

NIRMALA COLLEGE FOR WOMEN (AUTONOMOUS), COIMBATORE -18.

UNDER GRADUATE PROGRAMME – B.Sc DATA SCIENCE.

UG SCHEME OF EXAMINATIONS: CBCS PATTERN.

(For the Candidates Admitted from the academic year 2023 - 2024 Onwards)

SEMESTER	PART	COURSE CODE	TITLE OF THE COURSE	NATURE	INSTRUCTIONAL HOURS	CREDIT POINTS	EXAM HOURS	MARKS		TOTAL
								CIA	ESE	
I	Part I	23UTAM101/ 23UHN101 / 23UFRE101	LANGUAGE - TAMIL/HINDI/FRENCH	LAN	6	3	3	25	75	100
	Part II	23UENG101/ 23UAEN101	ENGLISH – GENERAL ENGLISH / ADVANCED ENGLISH	ENG	6	3	3	25	75	100
	Part III	23UDS1C01	JAVA PROGRAMMING <i>(Employability)</i>	CC	5	5	3	25	75	100
		23UDS1CP1	CORE PRACTICAL: JAVA PROGRAMMING <i>(Employability)</i>	CC	6	3	3	25	75	100
		23UMAIA19	ALLIED : APPLIED STATISTICS I	GEN	5	4	3	20	55	75
	Part IV	15UVAL101	VALUE EDUCATION	AEC	2	2	3	-	50	50
II	Part I	23UTAM202/ 23UHN202/ 23UFRE202	LANGUAGE - TAMIL/HINDI/FRENCH	LAN	6	3	3	25	75	100
	Part II	23UENG202/ 23UAEN202	ENGLISH – GENERAL ENGLISH / ADVANCED ENGLISH	ENG	6	3	3	25	75	100
	Part III	23UDS2C02	CORE: DIGITAL FUNDAMENTALS AND COMPUTER ARCHITECTURE <i>(Skill Development)</i>	CC	4	4	3	25	75	100
		23UDS2C03/ 23UCS2C03/ 23UCA2C03/ 23UIT2C03	CORE: DATA SCIENCE <i>(Employability)</i>	CC	4	4	3	25	75	100
		23UDS2CP2	CORE PRACTICAL: DATA SCIENCE LAB.	CC	3	2	3	25	75	100

		23UMA2A12	ALLIED: OPERATIONS RESEARCH	GEN	6	5	3	50	50	100
	Part IV	21UENS202	ENVIRONMENTAL STUDIES	AEC	2	2		-	50	50
III	Part I	23UTAM101/ 23UHIN101/ 23UFRE101	LANGUAGE – TAMIL/HINDI / FRENCH	LAN	4	3	3	25	75	100
	Part II	23UENG101/ 23UAEN101	ENGLISH – GENERAL ENGLISH / ADVANCED ENGLISH	ENG	4	3	3	25	75	100
		23UDS3C04	CORE: R PROGRAMMING	CC	4	4	3	20	55	75
		23UDS3C05	CORE: DESIGN AND ANALYSIS OF ALGORITHMS	CC	4	4	3	20	55	75
		23UDS3CP3	CORE PRACTICAL: R PROGRAMMING LAB	CC	4	2	3	20	55	75
		23UDS3A01	ALLIED: APPLIED STATISTICS II	GEN	5	4	3	20	55	75
	Part IV	22UBTA301/ 22UATA301/ 21UGE303	BASIC TAMIL /ADVANCED TAMIL /NON-MAJOR ELECTIVE / GENERAL AWARENESS	AEC	2	2	2	25	25	50
								--	50	
		23UDS3SB1	SKILL BASED : DESIGN AND ANALYSIS OF ALGORITHMS LAB	SEC	3	2	3	25	75	100
		21UNCCWS1	WOMEN STUDIES	AEC	2	-	2	-	50	50
IV	Part I	23UTAM101/ 23UHIN101/ 23UFRE101	LANGUAGE – TAMIL/HINDI / FRENCH	LAN	4	3	3	25	75	100
	Part II	23UENG101/ 23UAEN101	ENGLISH – GENERAL ENGLISH / ADVANCED ENGLISH	ENG	4	3	3	25	75	100
	Part III	23UDS4C06	DATABASE MANAGEMENT SYSTEM	CC	4	4	3	20	55	75
		23UDS4C07	CORE: DATA MINING	CC	4	4	3	20	55	75
		23UDS4CP4	CORE PRACTICAL: DATABASE MANAGEMENT SYSTEM	CC	4	2	3	20	55	75

		23UMAIA20	ALLIED: INFORMATION AND DATA SECURITY	GEN	5	4	3	20	55	75
	Part IV	22UBTA402/ 22UATA402/ 21UHUR404	BASIC TAMIL/ADVANCED TAMIL/NON- MAJOR ELECTIVE / HUMAN RIGHTS	SEC	3	2	3	25	75	100
		23UDS4SB2	SKILL BASED: DATA MINING TOOLS LAB	CC	5	5	3	20	55	75
V	Part III	23UDS3C08	CORE: BIG DATA	CC	5	5	3	20	55	75
		23UDS5C09	CORE: ARTIFICIAL INTELLIGENCE	CC	5	5	3	20	55	75
		23UDS5CP5	CORE PRACTICAL: BIG DATA AB	CC	5	3	3	20	55	75
		23UDS5E01/ TESTING	ELECTIVE: DATA VISUALISATION & TESTING	DSE	5	4	3	25	75	100
		23NDS5E01	NME: BUSINESS INTELLIGENCE	GE	4	4	3	25	75	100
	Part IV	23UDS5SB3	SKILL BASED: SCILAB	SEC	3	2	3	25	75	100
		23UDSSB03	INTER DISCIPLINARY SKILL BASED: ANIMATION LAB	SEC	3	2	3	25	75	100
VI	Part III	23UDS6C10	CORE: PREDICTIVE ANALYTICS	CC	5	5	3	20	55	75
		23UDS6CP6	CORE PRACTICAL: MATLAB	CC	5	3	3	25	75	100
		23UDS6E01	ELECTIVE: SOFTWARE TESTING	DSE	5	4	3	25	75	100
		23UDS6PVV	PROJECT	CC	5	4	3	25	75	100
	Part IV	23UDS6SB4	SKILL BASED: POWERBI LAB	SEC	3	2	3	25	75	100
		23UDSSB03	INTER DISCIPLINARY SKILL BASED: ANIMATION LAB	SEC	3	2	3	25	75	100

	Part V		CO-CURRICULAR ACTIVITIES (NSS, NCC, SPORTS, RSP, YRC, NECTAR, CHETNA WOMEN CELL ,AICUF)			1				50
	TOTAL					140				3800
		19UCYS605	CYBER SECURITY		2	2	2	-	50	50
			MOOC / SWAYAM / NPTEL			2				
	GRAND TOTAL		Total		180 +2 +2	140 +2 +2				3800 + 50

IH – Instructional Hours , CP – Credit Points , CIA – Continuous Internal Assessment , ESE – End Semester Examination

PART- WISE TOTAL MARKS

PART	COURSE	MARKS	TOTAL MARKS	TOTAL CREDIT POINTS
Part I	Language - Tamil/ Hindi/ French	400	400	12
Part II	English – General /Advanced	400	400	12
Part III	Core- Theory, Practical and Project	1450	2100	65
	Allied – Theory	350		18
	Elective	300		12
Part IV	Basic Tamil/Advanced Tamil	100	850	4
	General Awareness/ Human Rights			
	Skill Based (6 Courses)	600		12
	Value Education	50		2
	Environmental Studies	50		2
	Women Studies	50		-
Part V	Co-curricular Activities (NSS, NCC, SPORTS, RSP, YRC, NECTAR, CHETNA WOMEN CELL ,AICUF)	50	50	1
TOTAL			3800	140

	Cyber Security		50	2
	MOOC/SWAYAM / NPTEL		-	2
GRAND TOTAL			3800+50	140+2+2

ABBREVIATIONS	NATURE OF THE COURSES
LAN	LANGUAGE
ENG	ENGLISH
CC	CORE
GEN	GENERIC (Allied)
AEC	ABILITY ENHANCEMENT COURSE
SEC	SKILL ENHANCEMENT COURSE
GE	GENERIC ELECTIVE (NME)
DSE	DISCIPLINE SPECIFIC ELECTIVE

SEMESTER I
COURSE CODE: 23UDS1C01
CORE PAPER I: JAVA PROGRAMMING

OBJECTIVES

- To impart the fundamental concepts of JAVA.
- To gain knowledge of standalone and web applications

Total Credits -5

Instructional hours-60 hours

UNIT-I: Introduction

12 hours

JAVA Evolution: History – Features – Java differs from C and C++ - Java and Internet - Java and WWW – Web Browsers - Overview of Java: Introduction to simple Java program – Structure – Java tokens – Statements - Java Virtual Machine.

(Self-Study: Web Browsers)

UNIT-II: Decision Making and Looping

12 hours

Constants, Variables and Data types – Operators and Expressions - Decision making - Branching – Looping - Classes - Objects and Methods.

UNIT-III: Exception Handling and Threads

12 hours

Arrays - Strings and Vectors – Interfaces - Multiple Inheritance - Packages: Putting classes together – Multithreaded programming - Managing Errors and Exceptions.

UNIT-IV: GUI Programming

12 hours

Graphics Programming – Sizing Graphics - Simple Graphics Methods – Color – Fonts. Abstract Window Toolkit: Components – Layout – Event- Swings.

UNIT-V: Files

12 hours

Files: Introduction – Concept of streams – Stream classes – Using streams – I/O classes - File class – I/O Exceptions – Creation of files- Reading/Writing Characters/ Bytes - Handling primitive data types – Random Access Files.

TEXT BOOKS

1. E. Balagurusamy (2014) Programming with JAVA (5th Edition). McGraw-Hill Education.
2. Patrick Naughton and Herbert Schildt, **“THE COMPLETE REFERENCE JAVA**

REFERENCE BOOKS

1. Herbert Schildt (2014) JAVA - The Complete Reference (9th Edition). McGraw-Hill Publications.
2. Rashmi Kanta Das (2015) Core Java for Beginners (3rd Edition) First Reprint. Vikas Publishing House Pvt Ltd.
3. Paul Deitel, Harvey Deitel (2015) Java How to Program, (9th edition), PHI.
4. Samanta D (2005) Object Oriented Programming With C++ and JAVA (2nd edition). Prentice-Hall of India Private Limited.

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Checked by CDC : Ms.A.Jansi Rani	Approved by : Principal

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SEMESTER I
COURSE CODE : 23UDS1CP1
CORE PRACTICAL I: JAVA PROGRAMMING

OBJECTIVES

- To inculcate knowledge about the Object-Oriented concepts and file operations
- To learn about data manipulation in Excel and to make the graphs for statistical data

Total Credits- 4

Instructional Hours- 90 hours

LIST OF PRACTICALS

JAVA PROGRAMS

1. Write a program to perform arithmetic operations.
2. Write a program to find the greatest of 3 numbers using decision making statement.
3. Write a program to find the factorial of a given number.
4. Write a program using decision making statement.
5. Write a program to perform string operation using string functions.
6. Write a program to perform matrix addition using two dimensional arrays.
7. Write a program to handle the divide by zero exception.
8. Write a program to calculate electricity bill using inheritance.
9. Write a program to find area of triangle and rectangle using package.
10. Write a java program to create a frame.
11. Write a Java program to demonstrate the multiple selection list box.
12. Write Java program to create a menu bar and pull-down menus

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SEMESTER: II

COURSE CODE : 22UDS2C02

CORE II: DIGITAL FUNDAMENTALS AND COMPUTER ARCHITECTURE

OBJECTIVES

- To provide a strong foundation in understanding the concept of digital number system and circuits.
- To have a deep knowledge on memory and I/O organization.

Credits :4

Instructional hours:60

UNIT-I: Number Systems and Boolean Algebra

12 hours

Number Systems – Binary Operations – Floating Point Representation - Complements - BCD - Excess 3 - Gray Code - Boolean Algebra – Karnaugh Map – Canonical Form1 – Construction and Properties – Implicants – Don't Care Combination – Product of Sums – Sum of Products – Simplifications.

(Self study: BCD)

UNIT-II: Combinational Logic Design

12 hours

Basic Logic Gates – NOR, NAND, XOR Gates –Half Adder - Full Adder - Parallel Binary Adder - BCD Adder - Half Subtractor - Full Subtractor - Parallel Binary Subtractor – RS - D - JK - T Flipflops.

(Self Study: Basic Logic Gates)

UNIT-III: Registers

12 hours

Shift Register – Shift Left Register – Shift Right Register - Encoder – Decoder – Multiplexers – Demultiplexers – Counters – Ring Counter – Programmable Counter

UNIT-IV: I/O Organization

12 hours

Input/Output Interface – I/O Bus and Interface – I/O Bus Vs Memory Bus – Isolated vs Memory – Mapped I/O – Introduction to Asynchronous Data Transfer - Strobe Control and Handshaking.

UNIT-V: Memory Organization

12 hours

Memory Hierarchy – Main Memory – Associative Memory - Cache Memory - Virtual Memory.

TEXT BOOKS

- 1.Puri V.K. (2010). Digital Electronics Circuits and Systems (3rd Edition). Tata McGraw Hill Publication Company.
- 2.Morris Mano M.(2012). Computer System Architecture (3rd Edition). Pearson Education Publication.

REFERENCE BOOK

1. Morris Mano M.(2006). Digital Design (4th Edition)Prentice Hall of India.

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SEMESTER: II
COURSE CODE : 23UDS2C03
CORE III: CORE: DATA SCIENCE

OBJECTIVES

- To inculcate a greater understanding of programming language design and implementation.
- To comprehend the paradigm of object-oriented concepts with PYTHON Programming.

Credits :4

Instructional hours:60

UNIT I: Datascience Concepts

12 hours

Data Science: Benefits and uses – facets of data - Data Science Process: Overview – Defining research goals – Retrieving data – Data preparation - Exploratory Data analysis – build the model– presenting findings and building applications

UNIT II: Control structures and Functions

12 hours

The Python Programming Language: Python - The IDLE Python Development Environment - Python IDLE - String Formatting Implicit and Explicit Line Joining - Lists: List Structures- Lists (Sequences) in Python: Python List Type – Tuples - Sequences -Nested Lists- Functions: Program Routines - Defining Functions - Parameter Passing - Keyword Arguments in Python - Default Arguments in Python - Variable Scope

Self Study: Boolean Expressions – Selection Control

UNIT III : Modular Design

12 hours

Modules - Module Specification - Python Modules- Modules and Namespaces- Importing Modules - Object-Oriented Programming: Class - Features of Object-Oriented Programming - Encapsulation - Defining Classes in Python - Inheritance Subtypes - Subclasses in Python - Polymorphism – Recursion: Recursive Functions.

UNIT IV : Dictionary Sets ,Turtle and Tkinter

12 hours

Exception Handling - The Propagation of Raised Exceptions - Catching and Handling Exceptions - Exception Handling and User Input - Exception Handling and File Processing - Dictionaries and Sets: Dictionary Type in Python- Dictionary- Set Data Type in Python Modular Design- Turtle Graphics - Creating a Turtle Graphics Window - The “Default” Turtle -Fundamental Turtle Attributes and Behavior - Additional Turtle Attributes - Creating Multiple Turtles - GUI Programming : Tkinter – Introduction – Tkinter and Python Programming – GUIs- Related Modules and GUIs.

UNIT V: Tableau Basics

12 hours

Bringing in Data: Understanding Data Connections-Connecting to Data-Visualizing Data- Understanding Tableau Desktop Environment-Adding Worksheets-Creating Dashboards- Building Stories-Publishing Workbooks

TEXT BOOKS

1. David Cielien, Arno D. B. Meysman, and Mohamed Ali, “Introducing Data Science”, Manning Publications, 2016.
2. Charles Dierbach, Introduction To Computer Science Using Python –Computational Problem-Solving Focus, Wiley Publication,Reprint 2016.
3. Molly Monsey and Paul Sochan,”Tableau for Dummies” Wiley Publication 2016

REFERENCE BOOKS

1. Reema Thareja, Python Programming Using Problem Solving Approach, Oxford University Press,First Edition, Isbn-13: 978-0-19-948017.
2. Kenneth A.Lambert, Martin Osborne. Fundamentals Of Python, Cengage Publication,First Edition.

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SEMESTER: II

COURSE CODE : 23UDS2CP2

CORE LAB II: DATA SCIENCE LAB

OBJECTIVES

- To inculcate knowledge about the python Programming.
- To gain knowledge of aspects of the data analysis process

Credits :5

Instructional hours:45

LIST OF PROGRAMS

- 1) Implement Python program
 - i. To Calculate GCD of two numbers.
 - ii. To find the Mean and Median of the numbers
- 2) Write a Python program to find the index of an item of a tuple.
- 3) Implement function overloading with different function signatures.
- 4) Write a Python class named Circle constructed by a radius and two methods which will compute the area and the perimeter of a circle.
- 5) Write a program in python to add, delete, update an key value in dictionary and merge two Dictionary.

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