SCHOOL OF DATA SCIENCE AND FORECASTING

PROGRAM CODE: DS7A   BATCH: 2020-22

PROGRAM TITLE: MASTER OF TECHNOLOGY (M.Tech.) - DATA SCIENCE

AICTE approved M.Tech. programme in Future Studies and Planning has been running in the School since 1990. Now, the programme has been restructured and renamed as M.Tech. in Data Science after approval of the State Govt. The programme with new name has also been approved by the AICTE, New Delhi.

There are many applications, such as climate change, social media, healthcare, e-commerce, weather forecast, etc., that are generating massive amounts of data with volume, velocity, variety, veracity and value at an unprecedented scale. This has led to a critical demand of skilled professionals, Data Scientists, who can mine and interpret the data. Making sense of this massive data is a very difficult challenge for scientific, technological and industrial disciplines. Data science is concerned with the acquisition, storage, retrieval, processing and finally the conversion of data into knowledge where the quantum of data is very large. Three disciplines that have strong relationships with data science are computer science, mathematics and statistics.

The Master of Technology (M.Tech.) programme in Data Science is designed to meet such demands and train the next generation of data scientists. This is a two year postgraduate interdisciplinary course spread over four semesters. The curriculum covers subjects such as linear algebra, calculus, forecasting methods, operations research, statistical research methods, Hadoop/Spark, R, Python, Big data, cloud computing, system dynamics, etc. Students have the opportunity to gain hands-on experience with a variety of analytical tools available for the purpose of structuring large data sets to unearth hidden information to allow the organizations to build and sustain a long-term competitive advantage. The capstone of the programme is a dissertation during second year in which students apply the acquired theoretical knowledge in data science to solve real-world business problems.

Objectives:
The broad objectives of the programme are as follows:

- To train and develop in depth understanding of the key technologies in data science such as database management, data mining, data visualization techniques, Hadoop, R, forecasting methods, and statistics.
- To provide opportunities of higher studies in the area of data science.
- To impart knowledge on various theoretical and practical aspects of data science.
- To practice problem analysis and decision-making.
- To gain practical, hands-on experience with statistical programming languages and big data tools.

PROGRAM OUTCOMES:

- Understanding of the key technologies in data science such as database management, data mining, data visualization techniques, Machine Learning, Hadoop, R, forecasting methods, and statistics.
- Demonstrate knowledge of mathematical and statistical skills.
- Demonstrate use of team work, leadership skills, and decision making.
- Opportunities of higher studies in the area of Data Science.
- Knowledge on various theoretical and practical aspects of data science.

PROGRAM SPECIFIC OUTCOMES:

- Work with messy data, applying models, and understanding the business context.
- Work with unstructured data from various sources like video and social media.
- Use Data Visualization techniques.
- Write the programming codes in R and Python.
- Employ cutting edge tools and technologies to analyze Big Data.

Eligibility:

At least 55% aggregate marks in B.E./B.Tech. in any relevant branch (CSE/IT/Any other computer related) of Engineering or Masters degree in Physics / Mathematics/ Statistics / Computer Science or any other equivalent degree. Relaxation of 5% marks in eligibility for sponsored/ SC/ ST candidates.

For sponsored candidates minimum two years working experience after qualifying degree is required. The sponsored candidates have to submit a certificate from the employer on the prescribed Performa.

AGE LIMIT: As per the directives of Government of Madhya Pradesh, there is no upper age limit for admission in the programme.

Admission Procedure:

GATE qualified candidates will be preferred for admission. Admissions will be given as per GATE score. However, if seats are vacant due to non-availability of the GATE qualified candidates, then NON-GATE candidates will be admitted as per the merit developed on the basis of % of marks obtained in the qualifying examination.

The sponsored candidates will be admitted as per the merit developed on the basis of % of marks obtained in the following categories:

Category	Qualifying examination	Written Test	Interview	Service Experience*	Total
Max. Marks	100	50	30	20	200

* Service experience - 2 marks per year limited to max. 20 marks.

Seats: Unreserved-10; SC-1; ST-2; Sponsored-5 (Total seats: 18).

Duration: Four Semesters (Two Years).

Scholarships:

Scholarship is provided directly to the GATE qualified candidates by AICTE through DBT (Direct Benefit Transfer). Candidates must note that the University/School does not take any responsibility in this regard.

Fee Structure for Batch 2020-22:

Semester	Academic Fee	Development & Maintenance Fee	Students' Services Fee		Examination Fee	Total (Rs.)	
			Boys	Girls		Boys	Girls
First	7000	5500	3300	3111	2500	18300	18111
Second	7000	5500	2911	2722	2500	17911	17722
Third	7000	5500	3300	3111	2500	18300	18111
Fourth	7000	5500	2911	2722	2500	17911	17722

- Caution money (Refundable) of Rs. 4000/- will be charged additionally in the first semester.
- Alumni Fee of Rs. 500/- will be charged extra in the first semester.
- Rs. 5000/- per semester will be charged additional from sponsored candidates as Development and Maintenance Fee.
- If a student repeats a paper(s) in a semester, an additional fee of Rs.500/- per paper shall be payable.
- For NRI/ FN/ PIO Candidates, a fee of US$ 3500 Per Annum shall be payable on yearly basis. They will have to pay a refundable deposit of US$ 500 once at the time of admission.
- Hostel Fee and Central Library Fee will be extra.

Curriculum:

First Semester:

Code	Title	Credits (L-T-P)
CORE COURSES		
DS7A-701	Operations Research	4 (3-1-0)
DS7A-703	Statistical Computing	4 (3-1-0)
DS7A-705	RDBMS and NOSQL	3 (2-0-2)
DS7A-707	Python for Analytics	3 (2-0-2)
DS7A-709	Laboratory-Advanced Excel	2 (0-0-4)
ELECTIVE COURSES-DISCIPLINE CENTRIC (Any Two)		
DS7A-721	Cloud Computing	3 (2-1-0)
DS7A-723	Statistical Programming in R	3 (2-0-2)
DS7A-725	Multivariate Analysis	3 (2-0-2)
ELECTIVE GENERIC: The students can choose following course or any generic course being		

	offered in other M.Tech. programmes being run in this campus.	
DS7A-741	Fundamentals of Algorithms	3 (2-1-0)
DS7A-751	Comprehensive Viva-Voce	4

Second Semester:

Code	Title	Credits (L T P)
CORE COURSES		
DS7A-702	Forecasting Methods	4 (2-1-2)
DS7A-704	Big Data Technologies	3 (2-0-2)
DS7A-706	Linear Algebra and Advanced Calculus	3 (2-1-0)
DS7A-708	Machine Learning	3 (2-0-2)
DS7A-710	Data Mining and Data Warehousing	3 (2-0-2)
ELECTIVE COURSES-DISCIPLINE CENTRIC (Any One)		
DS7A-722	Scientific Computing	3 (2-1-0)
DS7A-726	Web Mining	3 (2-0-2)
ELECTIVE GENERIC: The students can choose following course or any generic course being offered in other M.Tech. programmes being run in this campus.		
DS7A-742	Technical Communication	3 (2-1-0)
DS7A-752	Comprehensive Viva-Voce	4

Third Semester:

Code	Title	Credits (L T P)
CORE COURSES		
DS7A-801	Natural Language Processing	3 (2-0-2)
DS7A-803	Modelling and Simulation	3 (2-0-2)
DS7A-805	Deep Learning	3 (2-0-2)
DS7A-807	Java	3 (2-0-2)
DS7A-809	Data Visualization	3 (2-0-2)
ELECTIVE COURSES-DISCIPLINE CENTRIC (Any One)		
DS7A-821	Internet of Things	3 (2-1-0)
DS7A-823	Predictive Analytics	3 (2-0-2)
ELECTIVE GENERIC: The students can choose following course or any generic course being offered in other M.Tech. programmes being run in this campus.		
DS7A-841	Minor Project	3 (2-1-0)
DS7A-851	Comprehensive Viva-Voce	4

Fourth Semester:

Code	Title	Credits
DS7A-802	M.Tech. Dissertation/ Internship	12

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