



University of Madras

Chepauk, Chennai 600 005

[Est. 1857, State University, NAAC 'A⁺⁺' Grade, CGPA 3.59, NIRF 2019 Rank: 20]

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Undergraduate Programme in Computer Science with Artificial Intelligence

Syllabus for
B.Sc. Computer Science with Artificial Intelligence
(With effect from the Academic Year 2023 -24)

Learning Outcome Based Curriculum Framework

Note: The Committee is designed Learning Outcome Based Curriculum Framework of Undergraduate Computer Science Programmes prescribed by UGC

I Preamble

Bachelor of Computer Science with Artificial Intelligence is a 3 – Year Undergraduate Programme spread over six semesters. The course is designed to achieve a high degree of technical skills in Problem solving and Modern application development. The course develops requisite professional skills and problem solving along with developing the analytical abilities for pursuing a successful career in software industry and forms the required basics for further higher studies in Computer Science specifically in the area of Artificial Intelligence.

II Eligibility

A pass in the Higher secondary Examination (Academic Stream) conducted by the Government of Tamil Nadu with Mathematics as one of the subjects.

III Programme Objectives

PO1	Disciplinary knowledge: Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines that form a part of an undergraduate Programme of study
PO2	Communication Skills: Ability to express thoughts and ideas effectively in writing and orally; Communicate with others using appropriate media; confidently share one's views and express herself/himself; demonstrate the ability to listen carefully, read and write analytically, and present complex information in a clear and concise manner to different groups.
PO3	Critical thinking: Capability to apply analytic thought to a body of knowledge; analyse and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence; identify relevant assumptions or implications; formulate coherent arguments; critically evaluate practices, policies and theories by following scientific approach to knowledge development.
PO4	Problem solving: Capacity to extrapolate from what one has learned and apply their competencies to solve different kinds of non-familiar problems, rather than replicate curriculum content knowledge; and apply one's learning to real life situations.
PO5	Analytical reasoning: Ability to evaluate the reliability and relevance of evidence; identify logical flaws and holes in the arguments of others; analyze and synthesize data from a variety of sources; draw valid conclusions and support them with evidence and examples, and addressing opposing viewpoints.

PO6	Research-related skills: A sense of inquiry and capability for asking relevant/appropriate questions, problem arising, synthesising and articulating; Ability to recognise cause-and-effect relationships, define problems, formulate hypotheses, test hypotheses, analyse, interpret and draw conclusions from data, establish hypotheses, predict cause-and-effect relationships; ability to plan, execute and report the results of an experiment or investigation
PO7	Cooperation/Team work: Ability to work effectively and respectfully with diverse teams; facilitate cooperative or coordinated effort on the part of a group, and act together as a group or a team in the interests of a common cause and work efficiently as a member of a team
PO8	Scientific reasoning: Ability to analyse, interpret and draw conclusions from quantitative/qualitative data; and critically evaluate ideas, evidence and experiences from an open-minded and reasoned perspective.
PO9	Reflective thinking: Critical sensibility to lived experiences, with self awareness and reflexivity of both self and society.
PO10	Information/digital literacy: Capability to use ICT in a variety of learning situations, demonstrate ability to access, evaluate, and use a variety of relevant information sources; and use appropriate software for analysis of data.

IV Programme Specific Objectives

PSO1	To enable students to apply basic microeconomic, macroeconomic and monetary concepts and theories in real life and decision making.
PSO2	To sensitize students to various economic issues related to Development, Growth, International Economics, Sustainable Development and Environment.
PSO3	To familiarize students to the concepts and theories related to Finance, Investments and Modern Marketing.
PSO4	Evaluate various social and economic problems in the society and develop answer to the problems as global citizens.
PSO5	Enhance skills of analytical and critical thinking to analyze effectiveness of economic policies.

B.Sc. COMPUTER SCIENCE WITH ARTIFICIAL INTELLIGENCE

COURSE STRUCTURE

YEAR – I SEMESTER – I

Part	Sub. Code	List of Courses	Credit	Hrs	Int.	Ext.	Total
Part-I	----	Language Paper-I	3	6	25	75	100
Part-II	100L1Z	English Paper-I	3	6	25	75	100
Part-III	126C1A	CC - I: Python Programming @#%&	5	4	25	75	100
	126C1I	CC - II: Python Programming Practical @#%&	5	5	40	60	100
	126E1A	EC - I Generic / Discipline Specific: Mathematics I @#%& / Statistics I @#%& / Physics I #%	3	5	25	75	100
	126E1B		2	3	25	75	100
	126E1C		---	2	---	---	---
---	Physics-I Practical #%	---	2	---	---	---	
Part-IV	126S1A	SEC - I: Office Automation @#%& *	2	2	25	75	100
	100S1A	Basic Tamil-I (Other Language Students) *					
	100S1B	Advanced Tamil-I (Other Language Students) *					
	126B1A	FC: Fundamentals of Computers @#%&	2	2	25	75	100
			22/23	30			

*** PART-IV: SEC-1 / Basic Tamil / Advanced Tamil (Any one)**

- Students who have studied Tamil up to XII STD and also have taken Tamil in Part I shall take SEC-I.
- Students who have not studied Tamil up to XII STD and have taken any Language other than Tamil in Part-I shall take Basic Tamil comprising of Two Courses (level will be at 6th Std.).
- Students who have studied Tamil up to XII STD and have taken any Language other than Tamil in Part-I shall take Advanced Tamil comprising of Two Courses.

YEAR – I SEMESTER – II

Part	Sub. Code	List of Courses	Credit	Hrs	Int.	Ext.	Total
Part-I	----	Language Paper-II	3	6	25	75	100
Part-II	100L2Z	English Paper-II	3	6	25	75	100
Part-III	126C2A	CC - III: Java Programming @#%&	5	4	25	75	100
	126C2I	CC - IV: Java Programming Practical @#%&	5	5	40	60	100
	126E2A	EC - II Generic / Discipline Specific Mathematics II @#%&/ Statistics II @#%&/ Physics II #%	3	5	25	75	100
	126E2B		2	3	25	75	100
	126E2C		2	2	40	60	100
	126E2I	Physics I & II (Practicals) #%	2	2	40	60	100
Part-IV	126S2I	SEC-II: Office Automation Practical @#%& *	2	2	40	60	100
	100S2A	Basic Tamil-II (Other Language Students) *			25	75	100
	100S2B	Advanced Tamil-II *			25	75	100
	126S2A	SEC - III: Quantitative aptitude @#%&	2	2	25	75	100
			23/24	30			

YEAR – II SEMESTER – III

Part	Sub. Code	List of Courses	Credit	Hrs	Int.	Ext.	Total
Part-I	----	Language Paper-III	3	6	25	75	100
Part-II	200L3Z	English Paper-III	3	6	25	75	100
Part-III	226C3A	CC - V: Data Structures @%&	5	4	25	75	100
	226C31	CC - VI: Data Structures Practical @%&	5	5	40	60	100
	226E3A	EC - III Generic / Discipline Specific : Mathematics I @#%&/ Statistics I @#%&/ Physics-I #%\$	3	5	25	75	100
	226E3B 226E3C		2	3	25	75	100
	---	Physics-I Practical #%\$	---	2	---	---	---
Part-IV	226S31	SEC - IV: Web Page Design Practical @#%&	1	1	40	60	100
	226S32	SEC - V: Desktop publishing Practical @#%&	2	2	40	60	100
	----	Environmental Science	--	1	--	--	--
			21/22	30			

YEAR – II SEMESTER – IV

Part	Sub. Code	List of Courses	Credit	Hrs	Int.	Ext.	Total
Part-I	----	Language Paper-IV	3	6	25	75	100
Part-II	200L4Z	English Paper-IV	3	6	25	75	100
Part-III	226C4A	CC - VII: Introduction to Artificial Intelligence %	5	4	25	75	100
	226C41	CC -VIII: Prolog Practical %	5	4	40	60	100
	226E4A	EC - IV Generic / Discipline Specific: Mathematics II @#%&/ Statistics II @#%&/ Physics-II #%\$	3	5	25	75	100
	226E4B 226E4C		2	3	25	75	100
	226E41	Physics I & II (Practicals) #%\$	2	2	40	60	100
Part-IV	226S4A	SEC -VI: Emotional Intelligence @#%&	2	2	25	75	100
	226S4B	SEC -VII: Technical Writing @#%&	2	2	25	75	100
	---	Environmental Science	2	1	25	75	100
			25	30			

YEAR – III SEMESTER – V

Part	Sub. Code	List of Courses	Credit	Hrs	Int.	Ext.	Total
Part- III	326C5A	CC - IX: Computer Vision %	4	5	25	75	100
	326C51	CC - X: Computer Vision Practical %	4	5	40	60	100
	326C5B	CC - XI: Natural Language Processing %&	4	5	25	75	100
	326C52	CC - XII: Natural Language Processing Practical %	4	5	40	60	100
	326E5A 326E5B 326E5C	EC -V: Computer Networks #&\$/ Software Engineering @#&\$/ Computing System Fundamentals #&	3	4	25	75	100
	326E5D 326E5E 326E5F	EC -VI: Cloud Computing @#&\$/ Big Data Analytics @#&\$/ Expert System %	3	4	25	75	100
Part-IV	---	Value Education	2	2	25	75	100
	---	Internship / Industrial Training (During summer vacation at the end of IV semester)	2	--	--	--	--
			26	30			

YEAR – III SEMESTER – VI

Part	Sub. Code	List of Courses	Credit	Hrs	Int.	Ext.	Total
Part- III	326C6A	CC - XIII: Machine Learning %	4	6	25	75	100
	326C61	CC - XIV: Machine Learning Practical %	4	6	40	60	100
	326C6B	Core Paper - XV: Fuzzy Logic %	4	6	25	75	100
	326E6A 326E6B 326E6C	EC Course -VII: Mobile Ad-hoc Network @#&\$/ Data Mining and Warehousing @#&\$/ Artificial Neural Networks %&	3	5	25	75	100
	326E6D 326E6E 326E6F	EC -VIII: Internet of Things and its Applications @#&\$/ Robotics and Its Applications @#& / Information Security %&	3	5	25	75	100
	Part-IV	326S61	Professional Competency Skill Course: Mini Project @%&	2	2	40	60
---		Extension Activity	1	--	--	--	--
			21	30			

@ - Common to B.C.A.

- Common to B.Sc. Software Applications

\$ - Common to B.Sc. Computer Science

% - Common to B.Sc. Computer Science with Artificial Intelligence

& - Common to B.Sc. Computer Science with Data Science