

DEPARTMENT OF COMPUTER SCIENCE WITH DATA ANALYTICS

**Nallamuthu Gounder Mahalingam College
(Autonomous)
(An ISO 9001:2015 Certified Institution)
Re-Accredited with 'B' Grade by NAAC
Pollachi-642001**



SYLLABUS

B.Sc. COMPUTER SCIENCE WITH DATA ANALYTICS

BATCH 2022-2025

NGM COLLEGE

Vision

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

Mission

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

DEPARTMENT OF COMPUTER SCIENCE WITH DATA ANALYTICS

Vision

To prepare the next generation of practitioners and researchers for a data centric world and to achieve the academic excellence and research in the field of Data Science at the national and global levels.

Mission

- To develop professionals who are skilled in the area of Data science and analytics
- To impart quality and value-based education and contribute towards the innovation of Computing expert systems.
- To apply new advancements in high performance computing hardware and software

Program Educational Objectives (PEOs)	
The B.Sc. Computer Science with Data Analytics program describe accomplishments that graduates are expected to attain within five to seven years after graduation.	
PEO1	Develop in depth understanding of the key technologies in data science and business analytics: data mining, machine learning, visualization techniques, predictive modeling, and statistics
PEO2	Apply principles of Data Science to the analysis of business problem
PEO3	Demonstrate knowledge of statistical data analysis techniques utilized in business decision making.
PEO4	To enhance communicative skill and inculcate the spirit through professional activities and to solve the complex problems in data analysis
PEO5	To embed human values and professional ethics in the young minds and contribute towards nation building

Programme Outcomes (POs)	
On successful completion of the B.Sc. Computer Science with Data Analytics	
PO1	Disciplinary knowledge: Capable to apply the knowledge of mathematics, algorithmic principles and computing fundamentals in the modeling and design of computer based systems of varying complexity.
PO2	Scientific reasoning/ Problem analysis: Ability to critically analyze, categorizes, formulate and solve the problems that emerges in the field of computer science with Data Analytics
PO3	Problem solving: Able to provide software solutions for complex Data Analysis problems or processes that meet the specified needs with appropriate consideration for the public health and safety and the cultural, societal and environmental considerations
PO4	Environment and sustainability: Understand the impact of software solutions in environmental and societal context and strive for sustainable development
PO5	Modern tool usage: Use contemporary techniques, skills and tools necessary for integrated solutions
PO6	Ethics: Function effectively with social, cultural and ethical responsibility as an individual or as a team member with positive attitude.
PO7	Cooperation / Team Work: Function effectively as member or leader on multidisciplinary teams to accomplish a common objective.
PO8	Communication Skills: An ability to communicate effectively with diverse types of audience and also able to prepare and present technical documents to different groups.
PO9	Self-directed and Life-long Learning: Graduates will recognize the need for self-motivation to engage in lifelong learning to be in par with changing technology
PO10	Research: Enhance the research culture and uphold the scientific integrity and objectivity.

Program Specific Outcomes (PSOs)	
After the successful completion of B.Sc. Computer Science with Data Analytics program, the students are expected to	
PSO1	Impart education with domain knowledge and key technologies in data science and business analytics like data mining, machine learning, No SQL, visualization techniques, predictive modeling, and statistics 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.

PEOs POs \ PSOs	PEO1	PEO2	PEO3	PEO4	PEO5
PO1	H	H	H	L	L
PO2	H	H	H	L	L
PO3	H	H	H	H	L
PO4	L	M	M	M	L
PO5	M	M	M	H	M
PO6	L	L	M	H	L
PO7	M	M	M	H	M
PO8	L	L	L	H	M
PO9	M	M	M	H	L
PO10	M	M	M	M	L
PSO1	H	H	H	M	L
PSO2	H	H	H	H	M

N.G.M College - Curriculum Development Cell										
Scheme of Examination For 2022 - 2023										
Choice Based Credit System & OBES										
Part	Course Code	Title of the Paper	Hours/ Week		Exam Hours	MAX.MARKS			Credits	
			T	P		CI A	ESE	Total		
<u>I SEMESTER</u>										
I	22UTL101/ 22UHN101/ 22UFR101	Tamil Paper-I/ Hindi Paper-I/ French Paper-I	6		3	50	50	100	3	
II	22UEN101	English Paper-I	5		3	50	50	100	3	
III	22UDA101	Core I: Programming in C	4		3	50	50	100	4	
	22UDA102	Core II: Data Structures and Algorithms	4		3	50	50	100	4	
	22UDA1A1	Allied-1: Mathematical Foundation for Data Science	4		3	50	50	100	4	
	22UDA103	Core Lab I: Programming Lab in C		5	3	25	25	50	2	
IV	22HEC101	Human Excellence: Personal Values & SKY Yoga Practice - 1		1	2	25	25	50	1	
	22UHR101	Human Rights in India	1		2		50	50	2	
V		Extension Activities (NSS, NCC, Sports & Games)								
Total								650	23	

II SEMESTER									
Part	Course Code	Title of the Paper	Hours/Week		Exam Hours	MAX. MARKS			Credits
			T	P		CI A	ESE	Total	
I	22UTL202/ 22UHN202 22UFR202	Tamil Paper-II/ Hindi Paper-II/ French Paper-II	6		3	50	50	100	3
II	22UEN202	English Paper – II	5		3	50	50	100	3
III	22UDA204	Core III: Object Oriented Programming with Java	3		3	50	50	100	4
	22UDA205	Core IV: Operating System	4		3	50	50	100	4
	22UDA2A1	Allied 2 : Statistics and Probability	4		3	50	50	100	4
	22UDA206	Core Lab II: Programming Lab in Java		5	3	25	25	50	2
	22UDA207	Capstone Project - 1				25	25	50	2
IV	22HEC202	Human Excellence: Family Values & SKY Yoga Practice-2		1	2	25	25	50	1
	22EVS201	Environmental Studies	2		2		50	50	2
V		Extension Activities (NSS, NCC, Sports & Games)							
EC		Online Course (MOOC/NPTEL/SWAYAM) Optional							
	22CMM201	Manaiyiyal Mahathuvam - I	Certificate course						
	22CUB201	Uzhavu Bharatham - I	Certificate course						
Value Added Course	22VAD201	Department Specific Value-Added Course							
Total								700	25

Question Paper Pattern (Based on Bloom's Taxonomy)

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

1. Theory Examinations: 50 Marks (Part I, II, & III)

(i) Test- I & II, ESE:

Knowledge Level	Section	Marks	Description	Total
K1 & K2 (Q 1 -10)	A (Q 1 – 5 MCQ) (Q 6–10 Define/Short Answer)	10 x 1 = 10	MCQ/Define	50
K3 (Q 11-15)	B (Either or pattern)	5 x 3 = 15	Short Answers	
K4 & K5 (Q 16 – 20)	C (Either or pattern)	5 x 5 = 25	Descriptive/ Detailed	

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

Knowledge Level	Section	Marks	Description	Total
K1 & K2 (Q 1 -10)	A (Q 1 – 5 MCQ) (Q 6–10 Define/Short Answer)	10 x 1 = 10	MCQ Define	50
K3, K4 & K5 (Q 11-15)	B (Either or pattern)	5 x 8 = 40	Short Answers	

3. Practical Examinations: 100/50 Marks

Knowledge Level	Criterion	External/Internal Marks	Total
K3	Record work & Practical	50/50	100
K4			
K5		25/25	50

Components of Continuous Assessment**THEORY****Maximum Marks: 100; CIA Mark: 50**

Components		Calculation	CIA Total
Test 1	$(50 / 3.33) = 15$	15+15+10+05+05	50
Test 2 / Model	$(50 / 3.33) = 15$		
Assignment / Digital Assignment	10		
Seminar / Socratic Seminar	05		
Group Task : GD, Role Play, APS	05		

Maximum Marks: 50; CIA Mark: 25

Components		Calculation	CIA Total
Test / Model	10	10+5+5+5	25
Assignment / Digital Assignment	5		
Seminar / Socratic Seminar	5		
Group Task : GD, Role Play, APS	5		

PRACTICAL**Maximum Marks: 50; CIA Mark: 25**

Components		Calculation	CIA Total
Test / Model	15	15+5+5	25
Observation Note	5		
Record	5		

Maximum Marks: 100; CIA Mark: 50

Components		Calculation	CIA Total
Test / Model	30	30+5+15	50
Observation Note	5		
Record	15		

Maximum Marks: 200; CIA Mark: 100

Components		Calculation	CIA Total
Test / Model	60	60+10+30	100
Observation Note	10		
Record	30		

PROJECT

Maximum Marks: 100; CIA Mark: 50

Components		Calculation	CIA Total
Review I	10	10+10+10+20	50
Review II	10		
Review III	10		
Report Submission	20		

Maximum Marks: 200; CIA Mark: 100

Components		Calculation	CIA Total
Review I	20	20+20+20+40	100
Review II	20		
Review III	20		
Report Submission	40		

** Components for 'Review' may include the following:*

Originality of Idea, Relevance to Current Trend, Candidate Involvement and Presentation of Report for Commerce, Management & Social Work.

Synopsis, System Planning, Design, Coding, Input form, Output format, Preparation of Report & Submission for Computer Science cluster.

STUDENT SEMINAR EVALUATION RUBRIC**Grading Scale:**

A	B	C	D
5	4	2 - 3	0 - 1

CRITERIA	A - Excellent	B - Good	C - Average	D - Inadequate
Organization of presentation	Information presented as interesting story in logical, easy to follow sequence	Information presented in logical sequence; easy to follow	Most of information presented in sequence	Hard to follow; sequence of information jumpy
Knowledge of subject & References	Demonstrated full knowledge; answered all questions with elaboration & Material sufficient for clear understanding AND exceptionally presented	At ease; answered all questions but failed to elaborate & Material sufficient for clear understanding AND effectively presented	At ease with information; answered most questions & Material sufficient for clear understanding but not clearly presented	Does not have grasp of information; answered only rudimentary Questions & Material not clearly related to topic OR background dominated seminar
Presentation Skills using ICT Tools	Uses graphics that explain and reinforce text and presentation	Uses graphics that explain text and presentation	Uses graphics that relate to text and presentation	Uses graphics that rarely support text and presentation
Eye Contact	Refers to slides to make points; engaged with audience	Refers to slides to make points; eye contact majority of time	Refers to slides to make points; occasional eye contact	Reads most slides; no or just occasional eye contact
Elocution – (Ability to speak English language)	Correct, precise pronunciation of all terms. Voice is clear and steady; audience can hear well at all times	Incorrectly pronounces few terms. Voice is clear with few fluctuations; audience can hear well most of the time	Incorrectly pronounces some terms. Voice fluctuates from low to clear; difficult to hear at times	Mumbles and/or Incorrectly pronounces some terms. Voice is low; difficult to hear

WRITTEN ASSIGNMENT RUBRIC**Grading Scale:**

A	B	C	D	F
09 - 10	07- 08	05 - 06	03 - 04	01 - 02

CRITERION	A - Excellent	B - Good	C - Average	D - Below Average	F - Inadequate
Content & Focus	Hits on almost all content exceptionally clear	Hits on most key points and writing is interesting	Hits in basic content and writing is understandable	Hits on a portion of content and/or digressions and errors	Completely off track or did not submit
Sentence Structure & Style	<ul style="list-style-type: none"> * Word choice is rich and varies * Writing style is consistently strong * Students own formal language 	<ul style="list-style-type: none"> * Word choice is clear and reasonably precise * Writing language is appropriate to topic * Words convey intended message 	<ul style="list-style-type: none"> * Word choice is basic * Most writing language is appropriate to topic * Informal language 	<ul style="list-style-type: none"> * Word choice is vague * Writing language is not appropriate to topic * Message is unclear 	* Not adequate
Sources	Sources are cited and are used critically	Sources are cited and some are used critically	Some sources are missing	Sources are not cited	Sources are not at all cited
Neatness	Typed; Clean; Neatly bound in a report cover; illustrations provided	Legible writing, well-formed characters; Clean and neatly bound in a report cover	Legible writing, some ill-formed letters, print too small or too large; papers stapled together	Illegible writing; loose pages	Same as below standard
Timelines	Report on time	Report one class period late	Report two class periods late	Report more than one week late	Report more than 10 days late

Continuous Internal Assessment for Project / Internship

For Commerce, Management & Social Work Programme

The Final year Commerce, Management & Social Work students should undergo a project work during (V/VI) semester

- ❖ The period of study is for 4 weeks.
- ❖ Project / Internship work has to be done in an industrial organization (or) work on any industrial problem outside the organization is allowed.
- ❖ Students are divided into groups and each group is guided by a Mentor.
- ❖ The group should not exceed four students, also interested student can undergo individually.
- ❖ A problem is chosen, objectives are framed, and data is collected, analyzed and documented in the form of a report / Project.
- ❖ Viva – Voce is conducted at the end of this semester, by an External Examiner and concerned Mentor (Internal Examiner).
- ❖ Project work constitutes 100 marks, out of which 50 is Internal and 50 is External Marks.

Mark Split UP

Internal	External	Total
50	50	100

S. No	Internal Components	Marks
1	Review - I	10
2	Review - II	10
3	Review - III	10
4	Rough Draft Submission	20
Total		50

S. No	External Components	Marks
1	Originality of Idea	05
2	Relevance to Current Trend	05
3	Candidate Involvement	05
4	Thesis Style / Language	05
5	Presentation of Report	10
6	Viva-Voce	20
Total		50

Continuous Internal Assessment for Project**For Computer Science Cluster****Maximum Marks: 50 Marks**

Criterion	Mode of Evaluation	Marks	Total
I	Synopsis, Company Profile, System Specification, Existing System, Proposed System OR (For Android Developments) Planning Stage	10	50
II	Supporting Diagrams like system flowchart, ER, DFD, Usecase and Table Design OR UI and UX Design Application Architect and Prototyping	10	
III	Coding, Input forms, Output format, Testing OR Development, Testing	20	
IV	Preparation of Report & Submission	10	

External Assessment: 50 Marks

Mode of Evaluation	Marks	Total	Grand Total
Project Report			50
Title Relevance of the Industry/Institute	05	30	
Technology	05		
Design and development Publishing	10		
Testing, Report	10		
Viva Voce			
Project Presentation	10	20	
Q&A Performance	10		

COMPUTER SCIENCE PROJECT and VIVA VOCE

Guidelines

Introduction

The title of the project work and the organization will be finalized at the end of fifth Semester. Each student will be assigned with a Faculty for guidance. The Project work and coding will be carried by using the facility of computer science lab as well as in the organization. Periodical review will be conducted to monitor the progress of the project work. Project report will be prepared and submitted at the end of the semester. External examiner appointed by the Controller of Examination will conduct the viva voce examination along with respective guide.

Area of Work

- Web Based Development
- Mobile app development
- Website development
- IoT Projects
- Big Data and Data Mining Projects
- Cloud Computing Projects
- Networking Projects
- Artificial Intelligence and Machine learning Projects
- Data Analytics Projects using Python, R, Tableau etc..
- System Software
- Web Security Projects
- Image Processing

Methodology

Arrangement of Contents

The sequence in which the project report material should be arranged and bound as follows:

1. Cover Page & Title Page
2. Bonafide Certificates
3. Declaration
4. Acknowledgement
5. Synopsis
6. Table of Contents
7. Chapters
8. Appendix
9. References

Format of Table of Contents**TABLE OF CONTENTS**

Chapter No.	Title	Page No.
i	Certificates	
ii	Declaration	
iii	Acknowledgement	
iv	Synopsis	
1.	Introduction	
	1.1 Introduction	
	1.2 Objective of the Project	
	1.3 Company Profile	
	1.4 System Specification	
	1.4.1 Hardware Specification	
	1.4.2 Software Specification	
2	System Study	
	2.1 Existing System	
	2.1.2 Drawbacks	
	2.2 Proposed System	
	2.3 Planning and Scheduling	
3	System Design	
	3.2 Overview of the Project	
	3.1 Modules of the Project	
	3.2 Input Design Format	
	3.3 Output Design	
	3.4 Table Design	
	3.5 Supporting Diagrams (ER/DFD/Use Case)	
4	Implementation and Testing	
	4.1 Coding Methods	
	4.2 Testing Approach	
	4.3 Implementation and Maintenance	
5	Project Evaluation	
	5.1 Project Outcome	
	5.2 Limitation of the Project	
	5.3 Further Scope of the Project	
6	Conclusion	
7	Appendix	
	7.1 Source Code	
	7.2 Screenshots and Reports	
8	References	

Size of the Project

The Project Report contents should be maximum of not exceeding 70 pages.

SEMESTER I

Programme Code:	B.Sc			Programme Title:	Bachelor of Science (Computer Science with Data Analytics)		
Course Code:	22UDA101			Title	Batch:	2022 - 2025	
Lecture Hrs./Week or Practical Hrs./Week	4	Tutorial Hrs./Sem	60	Core I: Programming in C	Semester:	I	
					Credits:	4	

Course Objective

To introduce the concepts of Procedure Oriented Programming and the various programming constructs of C programming

Course Outcome

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

CO Number	CO Statement	Knowledge Level
CO1	Remembering the history, importance and basic structure of C Programming	K1
CO2	Interpret the concepts of Variables, Constant, Operators and various types of expressions	K2
CO3	Apply the concept of Decision-making statements and looping constructs for solving basic programs	K3
CO4	Use the concepts of files and pointers inside a C program	K4
CO5	Develop programs incorporating all the C language constructs	K5

Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	H	H	H	M	L	M	L	M	M	H	H
CO2	H	H	H	H	H	L	M	L	M	L	H	H
CO3	M	H	M	H	M	L	M	M	M	L	H	H
CO4	M	H	M	H	M	L	H	L	M	L	H	H
CO5	H	M	H	H	L	L	M	L	M	H	H	H

Units	Content	Hrs
Unit I	History of C – Importance of C – Basic structure of C Program – Programming Style – Executing a C Program - Overview of C - Introduction - Character set - C tokens - keyword & Identifiers - Constants - Variables - Data types - Declaration of variables - Assigning values to variables - Defining Symbolic Constants	12
Unit II	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 & Writing a character - Formatted input and output	11
Unit III	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	12
Unit IV	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 Life time of Variables- Multi file Programs- Structures and Unions.	12
Unit V	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.	13
	Total Contact Hrs	60

Pedagogy

Direct Instruction, Flipped Class, Digital Presentation

Assessment Methods:

Seminar, Quiz, Assignments, Group Task.

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	E Balagurusamy	Programming in ANSI C	Tata McGraw-Hill, Eighth Edition	2019

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Ashok N Kamthane	Programming with ANSI and Turbo C	Pearson	2002.
2	Henry Mullish & Hubert L. Cooper	The Spirit of C	Jaico,	1996

Course Designed by	Head of the Department	Curriculum Development Cell	Controller of the Examination
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Dr. E. Rama Devi	Dr. E. Rama Devi	Mr. K. Srinivasan	Dr. R . ManicaChezian
Signature	Signature	Signature	Signature

Programme Code:	B.Sc			Programme Title:	Bachelor of Science (Computer Science with Data Analytics)		
Course Code:	22UDA102			Title	Batch:	2022 - 2025	
Lecture Hrs./Week or Practical Hrs./Week	4	Tutorial Hrs./Sem	60	Core II: Data Structures and Algorithms	Semester:	I	
					Credits:	4	

Course Objective

- To introduce the concept of data structures and the types of data structures
- To demonstrate how various data structures can be implemented and used in various applications

Course Outcome

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

CO Number	CO Statement	Knowledge Level
CO1	Define the concept of Data structure and list the various classifications of data Structures.	K1
CO2	Demonstrate how arrays, stacks, queues, linked lists, trees, heaps, Graphs and Hash Tables are represented in the main memory and various operations are performed on those data structures.	K2
CO3	Illustrate the various file organizations like Sequential, Random and Linked Organizations.	K3
CO4	Discover the real time applications of the various data structures	K4
CO5	Design algorithms for various sorting and searching techniques	K5

Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	H	H	H	M	L	M	L	M	M	H	H
CO2	H	H	H	H	H	L	M	L	H	L	H	H
CO3	M	M	M	H	M	L	M	M	M	L	H	H
CO4	M	H	M	H	M	L	H	L	M	L	H	H
CO5	H	M	H	H	L	L	M	L	M	H	H	H

Units	Content	Hrs
Unit I	Introduction: Introduction of Algorithms, Analyzing Algorithms. Arrays: Sparse Matrices- Representation of Arrays. Stacks and Queues. Fundamentals- Evaluation of Expression Infix to Postfix Conversion - Multiple Stacks and Queues	12
Unit II	Linked List: Singly Linked List –Linked Stacks and Queues- Polynomial Addition- More on Linked Lists- Sparse Matrices- Doubly Linked List and Dynamic – Storage Management- Garbage Collection and Compaction.	11
Unit III	Trees: Basic Terminology – Binary Trees- Binary Tree Representations - Binary Trees- Traversal- More on Binary Trees- Threaded Binary Trees- Binary Tree Representation of Trees- Counting Binary Trees. Graphs: Terminology and Representations - Traversals, Connected Components and Spanning Trees, Shortest Paths and Transitive Closure	12
Unit IV	External Sorting : Storage Devices –Sorting with Disks: K-Way Merging- Sorting with Tapes Symbol Tables: Static Tree Tables – Dynamic Tree Tables –Hash Tables: Hashing Functions- Overflow Handling	12
Unit V	Internal Sorting: Insertion Sort – Quick Sort – 2 Way Merge Sort- Heap Sort- Shell Sort-Sorting on Several Keys. Files: Files, Queries and Sequential organizations – Index Techniques- File Organizations.	13
Total Contact Hrs		60

Pedagogy

Direct Instruction, Flipped Class, Digital Presentation

Assessment Methods:

Seminar, Quiz, Assignments, Group Task.

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Ellis Horowitz, Sartaj Shani	Data Structures	Galgotia Publication.	2008

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Ellis Horowitz, Sartaj Shani, Sanguthevar Rajasekaran	Computer Algorithms	Galgotia Publication	2007

Course Designed by	Head of the Department	Curriculum Development Cell	Controller of the Examination
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Dr. K.Thilagam	Dr. E. Rama Devi	Mr. K. Srinivasan	Dr. R . ManicaChezian
Signature	Signature	Signature	Signature

Programme Code:	B.Sc,			Programme Title:	Bachelor of Science (Computer Science with Data Analytics)		
Course Code:	22UDA1A1			Title	Batch:	2022 - 2025	
Lecture Hrs./Week or Practical Hrs./Week	4	Tutorial Hrs./Sem	60	Allied I Mathematical Foundation for Data Science	Semester:	I	
					Credits:	4	

Course Objective

- To introduce the mathematical foundation for Data Science
- To demonstrate how various mathematical concepts are used in Data Science

Course Outcome

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

CO Number	CO Statement	Knowledge Level
CO1	To introduce the ideas in differential calculus	K1
CO2	To learn about definite integrals and its applications	K2
CO3	To learn the different methods of solving Simultaneous algebraic equation	K3
CO4	To learn about interpolation and its formula	K4
CO5	To introduce different methods of Numerical Differentiation and Numerical integration	K5

Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	L	H	H	H	M	L	M	L	M	M	H	H
CO2	H	M	M	H	H	L	M	L	M	L	H	H
CO3	M	H	M	H	M	M	H	M	M	L	H	H
CO4	M	H	M	H	M	L	H	L	M	L	H	M
CO5	H	M	H	H	L	L	M	L	M	H	H	H

Units	Content	Hrs
Unit I	Deferential Calculus: The Derivative as a Function- Maximum and Minimum Values- Optimization Problems	12
Unit II	Integral Calculus: The Definite Integral – The Fundamental theorem of Calculus- Areas between Curves- Volumes	12
Unit III	Numerical Methods: Solution of System of Simultaneous Algebraic Equations-Gauss Elimination Methods - Gauss Jordon Method - Gauss Jacobi Iterative Method - Gauss Seidal Iterative Method	12
Unit IV	Numerical Methods: Difference Table - Interpolation - Newton's Forward Interpolation Formula Newton's Backward Interpolation Formula-Construction of Polynomials-Equidistant terms with one or more missing values	12
Unit V	Numerical Methods : Numerical Differentiation : Newtons forward and Backward formula to compute the Derivatives Numerical Integration: TheTrapezoidalrule-Simpsons1/3and3/8rule	12
	Total Contact Hrs	60

Pedagogy

Direct Instruction, Flipped Class, Digital Presentation

Assessment Methods:

Seminar, Quiz, Assignments, Group Task.

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	James Stewart	Calculus: Early Transcendentals, Unit - I: Chapter II (Section 2.8), Chapter IV (Sections 4.1,4.7) Problems Only Unit-II: Chapter V Sections:(5.2,5.3),Chapter VI Sections 6.1,6.2) (Problems only)	7th Edition, Cengage Learning, USA,	2012
2	Sr.M.K. Venkataraman	Numerical Methods in Science and Engineering. Unit-III Chapter IV (Sections: 4.1,4.2 & 4.6) (Problems only) Unit-IV: Chapter V (Sections: 5.1 to 5.10, 6.1 to 6.5) (Problems only) Unit-V: (Sections: 9.1 to 9.3, 9.8, 9.10) (Problems only)	The National Publishing Company	July 2013

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	<u>Hadrien Jean</u>	Essential Math for Data Science	O'Reilly Media	July 13th 2021

Course Designed by	Head of the Department	Curriculum Development Cell	Controller of the Examination
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: Dr. E. Rama Devi	Name:Dr. E. Rama Devi	Name: Mr. K. Srinivasan	Name: Dr. R . ManicaChezian
Signature	Signature	Signature	Signature

Programme Code:	B.Sc			Programme Title:	Bachelor of Science (Computer Science with Data Analytics)		
Course Code:	22UDA103			Title	Batch:	2022 - 2025	
Lecture Hrs./Week or Practical Hrs./Week	5	Tutorial Hrs./Sem.	75	Core Lab I Programming Lab in C	Semester:	I	
					Credits:	2	

Course Objective

- To introduce the concepts of Procedure Oriented Programming and the various programming constructs of C

Course Outcome

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

CO Number	CO Statement	Knowledge Level
CO1	Apply the various basic programming constructs like decision making statements. Looping statements, functions, structures, pointers and files	K3
CO2	Design programs using the concept of files in C and be able to simulate operations	K4
CO3	Determine the efficient techniques in programming to solve various scientific problems	K5

Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	L	H	H	H	M	L	M	L	M	M	H	H
CO2	H	M	M	H	H	L	M	L	M	L	H	H
CO3	M	H	M	H	M	M	H	M	M	L	H	H

Units	Content
	<p style="text-align: center;">SET A</p> <ol style="list-style-type: none"> 1. Write a C program to calculate the average of N numbers 2. Write a C program to check the greatest among three numbers. 3. Write a C program for finding sum of individual digits. 4. Write a C program to check whether the given number is Armstrong number or not. 5. Write a C program to generate the prime numbers between a given range. 6. Write a C program to generate the Fibonacci series for the given number. 7. Write a C program to print the Floyd's triangle. 8. Write a C program to find the mean, median & mode for given values. 9. Write a C program to calculate the factorial value for the given number using recursion. 10. Write a C program to count the number of words, characters and lines in a given text. 11. Write a C program to find the reverse of a given number. 12. Write a C program to find if the given string is a palindrome or not. 13. Write a C program to count the number of vowels in a given string. 14. Write a C program to convert upper case to lower case and lower case to upper case. 15. Write a C program to insert or delete an element in an array. <p style="text-align: center;">SET B</p> <ol style="list-style-type: none"> 16. Write a C program to sort the numbers in ascending /descending order using arrays. 17. Write a C program to find the addition of matrix. 18. Write a C program to find the matrix multiplication 19. Write a C program to display transpose matrix of a given number. 20. Write a C program to sort the strings in alphabetical order. 21. Write a C program to perform linear search in a given array. 22. Write a C program to create a student file with reg no, name, mark1, mark2.. 23. Write a C program to merge two files. (Using Files) 24. Write a C program to read and write to the file Using fread() and fwrite() functions. 25. Write a program to implement command line arguments
	Total Hours 75

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	E Balagurusamy	Programming in ANSI C	Tata McGraw-Hill, Eighth Edition	

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Ashok N Kamthane	Programming with ANSI and Turbo C	Pearson	2002.
2	Henry Mullish & Hubert L. Cooper	The Spirit of C	Jaico,	1996

Course Designed by	Head of the Department	Curriculum Development Cell	Controller of the Examination
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: Dr. E. Rama Devi	Name: Dr. E. Rama Devi	Name: Mr. K. Srinivasan	Name: Dr. R . ManicaChezian
Signature	Signature	Signature	Signature

SEMESTER II

Programme Code:	B.Sc		Programme Title:	Bachelor of Science (Computer Science with Data Analytics)	
Course Code:	22UDA204		Title	Batch:	2022 - 2025
Lecture Hrs./Week or Practical Hrs./Week	4	Tutorial Hrs./Sem.	60	Core III: Object Oriented Programming with Java	Semester: II
				Credits:	4

Course Objective

- To introduce the concepts of Object Oriented Programming Paradigm and the programming constructs of JAVA

Course Outcome

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

CO Number	CO Statement	Knowledge Level
CO1	Recite the history of JAVA and its evolution	K1
CO2	Explain the various programming language constructs, object oriented concepts like overloading, inheritance, polymorphism, Interfaces , threads, exception handling and packages.	K2
CO3	Illustrate the concepts of Applets, files and the concept of stream classes.	K3
CO4	Outline the benefits and applications of objects oriented programming concepts and defend how JAVA differs from other programming languages	K4
CO5	Judge the pros and cons of other object oriented language with the concepts of JAVA	K5

Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	H	H	H	M	L	M	L	M	M	H	H
CO2	H	L	H	H	H	L	M	L	M	L	H	H
CO3	M	H	M	H	M	L	M	M	M	M	H	H
CO4	M	L	M	H	H	L	H	L	M	L	H	H
CO5	H	M	H	H	L	L	M	L	M	H	H	H

Units	Content	Hrs
Unit I	Fundamentals of Object-Oriented Programming: Object-Oriented Paradigm – Basic Concepts of Object-Oriented Programming – Benefits of Object-Oriented Programming – Application of Object- Oriented Programming. Java Evolution: History – Features – How Java differs from C and C++ – Java and Internet – Java and www –Web Browsers. Overview of Java: simple Java program- Java program Structure – Java Tokens – Statements –Java Virtual Machine – Command Line Arguments	12
Unit II	Constants, Variables, Data Types - Operators and Expressions – Decision Making and Branching: if, if...else, nested if, switch? : Operator - Decision Making and Looping: while, do, for – Jumps in Loops - Labeled Loops – Classes, Objects and Methods.	11
Unit III	Arrays, Strings and Vectors – Interfaces: Multiple Inheritance – Packages: Putting Classes together – Multithreaded Programming.	12
Unit IV	Managing Errors and Exceptions: Introduction-Types of Errors-Exceptions-Syntax of Exception Handling-Multiple catch statements-Finally statement-throwing our own exception Applet Programming: Introduction-How Applets differ application- Preparing to Write Applets-Building applet code- Applet lifecycle-Creating an Executable Applet - Designing Web page-Applet tag-Adding Applet to HTML file - Running the Applet-Passing Parameters to Applets Graphics Programming: Introduction-Graphics Class – Lines and Rectangles-Circles and Ellipses – Drawing Arcs-Drawing Polygons-Line Graph-using control loop in Applets-Drawing Bar Chart	12
Unit V	Managing Input / Output Files in Java: Concepts of Streams- Stream Classes – Byte Stream classes – Character stream classes – Using streams – I/O Classes – File Class – I/O exceptions – Creation of files – Reading / Writing characters, Byte-Handling Primitive Data Types – Random Access Files.	13
	Total Hours	60

Pedagogy

Direct Instruction, Flipped Class, Digital Presentation

Assessment Methods:

Seminar, Quiz, Assignments, Group Task.

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	E Balagurusamy	Programming with Java – A Primer	Tata McGraw-Hill, Eighth Edition	2019

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Patrick Naughton and Hebert Schildt	The Complete Reference Java 2	Tata McGraw-Hill, 3rd Edition	
2	John R. Hubbard	Programming with Java	Tata McGraw-Hill, 2nd Edition	

Course Designed by	Head of the Department	Curriculum Development Cell	Controller of the Examination
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: Dr. E. Rama Devi	Name: Dr. E. Rama Devi	Name: Mr. K. Srinivasan	Name: Dr. R . ManicaChezian
Signature	Signature	Signature	Signature

Programme Code:	B.Sc		Programme Title:	Bachelor of Science (Computer Science with Data Analytics)		
Course Code:	22UDA205		Title	Batch:	2022 - 2025	
Lecture Hrs./Week or Practical Hrs./Week	4	Tutorial Hrs./Sem.	60	Core IV: Operating System	Semester:	II
				Credits:	4	

Course Objective

The objective of the course is to enable the students to understand the concepts of operating system including Process management, Storage management, Scheduling and windows.

Course Outcome

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

CO Number	CO Statement	Knowledge Level
CO1	To remember the basic concepts Operating System	K1
CO2	To understand the concepts of Storage Allocation, Process Management, and Scheduling Algorithms	K2
CO3	To apply the Process Management principles and functionalities in Database Systems	K3
CO4	Understanding the File concepts	K4
CO5	To review the case studies in Windows	K5

Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	H	H	H	M	L	M	L	M	M	H	H
CO2	H	L	H	H	H	L	M	L	M	L	H	M
CO3	M	H	M	H	H	L	M	M	M	H	H	H
CO4	L	L	M	H	H	L	H	L	M	L	H	M
CO5	H	M	H	H	M	L	L	L	M	H	H	H

Units	Content	Hrs
Unit I	Introduction: Definition of operating system – History of operating system. Hardware: Interrupts and polling – Buffering – Storage protection – online and offline operation – Cycle stealing – Problem state – Virtual storage – Multi processing – Storage Hierarchy – RISC. Software: Machine Language programming – Spooling – Optimizing Compiler – Object oriented programming – Emulation. Process Management: Definition – process states – The Process Control Block – Operations on process – Interrupt Processing – Nucleus of OS.	12
Unit II	Storage Mangement: Real Storage: Storage organization – Management – Hierarchy – Storage management Strategies – Contiguous Vs Non-contiguous storage allocation – Fixed partition multiple programming – Variable partition multiple programming - Multiprogramming with storage swapping – Virtual storage organization – Concepts – Paging – Segmentation – Paging /segmentation systems.	11
Unit III	Job and Processor Scheduling: Introduction –Scheduling levels – Scheduling objectives – Scheduling criteria – Preemptive Vs Non-preemptive scheduling – Priorities – FIFO – Round Robin –Quantum size – Shortest job – Shortest remaining time – Highest response ratio next. Deadlock: Definition – Examples –Deadlock prevention, avoidance, detection and recovery– Banker’s Algorithm only	12
Unit IV	Auxillary Storage Management: Disk performance optimization: Why Disk scheduling is necessary –Desirable characteristics of disk scheduling polices – Seek optimization – Disk Caching – RAM Disks. File and Database Systems :Introduction – File system-File system function – Blocking and buffering – File Organization – Allocating and freeing space – File Descriptor – Access Control matrix – access control by user classes – Backup and recovery	12
Unit V	Case study Windows: Introduction - History– design goals - system architecture. Process & thread management: Process & thread organization scheduling-synchronization. Memory management: memory organization allocation-page replacement. File system management: file system drivers NTFS. Input output management: device drivers-I/O processing-interrupt handling-file cache management.	13
	Total Hours	60

Pedagogy

Direct Instruction, Flipped Class, Digital Presentation

Assessment Methods:

Seminar, Quiz, Assignments, Group Task.

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Deital, Deital and Choffnes	Operating Systems	Pearson education and Dorling kindersly publishing,Inc., Third edition.	2009

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Andrew S. Tanenbaum, Albert S. Woodhull	Operating Systems Design and Implementation	Prentice Hall, Third Edition	2006

Course Designed by	Head of the Department	Curriculum Development Cell	Controller of the Examination
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: Dr.K. Thilagam	Name: Dr. E. Rama Devi	Name: Mr. K. Srinivasan	Name: Dr. R . ManicaChezian
Signature	Signature	Signature	Signature

Programme Code:	B.Sc		Programme Title:	Bachelor of Science (Computer Science with Data Analytics)	
Course Code:	22UDA2A1		Title	Batch:	2022 - 2025
Lecture Hrs./Week or Practical Hrs./Week	4	Tutorial Hrs./Sem.	ALLIED II: Statistics and Probability	Semester:	II
		60		Credits:	4

Course Objective

To introduce the concepts of statistics and Probability in the field of Data Science

Course Outcome

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon.	K1
CO2	Understand the basic concepts of one and two dimensional random variables and apply in engineering applications.	K2
CO3	Apply the concept of testing of hypothesis for small and large samples in real life problems	K3
CO4	Apply the basic concepts of classifications of design of experiments in the field of agriculture and statistical quality control.	K4
CO5	Have the notion of sampling distributions and statistical techniques used in engineering and Management problems.	K5

Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	H	L	H	M	L	L	L	M	M	H	H
CO2	H	L	H	H	H	L	M	L	M	L	H	M
CO3	M	H	M	H	H	L	M	M	M	H	H	H
CO4	L	L	M	H	H	L	H	L	H	L	H	L
CO5	H	M	H	H	M	H	L	L	H	H	H	H

Units	Content	Hrs
Unit I	Probability – The axioms of probability – Conditional probability – Baye’s theorem – Discrete and continuous random variables – Moments – Moment generating functions – Binomial, Poisson, Geometric, Uniform, Exponential and Normal distributions.	12
Unit II	Joint distributions – Marginal and conditional distributions – Covariance – Correlation and linear regression – Transformation of random variables – Central limit theorem (for independent and identically distributed random variables).	11
Unit III	Sampling distributions – Estimation of parameters – Statistical hypothesis – Large sample tests based on Normal distribution for single mean and difference of means - Tests based on t, Chi-square and F distributions for mean, variance and proportion – Contingency table (test for independent) – Goodness of fit..	12
Unit IV	One way and Two way classifications – Completely randomized design – Randomized block design – Latin square design – 22 factorial design.	12
Unit V	Control charts for measurements (X and R charts) – Control charts for attributes (p, c and np charts) –Tolerance limits – Acceptance sampling.	13
	Total Hours	60

Pedagogy

Direct Instruction, Flipped Class, Digital Presentation

Assessment Methods:

Seminar, Quiz, Assignments, Group Task.

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Johnson, R.A., Miller, I and Freund J.,	Probability and Statistics for Engineers	Pearson Education, Asia, 8th Edition	2015
2	Milton. J. S. and Arnold. J.C	Introduction to Probability and Statistics	Tata McGraw Hill, 4 th Edition	2007

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Devore. J.L.	Probability and Statistics for Engineering and the Sciencesl,	Cengage Learning, New Delhi, 8th Edition	2014
2	Papoulis, A. and Unni krishnapillai, S.	Probability, Random Variables and Stochastic Processes	McGraw Hill Education India, 4th Edition, New Delhi.	2010
3	Ross, S.M.,	Introduction to Probability and Statistics for Engineers and Scientists	Elsevier, 3 rd Edition.	2004
4	Spiegel. M.R., Schiller. J. and Srinivasan, R.A.,	Schaum's Outline of Theory and Problems of Probability and Statistics	Tata McGraw Hill Edition	2004
5	Walpole. R.E., Myers. R.H., Myers. S.L. and Ye. K.	Probability and Statistics for Engineers and Scientists	Pearson Education, Asia, 8th Edition	2007

Course Designed by	Head of the Department	Curriculum Development Cell	Controller of the Examination
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: Dr.K.Thilagam	Name: Dr. E. Rama Devi	Name: Mr. K. Srinivasan	Name: Dr. R . ManicaChezian
Signature	Signature	Signature	Signature

Programme Code:	B.Sc		Programme Title:	Bachelor of Science (Computer Science with Data Analytics)	
Course Code:	22UDA206		Title	Batch:	2022 - 2025
Lecture Hrs./Week or Practical Hrs./Week	5	Tutorial Hrs./Sem.	75	Core Lab II Programming Lab in Java	Semester: II
				Credits:	2

Course Objective

- To introduce the concepts of Object Oriented Programming Paradigm and the programming constructs of JAVA

Course Outcome

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

CO Number	CO Statement	Knowledge Level
CO1	Apply the various basic programming constructs of JAVA like decision making statements. Looping statements, overloading, inheritance, polymorphism, constructors and destructors	K3
CO2	Illustrate the concepts of threading and multi-threading	K4
CO3	Design programs using various file stream classes; file types, and frames	K5

Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	L	H	H	H	M	L	M	L	M	M	H	H
CO2	H	M	M	H	H	L	M	L	M	L	H	H
CO3	M	H	M	H	M	M	H	M	M	L	H	H

Units	Content
	<p style="text-align: center;">SET A</p> <ol style="list-style-type: none"> 1. Program to sort n numbers 2. Program to search an element in an array 3. Program to implement stack using interface 4. Program to implement queue using package 5. Program for processing Bank details using the concept of multiple inheritance using Interfaces 6. Program to implement the concept of multithreading 7. Program to check division by zero using exception handling 8. Write a program to implement various string operations 9. Program to draw Smiley using Applet 10. Program to get the parts of the URL using Networking concepts <p style="text-align: center;">SET B</p> <ol style="list-style-type: none"> 11. Program to determine whether two string are anagram or not. 12. Write a program to implement mouse events 13. Program to implement Key events 14. Program to perform arithmetic operations using AWT controls. 15. Program to demonstrate the Multiple Selection List-box. 16. Program to create a frame with four text field's name, street, city and pin code with suitable tables. Also add a button called my details. When the button is clicked its corresponding values are to be appeared in the text fields. 17. Program to create a frame with three text fields for name, age and qualification and a text field for multiple line for address. 18. Program to copy one file to another file. 19. Program for processing random access file. 20. Program to create Menu Bars and pull down menus.
	Total Hours 75

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	E Balagurusamy	Programming with Java – A Primer	Tata McGraw-Hill, Eighth Edition	2019

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Patrick Naughton and Hebert Schildt	The Complete Reference Java 2	Tata McGraw- Hill, 3rd Edition	
2	John R. Hubbard	Programming with Java	Tata McGraw- Hill, 2nd Edition	

Course Designed by	Head of the Department	Curriculum Development Cell	Controller of the Examination
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: Dr. E. Rama Devi	Name: Dr. E. Rama Devi	Name: Mr. K. Srinivasan	Name: Dr. R. ManicaChezian
Signature	Signature	Signature	Signature

Programme Code:	B.Sc.	Programme Title:	Bachelor of Science (Computer Science with Data Analytics)	
Course Code:	22UDA207	Title	Batch:	2022- 2025
		Capstone Project - 1	Semester:	II

COMPUTER SCIENCE PROJECT and VIVA VOCE

Guidelines

Introduction

The title of the project work and the organization will be finalized at the end of fifth Semester. Each student will be assigned with a Faculty for guidance. The Project work and coding will be carried by using the facility of computer science lab as well as in the organization. Periodical review will be conducted to monitor the progress of the project work. Project report will be prepared and submitted at the end of the semester. External examiner appointed by the Controller of Examination will conduct the viva voce examination along with respective guide.

Area of Work

- Web Based Development
- Mobile app development
- Website development
- IoT Projects
- Big Data and Data Mining Projects
- Cloud Computing Projects
- Networking Projects
- Artificial Intelligence and Machine learning Projects
- Data Analytics Projects using Python, R, Tableau etc..
- System Software
- Web Security Projects
- Image Processing

Methodology

Arrangement of Contents

The sequence in which the project report material should be arranged and bound as follows:

10. Cover Page & Title Page

11. Bonafide Certificates
12. Declaration
13. Acknowledgement
14. Synopsis
15. Table of Contents
16. Chapters
17. Appendix
18. References

Format of Table of Contents

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	1.3 Company Profile	
	1.4 System Specification	
	1.4.1 Hardware Specification	
	1.4.2 Software Specification	
2	System Study	
	2.1 Existing System	
	2.1.2 Drawbacks	
	2.2 Proposed System	
	2.3 Planning and Scheduling	
3	System Design	
	3.2 Overview of the Project	
	3.1 Modules of the Project	
	3.2 Input Design Format	
	3.3 Output Design	
	3.4 Table Design	
	3.5 Supporting Diagrams (ER/DFD/Use Case)	
4	Implementation and Testing	
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	5.1 Project Outcome	
	5.2 Limitation of the Project	
	5.3 Further Scope of the Project	
6	Conclusion	

7	Appendix
	7.1 Source Code
	7.2 Screenshots and Reports
8	References

Size of the Project

The Project Report contents should be maximum of not exceeding 70 pages.