

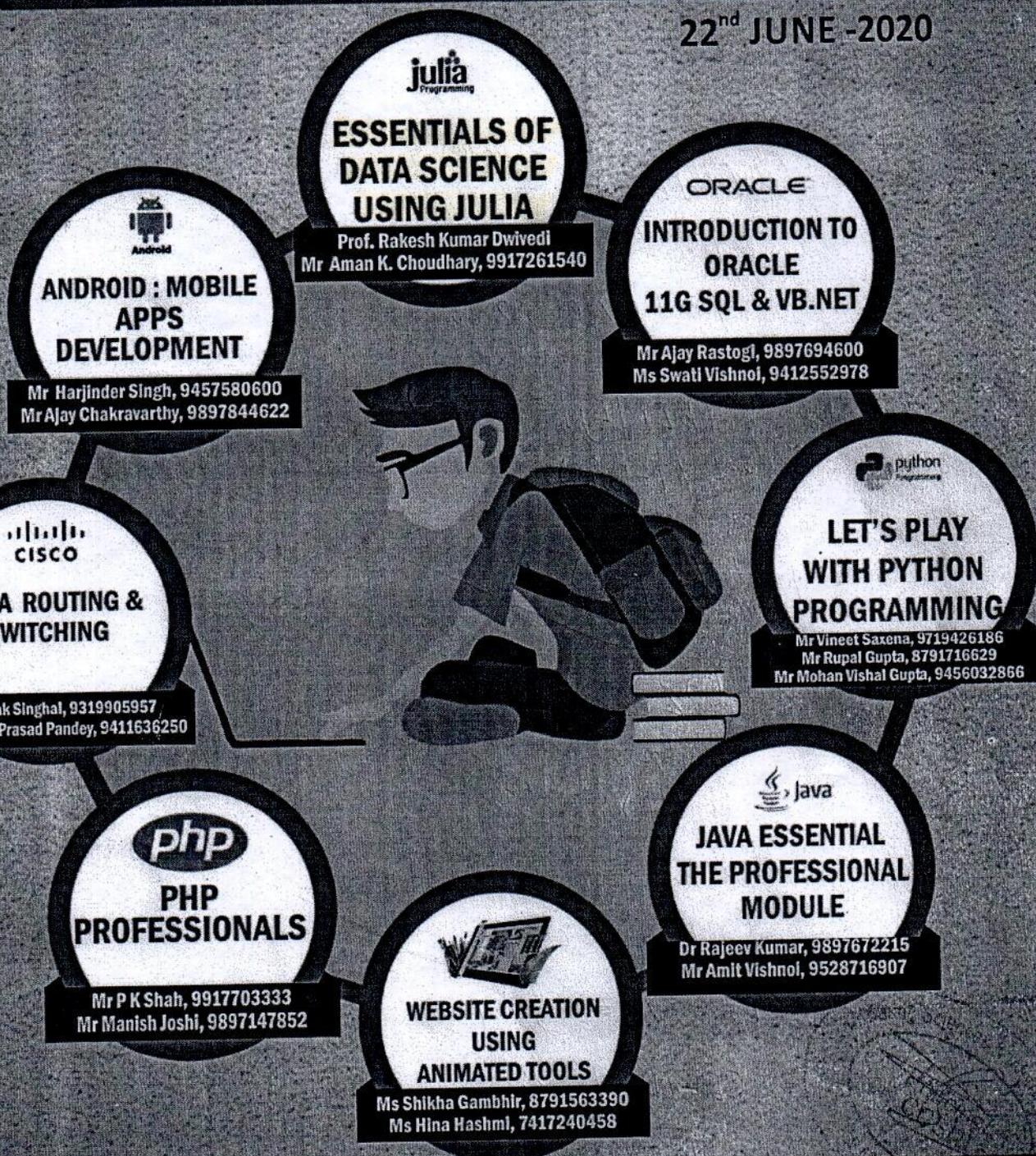


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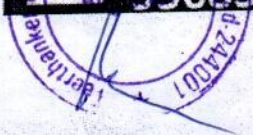
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Faculty of Engineering & Computing Sciences
Teerthanker Mahaveer University,
Delhi Road. Moradabad - 244 001. U.P. INDIA



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+91 - 9568516000,
9568517000, 7351418000



(2020-21)

Essentials of Data Science using Julia (Introduction to Data Science using Julia)

Duration: 40 Hrs

Modules: Total 6 Modules

Prerequisite: Basic Programming Knowledge (Like C language)

1. Data Science and Machine Learning: The requirement of time

- a. Introduction to Data Science
 - i. What is this?
 - ii. Why?
 - iii. Where?
- b. Introduction to Machine Learning
 - i. What is this?
 - ii. Why?
 - iii. Where?

2. Julia's Basic

- a. Introduction to Julia
- b. Installation instructions (Windows / Linux)
- c. Basic Constructs of Julia
 - i. Variables, Numbers and Comments
 - ii. Strings, Arrays, Tuples, Dictionary, Set
 - iii. Conditional Structure and Looping
 - iv. Functions and Packages

3. Julia's Essential Libraries of Data Science : Managing Third Party Package in Julia

- a. **Vector & Matrix Processing** : The Numerical Julia
 - i. Random Package :A brief introduction and installation instructions
 - ii. Random Package : Usage and Operations
 - iii. Algebra Operations: Built-in methods, vector methods and attributes
 - iv. Indexing, slicing, broadcasting & boolean masking
 - v. Arithmetic Operations & Universal Functions
- b. **Data Analysis with Data Frames** : The Data Frames in Julia
 - i. Introduction to Data Frames in Julia
 - ii. Installation Instructions
 - iii. Reading and Writing Data Frames
 - iv. Row and Column Operations in Data Frames
 - v. Reading CSV and other files
 - vi. Handling Missing Data
 - vii. Data Wrangling - Combining, merging, joining
 - viii. Data Frames Groupby



c. Data Visualization in Juila

- i. Installation Instructions to Plots Package
- ii. Plotting with **Plots**
 - 1. Plots Essentials 1- Basic Plotting Exercise
 - 2. Plots Essentials 2- Different types of plots
 - 3. Plots Essentials 3- Plotting DataFrames
 - 4. Plots Essentials 4- Visualizing real dataset
- d. Mini Project using real dataset

4. Essentials Statistics for DS and Data Wrangling

- a. Population & Sample
- b. Types of Data
- c. Introduction of Measures Central Tendency
- d. Data Mangling in Julia

5. GLM Package of Julia: Basic ML in Julia

- a. Introduction to ML - What, Why?
- b. Introduction to GLM Package
- c. **Regression Model** : Introduction
 - i. GLM 1: Linear Regression Model - Hands-on
 - ii. Project Demonstration using real dataset using linear regression
- d. **Classification Model** : Logistic Regression Introduction
 - i. GLM 2: Logistic Regression Model - Hands-on
- e. **Multiple Linear Regression** : Introduction
 - i. GLM 3: Multiple Regression Model- Hands-on

6. Projects : DS & ML (More Exercise, Project Phases and Assessment)

- a. 2 Projects on real dataset based on the learning : Phases of Data Science Project
 - i. Collection of Data
 - ii. Data Mangling / Wrangling (EDA)
 - iii. Data Visualization
 - iv. Model Selection
 - v. Model Preparation
 - vi. Model Evaluation & Deployment
- b. Two MCQ Quiz Assessment
- c. Final Project for Assessment

