

## Sant Gadge Baba Amravati University, Amravati

### Part B

#### Syllabus Prescribed for 3 Year BCA UG Programme

#### Programme: Bachelor of Computer Application (BCA)

#### Semester V

Code of the Course/Subject	Title of the Course/Subject	(Total Number of Hours)
<b>5BCA3</b>	<b>Fundamentals of Data Science</b>	<b>60</b>

**Cos: After completion of the syllabus student will be able to:**

1. Understand the Stages of data and its application in various field.
2. Clean the data for its processing.
3. Apply basics of statistics to the data.
4. Analyze the data
5. Develop data Model.

Unit	Content
Unit I	Introduction to Data Science – Evolution of Data Science – Data Science Roles – Stages in a Data Science Project – Applications of Data Science in various fields – Data Security Issues. <b>(12 Hours)</b>
Unit II	Data Collection and Data Pre-Processing Data Collection Strategies – Data Pre-Processing Overview – Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization. <b>(11 Hours)</b>
Unit III	Exploratory Data Analytics Descriptive Statistics – Mean, Standard Deviation, Skewness and Kurtosis – Box Plots – Pivot Table – Heat Map – Correlation Statistics – ANOVA. <b>(11 Hours)</b>
Unit IV	Model Development Simple and Multiple Regression – Model Evaluation using Visualization – Residual Plot – Distribution Plot – Polynomial Regression and Pipelines – Measures for In-sample Evaluation – Prediction and Decision Making. <b>(11 Hours)</b>
Unit V	Model Evaluation Generalization Error – Out-of-Sample Evaluation Metrics – Cross Validation – Overfitting – Under Fitting and Model Selection – Prediction by using Ridge Regression – Testing Multiple Parameters by using Grid Search. <b>(11 Hours)</b>
<b>*SEM Assignment, Class test, Attendance, Seminar, Study tour, Industrial visit, Field work, Group discussion or any other innovative practice/activity</b>	
<ol style="list-style-type: none"> <li>1. COs: To be able to draw upon foundational knowledge, learn, adapt and successfully bring to bear analytical and computational approaches on changing societal and technological challenges</li> <li>2. Cos: To assess the curricular skills acquired by students at college level through Assignments, Unit test, Internal Test, Group Discussion/Seminar/Mini Project, Study Tour</li> </ol>	
Activities	<ol style="list-style-type: none"> <li>1. Seminar,</li> <li>2. Design of Data Models.</li> </ol> <p style="text-align: right;"><b>(4 Hours)</b></p>

### Course Material/Learning Resources

Text books:

- 1) Data Science using Python: A Step-by-Step Practical Approach for Beginners.  
By Dr. Vishal Goyal Dr.Monika Bansal, Dr.Munish Jindal , Dr.Harmandeep Kaur. DPS PUBLISHING HOUSE.
- 2) Data Analytics using Python by Bharti Motwani Publication: Wiley

Reference Books:

1. Data Science and Machine Learning using Python by By Reema Thareja  
Published: August 1, 2022

Weblink to Equivalent MOOC on SWAYAM if relevant:

<https://medium.com/analytics-vidhya/top-10-moocs-for-learning-data-science-and-machine-learning-cc725ecfd551>

<https://www.my-mooc.com/en/categorie/data-analysis>

<https://www.my-mooc.com/en/categorie/data-visualization>

Weblink to Equivalent Virtual Lab if relevant:

[http://vlabs.iitb.ac.in/vlabs-dev/labs/machine\\_learning/labs/index.php](http://vlabs.iitb.ac.in/vlabs-dev/labs/machine_learning/labs/index.php)

<http://vlabs.iitb.ac.in/vlabs-dev/labs/python-basics/experiments/data-types-iitk/simulation.html>

<https://python-iitk.vlabs.ac.in/>

Any pertinent media (recorded lectures, YouTube, etc.) if relevant:

<https://www.youtube.com/watch?v=vPw734VvPqg>

<https://www.youtube.com/watch?v=MmfMncjyAkI>

<https://www.youtube.com/watch?v=11unm2hmvOQ>