

PROGRAMME CODE: DS6A

PROGRAMME TITLE: Master of Technology (Integrated) in Artificial Intelligence and Data Science

INTRODUCTION:

Artificial Intelligence (AI) and Data Science (DS) gain its significance due to the exploration of Internet. With the rapid growth of computers and computing, AI and DS are inevitable and provide powerful solutions to smart environments including Internet of Things and Industry 4.0.

Building human-level thought processes through the creation of artificial intelligence (AI) is the state-of-the-art in Computer Science. Intelligent machines are influenced by emerging technologies, smart devices, sensors, computing power, faster data processing, huge storage and human-machine interaction capabilities. Data Science is an interdisciplinary field with the ability to extract knowledge/insights from data - be it structured, unstructured, or semi-structured data. Twinned with Artificial Intelligence, more efficient solutions to find meaningful information from huge pools of data are possible today, with data from multiple sources - sensors, images, streaming video, satellite, medical imagery and the cloud. This M.Tech. (Integrated) programme has a comprehensive coverage of applied statistics and mathematics used in data science and artificial intelligence while preparing the students to analyze, design and experiment solutions to problems.

The curriculum targets technical and design skills, AI knowledge, and competencies needed to master strategic analytical methods and tools, and data management, with the objective of creating innovative strategies to solve challenging real-world problems. The programme will equip the students to deliver data driven solutions using computational principles, methods and systems for extracting knowledge from data and modern computational systems that demonstrate capabilities of perception, reasoning, learning and action that are typical of human intelligence.

OBJECTIVES:

- The broad objectives of the programme are as follows:
- To gain thorough knowledge in Artificial Intelligence and Data Science subjects.
- To examine large amounts of data to uncover hidden information.
- To be able to turn actionable insights and cutting-edge technology into innovative products towards solving real-world problems.

PROGRAMME OUTCOMES:

1. Enable students to design and harness the power of AI in broad application fields from vision to advanced autonomous systems.
2. Examine large amounts of data to uncover hidden patterns, correlations, insights, and help organizations harness their data to identify new opportunities.
3. Obtain expertise to turn actionable insights and cutting-edge technology into innovative products towards solving real-world problems.
4. Effectively communicate findings in terms of reports and presentations.
5. Inculcate independent research ability that addresses fundamental problems.

PROGRAMME SPECIFIC OUTCOMES:

After completing the programme the students will become experts in Artificial Intelligence and Data Science. They will have the necessary functional and practical knowledge in Programming and Statistical Techniques for Data Science along with Data Scrapping and Data Wrangling. They will also be competent in Big Data Technologies, Machine Learning, Artificial Intelligence, Cloud Computing, Deep Learning and Advance AI Applications and be able to handle diverse Data Science domains in different organizations.

ELIGIBILITY:

Higher Secondary (10+2) with science stream and mathematics as a subject with at least 50% marks in aggregate or an equivalent grade for General/OBC candidates, and 45% marks in aggregate or an equivalent grade for SC/ST and Differently Abled (DA) category candidates from a recognized Board.

AGE LIMIT: As decided by the Devi Ahilya Vishwavidyalaya or State Govt. for U.G. programmes.

ADMISSION PROCEDURE:

For Admissions in 2020: As per merit developed on the basis of 35% of marks in 10th and 65% of marks in 12th.

SEATS: Seats for Indian Students: 40 (reservation as per state Govt. rules).
Seats for PIO/ Foreign Students: 06

DURATION: Ten Semesters (Five Years).

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Fee Structure for Batch 2020-25:

Semester	Academic Fee	Development & Maintenance Fee	Students' Services Fee		Examination Fee	Total (Rs.)	
			Boys	Girls		Boys	Girls
First	20000	12500	3300	3111	2500	38300	38111
Second	20000	12500	2911	2722	2500	37911	37722
Third	20000	12500	3300	3111	2500	38300	38111
Fourth	20000	12500	2911	2722	2500	37911	37722
Fifth	20000	12500	3300	3111	2500	38300	38111
Sixth	20000	12500	2911	2722	2500	37911	37722
Seventh	20000	12500	3300	3111	2500	38300	38111
Eighth	20000	12500	2911	2722	2500	37911	37722
Ninth	20000	12500	3300	3111	2500	38300	38111
Tenth	20000	12500	2911	2722	2500	37911	37722

- For NRI/ NRI Sponsored/ PIO/ Foreign Nationals Belong to SAARC or BIMSTEC: Fee in each semester will be 1.5 times of the above mentioned existing total fee or INR 20,000 more than the existing total fee (whichever is less).
- Foreign Nationals Belong to other than SAARC or BIMSTEC: Fee of US\$ 3500 per annum shall be payable on yearly basis.
- Caution Money (Refundable) and Alumni Fee (Chargeable in the First Semester):

Category	Caution Money	Alumni Fee
For Indian Nationals	Rs. 4,000	Rs. 500
For NRI/ NRI Sponsored/ PIO/ Foreign Nationals Belong to SAARC or BIMSTEC	Rs. 10,000	Rs. 1,000
Foreign Nationals Belong to other than SAARC or BIMSTEC	USD 500	USD 100

- If a student repeats a paper(s) in a semester, an additional fee of Rs.500/- per paper shall be payable.
- Hostel Fee and Central Library Fee will be extra.

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Curriculum:

First Semester:

Code	Title	Credits (L T P)
CORE COURSES		
DS6A-101	Calculus	3 (2-1-0)
DS6A-103	Physical Chemistry	3 (2-0-2)
DS6A-105	Modern Physics	3 (2-1-0)
DS6A-107	Programming in C++	3 (2-0-2)
DS6A-109	Basic Electrical and Electronics Engineering	3 (2-1-0)
ABILITY ENHANCEMENT COURSE		
DS6A-111	Communication Skills	3 (2-1-0)
ELECTIVE COURSES-DISCIPLINE CENTRIC (Any One)		
DS6A-121	Engineering Graphics	3 (2-0-2)
DS6A-123	Manufacturing Practices	3 (2-0-2)
ELECTIVE GENERIC: The students can choose following course or any other UG level generic course being run in this campus.		
DS6A-141	MS Office-Excel	3 (0-0-6)
Comprehensive Viva-Voce		
DS6A-151	Comprehensive Viva-Voce	4

Second Semester:

Code	Title	Credits (L T P)
CORE COURSES		
DS6A-102	Linear Algebra	3 (2-1-0)
DS6A-104	Inorganic and Organic Chemistry	3 (2-0-2)
DS6A-106	Engineering Mechanics	3 (2-1-0)
DS6A-108	Data Structures	3 (2-0-2)
DS6A-110	Fundamental of Economics	3 (2-1-0)
ABILITY ENHANCEMENT COURSE		
DS6A-112	Language Lab.	3 (0-0-6)
ELECTIVE COURSES-DISCIPLINE CENTRIC (Any One)		
DS6A-122	Digital Electronic Circuits	3 (2-0-2)
DS6A-124	Basic Mechanical Engineering	3 (2-1-0)
ELECTIVE GENERIC: The students can choose following course or any other UG level generic course being run in this campus.		
DS6A-142	Environmental Studies	3 (2-1-0)
Comprehensive Viva-Voce		
DS6A-152	Comprehensive Viva-Voce	4

Third Semester:

Code	Title	Credits (L T P)
CORE COURSES		
DS6A-201	Complex Analysis	3 (2-1-0)
DS6A-203	Discrete Mathematical Structures	3 (2-1-0)
DS6A-205	Database and Information Systems	3 (2-0-2)

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DS6A-207	Micro Economics	3 (2-1-0)
DS6A-209	Introduction to Probability Theory	3 (2-1-0)
ELECTIVE COURSES-DISCIPLINE CENTRIC (Any Two)		
DS6A-221	Design Practices in Computer Science	3 (2-0-2)
DS6A-223	Design and Analysis of Algorithms	3 (2-1-0)
DS6A-225	Software Engineering	3 (2-0-2)
ELECTIVE GENERIC: The students can choose following course or any other UG level generic course being run in this campus.		
DS6A-241	Advanced Excel	3 (0-0-6)
Comprehensive Viva-Voce		
DS6A-251	Comprehensive Viva-Voce	4

Fourth Semester:

Code	Title	Credits (L T P)
CORE COURSES		
DS6A-202	Computer Architecture	3 (2-0-2)
DS6A-204	Parallel Computing	3 (2-0-2)
DS6A-206	Probability Distributions	3 (2-1-0)
DS6A-208	Numerical Methods	3 (2-1-0)
ELECTIVE COURSES-DISCIPLINE CENTRIC (Any Two)		
DS6A-222	Automata Theory	3 (2-0-2)
DS6A-224	Logic Design	3 (2-0-2)
DS6A-226	Optimization Algorithms and Techniques	3 (2-0-2)
Summer Training/ Internship		
DS6A-242	Internship	6 (0-0-12)
Comprehensive Viva-Voce		
DS6A-252	Comprehensive Viva-Voce	4

Fifth Semester:

Code	Title	Credits (L T P)
CORE COURSES		
DS6A-301	Python	3 (2-0-2)
DS6A-303	Stochastic Processes	3 (2-1-0)
DS6A-305	Artificial Intelligence	3 (2-0-2)
DS6A-307	Computer Networks	3 (2-0-2)
DS6A-309	Macro Economics	3 (2-1-0)
ELECTIVE COURSES-DISCIPLINE CENTRIC (Any Two)		
DS6A-321	Digital Hardware Design	3 (2-0-2)
DS6A-323	Numerical and Scientific Computing	3 (2-0-2)
DS6A-325	Computer Graphics	3 (2-0-2)
ELECTIVE GENERIC: The students can choose following course or any other UG level generic course being run in this campus.		
DS6A-341	Literature/ Philosophy/ Psychology/ Sociology	3 (2-1-0)
Comprehensive Viva-Voce		
DS6A-351	Comprehensive Viva-Voce	4

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Sixth Semester:

Code	Title	Credits (L T P)
CORE COURSES		
DS6A-302	Operating Systems	3 (2-0-2)
DS6A-304	Designs of Experiments	3 (2-0-2)
DS6A-306	RDBMS and NOSQL	3 (2-0-2)
DS6A-308	Embedded Systems	3 (2-1-0)
ELECTIVE COURSES-DISCIPLINE CENTRIC (Any Two)		
DS6A-322	Compiler Design	3 (2-0-2)
DS6A-324	Soft Computing	3 (2-0-2)
DS6A-326	Cloud Computing	3 (2-1-0)
Summer Training/ Internship		
DS6A-342	Internship	6 (0-0-12)
Comprehensive Viva-Voce		
DS6A-352	Comprehensive Viva-Voce	4

Seventh Semester:

Code	Title	Credits (L T P)
CORE COURSES		
DS6A-401	Forecasting Methods	4 (2-1-2)
DS6A-403	Operations Research	4 (3-1-0)
DS6A-405	Sampling Distributions	3 (2-0-2)
DS6A-407	R Programming	3 (2-0-2)
DS6A-409	Econometrics	3 (2-1-0)
ELECTIVE COURSES-DISCIPLINE CENTRIC (Any Two)		
DS6A-421	Digital Image Analysis	4 (2-0-2)
DS6A-423	Architecture of High Performance Computers	4 (2-0-2)
DS6A-425	Multivariate Analysis	4 (2-1-0)
ELECTIVE GENERIC: The students can choose following course or any other UG level generic course being run in this campus.		
DS6A-441	Professional Practices	3 (2-0-0)
Comprehensive Viva-Voce		
DS6A-451	Comprehensive Viva-Voce	4

Eighth Semester:

Code	Title	Credits (L T P)
CORE COURSES		
DS6A-402	Machine Learning	4 (2-0-2)
DS6A-404	Statistical Research Methods	4 (3-1-0)
DS6A-406	Data Mining and Data Warehousing	3 (2-0-2)
DS6A-408	Java programming	3 (2-0-2)
ELECTIVE COURSES-DISCIPLINE CENTRIC (Any Two)		
DS6A-422	Scientific Computing	4 (2-1-0)
DS6A-424	Natural Language Processing	4 (2-0-2)
DS6A-426	Web Mining	4 (2-0-2)
Summer Training/ Internship		
DS6A-442	Internship	6 (0-0-10)

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Comprehensive Viva-Voce		
DS6A-452	Comprehensive Viva-Voce	4

Ninth Semester:

Code	Title	Credits (L T P)
CORE COURSES		
DS6A-501	Hadoop	4 (2-1-2)
DS6A-503	Data Visualization	4 (2-1-2)
DS6A-505	Decision Analysis	3 (2-1-0)
DS6A-507	Spark	3 (2-0-2)
DS6A-509	Deep Learning	3 (2-1-0)
ELECTIVE COURSES-DISCIPLINE CENTRIC (Any Two)		
DS6A-521	Social Network Analysis	4 (2-1-2)
DS6A-523	Scala Programming	4 (2-1-2)
DS6A-525	Massive Graph Analysis	4 (2-1-2)
ELECTIVE GENERIC: The students can choose following course or any other UG level generic course being run in this campus.		
DS6A-541	Technical Communication	3 (2-1-0)
Comprehensive Viva-Voce		
DS6A-551	Comprehensive Viva-Voce	4

Tenth Semester:

Code	Title	Credits (L T P)
CORE COURSES		
DS6A-502	M.Tech. Dissertation	12 (0-0-24)
Comprehensive Viva-Voce		
DS6A-552	Comprehensive Viva-Voce	4

Note: The above course contents can be modified as per requirement from time to time in accordance with University Ordinance No. 14.
