

K.M.G. COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS)

Approved by the Government of Tamil Nadu Permanently Affiliated to Thiruvalluvar University, Vellore. Recognized under Section 2(f) and 12(B) of the UGC Act 1956 Accredited by NAAC (2nd Cycle) with (CGPA of 3.24/4) 'A' Grade

DEPARTMENT OF ARTIFICIAL INTELLIGENCE

B.Sc., ARTIFICIAL INTELLIGENCE

SYLLABUS

(CHOICE BASED CREDIT SYSTEM)

Under

LEARNING OUTCOMES-BASED CURRICULUM

FRAMEWORK (LOCF)

(Effective for the Batch of Students Admitted from 2024-2025)

PREFACE

Artificial intelligence or AI is the science that deals with the development of machines capable of thinking like a human brain. It focuses on the stimulation of human thought and behaviour in machines including learning from data, reasoning, and self correction. With the advent of technologies and applications (apps) that can gratify our wishes and cravings at the touch of our fingertips, BSc Artificial Intelligence has become a sought after course that offers excellent opportunities in the upcoming field of artificial intelligence and machine learning.

In pursuit of the Higher Education Department Policy Note 2022-23 Demand 20, Section 1.4, Tamil Nādu State Council for Higher Education took initiative to revamp the curriculum. On 27 July 2022, a meeting was convened by the Member-Secretary Dr. S.Krishnasamy enlightening the need of the hour to restructure the curriculum of both Undergraduate and Post-graduate programmes based on the speeches at the Tamil Nādu Legislative Assembly Budget meeting by the Honourable Higher Education Minister Dr K. Ponmudy and Honourable Finance Minister Dr. P. Thiagarajan. At present there are three different modes of imparting education in most of the educational institutions throughout the globe. Outcome Based Education, Problem Based Education, and Project Based Education.

Now our Honourable Higher Education Minister announced Industry Aligned Education. During discussion, Member Secretary announced the importance of question papers and evaluation as envisaged by the Honourable Chief Secretary to Government Dr, V. IraiAnbu. This is very well imbedded in Revised Bloom's Taxonomy forms three learning domains: the cognitive (knowledge), affective(attitude), and psychomotor (skill). This classification enables to estimate the learning capabilities of students.

Briefly, it is aimed to restructure the curriculum as student-oriented, skill-based, and institution industry- interaction curriculum with the various courses under "Outcome Based Education with Problem Based Courses, Project Based Courses, and Industry Aligned Programmes" having revised Bloom's Taxonomy for evaluating students skills. Three domains:

(i)Cognitive Domain

(Lower levels: K1: Remembering ; K2: Understanding ; K3: Applying; Higher levels: K4: Analysing ; K5: Evaluating; K6: Creating)

(ii) Affective Domain

(iii) Psychomotor Domain

ABOUT THE COLLEGE

The College was founded in the new millennium 2000 by the vision of late Shri.K.M.Govindarajan fondly known as Iyah, with a mission to offer higher education in the fields of Arts and Science to the needy and the poor middle class students of this area and make them fully employable and economically self-reliant. With a humble beginning of launching an elementary school named Thiruvalluvar Elementary School in the year 1952, Iyah groomed it into a Higher Secondary School and later into a college. Education was his soul and breath. The college has grown into a full-fledged educational hub offering 12 graduate programmes, 8 post graduate programmes, 5 M.Phil research programmes and 4 Ph.D programmes. The college has been accredited with 'A' grade by NAAC in 2nd cycle and recognized under section 2(f) & 12(B) of the UGC act 1956. The College is permanently affiliated to Thiruvalluvar University. The College is also acquired the status of Autonomous from the academic year 2024-2025. The College is an associate member of ICT Academy and registered member of NPTEL and Spoken Tutorials of IIT Bombay. The college is also a member of INFLIBNET and NDL.

VISION OF THE COLLEGE

Empower young men and women by educating them in the pursuit of excellence, character building and responsible citizen.

MISSION OF THE COLLEGE

Offer higher education in the fields of Arts, Science & Management to the needy and make them fully self-dependent.

QUALITY POLICY OF THE COLLEGE

KMG Students achieve the best learning results and personal growth with modern education that equip them for working life and a changing society to become deserving citizens.

ABOUT THE DEPARTMENT

The Department of Artificial Intelligence was established in the year 2023 with a view to fulfill the dynamic needs of corporate world in the field of Artificial Intelligence and Machine Leaning.

The department is well equipped with all basic and latest resources. The department comprises of well qualified and dedicated faculty members.

The Department runs the following courses.

UG Course

• B.Sc., Artificial Intelligence

VISION OF THE DEPARTMENT

To develop young professionals from rural area in the field of Artificial Intelligence and Machine Leaning contributing globally to the benefit of industry and society.

MISSION OF THE DEPARTMENT

- Developing practically trained skilled professionals to meet the demands of the corporate world.
- Developing professionals with high ethical values and ability to solve real-life problems.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

1. Professional Excellence: Graduates will demonstrate competency and excellence in their chosen fields of study, applying theoretical knowledge to practical situations effectively.

2. Character Development: Graduates will exhibit strong moral and ethical character, upholding values of integrity, honesty, and respect for others in both personal and professional endeavors.

3. Leadership and Citizenship: Graduates will emerge as responsible leaders and active citizens, contributing positively to their communities and society at large through their actions and initiatives.

4. Continuous Learning: Graduates will engage in lifelong learning and professional development activities, adapting to evolving technologies, methodologies, and societal needs.

5. Self-Dependency and Entrepreneurship: Graduates will possess the skills and mindset necessary to be self-reliant and entrepreneurial, capable of creating opportunities for themselves and others through innovation and initiative.

6. Effective Communication and Collaboration: Graduates will demonstrate proficiency in communication skills, both verbal and written, and exhibit the ability to collaborate effectively with diverse teams and stakeholders.

7. Global Perspective: Graduates will have a broad understanding of global issues and perspectives, demonstrating cultural sensitivity and adaptability in multicultural environments.

PROGRAM OUTCOMES (POs)

On successful completion of the programme, the students will be able to:

POs	Graduate Attributes	Statements		
PO1	Disciplinary Knowledge	Acquire detailed knowledge and expertise in all the disciplines of the subject.		
PO2	Communication Skills	Ability to express thoughts and ideas effectively in writing, listening and confidently Communicate with others using appropriate media		
PO3	Critical Thinking Students will develop aptitude Integrate skills of and critiquing, application and creativity.			
PO4	Analytical Reasoning	Familiarize to evaluate the reliability and relevance of evidence, collect, analyze and interpret data.		
PO5	Problem Solving	Capacity to extrapolate the learned competencies to solve different kinds of non-familiar problems.		
PO6	Employability and Entrepreneurial Skill	Equip the skills in current trends and future expectations for placements and be efficient entrepreneurs by accelerating qualities to facilitate startups in the competitive environment.		
PO7	Individual and Team Leadership Skill	Capability to lead themselves and the team to achieve organizational goals and contribute significantly to society.		
PO8	Multicultural Competence	Possess knowledge of the values and beliefs of multiple cultures and a global perspective.		
PO 9	Moral and Ethical awareness/reasoning	Ability to embrace moral/ethical values in conducting one's life.		
PO10	Lifelong Learning	Identify the need for skills necessary to be successful in future at personal development and demands of work place.		

PROGRAM SPECIFIC OUTCOMES (PSOs)

On successful completion of the B.Sc., Artificial Intelligence, the students will be able to:

PSOs	Statements
	To learn, select, apply and create the theoretical knowledge of AI and Data
PSO1	Analytics along with practical knowledge to manage and solve societal
	problems
	Develop data analytics and data visualization skills, skills pertaining to
PSO2	knowledge acquisition, knowledge representation and knowledge engineering,
	and hence be capable of coordinating in projects.
	Evolve AI based efficient domain specific processes for effective decision
PSO3	making in several domains such as business and governance domains.

Correlation Rubrics:

High	Moderate	Low	No Correlation
3	2	1	-

Mapping of PSOs with POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
PSO1	3	3	3	3	3	3	2	-	-	2
PSO2	3	2	3	3	3	3	2	1	-	2
PSO3	3	3	3	3	3	3	2	2	3	3

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Subject and Credit System- B.Sc., Artificial Intelligence

(Effective for the Batch of Students Admitted from 2024-2025)

					Ins.Hr		May	kimum Marl	ks
Semester	Part	Category	Course Code	Course Title	s/ Week	Credit	Internal	External	Total
	Ι	Language	AULT10 / AULU 10	General Tamil - I / Urdu - I	6	3	25	75	100
	II	English	AULE10	English I	6	3	25	75	100
Ι	III	Core – 1	AUCAI11	Programming for Problem Solving	5	5	25	75	100
	III	Core – 2	AUCPAI15	Practical - Problem Solving using C Lab	5	5	25	75	100
IESTE]	III	Elective-I (Choose any One)	AUEMA12A AUEMA12C	Statistical Methods and its applications Resource Management Techniques	4	3	25	75	100
SEN	IV	Skill Enhancement	AUSAI13	Introduction to HTML	2	2	25	75	100
	IV	Foundation Course	AUFAI14	Office Automation	2	2	25	75	100
				Semester Total	30	23			
	Ι	Language	AULT20 / AULU 20	General Tamil - II / Urdu - II	6	3	25	75	100
	Π	English	AULE20	English II	6	3	25	75	100
	III	Core - 3	AUCAI21	Python Programming	5	5	25	75	100
Π	III	Core - 4	AUCPAI25	Practical II – Python Programming Lab	5	5	25	75	100
STER –	III	Elective-II (Choose any One)	AUEMA22B AUEMA22D	Numerical Methods Discrete Mathematics	4	3	25	75	100
SEME	IV	Skill Enhancement - 2	AUSAI23	Understanding Internet	2	2	25	75	100
	IV	Skill Enhancement - 3	AUSAI24	PHP Programming	2	2	25	75	100
	•			Semester Total	30	23			

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English Core - 5 Core - 6 Elective-III (Choose any One) Skill Enhancement - 4 Skill Enhancement - 5 Compulsory Language	AULE30 AUCAI31 AUCAI31 AUCPAI35 AUEAI32A AUEAI32B AUSAI33 AUSAI34 AUES30 AULT40 / AULT40 /	English III Artificial Intelligence Practical III - Artificial Intelligence Lab IOT and its Applications Introduction to Data Science Skill Enhancement Course SEC-IV Software Engineering Skill Enhancement Course SEC-V Operating System Design Environmental Studies Semester Total	6 5 3 1 2 30	3 5 5 3 1 2 2 2 2 4	25 25 25 25 25 25 25 25 25	75 75 75 75 75 75 75 75	100 100 100 100 100 100 100
Core - 5 Core - 6 Elective-III (Choose any One) Skill Enhancement - 4 Skill Enhancement - 5 Compulsory Language	AUCAI31 AUCPAI35 AUEAI32A AUEAI32B AUSAI33 AUSAI34 AUSAI34 AUES30 AULT40 / AULT40 /	Artificial Intelligence Practical III - Artificial Intelligence Lab IOT and its Applications Introduction to Data Science Skill Enhancement Course SEC-IV Software Engineering Skill Enhancement Course SEC-V Operating System Design Environmental Studies Semester Total General Tamil - IV / Urdu - IV	5 5 3 1 2 2 30	5 5 3 1 2 2 2 2 4	25 25 25 25 25 25 25	75 75 75 75 75 75 75	100 100 100 100 100 100
Core – 6 Elective-III (Choose any One) Skill Enhancement - 4 Skill Enhancement - 5 Compulsory Language	AUCPAI35 AUEAI32A AUEAI32B AUSAI33 AUSAI34 AUES30 AULT40 / AULT40 /	Practical III - Artificial Intelligence Lab IOT and its Applications Introduction to Data Science Skill Enhancement Course SEC-IV Software Engineering Skill Enhancement Course SEC-V Operating System Design Environmental Studies Semester Total	5 3 1 2 30	5 3 1 2 2 2 2 4	25 25 25 25 25 25	75 75 75 75 75 75	100 100 100 100 100
Elective-III (Choose any One) Skill Enhancement - 4 Skill Enhancement - 5 Compulsory Language	AUEAI32A AUEAI32B AUSAI33 AUSAI34 AUES30 AULT40 / AULT40 /	IOT and its Applications Introduction to Data Science Skill Enhancement Course SEC-IV Software Engineering Skill Enhancement Course SEC-V Operating System Design Environmental Studies Semester Total General Tamil - IV / Urdu - IV	3 1 2 2 30	3 1 2 2 24	25 25 25 25 25	75 75 75 75	100 100 100 100
(Choose any One) Skill Enhancement - 4 Skill Enhancement - 5 Compulsory Language	AUEAI32B AUSAI33 AUSAI34 AUES30 AULT40 / AULT40 /	Introduction to Data Science Skill Enhancement Course SEC-IV Software Engineering Skill Enhancement Course SEC-V Operating System Design Environmental Studies Semester Total General Tamil - IV / Urdu - IV	3 1 2 30	3 1 2 2 2 2 4	25 25 25 25 25	75 75 75 75	100 100 100 100
Skill Enhancement - <u>4</u> Skill Enhancement - <u>5</u> Compulsory Language	AUSAI33 AUSAI34 AUES30 AULT40 / AULT40 /	Skill Enhancement Course SEC-IV Software Engineering Skill Enhancement Course SEC-V Operating System Design Environmental Studies Semester Total General Tamil - IV / Urdu - IV	1 2 2 30	1 2 2 24	25 25 25	75 75 75	100 100 100
Skill Enhancement - 5 Compulsory Language	AUSAI34 AUES30 AULT40 / AULU 40	Skill Enhancement Course SEC-V Operating System Design Environmental Studies Semester Total General Tamil - IV / Urdu - IV	2 2 30	2 2 24	25 25	75	100
Compulsory	AUES30 AULT40 / AULU 40	Environmental Studies Semester Total General Tamil - IV / Urdu - IV	2 30	2 24	25	75	100
Language	AULT40 /	Semester Total General Tamil - IV / Urdu - IV	30	24			
Language	AULT40/	General Tamil - IV / Urdu - IV				Γ	
Language	AULT40 /	General Tamil - IV / Urdu - IV					
Language	AULU 40		6	2	25	75	100
			0	5	23	75	100
English	AULE40	English IV	6	3	25	75	100
Core - 7	AUCAI41	R Programming	5	5	25	75	100
Core – 8	AUCPAI45	Practical III – R Programming Lab	5	5	25	75	100
Elective-IV	AUEAI42A	Data Mining					+
(Choose any	AUEAI42B	Cloud Computing	4	3	25	75	100
One)							
Skill	AUSAI43	Software Project Management			25	75	100
Enhancement - 6			2	2	25	15	100
Skill Enhancement - 7	AUSAI44	Data Communication and Networking	2	2	25	75	100
	•	Semester Total	30	23			1
E	Skill Inhancement - 6 Skill Inhancement - 7	Skill AUSAI43 Chhancement - 6 Skill AUSAI44 Chhancement - 7	Skill AUSAI43 Software Project Management 6 Skill AUSAI44 Data Communication and Networking Skill AUSAI44 Data Communication and Networking 7 Semester Total	Skill AUSAI43 Software Project Management 2 Skill AUSAI44 Data Communication and Networking 2 Skill AUSAI44 Data Communication and Networking 2 7 Semester Total 30	Skill Inhancement - 6AUSAI43Software Project Management22Skill Inhancement - 7AUSAI44Data Communication and Networking22Skill Inhancement - 7Semester Total3023	Skill Inhancement - 6AUSAI43Software Project Management2225Skill Inhancement - 7AUSAI44Data Communication and Networking 22225Skill 7AUSAI44Data Communication and Networking 22225Semester Total30232325	Skill Inhancement - 6AUSAI43Software Project Management222575Skill Inhancement - 7AUSAI44Data Communication and Networking 2222575Skill Inhancement - 7Data Communication and Networking 30222575

	III	Core – 9	AUCAI51	Machine Learning	4	3	25	75	100
	III	Core – 10	AUCPAI55	Machine Learning Lab	4	3	25	75	100
	III	Core – 11	AUCAI52	Relational Data Base Management System	4	3	25	75	100
	III	Core – 12	AUCPAI56	Practical: RDBMS Lab using Oracle	3	3	25	75	100
	III	Core – 13	AUCPAI57	Project with Viva voce	5	4	25	75	100
Λ		Elective IV	AUEAI53A	Natural Language Processing					
.	III	(Choose any	AUEAI53B	Cryptography	4	3	25	75	100
ľE]		One)	AUEAI53C	Quantitative Aptitude		_	_		
ES		Elective V	AUEAI54A	i)Software Testing					
M	III	(Choose any	AUEAI54B	ii) Simulation and Modeling	4	3	25	75	100
SE		One)	AUEAI54C	iii) Artificial Neural Networks					
	IV	Compulsory	AUVE50	Value Education	2	2	25	75	100
			AUIAI58	Internship / Industrial Training					
	IV	Compulsory		(Summer vacation at the end of IV	-	2	100	-	100
				semester activity)					
				Semester Total	30	26			
	III	Core – 14	AUCAI61	CC14 – Tensor Flow	4	3	25	75	100
	III	Core – 15	AUCPAI66	CC15 – Tensor Flow Lab	4	3	25	75	100
	III	Core – 16	AUCAI62	CC16 - Deep Learning	5	3	25	75	100
VI	III	Core – 17	AUCPAI67	CC17- Deep Learning Lab	5	3	25	75	100
.			AUEAI63A	Robotics and its Applications		2	25	75	100
EF	111	Elective-VII	AUEAI63B	Agile Project Management	5	3	25	15	100
LS			AUEAI63C	Mobile Adhoc Networks					
Æ	ш		AUEAI64A	Big Data Analytics	_	2	25	75	100
EN	111	Elective-VIII	AUEAI64B	Financial Analytics	5	3	25	15	100
\mathbf{N}			AUEAI64C	Virtual Reality Technology					
	IV	Skill Enhancement - 8	AUSA165	Ethical Hacking	2	2	25	75	100
	IV	Compulsory	AUEA60	Extension Activity	-	1	100		100
		1	1	Semester Total	30	21			

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Parts	Semester-I	Semester-II	Semester-III	Semester-IV	Semester-V	Semester-VI	Total Credits
Part-I	3	3	3	3	-	-	12
Part-II	3	3	3	3	-	-	12
Part-III	13	13	13	13	22	18	92
Part-IV	4	4	5	4	4	3	24
Part-V	-	-	-	-	-	-	-
Total	23	23	24	23	26	21	140

Consolidated Semester wise and Component wise Credit distribution

*Part I, II, and Part III components will be separately taken into account for CGPA calculation and classification for the under graduate programme and the other components. IV, V has to be completed during the duration of the programme as per the norms, to be eligible for obtaining the UG degree.

Title of the Course	Programming for Problem Solving	Hours/Week	05
Course Code	AUCAI11	Credits	05
Category	Core-1	Year & Semester	I & I
Prerequisites	Basics of Computer Science	Regulation	2024

Objectives of the course:

- Recognize the need for programming languages and problem solving techniques
- > Apply memory management concepts and function based modularization
- Recognize the bugs in the C program
- Develop simple C programs to illustrate the applications of different data types such as arrays, pointers, functions.
- > Develop programming skills to solve real time computational problems

UNITS	Contents	COs	Cognitive
			Levels
I-LINU	Introduction to Programming: Introduction to computers, Computer characteristics, Hardware vs software, Steps to develop a rogram, Software development life cycle, Structured programming, Types of programming languages, Introduction to c, Developing a c program, Console input and output functions, Error diagnostics, Debugging techniques.	C01	K1, K6
II-LINU	Operators and Expressions: Identifiers and keywords, Data types Constants, Variables, Declarations, Expressions, Statements, Arithmetic operators, Unary operators, Relational and logical operators, Assignment operators, Conditional operator Branching, ifelse statement, switch statement, goto statement, Looping, while statement, do- while statement, for statement, Nested control structures, break statement, continue statement.	CO2	К3
III-LINU	Arrays and Strings: Defining an array, Processing an array, Multidimensional arrays, Searching algorithm, Linear search, Sorting algorithm, Bubble sort algorithm, Strings, Defining a string Initialization of strings, Reading and writing a string, Processing the strings.	CO3	K3,K4

VI-TINU	Functions: Functions, Overview, Defining a function, Accessing a function, Function prototypes, Passing arguments to a function Passing arrays to functions, Recursion.	CO4	K6				
V-TINU	Pointers and Structures: Fundamentals, Pointer declarations Passing pointers to functions, Pointers and one dimensional arrays, Dynamic memory allocation, Operations on pointers, Defining a structure Processing a structure, Array of structures, Structures and pointers,Self-referential structures – File handling.	CO5	K6				
Recomme	nded Text Books						
1.	Byron Gottfried, "Schaum's Outline of Programming with C", 3rd edition, 2016, M Hill Education (India), ISBN: 9780070145900	/IcGraw					
2.	. Balagurusamy, E "Programming in ANSI C", 7th edition, McGraw Higher Ed, 2016,						
	ISBN:9789339219666						
Reference	Books						
1.	Yashavant Kanetkar, "Let Us C", 15th edition, 2016, Bpb Publications, ISBN:9788183331630						
2	2. Herbert Schildit, "The Complete Reference C", 4th edition, 2017, McGraw Hill Education(India), 2017, ISBN:978007041183						
2.	Education(India), 2017, ISBN:978007041183						
3.	Education(India), 2017, ISBN:978007041183 Beulah Christalin Latha, Anuja Beatrice, Carolin Jeeva & Anita Sofia, Fundamen Computing and Programming, 1st edition, Pearson, 2018	tals of					
2. 3. 4.	Education(India), 2017, ISBN:978007041183 Beulah Christalin Latha, Anuja Beatrice, Carolin Jeeva & Anita Sofia, Fundamen Computing and Programming, 1st edition, Pearson, 2018 Sumitabha Das, "Computer Fundamentals and C Programming", 18th edition, 201 McGraw Hill Education (India), ISBN:9789387886070	tals of 8,					

Course Learning Outcomes (for Mapping with POs and PSOs)

On completion of the course the students should be able to

COs	CO Description	Cognitive Level
CO1	The Student can understand the fundamentals of computer and program development process and develop a program	K1,K6
CO2	The Student can prepare innovative solution for the problem using branching and looping statements.	К3
CO3	The Student can decompose a problem into functions and synthesize a complete program using divide and conquer approach.	K3,K4
CO4	The Student will be able to formulate algorithms and programs using arrays, pointers and structures	K6
CO5	The Student will be able to create a new application software to solve real world problems using file and structure.	K6

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	3	2	2	2	2	2	-	-	-	2	3	2	2
CO2	3	2	2	2	2	2	-	-	-	2	3	2	2
CO3	3	2	2	2	2	2	-	-	-	2	3	2	2
CO4	3	2	3	2	2	2	-	-	-	2	3	2	2
CO5	3	2	2	2	2	2	-	-	-	2	3	3	3

Title of the Course	Practical - Problem Solving using C Lab	Hours/Week	05
Course Code	AUCPAI15	Credits	05
Category	Core Practical	Year & Semester	I & I
Prerequisites	-	Regulation	2024

Objectives of the course:

- > Understand the need for programming to solve computational problems.
- > Discover the basic programming constructs to prepare the program.
- > Analyze and interpret data using array, functions and pointers
- ➢ Recognize the bugs in the C program.
- > Apply problem-solving skills to real-world scenarios

List of Practical	COs	Cognitive Levels
1. Implementation of Basic C programs	CO1	K2
2.Simple computational problems using arithmetic expressions and operators	CO4	K2
3. Problem solving using branching and logical expressions	CO3	K6
4. Iterative problems using Loops, while and for loops	CO3	K3
5.Implementation of linear searching, bubble sort, and Matrix Manipulation using Arrays	CO1	K2
6. Implementation of Text Processing using Strings	CO1	K2
7. Find Square Root, numerical differentiation, numerical integration using functions and recursion.	CO2	K1
8. Implementation of basic file operations	CO5	K2

Course Learning Outcomes (for Mapping with POs and PSOs)

On completion of the course the students should be able to

COs	CO Description	Cognitive Level
CO1	Translate given algorithms to a working and correct program	K2
CO2	Identify and correct logical errors encountered at run time	K1
CO3	Create iterative as well as recursive programs.	K6
CO4	Represent data in arrays, strings and structures and manipulate them through a program.	K2
CO5	Declare pointers of different types and use them in defining self-referential structures.	K1

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	3	3	2	2	2	2	-	-	-	1	3	3	2
CO2	3	3	2	2	2	2	-	-	-	1	3	2	2
CO3	3	3	2	2	2	2	-	-	-	2	2	2	2
CO4	3	3	2	2	2	2	-	-	-	1	2	2	2
CO5	3	3	2	2	2	2	-	-	-	1	2	2	2

Title of the Course	INTRODUCTION TO HTML	Hours/Week	2
Course Code	AUSAI13	Credits	2
Category	Skill Enhancement - 1	Year & Semester	I & I
Prerequisites	-	Regulation	2024

Objectives of the course:

- ➢ Insert a graphic within a web page.
- Create a link within a web page.
- > Create a table within a web page.
- ➢ Insert heading levels within a web page.
- > Insert ordered and unordered lists within a web page. Create a web page.

UNITS	Contents	COs	Cognitive
			Levels
I-TINU	Introduction: Web Basics: What is Internet–Web browsers–What is Webpage–HTML Basics: Understanding tags.	CO1	K1,K2
II-LINN	TagsforDocumentstructure(HTML,Head,BodyTag).Blockleveltextele ments:Headings-paragraph(tag)–Font-style elements:(bold, italic, font, small,strong, strike, big tags)	CO2	K1,K2
III-LINU	Lists: Types of lists: Ordered, Unordered– Nesting Lists–Other tags: Marquee,HR, BR- Using Images –Creating Hyper-links.	CO3	К2
VI-TINU	Tables: Creating basic Table, Table elements, Caption–Table and cell alignment–Row span, Col span–Cellpadding.	CO4	K6
A-TINU	Frames: Frameset–Targeted Links–No frame–Forms: Input, Text area, Select, Option.	CO5	K1,K2,K3
Recommen	nded Text Books	1	
1.	"Mastering HTML5 and CSS3 Made Easy", TeachUComp Inc., 2014.		
2.	Thomas Michaud, "Foundations of Web Design: Introduction to HTML & C	SS"	

Course Learning Outcomes (for Mapping with POs and PSOs)

On completion of the course the students should be able to

COs	CO Description	Cognitive Level
CO1	Knows the basic concept in HTML Concept of resources in HTML	K1,K2
CO2	Knows Design concept. Concept of Meta Data Understand the concept of save the files.	K1,K2
CO3	Understand the page formatting. Concept of list	K2
CO4	Creating Links. Know the concept of creating link to email address	K6
CO5	Concept of adding images, understanding frames and frameset	K1,K2,K3

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	3	3	3	2	2	2	-	-	-	1	2	2	2
CO2	3	2	2	2	2	2	-	-	-	1	2	2	2
CO3	3	2	2	2	2	2	-	-	-	1	2	2	2
CO4	3	3	2	2	2	2	-	-	-	1	2	2	2
CO5	3	2	2	2	2	2	-	-	-	1	2	2	2

Title of the Course	OFFICE AUTOMATION	Hours/Week	2
Course Code	AUFAI14	Credits	2
Category	FOUNDATION	Year & Semester	I & I
Prerequisites	-	Regulation	2024

Objectives of the course:

- > Understand the basics of computer systems and its components.
- > Understand and apply the basic concepts of a word processing package.
- > Understand and apply the basic concepts of electronic spreadsheet software.
- > Understand and apply the basic concepts of database management system.
- Understand and create a presentation using PowerPoint tool.

UNITS	Contents	COs	Cognitive Levels
I-TINU	Introductory concepts: Memory unit– CPU-Input Devices: Key Board, Mouse and Scanner. Output devices: Monitor, Printer. Introduction to Operating systems &Its features: DOS– UNIX– Windows. Introduction to Programming Languages.	CO1	K1,K2
II-LINU	Word Processing: Open, Save and close word document; Editing text –tools, formatting, bullets; Spell Checker - Document formatting –Paragraph alignment, indentation, headers and footers, numbering; printing Preview, options, merge.	CO2	K1,K2, K3, K6
III-LINU	Spreadsheets: Excel– opening, entering text and data, formatting, navigating; Formulas– entering, handling and copying; Charts– creating, formatting and printing, analysis tables, preparation of financial statements, introduction to data analytics.	CO3	K1,K2
AI-TINU	Database Concepts: The concept of data base management system; Data field, records, and files, Sorting and indexing data; Searching records. Designing queries, and reports; Linking of data files; Understanding Programming environment in DBMS; Developing menu drive applications in query language(MS–Access).	CO4	K2
A-TINU	Power point: Introduction to Power point - Features – Understanding slide typecasting & viewing slides – creating slide shows. Applying special object – including objects & pictures – Slide transition–Animation effects, audio inclusion, timers.	CO5	K1,K2, K3,K6

Recommended Text Books

PeterNorton, "IntroductiontoComputers"-TataMcGraw-Hill.

Reference Books

Jennifer Ackerman Kettel, Guy Hat-Davis, Curt Simmons, "Microsoft 2003", Tata McGrawHill.

Course Learning Outcomes (for Mapping with POs and PSOs)

On completion of the course the students should be able to

COs	CO Description	Cognitive Level
CO1	Possess the knowledge on the basics of computers and its competent	K1,K2
CO2	Gain knowledge on Creating Documents, spreadsheet and presentation.	K1,K2,K3, K6
CO3	Learn the concepts of Database and implement the Query in Database.	K1,K2
CO4	Demonstrate the understanding of different automation tools.	K2
CO5	Utilize the automation tools for documentation, calculation and presentation purpose.	K1,K2,K3,K6

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	3	1	2	1	2	1	-	-	-	1	2	1	2
CO2	3	1	2	1	2	2	-	-	-	1	2	2	1
CO3	3	1	2	1	2	1	-	-	-	1	2	2	2
CO4	3	1	2	1	2	2	-	-	-	1	1	2	2
CO5	3	1	2	1	2	1	-	-	-	1	2	2	2

COURSE DESCRIPTORS

Title of the Course	STATISTICAL METHODS AND ITS APPLICATIONS	Hours/Week	04
Course Code	AUEAI12A	Credits	03
Category	ELECTIVE COURSE -I	Year & Semester	I & I
Prerequisites	12 th Standard Mathematics	Regulation	2024

Objectives of the course:

- > Understand basic concepts of Statistical Methods
- > Show an understanding of measures of location
- > Show an understanding of measures of dispersion
- > Show an Understand about Measures of Skewness
- Knowledge about correlation

LINITS	Contonts	COs	Cognitive
UNIIS	Contents		Levels
I-TINU	Introduction - scope and limitations of statistical methods - classification of data - Tabulation of data- Diagrammatic and Graphical representation of data – Graphical, determination of Quartiles ,Deciles and Percentiles	CO1	K1,K2 K3
II-LINU	Measures of location: Arithmetic mean, median, mode, geometric mean and Harmonic mean and their properties.	CO2	K1,K2 K3
III-LINU	Measures of dispersion: Range, Quartile deviation, mean deviation, Standard deviation, combined Standard deviation, and their relative measures	CO3	K1,K2 K3
UNIT- IV	Measures of Skewness: Karl Pearson's, Bowley's, and kelly's and co- efficient of Skewness and kurtosis based on moments.	CO4	K1,K2 K3
A-TINU	Correlation - Karl Pearson - Spearman's Rank correlation - concurrent deviation methods. Regression Analysis:Simple Regression Equations.	CO5	K1,K2 K3,K4

Recommended Text Books

- 1. Fundamental of Mathematical Statistics-S.C.Gupta &V.K.Kapoor-Sultan Chand
- 2. Statistical Methods-Snedecor G.W.& Cochran W.G.oxford &+DII

Reference Books

- 1. Elements of Statistics -Mode. E.B.-Prentice Hall
 - 2. Statistical Methods-Dr.S.P.Gupta-Sultan Chand & Sons

Website and e-learning source

https://www.simplilearn.com/what-is-statistical-analysis-article

Course Learning Outcomes (for Mapping with POs and PSOs)

On completion of the course the students should be able to

COs	CO Description	Cognitive Level
CO1	Know the basics of statistical methods	K1,K2,K3
CO2	Understanding of measures of location	K1,K2,K3
CO3	Understanding of measures of dispersion	K1,K2,K3
CO4	Understand about Measures of skewness	K1,K2,K3
CO5	Understand about correlation, concurrent deviation method	K1,K2,K3,K4

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	3	1	3	2	2	1	1	-	-	1	2	2	1
CO2	2	1	3	1	2	-	1	-	-	1	2	2	1
CO3	3	1	3	1	2	1	1	-	-	1	2	2	1
CO4	3	1	3	2	2	-	1	-	-	1	2	2	1
CO5	3	1	3	2	2	1	1	-	-	1	2	2	1

Title of the Course	RESOURCE MANAGEMENT TECHNIQUES	Hours/Week	04
Course Code	AUEAI12B	Credits	03
Category	ELECTIVE COURSE –I	Year & Semester	I & I
Prerequisites	Higher Secondary Mathematics	Regulation	2024

Objectives of the course:

- To learn the basic concept of operation research theory which are frequently applied to business decision making
- > To acquire the knowledge about linear programming problems
- ➢ Knowledge about simplex methods.
- > To acquire knowledge about Mathematical formulation of transportation problem
- > Knowledge about Mathematical formulation of transportation problem

UNITS	Contents	COs	Cognitive
			Levels
I-TINU	Development of OR -Definition of OR -Modelling in OR -general methods for solving OR models -Main characteristics and phases of OR study -tools, techniques and methods –scientific methods in OR – scope of OR.	CO1	K1,K2 K3
II-LINU	Linear programming problems-Mathematical formulation of L.P.P slack and surplus variables -graphical solution of L.P.P.	CO2	K1,K2 K3
III-LINU	Simplex methods- Computational procedure- Artificial variables Technique- two phase method-Duality in linear programming	CO3	K1,K2 K3
VI-TIN	Mathematical formulation of assignment problem,-Method for solving The assignment problem.	CO4	K1,K2 K3

V-TINU	Mathematical formulation of transportation problem-optimal solution of T.PMethods for obtaining initial feasible solution-optimal solution-Degeneracy in T.PUnbalanced T.P	CO5	K1,K2 K3,K4					
Recomme	nded Text Books							
1. Operations Research-S.D.Sharma-KedarNath Ramnath&Co-1997.Chapter1to6(all sections)								
Reference 1.Operatio 2.Ackoff New York 3.Chames York 4.Srinath	Reference Books 1.OperationsResearchGupta,ManMohan,Gandhiswarup-Sulthand-ChandPublications 2.Ackoff R.L. and Sasieni M. W," Fundamentals of Operations Research", John Wiley and sons New York 1968 3.Chames A.CooperW.andHendersenA.,"IntroductiontoLinearProgramming",WileyandSons New York 4.Sringth L.S. "DEDT and CDM principles and applications " A filipited East Wast Press Prif Ltd.							
New York.								

Website and e-learning source

htt11://ebooks.i11ude.in.011erationsresearch/

htt11://ocw.mit.in/

Course Learning Outcomes (for Mapping with POs and PSOs)

COs	CO Description	Cognitive Level
CO1	To develop skills for decision making.	K1,K2,K3
CO2	To make use of Linear programming problems	K1,K2,K3
CO3	To make use of Simplex methods	K1,K2,K3
CO4	To make use of Mathematical formulation of assignment problem	K1,K2,K3
CO5	To utilize Mathematical formulation of transportation problem	K1,K2,K3,K4

On completion of the course the students should be able to

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	3	1	-	-	1	2	2	1
CO2	3	3	2	3	3	3	1	-	-	1	2	2	1
CO3	3	2	2	3	2	3	1	-	-	1	2	2	1
CO4	3	3	3	2	2	3	1	-	-	1	2	2	1
CO5	3	2	3	2	3	2	1	-	-	1	2	2	1

COURSEDESCRIPTORS										
Title of the Course	Python Programming	Hours/Week	5							
Course Code	AUCAI21	Credits	5							
Category	Core - 3	Year & Semester	I & II							
Prerequisites	Knowledge of Programming Language	Regulation	2024							

Objectives of the course:

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- > To make students understand the concepts of Python programming.
- > To apply the control structures in PYTHON programming.
- > To impart knowledge on function, argument and modules in PYTHON.
- > To make the students learn best practices in PYTHON programming
- > To know the file handling in PYTHON.

LINITS	Contonto	COs	Cognitive
UNIIS	Contents	COS	Levels
I-LINU	Basics of Python Programming: History of Python-Features of Python-Literal-Constants-Variables - Identifiers- Keywords-Built-in Data Types-Output Statements - Input Statements-Comments - Indentation- Operators-Expressions- Type conversions. Python Arrays: Defining and Processing Arrays - Array methods.	CO1	K1,K5
II-LINN	Control Statements: Selection/Conditional Branching statements: if, if-else, nested if and if-elif-else statements. Iterative Statements: while loop, for loop, else suite in loop and nested loops. Jump Statements: break, continue and pass statements.	CO2	K2, K6
III-TINU	 Functions: Function Definition – Function Call – Variable Scope and its Lifetime-Return Statement. Function Arguments: Required Arguments, Keyword Arguments, Default Arguments and Variable Length Arguments- Recursion. Python Strings: String operations- Immutable Strings-Built-in String Methods and Functions-String Comparison. Modules: import statement- The Python module–dir()function– Modules and Namespace – Defining our own modules. 	CO3	К3

AI-TINU	Lists: Creating a list- Access values in List- Updating values in Lists- Nested lists – Basic list operations-List Methods. Tuples: Creating, Accessing, Updating and Deleting Elements in a tuple – Nested tuples– Difference between lists and tuples. Dictionaries: Creating, Accessing, Updating and Deleting Elements in a Dictionary – Dictionary Functions and Methods - Difference between Lists and Dictionaries.	CO4	K6, K4			
	Python File Handling: Types of files in Python - Opening and					
V-1	Closing files-Reading and Writing files: write() and writelines()					
IN	methods-append() method- read() and readlines() methods – with	CO5	K2, K3, K6			
D	keyword– Splitting words – File methods - File Positions-					
Deserves	Renaming and deleting mes.					
Recomme		» г . (г	1			
1.	Reema Thareja, "Python Programming using problem solving approach	", First E	dition, 2017,			
	Oxford University Press.					
2.	Dr.R.Nageswara Rao, "Core Python Programming", FirstEdition,2017,D	Dreamtech	n Publishers.			
Reference	e Books					
	VamsiKurama, "PythonProgramming:AModernApproach", PearsonEduca	ation.				
Website and e-learning source						
http	s://www.programiz.com/python-programming					
http	s://www.guru99.com/python-tutorials.html					
http	s://www.w3schools.com/python2/python_intro.asp					
http	s://www.geeksforgeeks.org/python-programming-language/					

Course Learning Outcomes (for Mapping with POs and PSOs)

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On completion of the course the students should be able to

<mark>COs</mark>	CO Description	Cognitive Level
CO1	Illustrate the basics of python and Array, experimenting simple programs on python,	K1,K5
CO2	Summaries the concept of branching, Looping and jump statements, develop programs on Loops and jump statements.	K2, K6
CO3	Implementing Concept of function, function arguments, the concept strings, Significance of Modules, in various applications.	K3
CO4	Programming with the concept of List, tuples and dictionary in python and differentiate List, Tuple, Dictionary.	K6, K4
CO5	Interpreting the usage of File handlings in python, use the Concept of reading and writing files, Develop the programs using files.	K2, K3, K6

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	3	1	2	2	3	2	2	-	-	2	3	2	2
CO2	3	1	2	2	3	2	2	-	-	2	2	2	2
CO3	3	1	2	3	2	2	2	-	-	1	2	2	1
CO4	3	1	3	3	2	2	2	-	-	1	2	2	2
CO5	3	1	3	3	3	2	2	-	-	1	2	2	1

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Title of the Course	Python Programming Lab	Hours/Week	5
Course Code	AUCPAI25	Credits	5
Category	Core – 4 (Practical)	Year & Semester	I & II
Prerequisites	Knowledge of Programming Language	Regulation	2024

Objectives of the course:

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- > To design and program Python applications.
- > To create loops and decision statements in Python.
- > To work with functions and pass arguments in Python.
- > To build and package Python modules for reusability.
- > To read and write files in Python.

List of Practical	COs	Cognitive Levels
1. Program using variables, constants, I/O statements in Python.	CO1	K2
2. Program using Operators in Python.	CO1	К2
3. Program using Conditional Statements.	CO3	К3
4. Program using Loops.	CO3	К3
5. Program using Jump Statements.	CO3	К3
6. Program using Functions.	CO2	K1,K6
7. Program using Recursion.	CO2	K1,K6
 8. Develop Python program for the following in Array a. To sort the given array elements b. To add given two matrix c. To transpose the given matrix 	CO4	K4

9. D St	Develop Python program for the following without using tring built-in functions		
	a. To calculate the length of the given string		
	b. To reverse the given string		
	c. To count and display the Vowels in the given string	CO4	K4
	d. To remove spaces from the given string		
	e. To convert the given string from lowercase to uppercase		
10. Pi	rogram using Modules.	CO4	K4
11. (a (b	 a) Python program to find N largest elements from a Python List b) Count occurrences of an element in a list 	CO4	K4
12. D	Develop Python Program to do the following in Tuple		
	a. To demonstrate packing and unpacking		
	b. To check for membership with in and not in operators	CO4	K4
	c. Slicing operations		
	d. To concatenate more than one tuple in to a single tuple		
13. D	Develop Python program for the following in Dictionary		
	a. To create a dictionary and add items		
	b. To modify existing values using keys		
	c. Update function	CO4	K4
	d. To print values only		
	d. To print values only e. To print keys only		

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Course Learning Outcomes (for Mapping with POs and PSOs)

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On completion of the course the students should be able to

<mark>COs</mark>	CO Description	Cognitive Level
CO1	Demonstrate the understanding of syntax and semantics of Python.	К2
CO2	Identify the problem and solve using PYTHON programming techniques.	K1,K6
CO3	Examine suitable programming constructs for problem solving.	К3
CO4	Analyze various concepts of PYTHON language to solve the problem in an efficient way.	K4
CO5	Develop a PYTHON program for a given problem and test for its correctness.	K6

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	3	1	2	3	2	2	1	-	-	2	3	2	2
CO2	3	1	2	3	2	2	1	-	-	2	3	2	1
CO3	3	1	2	2	3	2	1	-	-	2	3	2	1
CO4	3	1	2	3	3	2	1	-	-	2	3	2	1
CO5	3	1	2	3	3	2	1	-	-	2	3	2	2

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Title of the Course	Understanding Internet	Hours/Week	2
Course Code	AUSAI23	Credits	2
Category	Skill Enhancement - 2	Year & Semester	I & II
Prerequisites		Regulation	2024

Objectives of the course:

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- ➤ Knowledge of Internet
- Learning TCP/IP–Internet Technologies and Protocol
- Learning internet connectivity.
- Learning internet networks
- Learning Electronic Mail

UNITS	Contents	COs	Cognitive Levels
I-LINU	Internet, Growth of Internet, Owners of the Internet, Anatomy of Internet, ARPA NET and Internet history of the World Wide Web, basic Internet Terminology, Net etiquette. Internet Applications– Commerce on the Internet, Governance on the Internet, Impact of Internet on Society Crime on/through the Internet.	CO1	K1
II-LINU	Packet switching technology, Internet Protocols: TCP/IP, Router and Internet Addressing Scheme: Machine Addressing(IP address), E-mail Addresses, Resources Addresses.	CO2	К2
III-LINU	Internet accounts by ISP: Telephone line options, Protocol options, Service options, Telephone line options–Dialup connections through the telephone system, dedicated connections through the telephone system, ISDN, Protocol options – Shell, SLIP, PPP, Service options – E-mail, WWW, News Firewall.	CO3	K4, K3

AI-LINU	Network definition, Common terminologies: LAN, WAN, Node, Host, Workstation, bandwidth, Interoperability, Network administrator, network security, Network Components: Severs, Clients, Communication Media, Types ofnetwork:PeertoPeer,ClientsServer,AddressinginInternet:DNS,Doma in Name and their organization.	CO4	K4,K1
UNIT-V	Email Networks and Servers, Email protocols–SMTP, POP3, IMAp4, MIME6, Structure of an Email – Email Address, Email Header, Body and Attachments.	CO5	K3,K6

Recommended Text Books

- 1. Greenlaw R and Hepp E "Fundamentals of Internet and www"2nd EL, Tata McGraw Hill, 2007.
- 2. D.Comer,"The Internet Book", Pearson Education, 2009

Reference Books

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M.L.Young, "The Complete reference to Internet", Tata McGraw Hill,2007.

Website and e-learning source

https://www.geeksforgeeks.org/what-is-internet-definition-uses-working-advantages-and-disadvantages/

Course Learning Outcomes (for Mapping with Pos and PSOs)

On completion of the course the students should be able to

COs	CO Description	Cognitive Level
CO1	Summaries the basic concept in internet.	K1
CO2	Extract the concept of TCP/IP – Internet Technologies and Protocol	К2
CO3	Understand the concept of Internet connectivity.	K4, K3
CO4	Can be able to know about internet networks	K4,K1
CO5	Understand the concept of Electronic mail.	K3,K6

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	3	1	1	1	1	1	1	-	-	2	2	1	-
CO2	3	1	2	2	1	2	1	-	-	1	2	1	1
CO3	3	1	2	2	1	1	1	-	-	1	2	1	1
CO4	3	1	2	2	1	1	1	-	-	1	2	1	1
CO5	3	1	1	1	1	2	1	-	-	2	2	1	1

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Title of the Course	PHP Programming	Hours/Week	2
Course Code	AUSAI24	Credits	2
Category	Skill Enhancement -3	Year & Semester	I & II
Prerequisites		Regulation	2024

Objectives of the course:

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- > To make students understand the basic concepts of PHP.
- > To apply the control structures in PHP programming.
- > To impart knowledge on function and array in PHP.
- > To make the students learn file handling in PHP.
- > To know the OOP using PHP.

UNITS	Contents	COs	Cognitive Levels
I-LINU	Introduction to PHP -Basic Knowledge of websites -Introduction of Dynamic Website-Introduction to PHP Scope of PHP-XAMPP and WAMP Installation – PHP Programming Basics – Syntax of PHP.	CO1	K1,K6
II-LINN	Introduction to PHP Variable -Understanding Data Types -Using Operators - Using Conditional Statements -If(), else if() and else if condition Statement - Switch() Statements -Using the while() Loop - Using the for() Loop.	CO2	K3
III-JINU	PHP Functions- PHP Functions- Creating an Array – Modifying Array Elements – Processing Arrays with Loops-Grouping Form Selections with Arrays -Using Array.	CO3	K2,K3
VI-TINU	PHP Advanced Concepts- Reading and Writing Files-Reading Data from a File – Managing Sessions and Using Session Variables.	CO4	K2, K1
A-TINU	OOPS Using PHP -OOPS Concept-Class, Object, Abstractions, Encapsulation, Inheritance, Polymorphism-Creating Classes and Object in PHP-Cookies and Session Management.	CO5	K2, K5

Recommended Text Books

- 1. Head First PHP & MySQL: A Brain-Friendly Guide-2009-Lynn mighley and Michael Morrison.
- 2. P.Rizwan Ahmed, Open Source Programming, Margham Publications, Chennai, 2017

Reference Books

- 1. The Joy of PHP: A Beginner's Guide to Programming Interactive Web Applications.
- 2. PHP: The Complete Reference Steven Holzner.

Website and e-learning source

https://www.w3schools.com/php/

https://www.geeksforgeeks.org/php-tutorial/

Course Learning Outcomes (for Mapping with Pos and PSOs)

On completion of the course the students should be able to

COs	CO Description	Cognitive Level
CO1	Learn the basics of PHP, Create simple programs on PHP,	K1,K6
CO2	Develop program using selection statement, work with Looping an jump statements, Do programs on Loops and jump statements.	К3
CO3	Concept of function, function arguments, Implementing the concept array in various application,	K2,K3
CO4	Work with file and performing various file operations.	K2, K1
CO5	Understand and implement the concept of OOP using PHP	K2, K5

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	3	1	2	2	3	2	1	-	-	2	3	2	1
CO2	3	1	2	2	3	2	1	-	-	2	3	1	1
CO3	3	1	2	3	3	3	2	-	-	2	3	2	1
CO4	3	1	2	2	2	2	1	-	-	2	2	1	1
CO5	3	1	2	2	2	2	1	-	-	2	2	2	1

Title of the Course	Artificial Intelligence	Hours/Week	05
Course Code	AUCAI31	Credits	05
Category	Core - 5	Year & Semester	II & III
Prerequisites	Basics of Algorithms	Regulation	2024

Objectives of the course:

0

- > To describe the concepts of Artificial Intelligence.
- > To understand the method of solving problems using Artificial Intelligence.
- > To learn about Knowledge Representation.
- > To understand the concept of Software Agents.
- > To understand about various AI applications.

UNITS	Contents	COs	Cognitive
			Leveis
I-LINN	INTRODUCTION : Introduction–Definition – Future of Artificial Intelligence – Characteristics of Intelligent Agents– Typical Intelligent Agents – Problem Solving Approach to Typical AI problems.	CO1	K1, K2
II-LINN	PROBLEM SOLVING METHODS: Problem solving Methods – Search Strategies- Uninformed – Informed – Heuristics – Local Search Algorithms and Optimization Problems – Searching with Partial Observations –Constraint Satisfaction Problems– Constraint Propagation–Backtracking Search–Game Playing – Optimal Decisions in Games – Alpha – Beta Pruning – Stochastic Games	CO2	K1,K2
III-LINN	KNOWLEDGEREPRESENTATION: First Order Predicate Logic– Prolog Programming – Unification – Forward Chaining – Backward Chaining – Resolution – Knowledge Representation –Onto logical Engineering –Categories and Objects – Events – Mental Events and Mental Objects–Reasoning Systems for Categories – Reasoning with Default Information	CO3	К3
AI-TINU	SOFTWAREAGENTS: Architecture for Intelligent Agents– Agent communication – Negotiation and Bargaining – Argumentation among Agents –Trust and Reputation in Multi – agent systems.	CO4	K4
A-TINU	APPLICATIONS AI applications – Language Models – Information Retrieval- Information Extraction – Natural Language Processing – Machine Translation – Speech Recognition – Robot – Hardware – Perception –Planning – Moving	CO5	K4, K5

Recommended Text Books

Elaine Rich, Kevin Knight(2008), Shivsankar B Nair, Artificial Intelligence, Third Edition, Tata

McGraw Hill Publication

Reference Books

Russel S,NorvigP(2010), Artificial Intelligence: A Modern approach, Third Edition, Pearson

Education

Website and e-learning source

https://www.tpointtech.com/artificial-intelligence-ai

https://www.geeksforgeeks.org/What-is-ai-artificial-intelligence/

Course Learning Outcomes (for Mapping with POs and PSOs)

On completion of the course the students should be able to

<mark>COs</mark>	CO Description	Cognitive Level
CO1	Understand the basics of the theory and practice of Artificial Intelligence as a discipline and about intelligent agents.	K1, K2
CO2	Understand search techniques and gaming theory.	K1,K2
CO3	The student will learn to apply knowledge representation techniques and problem solving strategies to common AI applications.	К3
CO4	Students will analyze various components of intelligent agent systems to enhance functionality and cooperation in complex environments.	K4
CO5	Student should analyze the fundamentals of pattern recognition and determine the steps required for it.	K4, K5

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	3	1	3	2	1	2	1	-	-	1	2	2	2
CO2	3	1	3	2	2	1	1	-	-	2	2	1	3
CO3	3	2	3	3	3	3	1	-	-	2	3	2	2
CO4	3	1	3	2	2	2	1	-	-	2	2	2	2
CO5	3	1	3	2	3	2	1	-	-	2	3	2	2

Title of the Course	Artificial Intelligence Lab	Hours/Week	05
Course Code	AUCPAI35	Credits	05
Category	Core Course Practical III	Year & Semester	II & III
Prerequisites	Python Programming	Regulation	2024

Objectives of the course:

0

- > To understand the concept of AI
- > To understand various concept in python.
- > To understanding Different AI Techniques
- > To implement various AI techniques in real time problems.
- > To understanding of Natural Language Tool Kit.

List of Practical	COs	Cognitive Levels
Write a python program to implement Breadth First Search Traversal.	CO1	K2
Write a python program to implement Water Jug Problem.	CO1	K2
Write a python program to remove punctuations from the given string.	CO2	K2
Write a python program to sort the sentence in alphabetical order.	CO3	K3
Write a program to implement Hangman game using python.	CO3	K3
Write a program to implement Tic – Tac – Toe game using python.	CO3	K3
Write a python program to remove stop words for a given passage from a text file using NLTK?	CO4	K2
Write a python program to implement stemming for a given sentence using NLTK.	CO4	K2
Write a python program to POS (Parts of Speech) tagging for the give sentence using NLTK?	CO5	K4
Write a python program to implement Lemmatization using NLTK?	CO4	K2
Write a python program for Text Classification for the give sentence using NLTK.	CO5	K4

^o Course Learning Outcomes (for Mapping with POs and PSOs)

On completion of the course the students should be able to

COs	CO Description	Cognitive Level
CO1	Use of python to understand the concept of AI.	K2
CO2	Demonstrate various concepts in python.	K2
CO3	Apply various AI techniques in practical Life.	К3
CO4	Understanding of Natural Language Tool Kit.	K2
CO5	Analyze Natural Language Tool Kit for various Practical Application.	K4

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	3	1	2	2	3	2	1	-	-	2	2	2	2
CO2	3	1	2	2	2	3	1	-	-	2	3	2	2
CO3	3	2	3	3	3	2	1	-	-	2	3	2	2
CO4	3	1	2	2	2	2	1	-	-	2	2	2	2
CO5	3	1	3	3	3	2	1	-	-	2	3	2	2

Title of the Course	IOT and its Applications	Hours/Week	03
Course Code	AUEAI32A	Credits	03
Category	Elective – 3	Year & Semester	II & III
Prerequisites	Basics of networking	Regulation	2024

Objectives of the course:

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- > To use of Devices, Gateways and Data Management in IoT.
- > To Design IoT applications in different domain and be able to analyze their performance.
- > To implement basic IoT applications on embedded platform.
- > To gain knowledge on Industry Internet of Things.
- > To learn about the privacy and Security issues in IoT.

UNITS	Contents	COs	Cognitive
I-TINU	IoT & Web Technology, The Internet of Things Today, Time for Convergence, Towards the IoT Universe, IoT Applications, Future Internet Technologies, Infrastructure, Networks and Communication, Processes, Data Management, Security, Privacy &Trust, Device Level Energy Issues, IoT Related Standardization.	CO1	K1, K4
II-LINU	M2M to IoT – A Basic Perspective– Introduction, Some Definitions, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT, M2M to IoT-An Architectural Overview–Building an architecture, Main design Principles and needed capabilities, Sensors – types, characteristics.	CO2	K2
III-LINU	IoT Architecture –State of the Art – Introduction, State of the art, Architecture. Reference Model- Introduction, Reference Model and architecture, IoT reference Model, IoT Reference Architecture- Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views.	CO3	K4
AI-TINU	IoT Applications - Smart Light, smart agriculture, smart vehicle, Smart Objects, Smart Applications, Four Aspects in your Business to Master IoT, Value Creation from Big Data and Serialization, IoT for Retailing Industry, IoT For Oil and Gas Industry, Opinions on IoT Application and Value for Industry, Home Management	CO4	K5

Department of Artificial Intelligence – Syllabus (Effect from 2024-2025)

	Internet of Things Privacy Security and Governance Introduction								
>	Overview of Governance Privacy and Security Issues Contribution								
-LI	from FP7 Projects, Security, Privacy and Trust in IoT-Data-Platforms K1 K3 K0								
N	for Smart Cities. First Steps Towards a Secure Platform. Smarty								
-	Approach. Data Aggregation for the IoT in Smart Cities, Security								
Reco	nmended Text Books								
Vijay Madisetti and Arshdeep Bahga, "Internet of Things: (A Hands-on Approach)",									
Universities Press(INDIA) Private Limited 2014, 1stEdition.									
Refe	ence Books								
	Michael Miller," The Internet of Things: How Smart TVs, Smart Cars, Smart Homes, and								
Smar	Cities Are Chang ng the World",kindle version.								
	Francisda Costa,"Re thinking the Internet of Things: A Scalable Approach to Connecting								
Ever	thing", A press Publications 2013,1st Edition,.								
Web	ite and e-learning source								
	https://www.geeksforgeeks.org/introduction-to-internet-of-things-iot-set-1/								
	https://www.javatpoint.com								

On completion of the course the students should be able to

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COs	CO Description	Cognitive Level
CO1	Identify and Assess the infrastructure, networks, and communication protocols essential for IoT implementations.	K1, K4
CO2	Describe the new industrial structures that are emerging due to the proliferation of IoT technologies	K2
CO3	Analyze the functional view and the information view of IoT architecture, highlighting their roles and contributions.	K4
CO4	Evaluate the impact of IoT technologies on the industries sector, focusing on efficiency, safety, and value addition.	K5
CO5	Identify and describe initial steps necessary to develop a secure IoT platform, including threat modeling and risk assessment.	K1, K3, K6

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	3	1	2	2	1	2	1	-	-	2	2	2	2
CO2	2	1	2	2	2	2	1	-	-	2	3	2	2
CO3	3	1	2	2	2	2	1	-	-	2	2	2	2
CO4	2	1	2	2	2	2	1	-	-	2	2	2	2
CO5	3	1	3	3	2	3	1	-	-	2	3	3	2

Title of the Course	Introduction to Data Science	Hours/Week	03
Course Code	AUEAI32B	Credits	03
Category	Elective - 3	Year & Semester	II & III
Prerequisites	Understanding data	Regulation	2024

Objectives of the course:

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- > To learn about basics of Data Science and Big data.
- > To learn about over view and building process of Data Science.
- > To learn about various Algorithms in Data Science.
- > To learn about Hadoop Framework.
- > To learn about case study about Data Science.

UNITS	Contents	COs	Cognitive
01115	Contents	COS	Levels
I-TINU	Introduction: Introduction to Data Science - history, advantages., Benefits and uses – Data - Facts of data – Types of Data – big data analytics and its types – Data science process – Big data ecosystem and data science.	CO1	K2
II-LIND	The Data science process : Overview – research goals – retrieving data – transformation – Exploratory Data Analysis – Model building.	CO2	K3
III-LINU	Algorithms: need for machine learning - Machine learning algorithms – Modeling process – Types – Supervised – Unsupervised - Semi- supervised – reinforcement. Machine learning process – machine learning challenges.	CO3	K4
VI-TINU	Introduction to Hadoop : Hadoop framework – Spark – replacing Map Reduce – No SQL – ACID – CAP – BASE –types.	CO4	K1,K2
V-TINU	Case Study : Prediction of Disease - Setting research goals - Data retrieval – preparation - exploration - Disease profiling - presentation and automation	CO5	K3,K4
Recomme	ended Text Books		•
	1. Davy Cielen, Arno D.B.Meysman, Mohamed Ali, "Introducing Data	a Science	",Manning

publications 2016

2. Dr S.Sridhar & Dr M.Vijayalakshmi, "Machine Learning" Oxford University Press India; 1st edition 2021.

Reference Books

Roger Peng," The Art of Data Science", lulu.com 2016.

Website and e-learning source

https://www.w3schools.com/datascience/

https://en.wikipedia.org/wiki/Data_science

http://www.cmap.polytechnique.fr/~lepennec/en/post/references/refs/

Course Learning Outcomes (for Mapping with Pos and PSOs)

On completion of the course the students should be able to

COs	CO Description	Cognitive Level
CO1	Understand the basics in Data Science and Big data.	K2
CO2	Demonstrate the over view and model building process in Data Science.	К3
CO3	Understand and analyze various Algorithms in Data Science.	K4
CO4	List and Explain the core components of Hadoop Frame work in Data Science.	K1,K2
CO5	The student will able to apply and analyze these skills in real-world scenarios	K3,K4

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	3	1	1	2	1	2	1	-	-	1	2	2	2
CO2	3	1	2	2	2	2	1	-	-	2	2	2	2
CO3	3	1	3	3	3	2	1	-	-	1	2	2	2
CO4	3	1	2	2	2	2	1	-	-	1	2	2	1
CO5	3	1	3	2	3	2	1	-	-	2	2	2	2

COURSEDESCRIPTORS

Title of the Course	Software Engineering Hours/Week					
Course Code	AUSAI33	Credits	01			
Category	Skill Enhancement - 4	Year & Semester	II & III			
Prerequisites	Problem Solving Ability	Regulation	2024			

Objectives of the course:

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- > To Gain basic knowledge of software engineering.
- > To apply software engineering principles and techniques.
- > To Model a reliable and cost-effective software system.
- > To Perform Testing at various levels and produce an efficient system.
- > To learn about software maintenance process.

UNITS	Contents	COs	Cognitive Levels					
I-LINU	Introduction: The software engineering discipline, programs vs software products, why study software engineering, Notable changes in software development practices, computer systems engineering.	CO1	K2					
II-LINU	Requirements Analysis and Specification: Requirements gathering and analysis, Software requirements specification (SRS). Software Design : Good software design, cohesion and coupling.	CO2	K1					
III-TINU	Function-Oriented Software Design: Overview of SA/SD methodology, Structured analysis, data flow diagrams (DFD's).	CO3	K6					
AI-TINU	Coding and Testing: Coding; code review; testing; testing in the large vs testing in the small; unit testing; black-box testing; white-box testing.	CO4	K3, K5					
V-TINU	Software Maintenance: Characteristic of software maintenance; software reverse engineering; software maintenance process models; estimation of maintenance cost.	CO5	K4					
Recommended Text Books Rajib Mall, Fundamentals of Software Engineering, Fifth Edition, Prentice-Hall of India, 2018								
Reference	 Books <i>1.</i> Richard Fairley, Software Engineering Concepts, Tata McGraw-Hill Ltd, Edition 1997. <i>2.</i> Roger S Pressman, Software Engineering, Seventh Edition, McGraw 	publishir -Hill	ng company					

Website and e-learning source

https://www.geeksforgeeks.org/software-engineering/ https://www.tpointtech.com/software-engineering

Course Learning Outcomes (for Mapping with POs and PSOs)

On completion of the course the students should be able to

COs	CO Description	Cognitive Level
CO1	Describe and evaluate significant changes in software development methodologies and practices over the years	K2
CO2	Define the processes involved in requirements gathering and analysis, including various techniques and stakeholder engagement strategies.	K1
CO3	Develop Data Flow Diagrams (DFDs) for a given system to represent the flow of data	K6
CO4	Apply testing techniques to evaluate software functionality to ensure it meets requirements.	K3, K5
CO5	Analyze common challenges and risks associated with software maintenance.	K4

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	3	1	1	2	1	1	2	-	-	1	1	2	1
CO2	3	1	2	2	2	2	2	-	-	2	1	2	1
CO3	3	1	3	3	3	2	1	-	-	2	2	2	1
CO4	3	1	3	3	3	2	1	-	-	2	2	2	1
CO5	3	1	2	2	2	1	1	-	-	2	1	2	1

Title of the Course	Operating System Design	Hours/Week	02
Course Code	AUSAI34	Credits	02
Category	Skill Enhancement - 5	Year & Semester	II & I
Prerequisites	Basics of Computer Science	Regulation	2024

Objectives of the course:

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- > To understand the fundamental concepts and role of Operating System.
- > To learn the Process Management and Scheduling Algorithms.
- > To understand the Memory Management policies.
- > To gain insight on and File management techniques.
- > To Analyze resource management techniques

UNITS	Contents	COs	Cognitive Levels
I-LINN	Introduction -views and goals–Operating System Services- User and Operating System interface - System Call- Types of System Calls – Operating System Structure, Types of OS.	CO1	K1, K2
II-LINN	Process Scheduling : Basic Concepts-Scheduling Criteria Scheduling Algorithm Multiple Processor Scheduling CPU Scheduling. Synchronization : The Critical- Section Problem.	CO2	K4
III-LINU	Deadlocks: Deadlock Characterization-Methods for Handling Deadlocks-Deadlock Prevention-Deadlock Avoidance – Deadlock Detection – Recovery from Deadlock.	CO3	К3
AI-TINU	 Memory-Management Strategies: Swapping - Contiguous Memory Allocation, Segmentation- Paging - Structure of the Page Table. Virtual- Memory Management: Demand Paging-Page Replacement – Allocation of Frames 	CO4	К4
V-TINU	 Storage Management: File System- File Concept - Access Methods - Directory and Disk Structure. Allocation Methods – Free - Space Management.	CO5	К5

Recommended Text Books

A.Silberschatz P.B.Galvin, Gange." Operating System Concepts", Ninth Edition, 2013, Addison Wesley Publishing Co.

Reference Books

Anderw S Tanenbaum, Albert S.Woodhull," Operating System Design and Implementation", prentice-Hall India Publication.

> William Stallings," Operating Systems Internals and Design Principles", Pearson, 2018, 9th Edition.

Website and e-learning source

https://www.guru99.com/operating-system-tutorial.html https://www.geeksforgeeks.org/what-is-an-operating-system/ http://www.cs.kent.edu/~farrell/osf03/oldnotes/2.th-edition.pdf

Course Learning Outcomes (for Mapping with POs and PSOs)

On completion of the course the students should be able to
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COs	CO Description	Cognitive Level
CO1	Define and Describe the main functions, services and goals of an operating system	K1, K2
CO2	Analyze and compare various CPU scheduling algorithms.	K4
CO3	Implement and demonstrate deadlock detection algorithms and explain their mechanisms	К3
CO4	Analyze the structure and function of the page table.	K4
CO5	Assess various free space management techniques to evaluate their effectiveness in managing disk space.	К5

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	3	1	1	1	1	1	1	-	-	2	1	1	1
CO2	3	1	3	3	3	2	1	-	-	2	2	1	1
CO3	3	1	3	3	3	2	1	-	-	2	2	2	1
CO4	3	1	3	2	2	2	1	-	-	2	2	1	1
CO5	3	1	2	2	2	2	1	-	-	2	1	1	1