

# DEPARTMENT OF COMPUTER SCIENCE

Dyal Singh College, University of Delhi

(ACADEMIC SESSION, 2022-23)

Course: B.Sc. (Hons.) Computer Science (V Semester)

Paper Code and Name: 32341502-Theory of Computation (TH/PR)

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## FACULTY

Name of Teacher: Dr. Sheetal Rajpal

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## ASSESSMENT DETAILS

Total Marks for the course is 100, comprising following components

- Attendance – 5 marks
  - Individual Assignment – 10 marks
  - Test/ Presentation – 10 marks
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## TEACHING PLAN

Week	Topics Covered/ Assignments/ Test/Presentations
1-2	Languages - Basic operations, kleene star, kleene closure Regular Expression - Definition, usage, and building up of expression.
3-4	Finite Automata (FA), Transition Graphs (TG), FA vs TG, Generalized Transition Graphs
5-6	Kleene's Theorem - Union, Concatenation, and Product Non-Deterministic Finite Automata, Conversion to Deterministic Finite Automata
7-8	Complement and Intersection of Regular Languages Pumping Lemma for Regular Languages
9-10	Context Free Language (CFL), Context Free Grammar (CFG), Parse Tree Pushdown Automata: Deterministic and Non-deterministic
11-12	Properties of Context Free Language and Pumping Lemma for CFL Introduction to Turing Machine
13-14	Configuration of Turing Machine and computation. Church Turing Thesis, Semi-Decidability, Recursively Enumerable and Recursive languages
15	Universal Turing Machine, Halting problem.

# DEPARTMENT OF COMPUTER SCIENCE

Dyal Singh College, University of Delhi

(ACADEMIC SESSION, 2022-23)

Course: B.Sc. (Prog.) Computer Science (III Semester)

Paper Code and Name: 42343307--Data Analysis using Python (TH/PR)

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## FACULTY

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## ASSESSMENT DETAILS

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## TEACHING PLAN

Week	Topics Covered/ Assignments/ Test/Presentations
1-2	Fundamentals of Python. Using Python as a tool for Data Analysis. Introduction of Python shell iPython and Jupyter Notebook. Essential Python Libraries: NumPy, pandas, matplotlib, IPython and Jupyter, SciPy, scikit-learn, statsmodels
3-4	NumPy Basics: Arrays and Vectorized computation: The NumPy ndarray, Universal Functions, Array Oriented Programming with Arrays
5-6	Pandas Library: Introduction to pandas Series and DataFrames, Essential Functionality, Summarizing and Computing Descriptive Statistics.
7-8	Importing and Exporting Data in Python: Installing, loading and using packages for importing and exporting data in Python
9-10	Data Preprocessing and Transformation: Handling of missing data, Data cleaning, Data Transformation and String Manipulation
11-12	Data Exploration: Exploring data using statistical methods: mean, median, mode, quantiles. Building a contingency table.
13-14	Data Aggregation and Group Operations Data Visualization: Basics of matplotlib- Scatter Plot, line graph, histogram, boxplot, line plots regression,
15	Data Visualization (contd.): word clouds, exporting plots as images, Plotting with pandas and seaborn