**Course Handout**

**TE Computer Engineering (2015 Course) w.e.f. June 2017**

**Skill Development Lab ( 310246 )**

**Name of Faculty :K.P.Birla**

**Teaching scheme :** Tutorial:2 hours/week Practical:4 hours/week

**Examination scheme:** Term work: 50 Marks

Oral: 50 Marks

**Date of Commencement of the term : 15 /06/2019 (Ist Term) 16 /12/ 2019 (II Term)**

**Date of Conclusion of Teaching: 16 / 10 /2019 (II Term) 11 /04/ 2019 (II Term)**

**Oral Exam : 18/10/2019 to 5/11/2019(Ist Term) 13/4 to 27/4/ 2019 (IInd Term)**

**Continuous Assessment Policy**

**(Term work marks of 50 will be awarded based on following policy)**

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| --- | --- | --- |
| Description | Weigtage | Evaluation criteria |
| Attendance in laboratory work | 10 Marks | Attendance between 95 and above --10marks  Attendance between 91 to 95 % --- 8marks  Attendance between 86 to 90 % --- 6marks  Attendance between 81 to 85 % --- 4marks  Attendance between 75 to 80 % --- 2marks |
| Timely Checking of laboratory work | 10 Marks | Each experiment / assignment will get 10 marks for timely submission.  Late submission will be valued as 0 in totality. Average of all experiments / assignments will be converted into 10 |

**Teaching Plan**

|  |  |  |
| --- | --- | --- |
| Lecture No. | Topics to be explored | Completion of topic : Date |
| I | **Python Basics :** Data types, Statements and Expressions, Operators and Math’s, Conditionals, Loops,  Strings, List , Tuples , Set Operation, Dictionary (Dict), Date and Times. | 25/6/2019 |
| II | **Functions, Packages and Classes:** Lambda function, Regular expression, Packages, Files, Exception  Handling, Classes, Objects, Method ,class and instance variable, constructor, destructor, inheritance. | 5/7/2019 |
| III | **Numpy and Matplotlib :**Array operations, Numpy Side Effects, 2D Numpy Arrays , Numpy Basic  Statistics, Universal Function, Matplotlib: Introduction, Simple plots, Line API, Legend API, Figures,  Subplots, Axes and Ticks | 16/7/2019 |
| IV | **Pandas:** Look Ups, Selections and Indexing, Filling Methods, Series operation, Handling NaN values,  Mapping, Data Frames, Reading Files, Plotting, Joins, Correlation, Histograms, Rolling calculation,  Date Time indexing, Grouping, Aggregate Functions, pandas.IO. Data, Panel. | 26/7/2019 |
| V | **Introduction to Data Science**- What is Data Science? Current landscape of perspectives, Skill sets  needed, The Data Science Process life cycle, Role of Data Scientist. Data pre-processing. ETL –  extract, transform, and load. | 9/8/2019 |
| VI | **Introduction to R**-What is R? Installation of R. Basic features of R. R Objects. Creating Vectors and  Matrices. Getting Data in and out of R. Using different packages related to data science. Managing  Data frames and Functions | 20/8/2019 |
| VII | **Descriptive Statistics using R -** Discrete and continuous random variables, densities and distributions  .Data Summarization: Measures of Central Tendency, Measures of Dispersion (quartiles, five number  summary, variance, standard deviation), Measures of shape (skewness, kurtosis), Measures of  association (covariance, correlation), Outliers. Using R for descriptive statistics and data visualization  using ggplot2 package | 30/8/2019 |
| VII | **Predictive Analysis using Machine Learning Techniques using R:** Machine learning - what, how,  where. Supervised, unsupervised and semi-supervised learning. Training, validation, testing,  generalization, over fitting. Building a Regression model using R. Features and feature engineering.  Using Decision trees, Linear classifiers, Naïve Bayes, Nearest neighbor methods in R packages. | 10/9/2019 |

**Schedule of submission**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Exp.No | Title | Batch | Date of Performance | Assessment starts on | Assessment completes on | In case ,assessment postpones, next date of completion |
| 1 | Word Count | A3  A1  A2 | 17/6/2019  18/6/2019  19/6/2019 | 24/6/2019  25/6/2019  26/6/2019 | 24/6/2019  25/6/2019  26/6/2019 | 1/7/2019  2/7/2019  3/7/2019 |
| 2 | Set Operations | A3  A1  A2 | 24/6/2019  25/6/2019  26/6/2019 | 1/7/2019  2/7/2019  3/7/2019 | 1/7/2019  2/7/2019  3/7/2019 | 8/7/2019  9/7/2019  10/7/2019 |
| 3 | Date and Time | A3  A1  A2 | 1/7/2019  2/7/2019  3/7/2019 | 8/7/2019  9/7/2019  10/7/2019 | 8/7/2019  9/7/2019  10/7/2019 | 12/7/2019  11/7/2019 13/7/2019 |
| 4 | Hangman Game | A3  A1  A2 | 8/7/2019  9/7/2019  10/7/2019 | 12/7/2019  11/7/201913/7/2019 | 15/7/2019  16/7/2019  17/7/2019 | 15/7/2019  16/7/2019  17/7/2019 |
| 5 | Graph Plotting | A3  A1  A2 | 12/7/2019  11/7/2019 13/7/2019 | 15/7/2019  16/7/2019  17/7/2019 | 22/7/2019  23/7/2019 24/7/2019 | 26/7/2019  25/7/2019  27/7/2019 |
| 6 | Data Cleaning | A3  A1  A2 | 15/7/2019  16/7/2019  17/7/2019 | 26/7/2019  25/7/2019  27/7/2019 | 29/7/2019  30/7/2019  31/7/2019 | 26/7/2019  25/7/2019  27/7/2019 |
| 7 | R installation and basic statistics | A3  A1  A2 | 26/7/2019  25/7/2019  27/7/2019 | 26/7/2019  25/7/2019  27/7/2019 | 5/8/2019  6/8/2019  7/8/2019 | 9/8/2019  8/8/2019  10/8/2019 |
| 8 | Data Preprocessing,Analysis and Visualization | A3  A1  A2 | 5/8/2019  6/8/2019  7/8/2019 | 9/8/2019  8/8/2019  10/8/2019 | 12/8/2019  13/8/2019  14/8/2019 | 16/8/2019  15/8/2019  17/8/2019 |
| 9 | Correlation and regression analysis | A3  A1  A2 | 9/8/2019  8/8/2019  10/8/2019 | 16/8/2019  15/8/2019  17/8/2019 | 19/8/2019  20/8/2019  21/8/2019 | 23/8/2019  22/8/2019  24/8/2019 |
| 10 | Case Study:  Machine Learning | A3  A1  A2 | 16/8/2019  15/8/2019  17/8/2019 | 23/8/2019  22/8/2019  24/8/2019 | 26/8/2019  27/8/2019  28/8/2019 | 2/9/2019  3/9/2019  4/9/2019 |
| 11 | Mini Project | A3  A1  A2 | 24/6/2019  25/6/2019  26/6/2019 | 2/9/2019  3/9/2019  4/9/2019 | 16/9/2019  17/9/2019  18/9/2019 | 20/9/2019  19/9/2019  21/9/2019 |

**Schedule of Expert lectures**

|  |  |  |  |
| --- | --- | --- | --- |
| Week / Date proposed | Actual date of conduction | Name of speaker | Topic of Lecture |
| **31/7/2019** |  |  | **Data science using Python** |
|  |  |  |  |

**Details of Term work**

**Oral** : The Oral is based on the term work which consists of a journal giving the detailed report on experiments and assignments performed and visit report.

**Text books recommended**

1) Zed A. Shaw, “Learn PYTHON The Hard Way”, Pearson, ISBN: 978-93-325-8210-1

2) Kenneth A Lambert and B L Juneja, “Fundamentals of PYTHON”, CENGAGE Learning,

ISBN:978-81-315-2903-4

3) Peng, Roger D and Elizabeth Matsui, “The Art of Data Science." A Guide for Anyone Who Works with Data. Skybrude Consulting 200 (2015): 162.

4) Evans, James R., and Carl H. Lindner, "Business analytics: the next frontier for decision

sciences." Decision Line 43.2 (2012): 4-6.

**Reference Books recommended**

1. Allen B Downey, “Think PYTHON”, O’Rielly, ISBN: 13:978-93-5023-863-9, 4th Indian Reprint 2015
2. Jiawei Han and Micheline Kamber, Morgan Kaufman, “Learning R, Richard Cotton”,

O’Reilly, ISBN: 13:978-93-5110-286-1, First Edition, Fourth Indian Reprint 2015

**Special instructions from Faculty:**

Try to get your mini project sponsored from industry, professional bodies.