



SIKKIM MANIPAL INSTITUTE OF TECHNOLOGY

DEPARTMENT OF COMPUTER APPLICATIONS

Data Analytics Using Python (CA 1308A)

EVEN SEMESTER 2025, BCA VI SEMESTER

LESSON PLAN

Faculty In-charge:
DIPENDRA GURUNG

LESSON PLAN

Name of Subject Teacher: Dipendra Gurung

Name of Subject: CA1308A Data Analytics Using Python

Department: Computer Applications

Semester (Section): VI

Total No. of Modules: 05

Hours Allotted Per Week: 04 (Theory)

Minimum Hours Allotted for Semester: 40

Credits: 04

SCHEDULE OF CLASSES

Sl . No.	Day	Period/Time
1.		
2.		
3.		
4.		
5.		

Total Working Days:

Total Working Hours:

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Subject Coordinator

HOD CA

Program Outcomes (PO)

PO 1	Computational Knowledge: Apply the knowledge of mathematics, fundamentals of computing, and fundamentals of machine learning to solve software development problems.
PO 2	Problem analysis: Identify, formulate, review and analyse computing processes and arrive at substantial conclusions using principles of mathematics, and computing sciences.
PO 3	Design/development of solutions: Design and evaluate solutions for <i>complex</i> computing problems, along with their components, and processes that meet the requirements with appropriate consideration of public health and safety measures.
PO 4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis, and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling for the computational problem with an understanding of its limitations.
PO 6	Environment and sustainability: Understand the impact of developing a solution for a computational problem in societal and environmental contexts and demonstrate the knowledge context of the sustainable development environment.
PO 7	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of professional computing practice.
PO 8	Individual and teamwork: Function effectively as an individual, and as a member or leader in diverse teams, and multidisciplinary settings.
PO 9	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 10	Project management and finance: Demonstrate knowledge and understanding of the computing and management principles and apply these to one's work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 11	Life-long learning: Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PO 12	Innovation and Entrepreneurship: Identify a timely opportunity and using innovation to pursue that opportunity to create value and wealth for the betterment of the individual and society at large.

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Course Outcome (CO)

Upon completion of this course, students will be able to

CO1	Implement Python program to read and write data to files, perform data processing using different Python constructs
CO2	Demonstrate data collection techniques, handle and pre-process data collected from various sources.
CO3	Apply various techniques/algorithms to generate models for analyzing data and collecting insights from them.
CO4	Assess the performance of techniques/algorithms used to analyze data.
CO5	Portray and describe findings using suitable visualizations and descriptions.

Bloom's Taxonomy Levels (1- Remembering, 2- Understanding, 3 – Applying, 4 – Analysing, 5 – Evaluating, 6 - Creating);

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EVEN SEMESTER, 2025
LESSON PLAN

Subject Code: CA1636

Subject Name: Data Analytics Using Python

Subject Teacher: Dipendra Gurung

1. **Objective:** Data, which is available in abundance and in accessible forms, if analyzed in an efficient manner unfolds many patterns and promising solutions. Data has to be pre-processed, converted to the required format and fed to an appropriately chosen algorithm to yield better results. This course aims at applying such techniques to raw data, using Python, to arrive at meaningful results.
2. **Scope:** Upon completing this course, the students will be able use Python to collect data, pre-process it, visualize and analyze them to extract meaningful information.
3. **Text Books:**
 1. Mark Lutz, “Programming Python”, O'Reilly Media, 4th edition, 2010.
 2. Mark Lutz, “Learning Python”, O'Reilly Media, 5th Edition, 2013.
4. **Reference Books:**
 1. Tim Hall and J-P Stacey, “Python 3 for Absolute Beginners”, Apress, 1st edition, 2009.
 2. Magnus Lie Hetland, “Beginning Python: From Novice to Professional”, Apress, Second Edition, 2005.
 3. Shai Vaingast, “Beginning Python Visualization Crafting Visual Transformation Scripts”, Apress, 2nd edition, 2014.
 4. Wes Mc Kinney, “Python for Data Analysis”, O'Reilly Media, 2012.
5. **Examination rules:**
 - a) **Questions to be set having equal weightage/marks from each unit:** FIVE (One from each module)
 - b) **Questions to be answered specific to each Unit:** All questions are compulsory

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6. LECTURE MODULES:

Module	Topics to be covered	Topics	Hrs
Module 1: Python Concepts, Data Structures, Classes	in class	Interpreter, Program Execution, Statements, Expressions, Flow Controls, Functions -Numeric Types, Sequences - Strings, Tuples, Lists and - Class Definition, Constructors, Inheritance, Overloading, Text & Binary Files - Reading and Writing.	[10]
	Assignment Topics	To be provided by the concerned faculty members	
Module 2: Data Wrangling	in class	Combining and Merging DataSets, Reshaping and Pivoting, Data Transformation, String Manipulation, Regular Expressions.	[7]
	Assignment Topics	To be provided by the concerned faculty members	
Module 3: Data Aggregation, Group Operations & Time Series	in class	Data Aggregation, Group Operations: GoupBy Mechanics, Data Aggregation, Group wise Operations and Transformations, Pivot, Tables and Cross Tabulations. Time Series: Date and Time Date Type tools, Time Series Basics, Data, Ranges, Frequencies and Shifting.	[7]
	Assignment Topics	To be provided by the concerned faculty members	
Module 4: Web Scraping	in class	Web Scraping: Data Acquisition by Scraping web applications –Submitting a form - Fetching web pages, Downloading web pages through form submission, CSS Selectors.	[8]
	Assignment Topics	To be provided by the concerned faculty members	
Module 5: Visualization in Python	in class	Visualization in Python: Matplotlib package, Plotting Graphs, Controlling Graph, Adding Text, More Graph Types, Getting and setting values, Patches.	[8]
	Assignment Topics	To be provided by the concerned faculty members	

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