclude Lattices)

UNIT – III: Counting

The basic of counting – The pigeonhole principle – Permutation and Combinations – Applications of recurrence relations – Solving recurrence relations – Divide and Conquer algorithms and recurrence relations. (All theorems and Results statement only)

UNIT – IV: Graphs

Graphs and Graphs models, (Excluding Biological networks; Tournaments; all its related examples and problems) – Graph terminology and special types of graphs – Representing graphs and Graph isomorphism – Connectivity (paths – connectedness in undirected graphs – paths and isomorphism – counting paths between vertices) – shortest path problems.

UNIT – V: Matrices

Introduction – operations – inverse – Rank of a matrix, solution of simultaneous linear equations – Eigen values and Eigen Vectors.

TEXT BOOKS:

1. *Discrete Mathematics and its Applications*, Seventh Edition, Kenneth. H. Rosen, Mc Graw Hill Publishing Company, 2012.
2. *Discrete Mathematics*, M. Venkataraman, N. Sridharan and N. Chandrasekaran, The National Publishing Company, 2009.

REFERENCE BOOKS:

1. *Modern Algebra* – S.Arumugam and A. Thangapandi Isaac, SciTech publications, 2005.
2. *Invitation to Graph Theory* – S.Arumugam and S.Ramachandran, Scitech Publications, 2005, Chennai.
3. *Discrete Mathematical Structures with applications to Computer Science* – Tremblay and Manohar, McGrawHill, 1997.
4. *Mathematical Structure for Compute Science, Discrete Mathematics and its Applications*, Judith L.Gersting, W.H.Freeman and Company, Seventh Edition, 2014.

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	–	–	3	2	–	3
CO2	–	–	3	2	–	3
CO3	–	–	3	2	–	3
CO4	–	–	3	2	–	3
CO5	–	–	3	2	–	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
23UCDS11	LAB: PC ASSEMBLING, TROUBLE SHOOTING AND SYSTEM MANAGEMENT	SBS – 1 LAB – II	–	2	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	I	40	60	100

NATURE OF COURSE	Employability <input checked="" type="checkbox"/>	Skill Oriented <input checked="" type="checkbox"/>	Entrepreneurship <input checked="" type="checkbox"/>
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COURSE DESCRIPTION:

This course provides the fundamental knowledge of component identification, memory-system, peripheral installation and configuration, preventive maintenance, hardware repair/Troubleshooting, installation/format Operating system and system configuration, and device-drivers.

COURSE OBJECTIVES:

- It aims to Understand basic concept & structure of Computer Hardware & Networking Components.
- To Apply their knowledge about computer peripherals to identify/rectify problems on board.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcome	Knowledge Level (According to Bloom's Taxonomy)
CO1	A hands-on approach will be used to provide the student with a basic skill level to work on a computer with the lid off	Upto K3
CO2	Student will be able to understand the hardware specifications that are required to run operating system and various shipboard application programs.	Upto K3
CO3	Perform routine maintenance, upgrades	Upto K3
CO4	Manage data backup & restore operations on server and update anti-virus software and set schedules	Upto K3
CO5	Learn basic networking hardware and tools	Upto K3

K1 – KNOWLEDGE (REMEMBERING), K2– UNDERSTANDING, K3– APPLICATION

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LAB: PC ASSEMBLING, TROUBLESHOOTING AND SYSTEM MANAGEMENT

PC Assembling

- Installing the motherboard.
- Installing the CPU and heat sink.
- Installing the RAM.
- Installing the power supply.
- Installing the hard disk and optical drive.
- Connecting various cables (ATX power connector, cabinet cables for power, reset button, front USB/audio panel cable).
- BIOS settings – setting time, changing boot sequence, system password setting
- Changing CMOS battery
- Connecting extra cabinet fan

PC Troubleshooting

- Booting with CD/DVD, pen drive, LAN & hard disk with different OS
- Formatting hard drive.
- Installing the OS and drivers.
- Troubleshooting BSOD (blue screen of death)
- Installation of service packs, applications such as MS Office, Anti-virus software.
- Creating restore point and backup a drive.
- Using hard disk tools (sfc, disk checker, defragmenter, data recovery).
- Windows update, registry fix, msconfig, gpedit.
- Using repair tools like ccleaner, system mechanic, malware bytes.

System Management

- Familiarization with configuring and installing a LAN (Assign IP addresses)
- Internet connection sharing over LAN
- File transfer over LAN
- Installing and using web browser and firewall
- Using search engines like Google
- CD/DVD burning – image burning – data/audio/video CD/DVD making with Nero
- Playing audio and video with VLC media player – creating play list.

REFERENCE BOOKS:

1. Mueller, Scott, *Upgrading & Repairing PCs*, 14th Edition, Que Publishing, 2003.
Moulton, Pete, "A+ Certification and PC repair Guide", 2nd Edition, Prentice Hall PTR, 2002.
2. Loukides, Mike, Musumeci, G., *System Performance Tuning*, 2nd Edition, O'Reilly, 2002.
3. Bigelow, Stephen, *Troubleshooting, Maintaining & Repairing PCs*, 5th Edition, Osborne, 2002.

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COURSE STRUCTURE – II SEMESTER

S No	CODE	Subject	Hrs./ Week	Exam (Hrs.)	CA	SE	Total Marks	Credits
1.	21UACT21	Part – I: Tamil – செய்யுளும் புதினமும்	6	3	25	75	100	3
	21UACH21	Hindi – Hindi – II						
	21UACS21	Sanskrit – Sanskrit – II						
2.	21UACE21	Part – II: English – English For Enrichment – II	6	3	25	75	100	3
3.	23UCDC21	Part – III: Core – 3: Java Programming	4	3	25	75	100	4
4.	23UCDCP2	Part – III: Core – 4: Lab – III: Java Programming	6	3	40	60	100	4
5.	23UCDA21	Part – III: Allied – 2: Mathematical Foundations – II	4	3	25	75	100	4
6.	23UCDS21	Part – IV: SBS – 2: Lab – IV: Linux and Shell Programming	2	3	40	60	100	2
7.	21UACES1	Part – IV: Environmental Studies	2	3	25	75	100	2
		Total	30					22

CA – Class Assessment (Internal)

SE – Summative Examination

SBS – Skill Based Subject

T – Theory

P – Practical

Signature of the Chairman



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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
23UCDC21	JAVA PROGRAMMING	CORE – 3	4	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	II	25	75	100

NATURE OF COURSE	Employability <input checked="" type="checkbox"/>	Skill Oriented <input checked="" type="checkbox"/>	Entrepreneurship <input type="checkbox"/>
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COURSE DESCRIPTION:

This course teaches students the syntax of the Java programming language; object-oriented programming with the Java programming language; creating graphical user interfaces (GUI), exceptions, and file input/output (I/O).

COURSE OBJECTIVES:

- To understand the basic concepts and fundamentals of platform independent object oriented language.
- To demonstrate skills in writing programs using exception handling techniques and multithreading.
- To understand streams and efficient user interface design techniques.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand the basic concepts of Object oriented programming and java evolution and features	Upto K3
CO 2	apply the basic concepts of OOP, java features and its applications.	Upto K3
CO 3	write object oriented programs using Inheritance, Strings and Vectors, Interfaces.	Upto K3
CO 4	design object oriented programs, multithreading, exception handling,	Upto K3
CO 5	understand Packages and Data files in JAVA.	Upto K3

K1 – KNOWLEDGE (REMEMBERING), K2 – UNDERSTANDING, K3 – APPLY

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JAVA PROGRAMMING

UNIT – I: Fundamentals of Object – Oriented Programming

Introduction, Object Oriented paradigm, Basic Concepts of OOP, Benefits of OOP, Applications of OOP, Java features.

Overview of Java Language: Introduction, Simple Java program structure, Java tokens, Java Statements, Implementing a Java Program, Java Virtual Machine, Command line arguments.

Constants, Variables & Data Types: Introduction, Constants, Variables, Data Types, Declaration of Variables, Giving Value to Variables, Scope of variables, Symbolic Constants, Type casting, Getting Value of Variables, Standard Default values; Operators & Expressions.

UNIT – II: Decision Making & Branching:

Introduction, Decision making with if statement, Simple if statement, if. Else statement, Nesting of if. else statements, the else if ladder, the switch statement, the conditional operator.

Decision Making & Looping: Introduction, The While statement, the do– while statement, the for statement, Jumps in loops.

Classes, Objects & Methods: Introduction, Defining a class, Adding variables, Adding methods, Creating objects, Accessing class members, Constructors, Method overloading, Static members, Nesting of methods;

UNIT – III: Inheritance:

Extending a class, Overloading methods, Final variables and methods, Final classes, Finalizer methods, Abstract methods and classes;

Arrays, Strings and Vectors: Arrays, One– dimensional arrays, Creating an array, Two– dimensional arrays, Strings, Vectors, Wrapper classes

Interfaces: Multiple Inheritance: Introduction, Defining interfaces, Extending interfaces, Implementing interfaces, Assessing interface variables;

UNIT – IV: Multithreaded Programming:

Introduction, Creating Threads, Extending the Threads, Stopping and Blocking a Thread, Lifecycle of a Thread, Using Thread Methods, Thread Exceptions, Thread Priority, Synchronization, Implementing the „Runnable“ Interface.

Managing Errors and Exceptions: Types of errors: Compile– time errors, Runtime errors, Exceptions, Exception handling, Multiple Catch Statements, Using finally statement.

UNIT – V: Packages:

Introduction, Java API Packages, Using System Packages, Naming conventions, Creating Packages, Accessing a Package, using a Package.

Managing Input/ Output Files in Java: Introduction, Concept of Streams, Stream classes, Byte Stream Classes, Input Stream Classes, Output Stream Classes, Character Stream classes: Reader stream classes, Writer Stream classes, Using Streams, Reading and writing files.

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TEXT BOOKS:

Programming with JAVA, A Primer, E. Balagurusamy, 5th Edition, McGraw– Hill Company, 2015.

- Unit I** : Chapters 1 – 5
Unit II : Chapters 6,7 and 8.1– 8.10
Unit III : Chapter 8.11– 8.18, Chapters 9 and 10
Unit IV : Chapter 12 and 13
Unit V : Chapter 14, 11.1– 11.7 and 16

REFERENCE BOOKS:

1. *Introduction to JAVA Programming*, K. Somasundaram, Jaico Publishing House, New Delhi, 2013.
2. K. Somasundaram, *Don Learn JAVA – A Practical Approach*, Anuradha Publications, Chennai,2013.
3. *Programming in Java*, Sachin Malhotra, Oxford University Press
4. *Programming with Java: Based on Schaums's Outline of Programming with Java*, Tata John R. Hubbard, Second Edition, McGraw – Hill Company,2001.

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3					
CO2		2	1			2
CO3	2					
CO4	2		2	3		1
CO5	2	2	2	3	2	1

3. Advanced Application 2. Intermediate Development 1. Introductory Level

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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
23UCDCP2	LAB: JAVA PROGRAMMING	CORE – 4 LAB – III	–	6	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	II	40	60	100

NATURE OF COURSE	Employability <input checked="" type="checkbox"/>	Skill Oriented <input checked="" type="checkbox"/>	Entrepreneurship <input type="checkbox"/>
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COURSE DESCRIPTION:

This course provides the object oriented programming features which supports modular programming and Applet programming features which support web based programming.

COURSE OBJECTIVES:

- To introduce Object oriented programming and Applet programming concepts using JAVA and improve their OOP and Applet programming Skills.
- To introduce Object oriented programming and java programming features– Encapsulation, Polymorphism, Inheritance, Multithreading, Exception handling, Interface, Package and Applets and Graphics.
- To develop programs for data file access using JAVA streams classes.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom’s Taxonomy)
CO 1	write programs using Object oriented programming paradigm – Encapsulation (Classes and objects), Polymorphism and Inheritance.	Upto K3
CO 2	apply various java features like multithreading, exceptional handling, interface, package, overloading, overriding	Upto K3
CO 3	utilize different types of inheritance to suit different applications	Upto K3
CO 4	design to write programs using Object oriented programming paradigm that enables runtime polymorphism using interface and applet programming	Upto K3
CO 5	apply Object oriented programming paradigm for flat file organization. – Sequential and Random access	Upto K3

K1 – KNOWLEDGE (REMEMBERING), K2 – UNDERSTANDING, K3 – APPLY

Signature of the Chairman



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LAB: JAVA PROGRAMMING

Write Programs in Java for the following:

1. To implement a simple temperature conversion program.
2. To perform addition and subtraction of complex numbers using class and objects.
3. To perform volume calculation using method overloading.
4. Using command line arguments, test if the given string is palindrome or not.
5. String manipulation using String Methods (Use of any five String methods are preferred).
6. Write a program to fill names into a list. Also, copy them in reverse order into another list. If the name contains any numeric value throw an exception Invalid Name
7. Program to demonstrate the use of any two built-in exceptions in Java.
8. To perform multiplication of matrices using class and objects.
9. Using multilevel inheritance process student marks.
10. Implement multiple inheritance for payroll processing.
11. Implement interface for area calculation for different shapes.
12. Create a package called Arithmetic that contains methods to deal with all arithmetic operators. Also write a program to use the package
13. Create two threads such that one of the threads generate Fibonacci series and another generate perfect numbers between two given limits.
14. Define an exception called: Marks Out of bound: Exception, that is thrown if the entered marks are greater than 100.
15. Program to demonstrate the use of Wrapper class methods.
16. File Processing using Byte stream.
17. File Processing using Character Stream.
18. Write applets to draw the following Shapes:
(a). Cone (b). Cylinder (c). Square inside a Circle (d). Circle inside a Square
19. Write an applet Program to design a simple calculator.
20. Write an Applet Program to animate a ball across the Screen.

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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
23UCDA21	MATHEMATICAL FOUNDATIONS – II	ALLIED – 2	4	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	II	25	75	100

NATURE OF COURSE	Employability	Skill Oriented	Entrepreneurship
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

COURSE DESCRIPTION:

This course helps to provide the fundamental knowledge of Mathematical foundations based on Statistics and Probability.

COURSE OBJECTIVES:

- To impart knowledge on data collection and diagrammatic representation in Statistics
- To give the basic ideas about Moments and Skewness
- To teach the basic concepts of Correlation and Regression
- To give the basic concepts of Probability
- To solve various problems using t– test, F– test and Chi– square test.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcome	Knowledge Level (According to Bloom's Taxonomy)
CO1	define collection of data and state the representation of data in Bar – charts, Pie – diagrams, Histograms, Frequency polygon and Ogives.	Upto K3
CO2	explain the concept of moments, skewness and kurtosis solve problems	Upto K3
CO3	define correlation, regression and solve problems in correlation, rank correlation. Also find the regression equations.	Upto K3
CO4	explain addition, multiplication theorem, conditional probability, independent events, expectation and solve problems	Upto K3
CO5	solve problems in t– test, F– test and chi– square test	Upto K3

K1 – KNOWLEDGE (REMEMBERING), K2 – UNDERSTANDING, K3 – APPLY

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MATHEMATICAL FOUNDATIONS – II

UNIT – I: Introduction to Statistics:

Primary and secondary data–classification, tabulation and Diagrammatic Representation of statistical data – Bar– charts, Pie– diagrams – Graphical Representation of data – Histograms, Frequency polygon, Ogives.

UNIT – II: Measures of Dispersion:

Characteristics–coefficient of dispersion – Coefficient of variation–Moments – skewness and kurtosis – Pearson’s coefficient of skewness – Bowley’s coefficient of Skewness – Coefficient of skewness based upon moments.

UNIT – III: Simple Correlation:

Karl Pearson’s coefficient of correlation –correlation coefficient for A bivariate frequency distribution – Rank correlation – Regression – lines of regression – Properties of regression coefficient.

UNIT – IV: Events and Sets:

Sample space – concept of probability–addition and multiplications Theorem on probability – conditional probability and independence of evens – Baye’s Theorem – concept of random variable – Mathematical Expectation.

UNIT – V: Concept of Sampling Distributions:

standard error–Tests of significance based on t, Chi – square and F distributions with respect to mean, variance.

TEXT BOOKS:

Statistical Methods, S.P. Gupta, Sultan Chand and sons, 2004.

Unit I : Chapters 1, 2.2, 2.2.1, 2.2.2, 2.2.3 – 2.2.5

Unit II : Chapters 7 and 8

Unit III: Chapters 9, 9.1, 9.2, 9.3, 10, 10.1, 10.2, 10.2.1, 10.2.2, 10.2.3, 10.3

Unit IV: Chapter 16

Unit V : Chapters 18.3, 18.4, 18.7.1, 18.7.2, 19

REFERENCE BOOKS:

1. Statistics, Dr. S. Arumugam and A. Thangapandi Issac, New Gamma Publication house, 2002.
2. Kishor S. Trivedi – Probability and statistics with reliability queuing and Computer Science
3. Applications – Prentice Hall of India (P) Ltd., New Delhi – 1997. Discrete Mathematics – Seymour Lipschutz, Marc Lars Lipson Schaum’s Outlines– by, 3rd Edition., Tata McGraw Hill, Education Pvt. Ltd., New Delhi. 5th Reprint 2012.

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	3	–	3
CO2	–	1	3	2	–	3
CO3	–	1	3	2	–	3
CO4	1	2	3	2	–	3
CO5	2	3	3	2	–	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

Signature of the Chairman



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COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
23UCDS21	LAB: LINUX AND SHELL PROGRAMMING	SBS – 2 LAB – IV	–	2	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
I	II	40	60	100

NATURE OF COURSE	Employability <input checked="" type="checkbox"/>	Skill Oriented <input checked="" type="checkbox"/>	Entrepreneurship <input type="checkbox"/>
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COURSE DESCRIPTION:

To understand the basic principles of Linux OS and also help them understand its utilities.

COURSE OBJECTIVES:

To understand and make effective use of **Linux** utilities and shell scripting language to solve problems.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO1	write simple programs using basic commands	Upto K3
CO2	write simple programs using mathematical logic	Upto K3
CO3	write a simple programs using strings	Upto K3
CO4	write a simple programs using while loop	Upto K3
CO5	write a simple programs using files	Upto K3

K1 – KNOWLEDGE (REMEMBERING), K2 – UNDERSTANDING, K3 – APPLY

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LAB: LINUX AND SHELL PROGRAMMING

SECTION – A

1. Write a Linux script to find the number of users who have logged in.
2. Write a Linux script to see the current date, user name and current directory.
3. Write a Linux script to print the numbers 5,4,3,2,1 using While loop.
4. Write a Linux script to set the attributes of a file.
5. Write a Linux script to convert lowercase to uppercase using trutility.
6. Write a Linux script to copy and rename a file.
7. Write a Linux script to add 5 numbers and find the average.
8. Write a Linux script to convert a decimal number to hexadecimal conversion.
9. Write a Linux script to find the factorial of a number.
10. Write a Linux script to check for palindrome.

SECTION – B

11. Write a Linux script to display Hello World in Bold, Blink effect and in different colors like red, green etc.
12. Write a Linux script to display a multiplication table.
13. Write a Linux script to perform arithmetic operations using case.
14. Write a Linux script to add two real numbers.
15. Write a Linux script to display the following pattern:
1
22
333
4444
55555
16. Write a Linux script to find the sum of digits and reversing of a given number.
17. Write a Linux script to display the student mark details.
18. Write a Linux script to prepare electricity bill.
19. Write a Linux script to sort the numbers in ascending order.
20. Write a Linux script
 - (i) To create and append a file
 - (ii) To compare two files.

Signature of the Chairman