SCHOOL OF DATA SCIENCE AND FORECASTING

M.Tech. (Data Science) for Working Executives:

There are many industries, such as social media, healthcare, insurance, e-commerce, transport, government, banking, telecommunications, etc., that are producing massive amounts of data, the so-called "BIG DATA", with Volume, Velocity, Variety, Veracity and Value (the five "Vs" of Big Data challenges) at an unprecedented scale. This has led to a critical need for skilled professionals, popularly known as *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.

Unfortunately, there is a gap between the demand and supply of data scientists and technologists. To fill up this gap School of Data Science and Forecasting has developed a two-year M.Tech. program in Data Science area that is flexible and can be self-paced. This program is exclusively designed to cater to the needs of **working executives**, wherein a candidate is expected to earn about twelve credits per semester from theory-cum-practical classes and remaining eight credits per semester from online courses and project work. The classes will be held over the weekends (or other timings suitable for working professionals). About 12-14 hours teaching-cum-practical classes per week will be conducted.

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 project work in each semester 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 data mining, data visualization techniques, Hadoop, R, forecasting methods, and statistics.
- 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.

Eligibility:

The candidate should have at least 55% aggregate marks in B.E. / B.Tech./ M.Sc. in a relevant subject or any other equivalent degree (including M.C.A.) from a recognised University. Relaxation of 5% marks in eligibility for SC/ ST candidates. Relevant subjects, for admission in M.Tech. Data Science, are CS/CSE/IT/Maths./Physics/ Statistics/ Computer Applications or other computer related subjects.

The candidates must have minimum two years of working experience after qualifying degree. The candidates have to submit a certificate from the employer on the prescribed Performa.

Admission Procedure:

The 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.

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

Seats:

Total Seats - 15 (Reservation as per State Govt. Rules).

Duration:

Four Semesters (Two Years).

Fee Structure for Batch 2019-21:

Semester	Academic Fee	Development & Maintenance Fee	Students' Services Fee		Examination Fee	Total (Rs.)	
			Boys	Girls		Boys	Girls
First	15000	12500	3300	3111	2500	33300	33111
Second	15000	12500	2911	2722	2500	32911	32722
Third	15000	12500	3300	3111	2500	33300	33111
Fourth	15000	12500	2911	2722	2500	32911	32722

- 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.
- If a student repeats a paper(s) in a semester, an additional fee of Rs.500/- per paper shall be payable.
- Candidates have to separately bear the fee for registering for MOOC courses.

- 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.

Learning Outcomes and Job Opportunities:

Fundamental knowledge in

Data Science, Forecasting, Statistical Methods, Operations Research, and System Dynamics.

Advanced knowledge in

Data Science and Analytics.

Ability for employment as

Data Scientist, Business Analyst, Consultant, Govt. Jobs, - Analyst, Professionals in Higher Education.

Ability for higher education and research in the areas of

Predictive Modelling, Data Science, Scenario development and analysis.

Curriculum:

First Semester:

Code	Title	Credits (L-T-P)
CORE COURSES		
DSE-701	Data Representation and Visualization	4 (2-1-2)
DSE-703	Statistical Research Methods	4 (2-1-2)
DSE-705	Python for Analytics	3 (2-0-2)
DSE-707	Laboratory-Advanced Excel	2 (0-0-4)
ELECTIVE COURSES-DISCIPLINE CENTRIC (Any One) through Online		
DSE-721	Data Mining and Warehousing	3 (2-0-2)
DSE-723	Multivariate Analysis	3 (2-0-2)
ELECTIVE GENERIC:		
DSE-751	Minor Project-I	4 (0-0-8)

Second Semester:

Code	Title	Credits (L T P)
CORE COURSES		
DSE-702	Operations Research	4 (3-1-0)
DSE-704	Big Data Technologies	6 (4-1-2)
DSE-706	Linear Algebra and Advanced Calculus	3 (2-1-0)
ELECTIVE COURSES-DISCIPLINE CENTRIC (Any One) through Online		
DSE-722	Cloud Computing	3 (2-1-0)
DSE-724	Web Mining	3 (2-0-2)
ELECTIVE GENERIC:		
DSE-752	Minor Project-II	4 (0-0-8)

Third Semester:

Code	Title	Credits (L-T-P)
CORE COURSES		
DSE-711	Econometrics	4 (3-1-0)
DSE-713	RDBMS and NOSQL	3 (2-0-2)
DSE-715	Forecasting Methods	3 (2-1-0)
DSE-717	Machine Learning	3 (2-0-2)
ELECTIVE COURSES-DISCIPLINE CENTRIC (Any One) through Online		
DSE-725	Statistical Programming in R	3 (2-0-2)
DSE-727	Technical Communication	3 (2-0-2)
ELECTIVE GENERIC:		
DS-753	Minor Project-III	4 (0-0-8)

Fourth Semester:

Code	Title	Credits (L T P)
CORE COURSES		
DSE-712	Data Security	4 (2-1-2)
DSE-714	Stochastic Processes and Simulation	3 (2-0-2)
DSE-716	Decision Analysis	3 (2-0-2)
DSE-718	Internet of Things (IOT)	3 (2-0-2)
ELECTIVE COURSES-DISCIPLINE CENTRIC (Any One) through Online		
DSE-726	Natural Language Processing	3 (2-0-2)
DSE-728	Social Media Analysis	3 (2-0-2)
ELECTIVE GENERIC:		
DSE-754	Minor Project-IV	4 (0-0-8)

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