DEPARTMENT OF INFORMATION TECHNOLOGY:: VRSEC M.TECH-23 REGULATIONS COURSE OUTCOMES

Course Code	Course Name	CO	Course outcomes
23ITDS1001	Mathematical Foundations For Data Science		
		CO1	Understand basic mathematical concepts like calculus and linear algebra
		CO2	Derive the probability mass and density functions of transformation of random variables
		CO3	Apply the mathematical and probabilistic foundations of statistical inference in computing
		CO4	Interpret the results of Regression and Correlation Analysis, for forecasting , perform analysis of variance
23ITDS1002	Advanced Data Structures And Algorithms		
		CO1	Analyze the time and space complexity of the algorithms
		CO2	Experiment with Tree structures to solve the problems
		CO3	Develop algorithms using Graph structure to solve real-life problems
		CO4	Apply suitable data structure and design strategy to solve computing problems
23ITDS1003	Machine Learning		
		CO1	Summarize the fundamental concepts of machine learning
		CO2	Apply linear, distance based, and decision tree based models for a given scenario
		CO3	Analyze probabilistic, neural network models

		CO4	Design a suitable machine learning model for a real world application
23ITDS1014 A	Statistics With R		
		CO1	Demonstrate The Semantics, Data Handling And Control Statements In R.
		CO2	Apply Data Manipulation Techniques And Linear, Nonlinear Models On The Given Datasets.
		CO3	Analyze The Relationship Among Data Attributes With Appropriate Techniques.
		CO4	Construct Suitable Plots Using Data Visualizations In R For The Given Application.
23ITDS1014 B	Advanced Java Programming		
		C01	Understand features of Spring Boot, Spring Framework, Spring cloud and process involved to connect to Java Database Connectivity
		CO2	Apply concepts of Servlets to develop server side applications
		CO3	Design web applications with Spring Boot Annotations and connecting to JPA with Spring MVC and Spring Boot
		CO4	Develop Representational State Transfer services in Spring Boot applications Understand Object Oriented Programming and threads concepts in Java.
23ITDS1014 C	Data Analysis With Python		
		CO1	Illustrate the fundamental concepts of Python for data analysis.
		CO2	Comprehend data by assessing its characteristics, engage in data preprocessing, and data visualization techniques
		CO3	Analyze various Python packages, including those for mathematical, scientific, and web data analysis.

		CO4	Evaluate the model development process for data analysis, and performance assessment.
23ITDS1015 A	Data Science For Decision Making		
		CO1	Outline the concept of data driven decision making.
		CO2	Apply the knowledge of data analysis to solve decision problems.
		CO3	Identify appropriate courses of action for a given managerial situation whether a problem or an opportunity
		CO4	Design viable solutions to decision making problems.
23ITDS1015 B	Cloud Data Engineering		
			Summarize the needs to migrate databases onto the cloud systems
			Identify data management in the cloud system to minimize risks of data loss and improper data handling.
			Apply the cloud features to protect systems on the network
			Analyse the impact of using cloud data systems and its migration
23ITDS1015 C	Cyber Security&Forensics		
			Categorize various types of attacks in Information security
			Apply data leakage prevention, protection and security policies on data
			Explore the role of Digital Forensics and its readiness
			planning in investigation Process
			Analyze First Responder Procedure through Computer Forensics Investigation Process
23MTMC102	Research		
6	Methodology And		

	IPR		
		CO1	Acquire an overview of the research methodology
			andtechniquesto define research problem
		CO2	Review the literature and identify the problem.
		CO3	Analyze the optimum sampling techniques for collected data.
		CO4	Apply various forms of the intellectual properties for
			research work.
23ITDS1051	Advanced Data		
	Structures And		
	Algorithms Lab		
		CO1	Implement operations on tree data structures.
		CO2	Perform operations on balanced data structures
		CO3	Apply graph data structure to solve real world problems
		CO4	Design an optimal solution using appropriate data structures
			and design techniques
23ITDS1052	Statistics With R		
Α	Lab		
		CO1	Interpret different types of data manipulation and group
			manipulation operations
		CO2	Apply data visualizations tools to displaypatterns and
			insights of data.
		CO3	Build classification and regression models in R
		CO4	Develop solutions to data analysis problems using statistical
			techniques
23ITDS1052	Advanced Java		
В	Programming Lab	604	
		CO1	Implement Java Database Connectivity Application
		000	Programming Interface to connect to relational databases
		CO2	Build server side applications to interact with server using
		CO2	Java Services
		CO3	Implement dependency injection and inversion of control to

			solve problems in Spring Boot.
		CO4	Create Spring Boot applications to solve real world problems
			that uses Representational State Transfer services
23ITDS1052	Data Analysis With		
C	Python Lab		
		CO1	Demonstrate competence in decision control, string
			handling, list manipulation, and object-oriented design.
		CO2	Apply data analysis skills to glean insights from diverse
			datasets.
		CO3	Analyze web data critically to derive actionable business
			insights.
		CO4	Create innovative data solutions, employing advanced
			processing and visualization techniques.
		CO5	Evaluate data quality and reliability critically, cultivating
			discernment and data-driven decision-making for informed
			outcomes.
23ITDS1052	Advanced Java		
B	Programming Lab		
		CO1	Implement Java Database Connectivity Application
			Programming Interface to connect to relational databases
		CO2	Build server side applications to interact with server using
			Java Servlets
		CO3	Implement dependency injection and inversion of control to
			solve problems in Spring Boot.
		CO4	Create Spring Boot applications to solve real world problems
			that uses Representational State Transfer services
23ITDS1052	Data Analysis With		
C	Python Lab	601	
		CO1	Demonstrate competence in decision control, string
		~ ~ ~ ~	handling, list manipulation, and object-oriented design.
		CO2	Apply data analysis skills to glean insights from diverse
			datasets.

		CO3	Analyze web data critically to derive actionable business insights.
		CO4	Create innovative data solutions, employing advanced processing and visualization techniques.
		CO5	Evaluate data quality and reliability critically, cultivating discernment and data-driven decision-making for informed outcomes.
23ITDS2001	Bigdata Framework For Data Science		
		CO1	Summarize Big Data Characteristics, Hadoop, Hive, Hdfs And Map Reduce Architectures.
		CO2	Experiment With Nosql Databases To Process Unstructured And Semi Structured Data.
		CO3	Apply Pig Latin, Hive Scripts And Map Reduce Programming On Real Time Applications.
		CO4	Perform In-Memory Data Analytics With Spark And Spark Streaming.
23ITDS2002	Deep Learning		
		CO1	summarize basic concepts of neural networks, back propagation, Attention mechanisms
		CO2	Apply ANN, CNN, Auto encoders and GANs on image processing applications
		CO3	Design a suitable RNN model for time series applications
		CO4	Create a suitable intelligent model for the given application
23ITDS2003	Data Visualization And Interpretation		
		CO1	Articulate objectives of Data Visualization and techniques
		CO2	Analyze data to create a visualization for various real-time applications
		CO3	Develop programs and map visual layouts & graphical properties.
		CO4	Create and publish visualizations that enable clear

		interpretations of big, complex and real world data
23ITDS2014	Business Analytics	
A	And Modelling	
		Understand the foundational concepts in business analytics,
		encompassing the evolution, scope, and models.
		Analyze and model probability distributions, enabling them
		to make informed decisions based on various types of data.
		Develop appropriate forecasting techniques, demonstrating an
		ability to analyze time series data and implement statistica
		models for accurate predictions.
		Integrate optimization methods and decision analysis for
		solving complex business problems by applying linear
		optimization and decision-making strategies.
23ITDS2014	Image And Video	
В	Analytics	
		Illustrate the principles and techniques of digital image in
		applications related to digital imaging system
		Understand various image preprocessing techniques and their
		significance.
		Analyze various standard deep learning networks for real
		time applications.
		Understand the fundamentals of digital video processing
23ITDS2014	Natural Language	
С	Processing	
		Apply Pre-Processing Techniques On Text Data.
		Solve NLP Problems Using Probabilistic Language Models
		Analyze Linguistic Structure In Text, Using Parsing And
		CFG
		Construct Syntactic And Semantics Structures For A Given
		Sentence
		Apply Pre-Processing Techniques On Text Data.
23ITDS2015	Web Mining And	

Α	Social Network	
	Analysis	
		Apply graph basics to analyze the social media data and measure the network measures
		Derive the similarities of people in the society and find the communities in the society.
		Generate recommendations, social recommendations and evaluate recommendations.
		Measuring influence and homophily, Analyze the individual behavior and collective behavior
23ITDS2015	Optimization	
В	Techniques For	
	Data Analysis	
	•	Summarize various techniques used for optimization
		problems arising from engineering areas.
		Analyze optimization algorithms for Linear Programming problems
		Solve various constrained and unconstrained nonlinear programming problems
		 Apply modern and multi objective optimization techniques to provide optimal solution for real time problems
23ITDS2015 C	Information Retrieval Systems	
		Interpret the basic concepts and techniques in Information Retrieval
		Evaluate information retrieval system performance and queries formulation
		Infer relevance feedback and query operations on a text database
		Analyze the web characterization, web search tasks. and digital libraries implications
23MTAC203	Technical Report	

6	Writing		
		CO1	Understand the significance of Technical Report Writing.
		CO2	Develop proficiency in writing technical reports.
		CO3	Apply the basic principles to prepare documentation using LATEX.
		CO4	Understanding the need of Bibliography and Reference Books for quality report writing
23ITDS2051	Big Data Lab		
			Implement Hdfs And Map Reduce Paradigm For Batch Oriented Applications.
			Apply NoSQL Concepts To Store And Process Varieties Of Data.
			Solve Data Intensive Problems Using Pig Latin And Hive.
			Develop Solutions For Real Time Problems Using Spark.
23ITDS2052	Data Visualization Lab		
			Understand the visualization pipeline with its relationship to other data
			Design considerations for the components of the good visualization
			Construct visualizations for different attributes and showcase them in plots, interpret using R/Python
			Construct visualizations for effective data analysis
23ITDS2063	Term Paper		
		CO1	Identify real world problems related to Data Science area
		CO2	Analyse the problems from its state of the art for arriving at feasible solutions
		CO3	Prepare an organized report employing elements of technical writing & critical thinking
		CO4	Summarize and communicate the content to audience in an

			effective manner
23ITDS3061	Project Part-A		
		CO1	Identify a topic in relevant areas of Data Science
		CO2	Review literature to identify gaps and define objectives & scope of the project
		CO3	Apply appropriate research methodology to provide a solution to the chosen problem
		CO4	Prepare a technical report effectively using modern tools
23ITDS4061	Project Part-B		
		CO1	Identify methods and resources to carry out analysis and experiments
		CO2	Reorganize the procedures with a concern for society, environment and ethics
		CO3	Generate possible alternative solutions to chosen problem, compare, analyze them and derive performance metrics of the result
		CO4	Prepare a comprehensive report of the project work and also explore the possibility of publishing the work.