KONGUNADU ARTS AND SCIENCE COLLEGE

(AUTONOMOUS)

Coimbatore - 641 029

DEPARTMENT OF COMPUTER SCIENCE WITH DATA ANALYTICS

CURRICULUM AND SCHEME OF EXAMINATIONS
(2023 – 2024)

DEPARTMENT OF COMPUTER SCIENCE WITH DATA ANALYTICS

Vision

To emerge as a throbbing and pioneering academic and research hub of global standards to empower students in Computer Science with Data Analytics.

Mission

- To incorporate modern trends in Data Science and Analytics.
- To fuel the passion in student community to excel in all fronts like logical thinking, decision making, reliability and application based on strong theoretical foundation and extensive practical training.
- To undertake industry – institute collaborations for knowledge and technology exchange.
- To generate new knowledge by high impact research in data analytics that has significant benefits for individual, industry and society by enabling better decision making.

Programme Outcomes (POs)	
On successful completion of the B.Sc. Computer Science with Data Analytics	
PO1	Exhibit good domain knowledge and completes the assigned responsibilities Effectively and efficiently in par with the expected quality standards
PO2	Apply analytical and critical thinking to identify, formulate, analyze, and solve complex problems in order to reach authenticated conclusions
PO3	Design and develop research-based solutions for complex problems with specified needs through appropriate consideration for the public health, safety, cultural, societal, and environmental concerns
PO4	Establish the ability to Listen, read, proficiently communicate and articulate complex ideas with respect to the needs and abilities of diverse audiences.
PO5	Deliver innovative ideas to instigate new business ventures and possess the qualities of a good entrepreneur
PO6	Acquire the qualities of a good leader and engage in efficient decision-making.
PO7	Graduates will be able to undertake any responsibility as an individual/member of multidisciplinary teams and have an understanding of team leadership
PO8	Function as socially responsible individual with ethical values and accountable to ethically validate any actions or decisions before proceeding and actively contribute to the societal concerns.
PO9	Identify and address own educational needs in a changing world in ways sufficient to maintain the competence and to allow them to contribute to the advancement of knowledge
PO10	Demonstrate knowledge and understanding of management principles and apply these to one own work to manage projects and in multidisciplinary environment.

Programme Specific Outcomes (PSOs)	
After the successful completion of B.Sc. Computer Science with Data Analytics programme the students are expected to	
PSO1	Impart education with domain knowledge effectively and efficiently in par with the expected quality standards for Data analyst professional.
PSO2	Ability to apply the mathematical, technical and critical thinking skills in the discipline of Data analytics to find solutions for complex problems.
PSO3	Ability to engage in life-long learning and adopt fast changing technology to Prepare for professional development.
PSO4	Expose the students to key technologies in data science and business analytics: data mining, machine learning, visualization techniques, predictive modeling, and statistics.
PSO5	Inculcate effective communication skills combined with professional & ethical Attitude.

KONGUNADU ARTS AND SCIENCE COLLEGE (AUTONOMOUS)
COIMBATORE – 641 029

Course Name B.Sc **Computer Science with Data Analytics**

Curriculum and Scheme of Examination under CBCS

(Applicable to the students admitted during the Academic Year 2023-2024)

Semester	Part	Subject Code	Title of the Paper	Instruction hours/cycle	Exam. Marks			Duration of Exam (hours)	Credits
					CIA	ESE	TOTAL		
I	I	23TML101	Language I@	6	25	75	100	3	3
	II	23ENG101	English -I	6	25	75	100	3	3
	III	23UDA101	Core Paper 1: Programming for Problem Solving using C	5	25	75	100	3	4
	III	23UDA1CL	Core Practical 1: Programming for Problem Solving using C Laboratory	5	40	60	100	3	2
	III	23UDA1A1	Allied Paper 1 - Discrete Mathematics and Statistics	6	25	75	100	3	5
	IV	23EVS101	Environmental Studies **	2	-	50	50	3	2
			Total	30	-	-	550	-	19
II	I	23TML202	Language II@	6	25	75	100	3	3
	II	23ENG202	English –II	4	25	25	50 @@	3	1
	II	23UGN2NM	Effective English: Language Proficiency for Employability http://kb.naanmudhalvan.in/Special:Filepath/Cambridge_Course_Details.pdf	2	25	25	50 ##		2
	III	23UDA202	Core Paper 2: Object Oriented Programming in C ++	5	25	75	100	3	4
	III	23UDA2CM	Core Practical 2 : Object Oriented Programming in C ++ Laboratory	5	40	60	100	3	2
	III	23UDA2A2	Allied Paper 2 - Optimization Techniques and Linear Algebra	6	25	75	100	3	5
	IV	23VED201	Value Education- Moral and Ethics**	2	-	50	50	3	2
			Total	**30**	**-**	**-**	**550**	**-**	**19**
III	I	23TML303	Language III@	6	25	75	100	3	3
	II	23ENG303	English –III	6	25	75	100	3	3
	III	23UDA303	Core Paper 3: Object Oriented Programming in Java	4	25	75	100	3	5
	III	23UDA3CN	Core Practical 3: Object Oriented Programming in Java Laboratory	5	40	60	100	3	3
	III	23UDA3A3	Allied Paper 3 – Fundamentals of Data Analytics	5	25	75	100	3	5
	IV	23UGC3S1	Skill Based subject 1- Cyber Security	2	100	-	100	3	3
	IV	23TBT301/ 23TAT301/ 23UHR3N1	Basic Tamil* / Advanced Tamil**/ Non-major elective- I**	2	-	75	75	3	2
			Total	**30**	**-**	**-**	**675**	**-**	**24**
IV	I	23TML404	Language IV@	6	25	75	100	3	3
	II	23ENG404	English –IV	6	25	75	100	3	3
	III	23UDA404	Core Paper 4: Python Programming	4	25	75	100	3	5
	III	23UDA4CO	Core Practical 4: Python Programming Laboratory	4	40	60	100	3	3
	III	23UDA4A4	Allied Paper 4 – Design and Analysis of Algorithm	5	25	75	100		5
	IV	23UDA4SL	**Skill Based subject 2-** Web Design	2	25	25	50	3	1

Part	Course Code	Title	Hours	CIA	ESE	Total	Exam	Credits
		Laboratory				@@		
IV	23UDA4NM ###	Office Fundamentals :Digital Skills for Employability http://kb.naanmudhalvan.in/Special:Filepath/Microsoft_Course_Details.xlsx	1	25	25	50 ##		2
IV	23TBT402/ 23TAT402/ 23USG4N2	Basic Tamil* / Advanced Tamil**/ Non-major elective- II**	2	-	75	75	3	2
		Total	**30**	**-**	**-**	**675**	**-**	**24**
V	III	23UDA505	Core Paper 5- R Programming	6	25	75	100	3	4
	III	23UDA5CP	Core Practical 5- R Programming Laboratory	6	40	60	100	3	4
	III	23UDA506	Core Paper 6- Relational Database Management system	6	25	75	100	3	4
	III	23UDA5CQ	Core Practical 6 – Relational Database Management System Laboratory	5	40	60	100	3	4
	III	23UDA5E1	Major Elective 1 -	5	25	75	100	3	5
	IV	-	**EDC**	2	100	-	100	3	3
	-	**23UDA5IT**	**Internship Training ******			Grade			
			Total	**30**	**-**	**-**	**600**	**-**	**24**
VI	III	23UDA607	Core Paper 7: Artificial Intelligence and its Applications	5	25	75	100	3	4
	III	23UDA6CR	Core Practical 7: Artificial Intelligence and Machine Learning Laboratory	5	40	60	100	3	4
	III	23UDA608	Core Paper 8: Machine Learning	4	25	75	100	3	4
	III	23UDA609	Core Paper 9: Database Design and Management	4	25	75	100	3	4
	III	23UDA6E2	Major Elective 2 –	5	25	75	100	3	5
	III	23UDA6Z1	Project*** ~	4	20	80	100	-	5
	IV	23UDA6S3	Skill Based subject 3- Ethical Hacking	2	25	25	50 @@	3	1
	IV	23UDA6NM ###	Project Based Learning: Advanced Platform Technology / Data Analytics & Visualization http://kb.naanmudhalvan.in/BharathiarUniversity_(BU)	1	25	25	50 ##		2
			Total	**30**	**-**	**-**	**700**	**-**	**29**
	V	23NCC $/NSS/YRC /PYE/ECC/ RRC/ WEC101#	Cocurricular Activities*	-	50	-	50	-	1
			Grand Total	**-**	**-**	**-**	**3800**	**-**	**140**

Note :

CBCS – Choice Based Credit system,   CIA– Continuous Internal Assessment,   ESE– End of Semester Examinations

@@ End semester examination will be conducted for 50 marks and the marks will be converted to 25 marks.

Naan Mudhalvan Course: End of semester will be assessed by Industry for 25 marks and CIA will be done by the course teacher

The course can be opted to suit the skill set requirement of the core domain from the courses provided by the Bharathiar University and the same may be intimated to the COE during the beginning of that particular semester.

$ For those students who opt NCC under Cocurricular activities will be studying the prescribed syllabi of the UGC

which will include Theory, Practical & Camp components. Such students who qualify the prescribed requirements will earn an additional 24 credits.

@ Hindi/Malayalam/ French/ Sanskrit – 23HIN/MLM/FRN/SAN101 - 404

* - No End-of-Semester Examinations. Only Continuous Internal Assessment (CIA)

**- No Continuous Internal Assessment (CIA). Only End-of-Semester Examinations (ESE)

*** Project Report   – 60 marks; Viva voce – 20 marks; Internal-20 marks
~ It will not be added in the Faculty Workload

**** The students shall undergo Internship training / field work for a minimum period of 14 working days at the end of the fourth semester during summer vacation and submit the report in the fifth semester which will be evaluated for 100 marks by the concerned guide and followed by an Internal Viva voce by the respective faculty or HOD as decided by the department. According to their marks, the grades will be awarded as given below.

Marks %	Grade
85 – 100	O
70 – 84	D
60 – 69	A
50 – 59	B
40 – 49	C
< 40	U (Reappear)

Major Elective Papers (2 papers are to be chosen from the following 8 papers)

1. Internet of Things

2. Software Testing and Quality Assurance

3. Cloud Computing Fundamentals

4. Digital Forensics

5. Natural Language Processing

6. Deep Learning

7. Data Warehousing and Data Mining

8. Cryptography and Information system

Non-Major Elective Papers

1. Human Rights
2. Consumer Affairs
3. SOGIESC Studies

Sub. Code & Title of the Extra Departmental Course (EDC) :

23UDA5XL **-** Internet Basics and Advanced Excel Laboratory

 # List of Cocurricular Activities:

1. National Cadet Corps (NCC)

2. National Service Scheme (NSS)

3. Youth Red Cross (YRC)

4. Physical Education (PYE)

5. Eco Club (ECC)

6. Red Ribbon Club (RRC)

7. Women Empowerment Cell (WEC)

Note: In core/ allied subjects, no. of papers both theory and practical are included wherever applicable. However, the total credits and marks for core/allied subjects remain the same as stated below.

Tally Table:

S.No.	Part	Subject	Marks	Credits
1.	I	Language – Tamil/Hindi/Malayalam/ French/ Sanskrit	400	12
2.	II	English	400	12
3.	III	Core – Theory/Practical	1600	60
	III	Allied	400	20
		Electives/Project	300	15
4.	IV	Basic Tamil / Advanced Tamil (OR) Non-major electives	150	4
		Skill Based subject	300	9
		EDC	100	3
		Environmental Studies	50	2
		Value Education	50	2
5.	V	Cocurricular Activities	50	1
		Total	**3800**	**140**

➢ 25 % CIA is applicable to all subjects except JOC, COP and SWAYAM courses which are considered as extra credit courses.

➢ 100 % CIA for Cyber Security and EDC paper.

➢ The students to complete any **MOOC On learning platforms like SWAYAM, NPTEL, Course era, IIT Bombay Spoken Tutorial etc.,** before the completion of the 5th semester and the course completion certificate should be submitted through the HOD to the Controller of Examinations. Extra credits will be given to the candidates who have successfully completed.

➢ An **Onsite Training** preferably relevant to the course may be undertaken as per the discretion of the HOD.

Components of Continuous Internal Assessment

Components		Marks	Total
Theory			
CIA I	75	(75+75) converted to 30	
CIA II	75		25
Assignment/Seminar		5	
Attendance		5	
Theory			
CIA I	50	(50+50) Converted to 15	
CIA II	50		25
Assignment/Seminar		5	
Attendance		5	
Practical			
CIA Practical		25	
Observation Notebook		10	40
Attendance		5	
Practical			
CIA Practical		25(converted to 10)	
Observation Notebook		10	25
Attendance		5	
Project			
Review		15	
Regularity		5	20

BLOOM'S TAXONOMY BASED ASSESSMENT PATTERN

K1-Remembering; **K2**-Understanding; **K3**-Applying; **K4**-Analyzing; **K5**-Evaluating

1.Theory Examination:

(i) CIA I & II and ESE: 75 Marks

Knowledge Level	Section	Marks	Description	Total
K1 Q1 to 10	A (Answer all)	10 x 1 = 10	MCQ	
K1 – K5 Q11 to 15	B (Either or pattern)	5 x 5 = 25	Short Answers	75
K2 – K5 Q16 to 20	C (Either or pattern)	5 x 8 = 40	Descriptive / Detailed	

**For ESE 50 marks converted to 25 marks.

(i) CIA I & II and ESE: 50 Marks

Knowledge Level	Section	Marks	Description	Total
K1 Q1 to 10	A (Answer all)	10 x 1 = 10	MCQ	
K1 – K5 Q11 to 15	B (Either or pattern)	5 x 3 = 15	Short Answers	50**
K2 – K5 Q16 to 20	C (Either or pattern)	5 x 5 = 25	Descriptive / Detailed	

**For ESE 50 marks converted to 25 marks.

2. ESE Practical Examination:

Knowledge Level	Section	Marks	Total
K3	Experiments	50	
K4	Record Work	10	60
K5			

Knowledge Level	Section	Marks	Total
K3	Experiments	20	
K4	Record Work	05	25
K5			

3. ESE Project Viva Voce:

Knowledge Level	Section	Marks	Total
K3	Project Report	60	
K4	Viva voce	20	80
K5			

Programme Code: 23	B.Sc. Computer Science with Data Analytics

Title of the Paper : Core Paper 1 - Programming for Problem Solving using C

Batch	Hours / Week	Total Hours	Credits
2023-2024	5/15	75	4

Course Objectives

1. To introduce the concepts of Procedure Oriented Programming and the various Programming constructs of C programming
2. To provide exposure to problem solving through programming and to develop programming skills.
3. To impart adequate knowledge of programming languages and problem solving techniques.

Course Outcomes (CO)

K1 to K5	**CO1**	Describe about the about the fundamentals of computers, history and various types of software and hardware devices.
	CO2	Interpret the concepts of Variables, Constant, Operators and various types of expressions.
	CO3	Apply the concept of Decision making statements and looping constructs for solving basic programs.
	CO4	Developing programs using pointer, enumerated data types, function, Union and nested structures.
	CO5	Designing programs using pointers and file concepts.

Syllabus

UNIT I (15 Hours)

Fundamentals of Computers : Introduction – History of Computers - Generations of Computers - Classification of Computers - Basic Anatomy of a Computer System - Input Devices - Processor - Output Devices - Memory Management – Types of Software - Overview of Operating System- Programming Languages - Translator Programs - Problem Solving Techniques.

UNIT II (15 Hours)

Overview of C - Introduction - Character set - C tokens - Keyword and Identifiers - Constants - Variables - Data types - Declaration of variables - Assigning values to variables - Defining Symbolic Constants - Arithmetic, Relational, Logical, Assignment, Conditional, Bitwise, Special, Increment and Decrement operators - Arithmetic Expressions - Evaluation of expression - precedence of arithmetic operators - Type conversion in expression – operator precedence & associativity - Mathematical functions - Reading and Writing a character - Formatted input and output.

UNIT III **(15 Hours)**

Decision Making and Branching: Introduction – if, if….else, nesting of if …else statements - else if ladder-The switch statement -The?: Operator – The goto Statement. Decision Making and Looping: Introduction-The while statement - the do statement – The for statement - Jumps in loops. Arrays – Character Arrays and Strings.

UNIT IV **(15 Hours)**

User-Defined Functions: Introduction – Need and Elements of User-Defined Functions- Definition-Return Values and their types - Function Calls – Declarations – Category of Functions - Nesting of Functions - Recursion – Passing Arrays and Strings to Functions - The Scope, Visibility and Lifetime of Variables- Multi file Programs- **Structures and Unions*.**

UNIT V **(15 Hours)**

Pointers: Introduction-Understanding pointers-Accessing the address of a variable-Declaration and Initialization of pointer Variable – Accessing a variable through its pointer-Chain of pointers- Pointer Expressions – Pointer Increments and Scale factor- Pointers and Arrays- Pointers and Strings – Array of pointers – Pointers as Function Arguments- Functions returning pointers – Pointers to Functions – Pointers and Structures. File Management in C.

* Denotes Self Study and questions for examinations may be taken from the self-study portions also.

Teaching Methods

Chalk and Talk/ Power point presentation/ Google Class Rooms/ Smart Class Rooms /Seminar / Quiz / Discussion / Assignment/ Demonstration/ Video presentation /Podcast /Materials from NDLI/ Class blended learning/ Flipped class

Text Book

1. E Balagurusamy (2008), "Computing Fundamentals & C Programming" – Tata McGraw-Hill Education Pvt. Ltd.

Reference Books

1. Ashok N Kamthane (2002),"Programming with ANSI and Turbo C", Pearson.
2. Henry Mullish& Herbert L Cooper, (1996), "The Spirit of C",Jaico Publication House.
3. P.J.Deitel and H.M.Deitel,(2008),"C How to Program" ,5th Edition, Tata McGraw Hill
4. YeswanthKanethkar,(2007),"Let Us C", Eigth Edition - BTB Publications

PSO CO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	H	M
CO2	S	S	M	H	H
CO3	S	H	H	S	M
CO4	H	S	M	H	M
CO5	S	H	H	S	S

S – Strong **H** – High **M** – Medium **L** – Low

Programme Code: 23	B.Sc. Computer Science with Data Analytics

Title of the Paper : Core Practical 1: Programming for Problem Solving using C Laboratory

Batch	Hours / Week	Total Hours	Credits
2023-2024	5/15	75	2

Course Objectives

1. To introduce C Programming concepts to develop the programming knowledge.
2. To enhance their analyzing and problem solving skills and use the same for writing programs in C.
3. To guide the candidates to explore the fundamental building blocks in the programming language.

Course Outcomes (CO)

K3 to K5	**CO1**	Learning process helps in deep understanding the concepts of C language.
	CO2	Developing programs using control statements, Arrays and Strings.
	CO3	Apply the various basic programming constructs like structures, pointers and files
	CO4	Design programs using the concept of files in C and be able to simulate operations.
	CO5	Implementing the strings and files concepts.

LIST OF PRACTICAL PROGRAMS

1. Develop a C program to perform variables and datatypes.

2. Develop a C program to perform various operators.

3. Develop a C program to perform mathematical function.

4. Develop various C Programs using Conditional statements.

5. Develop various C Programs using Control Structures.

6. Develop various C programs using Switch case.

7. Develop a C program to illustrate user defined function.

8. Develop a C program to manipulate strings using string functions.

9. Develop a C program to perform pointer.

10. Develop a C program using Array of Structures.

11. Develop a C program to calculate electricity bill using files.

12. Develop a C program to encrypt and decrypt files.

Text Book
1. E Balagurusamy (2008), "Computing Fundamentals & C Programming" , Tata Mcgraw, Hill Education Pvt. Ltd.

Reference Books
1. Ashok N Kamthane (2002),"Programming with ANSI and Turbo C", Pearson.
2. Henry Mullish& Herbert L Cooper, (1996), "The Spirit of C",Jaico Publication House.
3. P.J.Deitel and H.M.Deitel,(2008),"C How to Program" ,5th Edition, Tata McGraw Hill.
4. YeswanthKanethkar,(2007),"Let Us C", Eigth Edition - BTB Publications.

Teaching Methods
Smart Classroom, PowerPoint Presentations, Discussions, Flipped Class, Assignment, Video Lectures

Guidelines to the distribution of marks for practical Examinations

Two questions will be given for each student (**3 Hours / 60 Marks**)
> 1. **Record Work**: 10 Marks.
> 2. **Algorithm, Program, Typing and Execution:**50 Marks.

Particulars	Program I (Marks)	Program II (Marks)
Algorithm	5	5
Program Writing	10	10
Typing and Execution	10	10

Internal Mark Split up for 40 Marks:

> **Observation:** 10 Marks
> **Attendance:** 5 Marks
> **One Model Practical:** 25 Marks.

MAPPING					
PSO / CO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	H	M
CO2	S	S	M	H	H
CO3	S	H	H	S	M
CO4	H	S	M	H	M
CO5	S	H	H	S	S
S – Strong	**H** – High		**M** – Medium		**L** – Low

Programme Code: 23	B.Sc. Computer Science with Data Analytics

Title of the Paper : Core Paper 2: Object Oriented Programming in C ++			
Batch	**Hours / Week**	**Total Hours**	**Credits**
2023-2024	5/15	75	4

Course Objectives

1. To introduce he concepts of Object Oriented Programming Paradigm and the programming constructs of C++.
2. To develop an in-depth understanding of functional, logic, and object-oriented programming paradigms.
3. To program using more advanced OOP's features such as objects, operator overloading, dynamic memory allocation, inheritance and polymorphism, File I/O.

Course Outcomes (CO)

<table>
<tr><td rowspan="6">K1 to K5</td><td>CO1</td><td>Describe the procedural and object oriented paradigm with concepts of streams, classes, functions, data and object.</td></tr>
<tr><td>CO2</td><td>Demonstrate the various basic programming constructs like decision-making statements. Looping statements and functions.</td></tr>
<tr><td>CO3</td><td>Explain the object oriented concepts like operator overloading, inheritance & virtual base classes.</td></tr>
<tr><td>CO4</td><td>Implementing the concepts of pointers, virtual functions and polymorphism.</td></tr>
<tr><td>CO5</td><td>Evaluating the usage of concepts of various file stream classes, file types, usage of templates and exception handling mechanisms.</td></tr>
</table>

Syllabus

UNIT I **(15 Hours)**

Introduction to C++ - Key concepts of Object-Oriented Programming –Advantages – Object Oriented Languages – I/O in C++ - C++ Declarations. Control Structures: - Decision Making and Statements: If. else, jump, goto, break, continue, switch case statements - Loops in C++ : for, while, do - functions in C++ - inline functions – Function Overloading.

UNIT II **(15 Hours)**

Classes and Objects: Declaring Objects – Defining Member Functions – Static Member variables and functions – array of objects – friend functions – Overloading member functions – Bit fields and classes – Constructor and destructor with static members.

UNIT III **(15 Hours)**

Operator Overloading: Overloading unary, binary operators – Overloading Friend functions – type conversion – Inheritance: Types of Inheritance – Single, Multilevel, Multiple, Hierarchal, Hybrid, Multi path inheritance – Virtual base classes – Abstract Classes.

UNIT IV **(15 Hours)**

Pointers – Declaration – Pointer to Class , Object – this pointer – Pointers to derived classes and Base classes – Arrays – Characteristics – array of classes – Memory models – new and delete operators – dynamic object – Binding, **Polymorphism and Virtual Functions*.**

UNIT V (15 Hours)

Files – File stream classes – file modes – Sequential Read / Write operations – Binary and ASCII Files – Random Access Operation – Templates – Exception Handling - Strings – Declaring and Initializing string objects – String Attributes – Miscellaneous functions .

* Self Study and questions for examinations may be taken from the self-study portions also.

Teaching Methods

Chalk and Talk/ Power point presentation/ Google Class Rooms/ Smart Class Rooms /Seminar / Quiz / Discussion / Assignment/ Demonstration/ Video presentation /Podcast /Materials from NDLI/ Class blended learning/ Flipped class

Text Book

1. Ashok N Kamthane (2003),"Object-Oriented Programming with Ansi and Turbo C++", Pearson Education.

Reference Books

1. E. Balagurusamy (1998)," Object-Oriented Programming with C++", TMH.
2. Maria Litvin &GrayLitvin (2002)" C++ for you", Vikas publication.
3. John R Hubbard (2002)"Programming with C", 2nd Edition, TMH publication.

MAPPING

PSO / CO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	H	S	S
CO2	S	H	S	H	M
CO3	S	H	M	H	S
CO4	S	M	S	M	H
CO5	S	H	H	H	S

S – Strong   **H** – High   **M** – Medium   **L** – Low

Programme Code: 23	B.Sc. Computer Science with Data Analytics

Title of the Paper : Core Practical 2 : Object Oriented Programming in C ++ Laboratory

Batch	Hours / Week	Total Hours	Credits
2023-2024	5/15	75	2

Course Objectives
1. To introduce the concepts of Object Oriented Programming Paradigm and the Programming constructs of C++.
2. To develop the ability to write a program to solve specific problems.
3. To practice the fundamental methodology to implement file and I/O stream concepts.

Course Outcomes (CO)

K3 to K5	**CO1**	Designing programs using appropriate predefined functions and classes in C++.
	CO2	Developing applications using Friend functions, Inheritance and polymorphism.
	CO3	Illustrate the concept of virtual classes, inline functions and friend functions.
	CO4	Compare the various file stream classes, file types and exception handling mechanisms.
	CO5	Implementing stream I/O, Files and usage of the available classes to handle stream objects.

LIST OF PRACTICAL PROGRAMS

1. Write a C++ Program to perform the following Basic programs
    a. C++ Program to Print "Hello, World!".
    b. C++ Program to Add Two Integers.
    c. C++ Program to Swap Values of Two Variables.
    d. C++ Program to Print ASCII Value.
    f. C++ Program to convert days to years, weeks and days.

2. Write a C++ Program to perform the following program using formulas and Operators
    a. C++ Program to to perform various Operator
    b. C++ Program to Calculate Area of Circle.
    c. C++ Program to Calculate Area of Square.
    d. C++ Program to Calculate Area of Rectangle.

3. C++ language to perform various string and string functions operations

4. Develop a C++ Program to perform various conditional statements

5. Develop a C++ Program to perform various looping operations

6. Develop a C++ Program to perform Switch Case Operations

7. Develop a C++ Program to perform a various array Operations

8. Develop a C++ Program to perform functions Operations

9. Develop a C++ Program to perform a pointer Operations

10. Develop a C++ Program to perform a various OOPS Programs

11. Develop a C++ Program to perform a various file operations.

12. Write a C++ Program to create class, which consists of EMPLOYEE Detail like Employee Number, Employee Name, Department, Basic, Salary, and Grade. Write a member function to get and display them. Derive a class PAY from the above class and write a member function to calculate DA, HRA and PF depending on the grade.

Text Book
1.Ashok N Kamthane (2003),"Object-Oriented Programming with Ansi And Turbo C++", Pearson Education.

Reference Books
1. E. Balagurusamy (1998)," Object-Oriented Programming with C++", TMH.
2. Maria Litvin&GrayLitvin (2002)"C++ for you", Vikas publication.
3. John R Hubbard (2002)"Programming with C", 2nd Edition, TMH publication.

Teaching Methods
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Guidelines to the distribution of marks for practical Examinations

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1. **Record Work**: 10 Marks.
2. **Algorithm, Program, Typing and Execution:**50 Marks.

Particulars	Program I (Marks)	Program II (Marks)
Algorithm	5	5
Program Writing	10	10
Typing and Execution	10	10

Internal Mark Split up for 40 Marks:

Observation: 10 Marks
Attendance: 5 Marks
One Model Practical: 25 Marks.

MAPPING					
PSO / CO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	H	M
CO2	S	S	M	H	H
CO3	S	H	H	S	M
CO4	H	S	M	H	M
CO5	S	H	H	S	S
S – Strong **H** – High **M** – Medium **L** – Low					

Environmental Studies

Programme Code: 23	For B.A., BBA, B.Com, BCA and B.Sc., Degree Students

Title of the Paper : PART IV – Environmental Studies

Batch	Hours / Week	Total Hours	Credits
2023-2024	2/15	30	2

COURSE OBJECTIVES

1. The course will provide students with an understanding and appreciation of the complex interactions of man, health and the environment. It will expose students to the multi-disciplinary nature of environmental health sciences

2. To inculcate knowledge and create awareness about ecological and environmental concepts, issues and solutions to environmental problems.

3. To shape students into good "Eco citizens" thereby catering to global environmental needs.

4. This course is designed to study about the types of pollutants including gases, chemicals petroleum, noise, light, global warming and radiation as well as pollutant flow and recycling and principles of environmental pollution such as air, water and soil

5. The course will address environmental stress and pollution, their sources in natural and workplace environments, their modes of transport and transformation, their ecological and public health effects, and existing methods for environmental disease prevention and remediation.

COURSE OUTCOMES

On successful completion of the course, the students will be able to

K1			
↑	CO 1	Understand how interactions between organisms and their environments drive the dynamics of individuals, populations, communities and ecosystems
	CO2	Develop an in depth knowledge on the interdisciplinary relationship of cultural, ethical and social aspects of global environmental issues
	CO3	Acquiring values and attitudes towards complex environmental socio-economic challenges and providing participatory role in solving current environmental problems and preventing the future ones
	CO4	To gain inherent knowledge on basic concepts of biodiversity in an ecological context and about the current threats of biodiversity
↓ K5	CO5	To appraise the major concepts and terminology in the field of environmental pollutants, its interconnections and direct damage to the wildlife, in addition to human communities and ecosystems

UNIT I MULTIDISCIPLINARY NATURE OF ENVIRONMENT   (6 HOURS)

Definition : scope and importance – Need for public awareness - Natural resources – Types of resources – Forest Resources – Water Resources – Mineral Resources – Food Resources – Energy Resources – Land Resources.

UNIT II ECOSYSTEMS   (6 HOURS)

Concept of an ecosystem – Structure and functions of an ecosystem – Procedures, consumers and decomposers – Energy flow in the ecosystem – Ecological succession – Food chains, food web and ecological pyramids – Structure and function of the following ecosystem – Forest Ecosystem –Grassland Ecosystem – Desert Ecosystem – Aquatic Ecosystem.

UNIT III BIODIVERSITY AND ITS CONSERVATION (6HOURS)

Introduction – Definition – Genetic – Species and ecosystem diversity- Bio geographical classification of India – Value of biodiversity – Biodiversity at global, national and local levels – India as a mega - diversity Nation - Hot spot of biodiversity – Threats to biodiversity - Endangered and endemic species of India – Conservation of Biodiversity – *Insitu* Conservation of Biodiversity – *Exsitu* Conservation of Biodiversity

UNIT IV ENVIRONMENTAL POLLUTION (6 HOURS)

Definition - Causes, effects and control measures of : Air Pollution – Water Pollution – Soil Pollution – Marine Pollution – Noise Pollution – Thermal Pollution – Nuclear Pollution – Solid Waste Management: Causes, effects, control measures of urban and industrial wastes – Role of individual in prevention of pollution – Pollution case studies – domestic waste water, effluent from paper mill and dyeing, cement pollution – Disaster Management – Food, Drought, Earthquake, Tsunami, Cyclone and Landslide.

UNIT V SOCIAL ISSUES AND THE ENVIRONMENT (6 HOURS)

Sustainable Development – Smart City, Urban planning, Town Planning , Urban problems related to energy – Water Conservation: Rain Water Harvesting and Watershed Management – Resettlement and rehabilitation of people, its problems and concerns, case studies Narmatha Valley Project – Environmental ethics, issues and possible solutions – Climate change, global warming, ozone layer depletion, acid rain, nuclear accidents and holocaust, case studies – Hiroshima and Nagasaki, Chernobyl – Consumerism and waste products – Environmental Protection Act – Air Pollution Act (Prevention and Control) – Water Pollution Act (Prevention and control) – Wild Life Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness – Human Population and the environment – Population Growth and Distribution – Population Explosion – Family Welfare Programme – Environment and Human Health – Human Rights – Value Education – HIV/ AIDS – Women and Child Welfare – Role of Information Technology in Environment and Human Health.

Text Book

1.P.Arul, A Text Book of Environmental Studies, Environmental Agency, No 27, Nattar street, Velacherry main road, Velacheery, Chennai – 42, First Edition, Nov.2004.

References

1.Purohit Shammi Agarwal, A text Book of Environmental Sciences, Publisher Mrs.Saraswati Prohit, Student Education , Behind Naswan Cinema Chopansi Road, Jodhpur.
2.Dr.Suresh and K.Dhameja, Environmental Sciences and Engineering , Publisher S.K.Kataria & Sons, 424/6, Guru Nanak Street, Vaisarak, Delhi -110 006.
3.J.Glynn Henry and Gary W Heinke, Environmental Science and Engineering, Prentice Hall of India Private Ltd., New Delhi – 110 001

Question Paper Pattern for General papers
Environmental Studies

22EVS101

Question Paper Pattern
(External only)

Duration: 3 hours   **Total Marks :**   50

Answer all Questions (5 x 10 = 50 Marks)

Essay type, either or type questions from each unit.

Value Education

Programme Code: 23	For B.A., BBA, B.Com, BCA and B.Sc., Degree Students

Title of the Paper : Value Education - MORAL AND ETHICS			
Batch	**Hours / Week**	**Total Hours**	**Credits**
2023-2024	2/15	30	2

Course Objectives

1. To impart Value Education in every walk of life.
2. To help the students to reach excellence and reap success.
3. To impart the right attitude by practicing self-introspection.
4. To portray the life and messages of Great Leaders.
5. To insist the need for universal brotherhood, patience and tolerance.
6. To help the students to keep them fit.
7. To educate the importance of Yoga and Meditation.

Course Outcomes (CO)
After completing the course the students:

K1 to K5	CO1	Will be able to recognize Moral values, Ethics, contribution of leaders, Yoga and its practice
	CO2	Will be able to differentiate and relate the day to day applications of Yoga and Ethics in real life situations
	CO3	Can emulate the principled life of great warriors and take it forward as a message to self and the society
	CO4	Will be able to Analyze the Practical outcome of practicing Moral values in real life situation
	CO5	Could Evaluate and Rank the outcome of the pragmatic approach to further develop the skills

Syllabus

UNIT I: **4 Hours**
        Moral and Ethics: Introduction – Meaning of Moral and Ethics – Social Ethics – Ethics and Culture – Aim of Education.

UNIT II: **6 Hours**
        Life and Teachings of Swami Vivekananda: Birth and Childhood days of Swami Vivekananda – At the Parliament of Religions – Teachings of Swami Vivekananda

UNIT III: **4 Hours**
        Warriors of our Nation: Subhas Chandra Bose – Sardhar Vallabhbhai Patel – Udham Singh – V. O. Chidambaram Pillai – Bhagat Singh – Tiruppur Kumaran – Dheeran Chinnamalai – Thillaiaadi Valliammai – Velu Nachiyar – Vanchinathan

UNIT IV: **8 Hours**
        Physical Fitness and Mental Harmony: Simplified Physical Exercise – Hand Exercises – Leg Exercises – Neuro Muscular Breathing Exercises – Eye Exercises – Kabalabathi – Maharasana A & B – Massage - Acupressure – Relaxation – Kayakalpa Yogam - LifeForce – Aim & Objectives – Principle – Methods. Introspection – Analysis of Thoughts – Moralization of Desires – Neutralization of Anger – Eradication of Worries

UNIT V: **8 Hours**

      Yoga and Meditation – The Asset of India: Yogasanam – Rules & Regulations – Surya Namaskar – Asanas –Sitting – Stanging – Prone - Supine - Pranayama – Naadi Sudhi – Ujjayi – Seethali – Sithkari - Benefits. Meditation – Thanduvasudhi - Agna – Shanthi – Thuriyam – Benefits.

Text Books:

      Value Based Education – Moral and Ethics – compiled by Kongunadu Arts and Science College (Autonomous), 2nd Edition (2021).

Reference Books:

1. Swami Vivekananda – A Biography, Swami Nikhilananda, Advaita Ashrama, India, 24th Reprint Edition (2010).
2. Gandhi, Nehru, Tagore and other eminent personalities of Modern India, Kalpana Rajaram, Spectrum Books Pvt. Ltd., revised and enlarged edition(2004).
3. Freedom Fighters of India, Lion M.G. Agrawal, Isha Books Publisher, First Edition (2008).
4. Easy steps to Yoga by Swami Vivekananda, A Divine Life Society Publication(2000).
5. Yoga Practices - 1 – The World Community Service Centre – Vethathiri Publications,Sixth Edition (2017),Erode.
6. Yoga Practices - 2 – The World Community Service Centre – Vethathiri Publications – Eighth Edition (2017),Erode.

MAPPING

PSO\CO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	H	H	S	S
CO2	S	S	S	H	H
CO3	S	H	S	H	H
CO4	S	H	S	H	H
CO5	S	H	H	S	S

S – Strong   **H** – High   **M** – Medium   **L** – Low

Value Education – Moral & Ethics

22VED201

Question Paper Pattern
(External only)

Duration: 3 hours   **Total Marks:** 50

Answer all Questions (5 x 10 = 50 Marks)

Essay type, either or type questions from each unit.