

VELS

INSTITUTE OF SCIENCE, TECHNOLOGY & ADVANCED STUDIES (VISTAS)

(Deemed to be University Estd. u/s 3 of the UGC Act, 1956)

PALLAVARAM - CHENNAI

ACCREDITED BY NAAC WITH 'A' GRADE

Marching Beyond 30 Years Successfully

INSTITUTION WITH UGC 12B STATUS

UNDERGRADUATE DEGREE PROGRAMME

B.Sc., Computer Science (Artificial Intelligence & Data Science)Three Years

/

B.Sc., (Hons) Computer Science(Artificial Intelligence & Data Science) Four Years

CURRICULUM & SYLLABUS

REGULATION 2025

Choice Based Credit System (CBCS)

&

Learning Outcomes Based Curriculum Framework (LOCF)

Effective from the Academic Year

2025 -2026

Department of Advanced Computing & Analytics

School of Computing Sciences



DEPARTMENT OF ADVANCED COMPUTING & ANALYTICS

VISION OF THE DEPARTMENT
Aims to provide quality education in the field of Computer Science with state of art facilities and handle quality research in association with industry and other Universities to produce well trained IT professionals in Computer Science domain.

MISSION OF THE DEPARTMENT	
M1	To Provide knowledge through teaching and training in the field of Computer Science
M2	To concentrate on teaching-learning, research, project and consultancy help to increase the growth of IT and IT Enabled Services.
M3	To train students to get best opportunities and tackle challenges in IT industry.
M4	To equip students with communication skill, Leadership quality, ability to work with team help to improve the society.
M5	To provide value based and technical oriented related students help to build the nation.

PROGRAMME EDUCATIONAL OUTCOMES (PEO)	
PEO1	Graduates are prepared to be employed in IT industries by providing expected Domain Knowledge.
PEO2	Graduates are provided with practical training, hands-on and project experience to meet the industrial needs.
PEO3	Graduates are motivated in career and entrepreneurial skill development to become global leaders.
PEO4	Graduates are trained to demonstrate creativity, develop innovative ideas and to work in teams to accomplish a common goal.
PEO5	Graduates are addressed with social issues and guided to operate problems with Solution.

PROGRAMME OUTCOMES (PO)	
PO1	**Critical Thinking:** Apply knowledge of Artificial Intelligence to identify, analyses problems and to provide effective solution in the area of Computing.
PO2	**Computing Skills:** Analyze a problem, identify and define the Computing requirements appropriate to its solution.
PO3	**Analytical skills:** Ability to design, develop algorithms and provide software solutions to cater the industrial needs.
PO4	**Modern Tool Usage:** Use current techniques, skills, and tools necessary for computing practices.
PO5	**Employability Skills:** Inculcate skills to excel in the fields of Information Technology and its Enabled services, Government and Private sectors, Teaching and Research.
PO6	**Ethics:** Insists ethical responsibilities, human and professional values and make their contribution to the society.
PO7	**Self-Directed and Life-long Learning:** Engaged in lifelong learning to equip them to the changing environment and be prepared to take-up mastering programmes.
PO8	**Individual and Team Work:** Function effectively as an individual, and as a member or a leader in diverse team and multidisciplinary settings.
PO9	**Project Management:** Demonstrate knowledge and understanding of the problem and management principles and apply these to one's own work.

PROGRAMME SPECIFIC OUTCOMES (PSO)	
PSO1	Ability to analyse a problem, and identify and define the AI & ML requirements appropriate to its solution.
PSO2	Ability to design, implement, and evaluate a Machine learning system, process, component, or program to solve the given problem.
PSO3	Improve their leading role in the community, enabling him or her to take responsibilities and contribute to solving problems through innovative thinking, collective work, reflection, and self-development
PSO4	Design, develop, and implement AI and ML systems by applying fundamental principles, algorithms, and techniques.

BOARD OF STUDIES

List of Members

Department of Computer Science

S. No.	Name & Designation	Address	Role
1.	Dr.R Sivakumar	Dean, School of Computing Sciences, VISTAS	Chairperson
2.	Dr. P. Magesh Kumar	Director, School of Computing Sciences, VISTAS	Internal Member
3.	Dr. R. Ganesan	Professor and Dean, School of CSE, VIT, Chennai Campus, Vandalur, Kelambakkam Main Road, Chennai-600127	Academic Expert (External Member)
4.	Mr.R.Rajkumar	ProgramManager, Birla Soft, Prince Infocity Chennai	Industrial Expert (External Member)
5.	Dr. G. Thailambal	Professor and Head, Department of Advanced Computing & Analytics, VISTAS	Internal Member
6.	Dr. S. Mangayarkarasi	Professor, Department of Advanced Computing & Analytics, VISTAS	Internal Member
7.	Dr. T. Sree Kala	Professor, Department of Advanced Computing & Analytics, VISTAS	Internal Member
8.	Dr. R. Durga	Professor, Department of Advanced Computing & Analytics, VISTAS	Internal Member
9.	Dr.R.Mahalakshmi	Associate Professor, Department of Advanced Computing & Analytics, VISTAS	Internal Member
10.	Mr. R. Balamurugan	Assistant Professor, Department of Advanced Computing & Analytics, VISTAS	Internal Member
11.	Dr.K.Abirami	Assistant Professor, Department of Advanced Computing & Analytics, VISTAS	Internal Member
12.	Mr. K. Thirumurugan	Milestone Internet Marketing Private Limited, Team Lead-DX, Chennai	Alumni Member (External Member)

CREDIT DISTRIBUTION

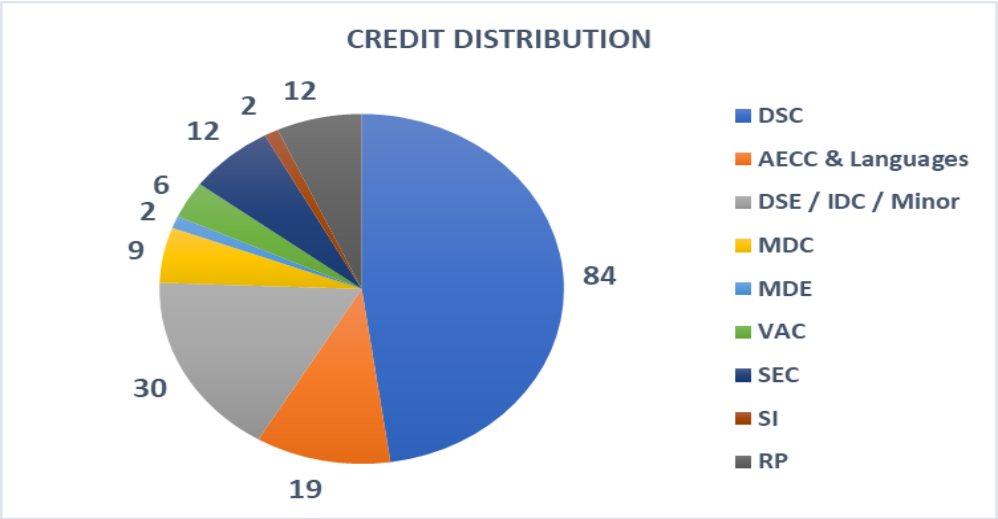
B.Sc., (Hons) Computer Science (Artificial Intelligence& Data Science)

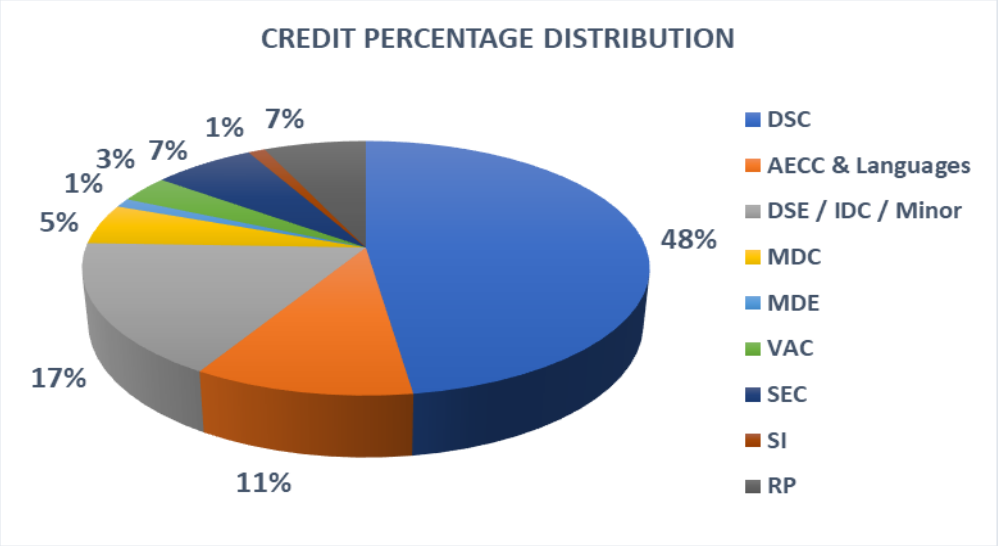
Minimum credits to be earned: 176

B.Sc., Computer Science (Artificial Intelligence& Data Science)

Minimum credits to be earned: 132

Component	I Sem	II Sem	III Sem	IV Sem	V Sem	VI Sem	3 Yrs. Total Credits	VII Sem	VIII Sem	4 Yrs Total Credits
DSC	8	8	8	8	12	16	60	12	12	84
AECC & Languages	4	4	4	7	-	-	19	-	-	19
DSE / IDC / Minor	3	4	3	4	4	4	22	4	4	30
MDC	3	3	3	-	-	-	9	-	-	9
MDE	-	-	2	-	-	-	2	-	-	2
VAC	1	2	-	1	2	-	6	-	-	6
SEC	2	2	2	2	2	2	12	-	-	12
SI	-	-	1	-	1	-	2	-	-	2
RP	-	-	-	-	-	-	-	6	6	12
Total Credits	21	23	23	22	21	22	132	22	22	176





ABBREVIATIONS

DSC	Disciplinary Specific Core
AECC	Ability Enhancement Compulsory Courses
DSE	Disciplinary Specific Elective
IDC	Interdisciplinary / Minor Courses
MDC	Multidisciplinary Courses
MDE	Multidisciplinary Elective
VAC	Value Added Courses
SEC	Skill Enhancement Courses
SI	Summer Internship
RP	Research Project

CURRICULUM STRUCTURE

B.Sc., Computer Science (Artificial Intelligence & Data Science) Three Years

/

BSc., (Hons) Computer Science (Artificial Intelligence & Data Science) Four Years

Total number of Credits: 176

	B.Sc.,(Hons)., Computer Science (Artificial Intelligence & Data Science) Minimum Credits to be earned :176 **B.Sc., Computer Science(Artificial Intelligence & Data Science) Minimum Credits to be earned: 132**

SEMESTER 1

			Hours/Week					Maximum Marks		
Category	**Code**	**Course**	**L**	**T**	**P**	**O**	**C**	**CIA**	**SEE**	**Total**
LANG 1	25LTAM11/ 25LHIN11/ 25LFRE11	Tamil I / Hindi I / French I	2	0	0	1	2	40	60	100
ENG 1	25LENG11	English I	2	0	0	1	2	40	60	100
DSC 1	25CBAD11	Problem solving using C	3	0	0	2	3	40	60	100
DSC 2	25CBAD12	Introduction to Artificial Intelligence	3	1	0	2	4	40	60	100
MDC 1	25BMA001	Mathematics- I	2	1	0	2	3	40	60	100
DSE 1/ IDC 1 / Minor 1	25DBAD1-	Discipline Specific Elective – I	3	0	0	2	3	40	60	100
DSC 1 (Lab)	24PBAD11	Practical I – Programming in C Lab	0	0	2	1	1	40	60	100
VAC 1	25DVAC11	Universal Human Values	1	0	0	1	1	40	60	100
SEC 1	25SSKU11	Soft Skills I	2	0	0	1	2	40	60	100
SEC 2		Orientation Programme / Industrial Visit	-	-	-	-	-	-	-	-
			18	**2**	**2**	**-**	**21**	**-**	**-**	**-**

CIA - Continuous Internal Assessment **SEE - Semester End Examination**

***L – Lecture, *T- Tutorial, *P- Practical, *O - Outside the class effort / self-study**

SEMESTER 2										
			Hours/Week					Maximum Marks		
Category	**Code**	**Course**	**L**	**T**	**P**	**O**	**C**	**CIA**	**SEE**	**Total**
LANG 2	25LTAM21/ 25LHIN21/ 25LFRE21	Tamil II / Hindi II / French II	2	0	0	1	2	40	60	100
ENG 2	25LENG21	English II	2	0	0	1	2	40	60	100
DSC 3	25CBAD21	Python Programming	3	0	0	2	3	40	60	100
DSC 4	25CBAD22	Data base Management System	3	0	0	2	3	40	60	100
MDC 2	25BMA002	Mathematics – II	2	1	0	2	3	40	60	100
DSE 2 / IDC 2 / Minor 2	25DBAD2-	Discipline Specific Elective – II	4	0	0	2	4	40	60	100
DSC 3 (Lab)	25PBAD21	Practical II - RDBMS Lab	0	0	2	1	1	40	60	100
DSC 4 (Lab)	25PBAD22	Practical III – Python programming Lab	0	0	2	1	1	40	60	100
VAC 2	25DVAC21	Communication Skills	2	0	0	1	2	40	60	100
SEC 3	25SSKU21	Soft Skills II	2	0	0	1	2	40	60	100
			20	**1**	**4**	**-**	**23**	**-**	**-**	**-**

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SEMESTER 3										
			Hours/Week					Maximum Marks		
Category	**Code**	**Course**	**L**	**T**	**P**	**O**	**C**	**CIA**	**SEE**	**Total**
LANG 3	25LTAM31/ 25LHIN31/ 25LFRE31	Tamil III / Hindi III / French III	2	0	0	1	2	40	60	100
ENG 3	25LENG31	English III	2	0	0	1	2	40	60	100
DSC 5	25CBAD31	Programming in Java	3	0	0	2	3	40	60	100
DSC 6	25CBAD32	R Programming	3	0	0	2	3	40	60	100
MDC 3	25BMA003	Probablity for Data Science	2	1	0	2	3	40	60	100
DSE 3 / IDC 3 / Minor 3	25DBAD3-	Discipline Specific Elective – III	3	0	0	2	3	40	60	100
DSC 5 (Lab)	25PBAD31	Practical IV – Programming using Java Lab	0	0	2	1	1	40	60	100
DSC 6 (Lab)	25PBAD32	Practical V – Data Analytics using R lab	0	0	2	1	1	40	60	100
MDE 1	-	Indian Knowledge System	2	0	0	1	2	40	60	100
SEC 4	25SSKU31	Soft Skills III	2	0	0	1	2	40	60	100
SI 1	25IBAD31	Internship I	0	0	2	1	1	-	100	100
			19	**1**	**6**	**-**	**23**	**-**	**-**	**-**

CIA - Continuous Internal Assessment **SEE - Semester End Examination**

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SEMESTER 4										
			Hours/Week					Maximum Marks		
Category	Code	Course	L	T	P	O	C	CIA	SEE	Total
LANG 4	25LTAM41/ 25LHIN41/ 25LFRE41	Tamil IV / Hindi IV / French IV	2	0	0	1	2	40	60	100
ENG 4	25LENG41	English IV	2	0	0	1	2	40	60	100
AECC 1	25EVS041	Environmental Studies	3	0	0	2	3	40	60	100
DSC 7	25CBAD41	Machine learning	3	0	0	2	3	40	60	100
DSC 8	25CBAD42	Data Visualization	3	0	0	2	3	40	60	100
DSE 4 / IDC 4 / Minor 4	25DBAD4-	Discipline Specific Elective –IV	4	0	0	2	4	40	60	100
DSC 7 (Lab)	25PBAD41	Practical VI –Machine learning using R Lab	0	0	2	1	1	40	60	100
DSC 8 (Lab)	25PBAD42	Practical VII – Data Visualization Lab	0	0	2	1	1	40	60	100
SEC 5	25SBAD41	Industry Oriented Employability Skills	1	0	2	1	2	40	60	100
VAC 3	25DVAC41	Yoga Education / NSS / NCC	0	0	2	1	1	-	100	100
SEC 6		In-plant Training/ Industrial Tour/ Summer Term	-	-	-	-	-	-	-	-
			18	-	8	-	22	-	-	-

CIA - Continuous Internal Assessment SEE - Semester End Examination

*L – Lecture, *T- Tutorial, *P- Practical, *O - Outside the class effort / self-study

SEMESTER 5										
			Hours/Week					Maximum Marks		
Category	**Code**	**Course**	**L**	**T**	**P**	**O**	**C**	**CIA**	**SEE**	**Total**
DSC 9	25CBAD51	Artificial Neural Network	3	0	0	2	3	40	60	100
DSC 10	25CBAD52	MATLAB Programming	3	0	0	2	3	40	60	100
DSC 11	25CBAD53	Robotic Process Automation	3	1	0	2	4	40	60	100
DSE 5 / IDC 5 / Minor 5	25DBAD5-	Discipline Specific Elective – V	4	0	0	2	4	40	60	100
DSC 9 (Lab)	25PBAD51	Practical VIII- Programming with MATLAB	0	0	2	1	1	40	60	100
DSC 10 (Lab)	25PBAD52	Practical IX –RPA tools Lab	0	0	2	1	1	40	60	100
SEC 7	25SBAD51	Entrepreneurial Development	2	0	0	1	2	40	60	100
VAC 4	25DVAC51	Advanced Excel	2	0	0	1	2	40	60	100
SI 2	25IBAD51	Internship II	0	0	2	1	1	-	100	100
SEC 8		Skill Enhancement Training / Student Club Activities/ Institution Innovation Council Activities	-	-	-	-	-	-	-	-
			17	**1**	**6**	**-**	**21**	**-**	**-**	**-**

CIA - Continuous Internal Assessment **SEE - Semester End Examination**

***L – Lecture, *T- Tutorial, *P- Practical, *O - Outside the class effort / self-study**

SEMESTER 6										
			Hours/Week					Maximum Marks		
Category	**Code**	**Course**	**L**	**T**	**P**	**O**	**C**	**CIA**	**SEE**	**Total**
DSC 12	25CBAD61	Deep learning	3	0	0	2	3	40	60	100
DSC 13	25CBAD62	Python for data science	3	1	0	2	4	40	60	100
DSC 14	25CBAD63	Reinforcement Learning	4	0	0	2	4	40	60	100
DSC 15	25CBAD64	Big data analytics	4	0	0	2	4	40	60	100
DSE 6 / IDC 6 / Minor 6	25DBAD6-	Discipline Specific Elective – VI	4	0	0	2	4	40	60	100
DSC 12 (Lab)	25PBAD61	Practical X – Data Science using Python Lab	0	0	2	1	1	40	60	100
SEC 9	25SBAD61	Mini Project	0	0	4	1	2	-	100	100
SEC 10		On Job Training / Apprenticeship / Startup	-	-	-	-	-	-	-	-
			18	1	**6**	-	**22**	-	-	-

CIA - Continuous Internal Assessment SEE - Semester End Examination

***L – Lecture, *T- Tutorial, *P- Practical, *O - Outside the class effort / self-study**

SEMESTER 7										
			Hours/Week					Maximum Marks		
Category	**Code**	**Course**	**L**	**T**	**P**	**O**	**C**	**CIA**	**SEE**	**Total**
DSC 16	25CBAD71	UI/UX design	3	0	0	2	3	40	60	100
DSC 17	25CBAD72	Internet of Things	4	0	0	2	4	40	60	100
DSC 18	25CBAD73	Green Computing	3	1	0	2	4	40	60	100
DSE 7 / IDC 7 / Minor 7	25DBAD7-	Discipline Specific Elective – VII	4	0	0	2	4	40	60	100
DSC 16 (Lab)	25PBAD71	Practical XI- UI/UX Lab	0	0	2	1	1	40	60	100
RP 1	25RBAD71	Research Project I	0	0	12	4	6	40	60	100
			14	**1**	**14**	**-**	**22**	**-**	**-**	**-**

CIA - Continuous Internal Assessment SEE - Semester End Examination

***L – Lecture, *T- Tutorial, *P- Practical, *O - Outside the class effort / self-study**

SEMESTER 8										
			Hours/Week					Maximum Marks		
Category	**Code**	**Course**	**L**	**T**	**P**	**O**	**C**	**CIA**	**SEE**	**Total**
DSC 19	25CBAD81	Digital Image processing	3	0	0	2	3	40	60	100
DSC 20	25CBAD82	Pattern Recognisation	3	0	0	2	3	40	60	100
DSC 21	25CBAD83	Virtual Reality	4	0	0	2	4	40	60	100
DSE 8 / IDC 8 / Minor 8	25DBAD8-	Discipline Specific Elective –VIII	3	1	0	2	4	40	60	100
DSC 19 (Lab)	25PBAD81	Practical XII- Image processing lab using OpenCV	0	0	2	1	1	40	60	100
DSC 20 (Lab)	25PBAD82	Practical XIII – Virtual Reality Lab	0	0	2	1	1	40	60	100
RP 2	25RBAD81	Research Project II	0	0	12	4	6	-	60	100
			13	**1**	**16**	**-**	**22**	**-**	**-**	**-**

CIA - Continuous Internal Assessment SEE - Semester End Examination

***L – Lecture, *T- Tutorial, *P- Practical, *O - Outside the class effort / self-study**

DISCIPLINARY SPECIFIC ELECTIVE COURSES

Category	Code	Course	L	T	P	O	C
DSE 1	25DBAD11	Fundamentals of data Science	3	0	0	2	3
	25DBAD12	Computer Organization & Architecture					
DSE 2	25DBAD21	Data Structures and Algorithms	4	0	0	2	4
	25DBAD22	Operating system					
DSE 3	25DBAD31	Cyber Security	3	0	0	2	3
	25DBAD32	Software Engineering					
DSE 4	25DBAD41	Natural Language Processing	4	0	0	2	4
	25DBAD42	Data Mining					
DSE 5	25DBAD51	Cloud Computing	3	1	0	2	4
	25DBAD52	Applications of data Science					
DSE 6	25DBAD61	Time Series Analysis	4	0	0	2	4
	25DBAD62	Machine vision system					
DSE 7	25DBAD71	Big Data Analytics	4	0	0	2	4
	25DBAD72	Cognitive Computing					
DSE 8	25DBAD81	Soft Computing Techniques	3	1	0	2	4
	25DBAD82	Design Thinking					

AECC & LANGUAGES

Category	Code	Course	L	T	P	O	C
LANG 1	24LTAM11/ 24LHIN11/ 24LFRE11	Tamil I / Hindi I/ French I	2	0	0	1	2
ENG 1	24LENG11	English I	2	0	0	1	2
LANG 2	24LTAM21/ 24LHIN21/ 24LFRE21	Tamil II / Hindi II / French II	2	0	0	1	2
ENG 2	24LENG21	English II	2	0	0	1	2
LANG 3	24LTAM31/ 24LHIN31/ 24LFRE31	Tamil III / Hindi III/ French III	2	0	0	1	2
ENG 3	24LENG31	English III	2	0	0	1	2
AECC 1	24EVS031	Environmental Studies	3	0	0	2	3

MULTIDISCIPLINARY COURSES

Category	Code	Course	L	T	P	O	C
MDC 1	24BMA001	Mathematics- I	2	1	0	2	3
MDC 2	24BMA002	Mathematics – II	2	1	0	2	3
MDC 3	24BMA003	Statistics-I	2	1	0	2	3

MULTIDISCIPLINARY ELECTIVES

MDE 1		**Indian Knowledge System**	**2**	**0**	**0**	**1**	**2**

VALUE ADDED COURSES

Category	Code	Course	L	T	P	O	C
VAC 1	24DVAC11	Universal Human Values	1	0	0	1	1
VAC 2	24DVAC21	Communication Skills	2	0	0	1	2
VAC 3	24DVAC41	Yoga Education / NSS / NCC	0	0	2	1	1
VAC 4	24DVAC51	Web Designing	2	0	0	1	2

SKILL ENHANCEMENT COURSES

Category	Code	Course	L	T	P	O	C
SEC 1	24SSKU11	Soft Skills I	2	0	0	1	2
SEC 2		Orientation Programme / Industrial Visit	-	-	-	-	-
SEC 3	24SSKU21	Soft Skills II	2	0	0	1	2
SEC 4	24SSKU31	Soft Skills III	2	0	0	1	2
SEC 5	25SBAD41	Industry Oriented Employability skills	1	0	2	1	2
SEC 6	25SBAD42	In-plant Training/ Industrial Tour/ Summer Term	-	-	-	-	-
SEC 7	24SBAL51	Entrepreneurial Development	2	0	0	1	2
SEC 8	24SBAL52	Skill Enhancement Training / Student Club Activities/ Institution Innovation Council Activities	-	-	-	-	-
SEC 9	24SBAD61	Mini Project	0	0	4	1	2

SEC 10	24SBAL62	On Job Training / Apprenticeship / Startup	-	-	-	-	-

SUMMER INTERNSHIP

Category	Code	Course	L	T	P	O	C
SI 1	24IBAL31	Internship I	0	0	2	1	1
SI 2	24IBAL51	Internship II	0	0	2	1	1

RESEARCH PROJECT

Category	Code	Course	L	T	P	O	C
RP 1	24RBAD71	Research Project I	0	0	12	4	6
RP 2	24RBAL81	Research Project II	0	0	12	4	6

SEMESTER I

25CBAD11 **PROBLEM SOLVING USING C** **3 0 0 2 3**

COURSE OBJECTIVE:

Gain knowledge of C language syntax, semantics, and programming constructs like variables, operators, control statements, and loops and work with arrays, strings, pointers, and structures to solve complex problem

UNIT-1 Introduction to C **9 Hours**

Introduction to computers, input and output devices, designing efficient programs. Introduction to C, Structure of C program, Files used in a C program, Compilers, Compiling and executing C programs, variables, data types, constants, Input/output statements in C, Operators in C, Type conversion and typecasting.

UNIT-II CONTROL STATEMENTS **9 Hours**

Decision control and Looping statements: Introduction to decision control, Conditional branching statements, iterative statements, nested loops, break and continue statements, goto statement.

UNIT-III FUNCTION **9 Hours**

Functions: Introduction using functions, Function definition, function declaration, function call, return statement, passing parameters to functions, scope of variables, storage classes, recursive functions**.**

UNIT-IV ARRAYS AND STRINGS **9 Hours**

Arrays: Declaration of arrays, accessing the elements of an array, storing values in arrays, Operations on arrays, Two dimensional arrays, operations on two-dimensional arrays, two-dimensional arrays to functions, multidimensional arrays. .Introduction to strings: Reading strings, writing strings, summary of functions used to read and write characters .Strings: String taxonomy, operations on strings, Miscellaneous string and character functions, arrays of strings.

UNIT-V POINTERS, STRUCTURE & FILE HANDLING **9 Hours**

Pointers: Understanding the Computers Memory, Introduction to Pointers, Declaring Pointer Variables. Structures: Introduction to structures-File handling-File mode- File operations

TOTAL: 45 Hours

Course Outcome

At the end of the course the student will be able to:

CO1. Elucidate the basic architecture and functionalities of a computer and also recognize the hardware parts.

CO 2. Apply programming constructs of C language to solve the real world problem

CO 3.Explore user-defined data structures like arrays in implementing solutions to problems like searching and sorting

CO 4.Explore user-defined data structures like structures, unions and pointers in implementing solutions

CO5.Design and Develop Solutions to problems using modular programming constructs using functions

BOOKS FOR STUDY

Programming in ANSI C, E.Balagurusamy, McGrawHill Education, 9th Edition, 2023

1. Problem Solving and Program Design in C, Jeri R. Hanly, Elliot B. Koffman, Pearson Education, 10th Edition, 2022
2. C How to Program, Paul Deitel, Harvey Deitel, Pearson Education, 11th Edition, 2021
3. Let Us C, Yashavant Kanetkar, BPB Publications, 17th Edition, 2023

Web Resources:

1. www.tutorialteacher.com
2. www.javatpoint.com
3. www.analyticsvidhya.com

25CBAD12 INTRODUCTION TO ARTIFICIAL INTELLIGENCE 3 1 0 2 4

COURSE OBJECTIVE:

Gain foundational knowledge of AI concepts, history, and its role in solving real-world problems, Learn supervised, unsupervised, and reinforcement learning techniques and Understand the role of neural networks and deep learning in AI systems.

UNIT-I: Basics of AI **12 Hours**

AI problems, foundation of AI and history of AI intelligent agents: Agents and Environments, the concept of rationality, the nature of environments, structure of agents, problem solving agents, problem formulation.

UNIT-II Searching in AI **12 Hours**

Searching- Searching for solutions, uniformed search strategies – Breadth first search, depth first Search. Search with partial information (Heuristic search) Hill climbing, A* ,AO* Algorithms, Problem reduction, Game Playing-Adversial search, Games, mini-max algorithm, optimal decisions in multiplayergames, Problem in Game playing, Alpha-Beta pruning, Evaluation functions.

UNIT-III Knowledge Representation **12 Hours**

Knowledge representation issues, predicate logic- logic programming, semantic nets- frames and inheritance, constraint propagation, representing knowledge using rules, rules based deduction systems. Reasoning under uncertainty, review of probability, Baye's probabilistic interferences and dempstershafer theory.

UNIT- IV Learning Algorithm **12 Hours**

First order logic. Inference in first order logic, propositional vs. first order inference, unification & lifts forward chaining, Backward chaining, Resolution, Learning from observation Inductivelearning,Decisiontrees,Explanationbasedlearning,Statistical Learning methods ,Reinforcement Learning.

UNIT- V Expert Systems **12 Hours**

Expert systems:- Introduction, basic concepts, structure of expert systems, the human element in expert systems how expert systems works, problem areas addressed by expert systems, expert systems success factors, types of expert systems, expert systems and the internet interacts web, knowledge engineering, scope of knowledge, difficulties, in knowledge acquisition methods of knowledge acquisition, machine learning, intelligent agents, selecting an appropriate knowledge acquisition method, societal impacts reasoning in artificial intelligence, inference with rules, with frames: model based reasoning, case based reasoning, explanation & meta knowledge inference with uncertainty representing uncertainty.

TOTAL: 60 Hours

COURSE OUTCOME:

At the end of the course, the student will be able to:

CO1: Understand AI basics.

CO2: Use problem solving technique using AI.

CO3: Learn knowledge representation in AI.

CO4: Analyse the concept of Expert system.

CO5: Understand the algorithm of Machine learning

BOOKS FOR STUDY:

1. S. Russel and P. Norvig, “Artificial Intelligence – A Modern Approach”, SecondEdition, Pearson Education, 2020

2. David Poole, Alan Mackworth, Randy Goebel, ”Computational Intelligence : a logical approach”, Oxford University Press, 2022

3. G. Luger, “Artificial Intelligence: Structures and Strategies for complex problemsolving”, Fourth Edition, Pearson Educatio, 2021.

4. J. Nilsson, “Artificial Intelligence: A new Synthesis”, Elsevier Publishers, 2019.

WEB RESOURCES:

1. www.nptel.com
2. www.simplilearn.com
3. www.upgrade.com
4. www.medium.com

25PBAD11	PROGRAMMING IN C LAB	0 0 2 1

OBJECTIVES

To introduce students to the basic knowledge of programming fundamentals of C language, to impart writing skill of C programming to the students and solving problems and to impart the concepts like looping, array, functions, pointers, file, structure.

LIST OF PROGRAMS

1. Write a program to calculate simple and compound interest.
2. Write a program to generate Fibonacci series.
3. Write a program to compute grade of students using if else ladder.
4. Write a Program to Check Whether a Number is Prime or not and to check given number is Armstrong number or not.
5. Write a program to find GCD and LCM of two numbers.
6. Write a program for addition of two matrices of any order in C.
7. Write a Program to multiply two 3 X 3 Matrices.
8. Write a program to add, subtract, multiply and divide two integers using user defined type function with return type.
9. Write a program to swap two integers using call by value and call by reference methods of passing arguments to a function.
10. Write a program to copy one array to another using pointer.
11. Write a program to add two distances in feet and inches using structure
12. Write a program to create a file called emp.txt and store information about a person, in terms of his name, age and salary and print their details.

TOTAL: 45 Hours

COURSE OUTCOMES:

After completing this lab course the student will be able to:

CO 1 : Understand the logic, algorithm and flow chart for a given problem.

CO 2: Recognize and understand the syntax and construction of C programming code and gain experience of procedural language programming.

CO 3: Learn the methods of iteration or looping and branching and make use of different data-structures like arrays, pointers, structures and files.

CO 4: Understand function declaration and definition.

CO 5: Understand proper use of user defined functions.

SEMESTER II

25CBAD21 **PYTHON PROGRAMMING** **3 0 0 2 3**

OBJECTIVES:

The aim of this course is to help the student to attain the industry identified competency through various teaching learning experiences and to develop general purpose programming language skill using python to solve problems

Unit I: Introduction to Python **9 Hours**

Features of Python-Interactive, Object oriented, Interpreted, platform independent-Python building blocks - Identifiers, Keywords, Indention, Variables, Comments, Python environment setup - Installation and working of IDE, Running Simple Python scripts to display 'welcome' message-Python Data Types: Numbers, String, Tuples, Lists, Dictionary. Declaration and use of data types

Unit II: Python Operators and Control Flow statements **9 Hours**

Basic Operators: Arithmetic, Comparison, Relational, Assignment, Logical, Bitwise, Membership, Identity operators, Python Operator Precedence-Control Flow: Conditional Statements -if, if ... else, nested if-Looping in python - while loop, for loop, nested loops-loop manipulation using continue, pass, break, else.

Unit III: Data Structures in Python **9 Hours**

List: Defining lists, accessing values in list, deleting values in list, updating lists. Basic List Operations Built in List functions-Tuples: Accessing values in Tuples, deleting values in Tuples, and updating Tuples, Basic Tuple operations. Built in Tuple functions-Sets: Accessing values in Set, deleting values in Set and updating Sets, Basic Set operations, Built in Set function- Dictionaries: Accessing values in Dictionary, deleting values in Dictionary and updating Dictionary, Basic Dictionary operations. Built in Dictionaries functions

Unit IV: Function, modules and packages **9 Hours**

Use of Python built in functions: type/ data conversion functions, math functions etc - User defined functions: Function definition, Function calling, function arguments and parameter passing, Return statement-Scope of Variables: Global variable and Local Variable-Modules: Writing modules, importing modules, importing objects from modules, Python built in modules namespace and Scoping-Python Packages: Introduction, Writing Python packages, Using standard and user defined packages

Unit V: Object Oriented Programming & File Concepts **9 Hours**

Creating Classes and Objects-Constructors-Method Overloading and Overriding—inheritance-polymorphism-I/O Operations: Reading keyboard input, Printing to screen-File Handling: Opening file in different modes, accessing file contents using standard library functions, Reading and writing files, closing a file, Renaming and deleting files, Directories in Python, File and directory related standard functions-Exception Handling: Introduction, Exception handling - 'try: except:' statement, 'raise' statement, User defined exceptions.

TOTAL: 45 Hours

COURSE OUTCOMES:

At the end of the course, student will be able to:

CO 1: Develop python program to demonstrate use of Operators

CO 2: Perform operations on data structures in Python.

CO 3: Develop functions for given problem.

CO 4: Design classes for given problem.

CO 5: Learn to handle exceptions.

BOOKS FOR STUDY

1. Rao, K. Nageswara, "Python programming", Scitech Publications (India) Pvt. Ltd, 2nd Edition, 2023
2. Lutz, Mark. " Learning Python", O'Reilly Publication, 5th Edition, 2022.
3. Beazley, David, "Python Essential Reference", Addition Wesley Publication, 4th Edition, 2022
4. Paul, Barry, "Head first Python", O'Reilly Publication, 2'd Edition, 2023

WEB RESOURCES:

1. www.tutoria1spoint.com/python/index.htm
2. www.nptel.ac.in/courses/117106113/34
3. www.w3schools.com/python/default.asp
4. www.programiz.com/python-programming

25CBAD22 **DATA BASE MANAGEMENT SYSTEM** **3 0 0 2 3**

COURSE OBJECTIVE:

To understand the basic concepts and the applications of database systems, master the basics of SQL and construct queries using SQL, learn the relational database design principles, become familiar with the basic issues of transaction processing and concurrency control and familiar with database storage structures and access technique.

Unit I: Basics of DBMS & Relational Model — 9 Hours

Introduction and applications of DBMS, Purpose of database, View of Data, Database Languages, Database architecture, Database users and DBA- Relational Model-Structure of Relational Databases, Database Schema, Keys, Relational Operations and Relational Algebra

Unit II: ER Model — 9 Hours

Structure of Relational Databases, Database Schema, Keys, Relational Operations and Relational Algebra

Unit III : SQL & PL/SQL — 9 Hours

Introduction to SQL, Data Definition of SQL, Basic structure of SQL queries, Basic SQL operations (rename, string operations, order by, where clause), Set operations, Null values, Aggregate functions, Nested Subqueries, Modification of Database, JOIN expressions, Views, Integrity constraints, Data types and Schemas, Authorization-PL/SQL: Introduction, Cursors, Stored Procedures, Stored Functions, Triggers, Partitioning

Unit IV: Relational Data base design — 9 Hours

First Normal Form, Decomposition, Desirable Properties of Decomposition, Functional Dependencies, Second and Third Normal Form and Boyce-Codd Normal Form

Unit V : Indexing, Hashing & Transaction Control — 9 Hours

Basic concepts of indexing, hash-based indexing, tree based indexing. Transaction concepts, properties of transactions, serializability, testing for serializability, Transaction Isolation and Atomicity, Transaction isolation levels, Implementation of isolation levels, Lock based protocols, Deadlock handling, Timestamp based protocols, two- phase locking protocol.

Total: 45 Hours

COURSE OUTCOMES:

At the end of the course, the student will be able to:

CO1: Understand database concepts and query language

CO2: Understand the E R model and relational model

CO3: Design and build a database system and demonstrate competence with the fundamental tasks involved with modelling, designing, and implementing a DBMS.

CO4: Apply PL/SQL programming using various basic and advanced concepts of RDBMS.

CO 5: Understand the concepts of indexing, hashing & transaction management in DBMS.

Books for Study:

1. Silberschatz, Korth, Sudarshan, "Database System Concepts", TMH Publication, 12th Edition,2020
2. Vikram Vaswani ."MySQL(TM): The Complete Reference", Wiley Publication, 2nd Edition, 2021
3. C. J. Date , "An Introduction to Database Systems" . Adission Wisley Publication, Eighth Edition, 2019
4. G K Gupta, Data base Management Systems, Dreamtech Publication, 3rd Edition, 2022

Web Resources:

1. www.simplilearn.com
2. www.medium.com
3. www.techtarget.com
4. www.tutorialteacher.com

25PBAD 21 **RDBMS LAB** **0 0 2 1 1**

COURSE OBJECTIVE:

To explain basic database concepts, applications, data models, schemas and instances, demonstrate the use of constraints and relational algebra operations. IV. Describe the basics of SQL and construct queries using SQL, emphasize the importance of normalization in databases.

LIST OF PROGRAMS:

1. Design a Database and create required tables. For e.g. Bank, College Database
2. Apply the constraints like Primary Key, Foreign key, NOT NULL to the tables.
3. Implement SQL select statement with various options
4. Write a SQL statement for implementing ALTER,UPDATE and DELETE
5. Write the queries to implement the joins
6. Write the query to implement various aggregate function
7. Write the query to implement the date and time function in SQL
8. Write the query to create the views
9. Perform the queries for triggers
10. Implement the usage of sub query
11. Write a PL/SQL program using stored procedure.
12. Write a PL/SQL program using cursor

Total : 45 Hours

COURSE OUTCOME:

At the end of the course, the student will be able to:

CO 1: Apply the basic concepts of Database Systems and Applications.

CO 2: Use the basics of SQL and construct queries using SQL in database creation and interaction

CO 3: Design a commercial relational database system by writing SQL using the system.

CO 4: Analyze and Select storage and recovery techniques of database system.

CO 5: Design program using PL/SQL

25PBAD22 **PYTHON PROGRAMMING LAB** **0 0 2 1 1**

COURSE OBJECTIVE:

To learn and run python program using IDE and apply the concepts related with the course.

LIST OF PROGRAMS

1. Program to convert the given temperature from Fahrenheit to Celsius and vice versa depending upon user's choice.
2. Program to calculate total marks, percentage and grade of a student. Marks obtained in each of the five subjects are to be input by user. Assign grades according to the following criteria:

   Grade A: Percentage >=80 Grade B: Percentage >=70 and <80

   Grade C: Percentage >=60 and <70 Grade D: Percentage >=40 and <60

   Grade E: Percentage <40
3. Program, to find the area of rectangle, square, circle and triangle by accepting suitable input parameters from user.
4. Program to display the first n terms of Fibonacci series.
5. Program to find factorial of the given number using recursive function.
6. Write a Python program to count the number of even and odd numbers from array of N numbers.
7. Python function that accepts a string and calculate the number of upper case letters and lower case letters.
8. Python program to reverse a given string and check whether the give string is palindrome or not.
9. Write a Python program to demonstrate the usage of Method Resolution Order (MRO) in multiple levels of Inheritance
10. Write a Python program to implement method over loading and method overriding.
11. Write a python program using parametrized constructor.
12. Write a Python code to merge two given file contents into a third file

Total: 45 Hours

COURSE OUTCOMES:

At the end of the Course the student shall be able to

CO1: apply comprehensions, different Decision-Making statements and Functions.

CO2: implement various data types like lists, tuples, strings.

CO3: use different File handling operations and Maps.

CO4: apply Object oriented programming in Python types.

CO5: Use Exception Handling mechanism in Python