

DEPARTMENT OF COMPUTER SCIENCE WITH ARTIFICIAL INTELLIGENCE & MACHINE LEARNING

**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 ARTIFICIAL INTELLIGENCE &
MACHINE LEARNING**

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 ARTIFICIAL INTELLIGENCE & MACHINE LEARNING

Vision

To be a leading school of emerging trends in Artificial Intelligence and Machine Learning that affords quality education to equip students with the technical know-how, ascertain their hidden talents, provide ambient environment to show case their highest potential and to transform the students to be creative and innovative leaders and entrepreneurs as anticipated by the Industry

Mission

- To offer a broad and balanced academic plans that strengthens and emphasizes high quality and creative instruction
- To strive for quality education that will prepare young minds for imbibing knowledge, skills and sensitivity.
- To create a platform for students for exploring their creative potential and nurturing the spirit of entrepreneurship and critical thinking.
- To inculcate a strong belief in hard work and equip students with the skills needed to adapt better to the changing global scenario and gain access to multiple career opportunities.

- To generate new domain knowledge through a broad array of scholarly, research and creative endeavors, which provide the basis to uncover the immediate and long-term needs of the Industry.
- To offer opportunities and encourage the students to Initiate, sustain and nourish research groups in Artificial Intelligence.
- To motivate the budding professionals in exploiting the potential of start-ups and innovations in Artificial Intelligence & Machine Learning and the related Domains.
- To maintain level of excellence and standards that offers them state wide, national and international significance.

Program Educational Objectives (PEOs)	
The B.Sc. Computer Science with Artificial Intelligence & Machine Learning program describe accomplishments that graduates are expected to attain within five to seven years after graduation.	
PEO1	Expertise with the principles of Artificial Intelligence and problem solving, inference, perception, knowledge representation, and learning
PEO2	Exhibit high standards with regard to application of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning and deep learning models
PEO3	Investigate with a machine learning model for simulation and analysis and explore the scope, potential, limitations, and implications of intelligent systems.
PEO4	Establish the ability to Listen, read, proficiently communicate and articulate complex ideas with respect to the needs and abilities of diverse audiences.
PEO5	Instill key technologies in Artificial Intelligence, Machine Learning and deep learning, visualization techniques, Natural language processing and Robotics.

Programme Outcomes (POs)	
On successful completion of the B.Sc. Computer Science with Artificial Intelligence & Machine Learning	
PO1	Domain Knowledge: Demonstrate a sound understanding of all the main areas of Machine Learning & AI and also demonstrate the ability to exercise critical judgement in the evaluation of Machine Learning and AI applications.
PO2	Problem Analysis: Understand how to distill a real-world challenge as an artificial intelligence problem, involving explicit representation and learning of symbolic and numeric models; reasoning about such models; and using such models for decision making, action selection, and interaction with humans.
PO3	Design/development of solutions: Design and develop research-based solutions for complex problems in artificial intelligence and machine learning industry through appropriate consideration for the public health, safety, cultural, societal, and environmental concerns.
PO4	Communicative & oratorical Skills: Establish the ability to Listen, read, proficiently communicate and articulate complex ideas with respect to the needs and abilities of diverse audiences.

PO5	Exhibit Entrepreneurial Skills: Deliver innovative ideas to instigate new business ventures and possess the qualities of a good entrepreneur
PO6	Ethics: Recognize the social impact of artificial intelligence and the underlying responsibility to consider the ethical, privacy, moral, and legal implications of artificial intelligence technologies.
PO7	Individual and teamwork: Graduates will be able to undertake any responsibility as an individual/member of multidisciplinary teams and have an understanding of team leadership
PO8	Use of State-of-the-Art AI and machine learning tools & techniques: Design, analyze, implement, and use state-of-the-art AI and machine learning tools & techniques for dealing with real-world data, including data involving vision, language, perception, and uncertainty.
PO9	Dynamism and Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PO10	Research instinct: Apply AI and ML specific research techniques, tools, methods, design of experiments, analysis and synthesis of the information for conducting investigations of complex problems.

Program Specific Outcomes (PSOs)	
After the successful completion of B.Sc. Computer Science with Artificial Intelligence and Machine Learning program, the students are expected to	
PSO1	Exhibit good domain knowledge and completes the assigned responsibilities effectively and efficiently in par with the expected quality standards for Artificial Intelligence and Machine Learning professional.
PSO2	Apply the technical and critical thinking skills in the discipline of artificial intelligence and machine learning to find solutions for complex problems. Design and develop research-based solutions for complex problems in artificial intelligence and machine learning industry through appropriate consideration for the public health, safety, cultural, societal, and environmental concerns.

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

B.Sc. – COMPUTER SCIENCE WITH ARTIFICIAL INTELLIGENCE & MACHINE LEARNING									
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	
I SEMESTER									
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: Java Programming	4		3	50	50	100	4
	22UAI102	Core II: Industry 4.0	4		3	50	50	100	4
	22UAI1A1	Allied-1: Introduction to Linear Algebra	4		3	50	50	100	4
	22UAI103	Core Lab I: Programming Lab in Java		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

<u>II SEMESTER</u>									
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	22UAI204	Core III: Programming in Python	3		3	50	50	100	4
	22UAI205	Core IV: Data Structures & Algorithms	4		3	50	50	100	4
	22UAI2A1	Allied 2 : Optimization techniques	5		3	50	50	100	4
	22UAI206	Core Lab II: Programming Lab in Python		4	3	25	25	50	2
	22UAI207	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	* Word choice is rich and varies * Writing style is consistently strong * Students own formal language	* Word choice is clear and reasonably precise * Writing language is appropriate to topic * Words convey intended message	* Word choice is basic * Most writing language is appropriate to topic * Informal language	* 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 AI & ML)	
Course Code:	22UAI101			Title	Batch:	2022 - 2025
Lecture Hrs./Week or Practical Hrs./Week	4	Tutorial Hrs./Sem .	60	Core I: Java Programming	Semester:	I
					Credits:	4

Course Objective

The course provides insight knowledge about object oriented programming concepts and programming language in Java.

Course Outcome

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

CO Number	CO Statement	Knowledge Level
CO1	Develop an in-depth understanding of object-oriented programming concepts	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	H	H	H	H	L	M	L	M	L	H	H
CO3	M	H	M	H	M	L	M	M	M	L	M	H
CO4	M	H	M	H	M	L	H	L	M	L	M	H
CO5	H	M	H	H	L	L	M	L	M	H	H	H

Units	Content	Hrs
Unit I	INTRODUCTION: Introduction to Java - Features of Java - Object Oriented Concepts - Lexical Issues - Data Types - Variables - Arrays - Operators - Control Statements.	12
Unit II	Classes and Objects: Classes - Objects - Constructors - Overloading method - Access Control - Static and fixed methods - Inner Classes - String Class - Inheritance - Overriding methods - Using super- Abstract class.	11
Unit III	Packages: Access Protection - Importing Packages - Interfaces - Exception Handling - Throw and Throws - Thread - Synchronization - Messaging - Runnable Interface - Inter thread Communication - Deadlock - Suspending, Resuming and stopping threads - Multithreading.	12
Unit IV	I/O Streams: File Streams - Applets - String Objects - String Buffer - Char Array - Java Utilities - Code Documentation .	12
Unit V	Networks basics: Socket Programming - Proxy Servers - TCP/IP Sockets - Net Address - URL – Datagrams - Working with windows using AWT Classes - AWT Controls - Layout Managers and Menus.	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
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1	R.Nageswara Rao	Core Java : An Integrated Approach	John Wiley, ISBN 9789351199250	2016
2	Cay S.Horstmann, Gary Cornell.	Core Java 2 Volume I - Fundamentals	Oracle Press Java, 12 th Edition.	2022
3	H. Schildt	Java2 The Complete Reference	McGraw Hill, 11 th Edition	2020

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Deital & Deital	Java How to Program	Third Edition, Pearson Education Asia	2012
2	K. Arnold and J. Gosling	TheJava Programming Language	Addison Wesley, 4 th Edition	2005

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. S. Niraimathi	Dr. S. Niraimathi	Mr. K. Srinivasan	Dr. R . ManicaChezian
Signature	Signature	Signature	Signature

Programme Code:	B.Sc			Programme Title:	Bachelor of Science (Computer Science with AI & ML)	
Course Code:	22UAI102			Title	Batch:	2022 - 2025
Lecture Hrs./Week or Practical Hrs./Week	4	Tutorial Hrs./Sem	60	Core II: Industry 4.0	Semester:	I
		.			Credits:	4

Course Objective

To impart knowledge on Industry 4.0, need for digital transformation and the following Industry 4.0 tools: 1. Artificial Intelligence 2. Big Data and Data Analytics 3. Internet of Things

Course Outcome

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

CO Number	CO Statement	Knowledge Level
CO1	Know the reason for adopting Industry 4.0 and Artificial Intelligence.	K1
CO2	Understand the need for digital transformation.	K2
CO3	Apply the industry 4.0 tools.	K3
CO4	Analyze the applications of Big Data.	K4
CO5	Examine the applications and security of IoT Applications.	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	M
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	L
CO5	H	M	H	H	L	L	M	L	M	H	H	M

Units	Content	Hrs
Unit I	Industry 4.0: Need – Reason for Adopting Industry 4.0 - Definition – Goals and Design Principles - Technologies of Industry 4.0 – Big Data – Artificial Intelligence (AI) – Industrial Internet of Things - Cyber Security – Cloud – Augmented Reality.	12
Unit II	Artificial Intelligence : Artificial Intelligence (AI) – What & Why? - History of AI - Foundations of AI -The AI -environment - Societal Influences of AI - Application Domains and Tools - Associated Technologies of AI - Future Prospects of AI - Challenges of AI .	11
Unit III	Big Data and IoT : Evolution - Data Evolution - Data : Terminologies - Big Data Definitions - Essential of Big Data in Industry 4.0 - Big Data Merits and Advantages - Big Data Components : Big Data Characteristics - Big Data Processing Frameworks - Big Data Applications - Big Data Tools - Big Data Domain Stack : Big Data in Data Science - Big Data in IoT - Big Data in Machine Learning - Big Data in Databases - Big Data Use cases Big Data in Social Causes - Big Data for Industry - Big Data Roles and Skills -Big Data Roles - Learning Platforms; Internet of Things (IoT) : Introduction to IoT - Architecture of IoT - Technologies for IoT - Developing IoT Applications - Applications of IoT - Security in IoT .	12
Unit IV	Applications And Tools Of Industry 4.0: Applications of IoT – Manufacturing – Healthcare – Education – Aerospace and Defense – Agriculture – Transportation and Logistics – Impact of Industry 4.0 on Society: Impact on Business, Government, People. Tools for Artificial Intelligence, Big Data and Data Analytics, Virtual Reality, Augmented Reality, IoT, Robotics.	12
Unit V	Jobs 2030: Industry 4.0 – Education 4.0 – Curriculum 4.0 – Faculty 4.0 – Skills required for Future - Tools for Education – Artificial Intelligence Jobs in 2030 – Jobs 2030 - Framework for aligning Education with Industry 4.0 .	13
	Total Contact Hrs	60

Pedagogy

Direct Instruction, Flipped Class, Digital Presentation

Assessment Methods:

Seminar, Quiz, Assignments, Group Task.

Text Book

S.N O	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATIO N
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1	P.Kaliraj & T. Devi Related Online	Higher Education for Industry 4.0 and Transformatio n to Education 5.0	Contents [MOOC, SWAYAM, NPTEL, Websites etc.] 1 https://nptel.ac.in/courses/106/105/106105195/	2020
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Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Manoel Carlos Ramon	API Features and Arduino Projects for Linux Programmers	Intel® Galileo and Intel® Galileo Gen 2:, Apress	2014
2	Marco Schwartz Yun	Internet of Things with the Arduino	Packt Publishing,	2014

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. S. Niraimathi	Mr. K. Srinivasan	Dr. R . ManicaChezian
Signature	Signature	Signature	Signature

Programme Code:	B.Sc,			Programme Title:	Bachelor of Science (Computer Science with AI & ML)	
Course Code:	22UAI1A1			Title	Batch:	2022 - 2025
Lecture Hrs./Week or Practical Hrs./Week	4	Tutorial Hrs./Sem	60	Allied I :Introduction to Linear Algebra	Semester:	I
		.			Credits:	4

Course Objective

To introduce the concepts of Numbers, Quantification, sets, logical reasoning, probability and calculus

Course Outcome

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

CO Number	CO Statement	Knowledge Level
CO1	Define basic terms and concepts of matrices.	K1
CO2	Comprehend the use of various matrix operations	K2
CO3	Understand the concept of Vector spaces and Basis	K3
CO4	Determine Eigen values and Eigen Vectors	K4
CO5	Determine orthogonal set concept	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	M
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	Systems of Linear equations: – Row Reduction and Echelon forms – Vector Equations : Vector Equation – The matrix Equation $Ax = b$ - Solution sets of Linear systems	12
Unit II	Matrix Operations: The Inverse of a Matrix – Characterizations of Invertible Matrices – Partitioned Matrices – Matrix Factorizations.	12
Unit III	Vector Spaces and Subspaces: Null spaces, Column Spaces and Linear Transformations – Linearly Independent Sets, Bases – coordinate systems – The Dimension of a vector space – Rank.	12
Unit IV	Eigen vectors and Eigen values: The Characteristic Equation – Diagonalization – Eigen vectors and Linear transformations	12
Unit V	Innerproduct, Length and Orthogonality: Orthogonal sets – Orthogonal Projections- The Gram – Schmidt Process.	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	David C. Lay Steven R. Lay and Judi J. McDonald	Linear Algebra and Its Applications	Pearsons Publications 5th edition	2016

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Ward CheneyDEwid Kincaid	Linear Algebra Theory and Applications,	Jones and Bartlett Publishers, Inc, II edition.	2011
2	Seymorelipschutz .	Beginning Linear Algebra	Tata McGraw hill	2005

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. S. Niraimathi	Name:Dr. S. Niraimathi	Name: Mr. K. Srinivasan	Name: Dr. R . ManicaChezian
Signature	Signature	Signature	Signature

Programme Code:	B.Sc			Programme Title:	Bachelor of Science (Computer Science with AI & ML)	
Course Code:	22UAI103			Title	Batch:	2022 - 2025
Lecture Hrs./Week or Practical Hrs./Week	5	Tutorial Hrs./Sem.	75	Core Lab I Programming Lab in Java	Semester:	I
					Credits:	2

Course Objective

- To make the student learn an object oriented way of solving problems using java.
- To make the students to write programs using multithreading concepts and handle exceptions.
- To make the students to write programs that connects to a database and be able to perform various front-end operations.

Course Outcome

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

CO Number	CO Statement	Knowledge Level
CO1	To remember and recollect the object oriented concepts	K3
CO2	To get the idea of packages, interfaces and exceptions and AWT	K4
CO3	To validate the projects using front-end and back-end programming	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
	1. Program to generate Fibonacci series 2. Program to check if the number is prime or not 3. Program to find the factorial of a number 4. Program to emulate a Simple calculator 5. Program to check if the string is a Palindrome or not 6. Program to check if the year is a Leap Year 7. Program to check if the number is an Armstrong number or not 8. Program to demonstrate Multilevel Inheritance. 9. Program to demonstrate Method Overloading. 10. Program to demonstrate Method Overriding. 11. Dynamic Method dispatch. 12. Program to demonstrate interfaces. 13. Program to demonstrate packages. 14. Program to demonstrate user-defined exception. 15. Program to demonstrate Multi-threading concept. 16. Applet program to demonstrate basic controls 17. Program to demonstrate font class. 18. Program to demonstrate Graphics class. 19. Program to demonstrate layout manager. 20. Program to create Menus. 21. Program to demonstrate animation. 22. Program to demonstrate mouse events and keyboard events
	Total Hours 75

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	R.Nageswara Rao	Core Java : An Integrated Approach	John Wiley, ISBN 9789351199250	2016
2	Cay S.Horstmann, Gary Cornell.	Core Java 2 Volume I – Fundamentals	Oracle Press Java, 12 th Edition.	2022
3	H. Schildt	Java2 The Complete Reference	McGraw Hill, 11 th Edition	2020

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Deital & Deital	Java How to Program	Third Edition, Pearson Education Asia	2012
2	K. Arnold and J. Gosling	TheJava Programming Language	Addison Wesley,4 th Edition	2005

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. S. Niraimathi	Name: Dr. S. Niraimathi	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 AI & ML)	
Course Code:	22UAI204			Title	Batch:	2022 - 2025
Lecture Hrs./Week or Practical Hrs./Week	4	Tutorial Hrs./Sem.	60	Core III: Programming in Python	Semester:	II
					Credits:	4

Course Objective

To impart knowledge in Core python, advanced concepts like Regular Expressions and Artificial Intelligence & DataScience tools which allow students to apply the concepts to become effective Python programmers.

Course Outcome

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the core programming constructs of Python	K1
CO2	Express proficiency in the handling of functions, strings, lists, dictionaries, tuples and sets	K2
CO3	Apply the use of regular expressions and built-in functions to navigate the file system.	K3
CO4	Illustration of Object-oriented Programming concepts in Python	K4
CO5	Realize the power of modules like NumPy, pandas, and Altair in developing solutions to problems related to data science	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	M
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	Introduction: Identifiers - Keywords - Statements and Expressions - Variables - Operators - Precedence and Associativity - Data Types - Indentation - Comments - Reading Input - Print Output - Type Conversions - The type() Function and Is Operator - Dynamic and Strongly Typed Language. Control Flow Statements - Functions: Built-In Functions - Commonly Used Modules - Function Definition and Calling the Function - The return Statement and void Function- Scope and Lifetime of Variables - Default Parameters - Keyword Arguments - *args and **kwargs - Command Line Arguments.	12
Unit II	Strings : Creating and Storing Strings - Basic String Operations - Accessing Characters in String by Index Number - String Slicing and Joining - String Methods - Formatting Strings – Lists: Creating Lists - Basic List Operations - Indexing and Slicing in Lists - Built-In Functions Used on Lists - List Methods - The del Statement.	11
Unit III	Dictionaries: Creating Dictionary - Accessing and Modifying key:valuePairs in Dictionaries - Built- In Functions Used on Dictionaries - Dictionary Methods - The del Statement - Tuples and Sets:Creating Tuples - Basic Tuple Operations - Indexing and Slicing in Tuples - Built-In Functions Used on Tuples - Relation between Tuples and Lists -Relation between Tuples and Dictionaries - Tuple Methods - Using zip() Function - Sets - Set Methods – Frozenset.	12
Unit IV	Files: Types of Files - Creating and Reading Text Data - File Methods to Read and Write Data - Reading and Writing Binary Files - The Pickle Module - Reading and Writing CSV Files - Python os and os.path Modules Regular Expression Operations: Using Special Characters - Regular Expression Methods - Named Groups in Python Regular Expressions - Regular Expression with glob Module.	12
Unit V	Object-Oriented Programming: Classes and Objects - Creating Classes in Python - Creating Objects in Python - The Constructor Method - Classes with Multiple Objects - Class Attributes versus Data Attributes - Encapsulation - Inheritance - The Polymorphism –Introduction to Data Science: Functional Programming - JSON and XML in Python - NumPy with Python - Pandas – Altair.	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	S. Gowrishankar, A. Veena,	Introduction to Python Programming,	CRC Press Taylor and Francis Group, Ist Edition	2018

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	E.Balagurusamy	Introduction to Computing and Problem Solving Using Python	McGraw Hill Education 1st Edition	2016
2	Wesley J. Chun	Core Python Programming	, Pearson Education, 2nd Edition	2009

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. S. Niraimathi	Name: Dr. S. Niraimathi	Name: Mr. K. Srinivasan	Name: Dr. R. ManicaChezian
Signature	Signature	Signature	Signature

Programme Code:	B.Sc			Programme Title:	Bachelor of Science (Computer Science with AI & ML)	
Course Code:	22UAI205			Title	Batch:	2022 - 2025
Lecture Hrs./Week or Practical Hrs./Week	4	Tutorial Hrs./Sem.	60	Core IV: Data Structures and Algorithms	Semester:	II
					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	M
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 to Data Structures: Why Data Structures – Operations of Data Structures – Data Types – Arrays and Lists – Representation Of Arrays – Operations On Arrays - Abstract Data Types (ADTs) – List ADT.	12
Unit II	Linear Data Structures: Stack: Operations of Stack – Representation – Implementation – Infix to Postfix Conversion – Postfix Evaluation – Recursion – Maze Problem – Queue: Operations of Queue – Representation – Implementation – Job Processing using Queue – Circular Queue – Double Ended Queue – Linked List: Representation – Implementation – Polynomial Addition – Doubly Linked List – Circular List – Circular Doubly Linked List.	11
Unit III	Non Linear Data Structures: Trees: Terminologies in Trees – Representation – Types of Trees – Forest – Transforming Forest into Binary Trees - Traversal Techniques – Applications of Trees Graphs: Terminologies in Graphs – Representation – Depth First Search – Breadth First Search – Applications of Graphs – Shortest Path- Travelling Salesman Problem – Dijkstra's Algorithm – Types of Graphs.	12
Unit IV	Sorting And Searching: Sorting: Bubble Sort – Selection Sort – Merge Sort – Insertion Sort – Quick Sort – Heap Sort – Searching: Linear Search – Binary Search – Divide and Conquer – Hashing - Hash Table – Direct Address Method – Mapping Function – Handling Collision.	12
Unit V	Complexity And Case Studies: Asymptotic Notation – Big Oh Notation – Omega Notation – Theta Notation – Complexity: Space Complexity – Time Complexity – Space and Time Complexities of Data Structures – Case Studies: Searching for Patterns- Inventing a new sorting Algorithm - Synthesizing Concurrent Graph Data Structures.	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	Gav Pai,	Data structures and algorithms, concepts, techniques and Applications	McGraw Hill, 1 st Edition, ISBN: 9780070667266	2019
2	Horowitz, S. Sahni, and S. Rajasekaran	Computer Algorithms	Galgotia Pub. Pvt. Ltd.,	2012

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	T. H. Cormen, C. E. Leiserson, R. L. Rivest	Introduction to Algorithms	Prentice hall, 3 rd Edition	2009

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.S.Niraimathi	Name: Dr.S.Niraimathi	Name: Mr. K. Srinivasan	Name: Dr. R . ManicaChezian
Signature	Signature	Signature	Signature

Programme Code:	B.Sc			Programme Title:	Bachelor of Science (Computer Science with AI & ML)	
Course Code:	22UDA2A1			Title	Batch:	2022 - 2025
Lecture Hrs./Week or Practical Hrs./Week	4	Tutorial Hrs./Sem.	60	ALLIED II: Optimization Techniques	Semester:	II
					Credits:	4

Course Objective

- To model linear programs and solving with a computer
- To use Simplex algorithms to solve linear programs & Other algorithms for linear programming,
- To introduce Integer Programming
- To Solve Network problems & Non-linear programming

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 principles and practices of computing grounded in mathematics and science	K1
CO2	To understand the Problems using various linear Algorithms	K2
CO3	To apply algorithms to the decision making problems	K3
CO4	To analyze the programming algorithms with exercises	K4
CO5	To Summarize the inventory and queuing models	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	Introduction: Simplex method – Graphical method – Standard form – IBFS- Artificial Variable technique – Big M Method	12
Unit II	Transportation : Mathematical formulation – Initial feasible solution – North – West Corner Method – Matrix minima method – Vogel’s approximation method – Optimized basic feasible solution- Solution by UV method Assignment Problem : Introduction – Definition – Assignment algorithm – Balanced Assignment Problem – Unbalanced Assignment problem – Hungarian Method	11
Unit III	Networks : Networks and basic components – rules – time calculation in networks – CPM – PERT – PERT Calculations- Resource analysis in network scheduling project cost – time cost optimization algorithm	12
Unit IV	Inventory : Introduction – Reasons for carrying Inventory – Type of Inventories – The Inventory decision – EOQ with no Shortages – Production problem with no shortages – EOQ with Shortages – Production problem with shortages- EOQ with Price Breaks – EOQ with no price breaks – EOQ with two price breaks Queuing Theory : Queuing System characteristics – Poisson process and exponential distribution (M/M/1) : (∞ /FIFO) , (M/M/1) : (N/FIFO) , (M/M/C) : (∞ / FIFO) , (M/M/C) : (N/FIFO)	12
Unit V	Sequencing : Introduction- problems of sequencing – problems with n jobs and two machines – Problems with n jobs and three machines – problems with n jobs and m machines Replacement Theory : Introduction – replacement of equipment or asset the deteriorates gradually – replacement of equipment that fails suddenly	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	KantiSwarup, P.K. Gupta and Man Mohan	Operations Research	Sultan Chand & Sons Educational Publishers, New Delhi.	2008

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	1. P.K. Gupta, D.S. Hira	Problem in Operations Research	S.Chand& Company Ltd.,	2007
2	J.K. Sharma	Operations Research Theory and Applications	Macmillan India Ltd. 3 rd Edition,	2006
3	Hamdy A. Taha	Operations Research : An Introduction	PHI, New Delhi, 8 th Edition	2008

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.S.Niraimathi	Name: Mr. K. Srinivasan	Name: Dr. R . ManicaChezian
Signature	Signature	Signature	Signature

Programme Code:	B.Sc			Programme Title:	Bachelor of Science (Computer Science with AI & ML)	
Course Code:	22UAI206			Title	Batch:	2022 - 2025
Lecture Hrs./Week or Practical Hrs./Week	5	Tutorial Hrs./Sem.	75	Core Lab II Programming Lab in Python	Semester:	II
					Credits:	2

Course Objective

To give a basic introduction to object-oriented and to demonstrate the concepts of Artificial Intelligence and Data science, using Python

Course Outcome

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

CO Number	CO Statement	Knowledge Level
CO1	To remember the principles of structured programming Recognize and construct common programming idioms: variables, loop, branch, subroutine, and input/output.	K3
CO2	To understand the common programming idioms: variables, loop, branch, subroutine, and input/output	K4
CO3	To figure out ability to analyze and solve the problems using advanced facilities of the Python language	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
	1. Program to find the factorial of a number using recursion 2. Program to implement the control structures 3. Program to implement the list 4. Program to implement the operations and methods of the String 5. Program to implement the Tuples 6. Program to implement the Dictionaries 7. Program to import and use the system libraries 8. Program to implement the modules 9. Program to implement the standard modules 10. Program to implement Exceptions and Error handling 11. Program to implement Objects and Class 12. Program to demonstrate File handling 13. Program to demonstrate JSON 14. Program to demonstrate Numpy 15. Program to Demonstrate Pandas
	Total Hours 75

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	S. Gowrishankar, A. Veena,	Introduction to Python Programming,	CRC Press Taylor and Francis Group, 1st Edition	2018

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	E.Balagurusamy	Introduction to Computing and Problem Solving Using Python	McGraw Hill Education 1st Edition	2016
2	Wesley J. Chun	Core Python Programming	, Pearson Education, 2nd Edition	2009

Programme Code:	B.Sc		Programme Title:	Bachelor of Science (Computer Science with AI & ML)	
Course Code:	22UAI207		Title	Batch:	2022 - 2025
			Capstone Project - 1	Semester:	II
Lecture Hrs./Week or Practical Hrs./Week		Tutorial Hrs./Sem.		Credits:	2

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

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	1.4.2 Software Specification	
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	2.1.2 Drawbacks	
	2.2 Proposed System	
	2.3 Planning and Scheduling	
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	3.1 Modules of the Project	
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	3.5 Supporting Diagrams (ER/DFD/Use Case)	
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	5.2	Limitation of the Project
	5.3	Further Scope of the Project
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	7.2	Screenshots and Reports
8		References

Size of the Project

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