आंध्रप्रदेश केंद्रीय विश्वविद्यालय

CENTRAL UNIVERSITY OF ANDHRA PRADESH

Ananthapuramu

Postgraduate Programme Structure

as per the UGC Credit Framework (NEP 2020)

Vidya Dadati Vinayam
(Education gives humility)

M.Sc. Artificial Intelligence and Data Science

"Today's AI is about new ways of connecting people to computers, people to knowledge, people to the physical world,and people to people."

- Patrick Winston

Programme Structure
(With effect from AY 2024 - 25)

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About the Program

M.Sc. Artificial Intelligence and Data Science is one of the new postgraduate programmes being offered by CUAP from 2023-24 academic year. Artificial Intelligence (AI) and Data Science are very close and fastest growing fields in contemporary scenario. AI is a branch of computer science that aims to create intelligence showcased by machines (computers and automation systems) in distinction to the natural intelligence of humans. The major goals of AI and Data Science are to attain success in knowledge reasoning, planning, machine learning, natural language processing, computer vision, data analytics and data engineering.

With a vision to impart knowledge of Artificial Intelligence and Data Science, the program focuses on training students to become analytical experts and critical thinkers in research and industry. The course is designed to encourage students to reason with data and build models which can predict future outcomes.

In this program, we aim to prepare students to work in various fields ranging from Artificial Intelligence, Data Science, Data Engineering and Data Analytics.

Programme Objectives:

- To impart knowledge of both fundamental and technical skills on various aspects of Artificial Intelligence and Data Science.
- To expose students to the developments in the area of Data Visualization, Data Cleaning, Machine Learning Models, Artificial Intelligence and their utilization in industry and research.
- To expose to techniques and developments in various domains where AI can be applied.

A Student completing this programme will be capable of taking a career path in the domain of Artificial Intelligence and Data Science.

Programme Outcomes:

On successful completion of the programme student should be able to:

- Understand the fundamentals of Artificial Intelligence, Machine Learning, Inference Engines, Speech, Vision, Natural Language Understanding, Robotics, and Human Computer Interaction.
- Unify the knowledge of Human Cognition, AI, Machine Learning and Data Engineering for designing systems.
- Apply ideas and intuition behind modern machine learning methods as well as a more formal understanding of how, why, and when they work.
- Develop real-time and robust AI-based systems with specific software, hardware and data requirements.
- Upgrade knowledge and undertake further study and research in Artificial Intelligence according to the need of society.

Program Structure:

- M.Sc AI & DS is a two-year program divided into four semesters with a total of around 102 credits.
- The program is designed with the combination of Core Courses, DisciplineSpecific Electives, Multidisciplinary Courses, and MOOCS.
- The program consists of discipline specific electives, comprising wide range of courses from the disciplines catering to the present industry requirement.
- In Semester II and III, 1 multi-disciplinary elective offered by other departments will be selected by the students.
- Students need to complete 1 MOOCS Course in each I, II and III Semester.
- Students will undergo for 2 months summer internship after II semester and submit internship in III semester.
- In semester IV students will undergo for 6 months Project Work.

Semester and Course wise Credits

Semester	Discipline Specific Core (DSC) (L+T+P)	Discipline Elective (DSE) / Elective (EL)	Project Work Disser tation	Common Compulsory Course (CCC)	Inter-Disciplinary Elective	Internship	Lab	Total Credits
I	DSC 1 (4) DSC 2 (4) DSC 3 (4) DSC 4 (4) Add on Course	Elective-I by MOOC/swayam(2) Elective-II (4)	-				System Building Lab- I (3) (DSC 2+ DSC 3+ DSC 4)	**25**
II	DSC 5 (4) DSC 6 (4) DSC 7(4) DSC 8(4) Add on Course	Elective-III by MOOC/Swayam (2) Elective-IV (4)	-	Introduction to R Programming (4)	IDE 1 (3) online/offline		System Building Lab- II (3) (DSC 5 + DSC 6+ DSC 8)	**32**
III	DSC 8(4) DSC 9 (4) DSC 10(4)	Elective-V by MOOC/Swayam (2) Elective-VI (4)		CCC-1 Building Mathematical Ability (4)	IDE 2 (3) online/offline	Internship(2)	System Building Lab- III (2) (DSC 9 + DSC 10)	**29**
IV	-	-	Dissertation (16)				-	**16**
Total	**44**	**18**	**16**	**8**	**6**	**2**	**8**	**102**
Percentage	**43.1**	**17.6**	**15.6**	**7.9**	**5.9**	**2**	**7.9**	**100**

IDE: Interdisciplinary Elective **AECC**: Ability Enhancement Compulsory Course **SEC:** Skill Enhancement Courses **VAC:** Value-Added Courses

MOOCs: Massive Open Online Course

Programme Structure with course titles

S. No	Course Code	Title of the Course	Credits	Contact Hours		
				L	T/L	P/S
Semester – I						
1.	MAI101	Mathematics for Data Science	4	3	1	0
2.	MAI102	Introduction to Artificial Intelligence	4	3	1	0
3.	MAI103	Advanced Data Structures and Algorithms	4	3	1	0
4.	MAI104	Fundamentals of Data Science through Python Programming	4	3	1	0
5.	MAI105	MOOC / Online/ Elective – **I**	2	2	-	-
	Any one of the following electives (Elective-II):		4	3	1	0
6.	MAI115	Computer Networks				
	MAI116	Recommender Systems				
	MAI117	Operating Systems				
	MAI118	Cyber Security				
7.	MAI125-L	System Building Labs -I: (Based on MAI 102,103,104 carrying 1 credit for each)	3	-	-	3
Total			**25**	**17**	**5**	**3**
Semester – II						
1.	MAI201	Artificial Neural Networks	4	3	1	0
2.	MAI202	Big Data Analytics	4	3	1	0
3.	MAI203	Natural Language Processing	4	3	1	0
4.	MAI204	Machine Learning	4	3	1	0
5.	MAI205	MOOC / Online/ Elective **III**	2	2	-	-
	Any one of the following electives: (**Elective-IV)**		4	3	1	0
6.	MAI215	Blockchain & Cryptocurrency Fundamentals				
	MAI216	Computer Architecture				
	MAI217	Data Preparation and Analysis				
	MAI218	Digital Forensics				
	MAI219	CCC -2 I Artificial Intelligence & Machine Learning	4	2	0	2
7.	MAI220	IDE1	3	3	0	0
8.	MAI225-L	System Building Labs -II (Based on MAI201,202,204 carrying 1 credit for each)	3	-	0	3
Total			**32**	**22**	**5**	**5**

S. No	Course Code	Title of the Course	Credits	Contact Hours		
				L	T/L	P/S
Semester – III						
1.	MAI301	Introduction to Deep Learning	4	3	1	0
2.	MAI302	Scalable Systems for Data Science	4	3	1	0
3.	MAI303	Data Mining & Data Warehousing	4	3	1	0
4.	MAI304	MOOC / Online/ Elective –**V**	2	2	-	-
	Any one of the following electives: **Elective- VI**		4	3	1	0
5.	MAI315	Research Methodology & IPR				
	MAI316	Health Care Data Analytics				
	MAI317	Digital Image Processing				
	MAI318	Theory of Computation				
6.	MAI319	Building Mathematical Ability	4	3	1	0
7.	MAI320	IDE2	3	3	0	0
8.	MAI321	Internship	2			2
9.	MAI325-L	System Building Labs-III (Based on MAI 301,302 carrying 1 credit for each)	2	-	0	2
Total			**29**	**20**	**5**	**4**
Semester – IV						
1.	MAI401	Project Work/Dissertation	16	0	0	0
Total			**16**	**0**	**0**	**0**

L – Lectures **T/L – Tutorials/Lab** **S/P– Seminar/Presentation**

Note 1: Project Dissertation Phase-I shall be identified and students have to Compulsorily make a presentation at the end of III Semester.

Note 2: One more MOOC course can be done by student to score additional credits. Any course that taken by student can be approved by the competent authority of the University.

Semester-Wise Credit Distribution

Semester	Total Credits	Cumulative credit at the end of the semester
I	25	25
II	32	57
III	29	86
IV	16	102

Important Information to Students

1. Eligibility: With at least 50% marks in the Bachelor's degree with Mathematics and Physics as compulsory subjects or B.E/B.Tech in any Branch with 50% aggregate.

2. The minimum duration for completion of any PG Program is four semesters (two academic years) and the maximum duration is eight semesters (four academic years) or as per amendments made by the regulatory bodies from time to time.

3. A student should attend at least 75% of the classes, seminars, practical / lab in each course of study.

4. All theory courses in the programme carry a Continuous Internal Assessment (CIA) component of 40 marks and Semester-end component for 60 marks. The minimum pass marks for a course are 40%.
   In case of courses with lab component Continuous Internal Assessment (CIA) component shall be of 60 marks and Semester-end component for 40 marks. The minimum pass marks for a course are 40%.

5. The student is given 3 Continuous Internal Assessment (CIA) tests per semester in each course from which the best 2 performances are considered for the purpose of calculating the marks in CIA. A record of the continuous assessment is maintained by the academic unit. The 3 internal tests are conducted for 15 Marks each, out of the best 2 tests scores are considered for 30 marks. Out of the remaining 10 marks, 5 marks are awarded for assignments, class presentations and class participation of the students and the remaining 5 marks are awarded for punctuality, and attendance of the student.

   Marks for the Attendance will be considered as follows:

S. No	Attendance (%)	Marks
1	95% or more	5
2	90-94%	4
3	85-89%	3
4	80-84%	2
5	75-79%	1

6. A student should pass separately in both CIA and the ESE, i.e., a student should secure 16 (40% of 40) out of 40 marks for theory and 24 (40% of 60) out of 60 marks for lab components in the CIA. Therefore, a student should secure 24 (40% of 60) out of 60

marks for theory and 16 (40% of 40) out of 40 marks for lab components in the End-semester examination (ESE).

7. Semester-end examination shall consist of Objective type questions, descriptive type questions, short answer questions and case studies or any other recommended by the BOS.

8. A student failing to secure the minimum pass marks in the CIA is not allowed to take the end semester examination of that course. She/he has to redo the course by attending special classes for that course and get the pass percentage in the internal tests to become eligible to take the end semester examination.

9. Students failing a course due to lack of attendance should redo the course.

10. Re-evaluation is applicable only for theory papers and shall not be entertained for other components such as practical/ thesis/ dissertation/ internship etc.

11. An on- campus elective course is offered only if a minimum of ten or 40% of the students registered, whichever is higher.