**2022-23**

Bhavan

# BHAVAN'S VIVEKANANDA COLLEGE
## OF SCIENCE, HUMANITIES & COMMERCE

Sainikpuri, Secunderabad - 500094
Reaccredited with 'A' grade by NAAC
Autonomous College, Affiliated to O.U.

unp.education

Department of Mathematics & Statistics

# SEMINAR:
# Unlocking a rewarding career in Data Science & Analytics

**Date:** 11th October 2022

**Time:** 3:00 - 4:30 pm

**Location:**
MBA Seminar Hall,
Bhavan's Vivekananda College
Sainikpuri, Secunderabad - 500 094

**Amar Vajjhala**
Adjunct Instructor - New York Univ
Co-Founder,Worksave Tech
UNP Founding Member/ Director

**Dr. Saptarshi Das, PhD**
Energy & AI Industry Leader
Data Science R&D Manager, Shell
UNP Founding Member

**Palash Pal**
Data Scientist
UNP Program Manager

**Abhishek Sinngh**
MD & Talent Acquisition Head

Coordinators :

**Mrs.G.S.Mini, HOD**
**Dr.V.Selva Kumar,** Assistant Professor, Coordinator HDS
Department of Mathematics & Statistics,
Bhavan's Vivekananda College
selvakumar.stats@bhavansvc.ac.in

**Department of Mathematics and Statistics**

**Unlocking a rewarding career in Data Science and Analytics**

-

- United National Professionals (UNP)

**Date: 11/10/2022**

**Resource Persons:**

1) Mr. Amar Vajjhala
   Adjunct Instructor - New York University

   Co-Founder,Worksave Tech

   UNP Founding Member/ Director

2) Dr. Saptarshi Das, PhD
   Data Science R&D Manager, Shell

   UNP Founding Member

3) Palash Pal
   Data Scientist, UNP

4) Abhishek Singh
   MD & Talent Acquisition Head

**Number of Students Participated: 100**

The UNP seminar, held on 11th October 2022, started at 3:30 p.m. with the advent of the UNP team. The audience was welcomed by Sreeram Nithin and Rohit Menon, students of B.Sc (Hons) Data Science course, who also introduced the team of UNP. The entire team was inaugurated with bouquets by the teaching staff of Bhavans Vivekananda College.


The session proceeded with Mr. Amarendra introducing the United Network of Professionals and its primary mission. With attractive presentation slides, Mr. Amar further explained the importance of Data Science in modern society and its applications in various fields.

He also pointed out some common mistakes beginners make as they prepare their CVs and how to correct them. Finally, the talk briefly explained courses and opportunities in Data Science.

The next speaker was Dr. Saptashri, who reiterated what Mr. Amar said and emphasized the importance of peer-to-peer learning. He explained to the data science students how to develop skills

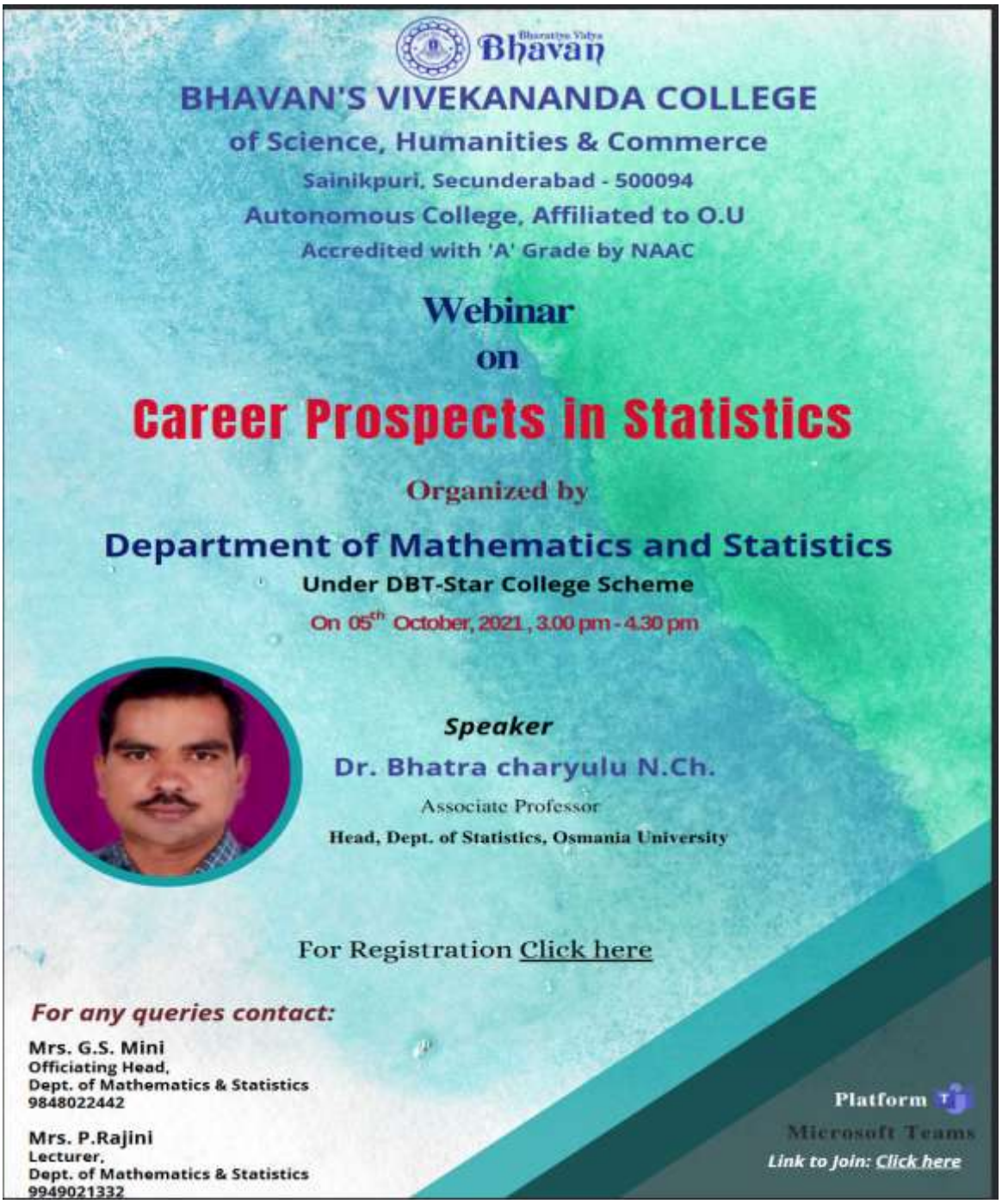
and expertise in data modeling and gain mastery through strong project experience in turning data into actionable business insights using advanced data science tools and techniques in Machine Learning. Mr.Abhishek Singh spoke about careers and opportunities for Data Science. Also, he explained about recruiters' expectations and how to prepare a resume. The platform was now open to questions from the audience.


A lot of students enthusiastically put forward their questions which received apt responses from the UNP team. With this, the session ended with a vote of thanks from H.V. Akanksha, a student of B.Sc. (Hons) Data Science, followed by the dispersal of the audience and members.

**2021-22**

# Webinars

## 1.Career Prospects in Statistics



Date:5th October 2021

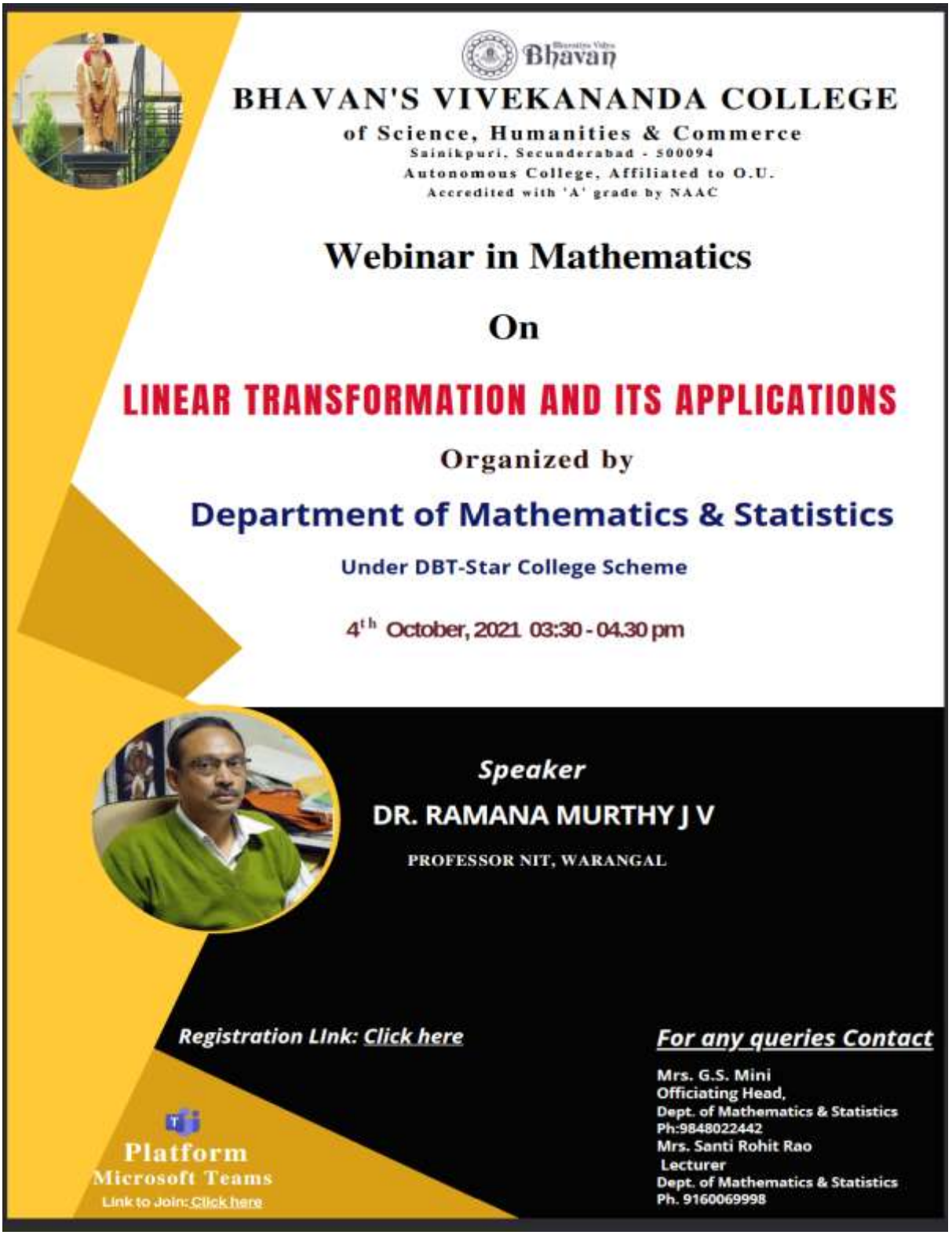
Time: 3:00 pm to 4:30 pm

Nature of Beneficiaries: UG Statistics Students

No. of Participants: 126

Dr.N.Ch. Bhatra charyulu spoke about the scope of statistics in the industry. He explained that Statistics is indispensable in this modern age aptly termed as "the age of planning". The governments of most countries around the world are constantly researching to improve its economic development. Statistical data and techniques of statistical analysis are immensely useful in solving economical problems such as wages, price, time series analysis, demand analysis. It is an irreplaceable tool of production control. Business executives are relying more and more on statistical techniques for studying the preference of the customers. He said one can find a career in the statistical profession by doing activities such as solving problems in a wide variety of fields and applying mathematical and statistical knowledge to social, economic problems. Careers that incorporate statistics can be found in a wide variety of disciplines. Here are a few examples of fields that use statistics, i.e agriculture, business, industry, computer science, health sciences, and government, private, scientific and other disciplines. These candidates can also apply for the Indian Statistical Services, Civil Services and Indian Economic Services exams. Sir also encourages students to do higher education in statistics which helps them to grow economically, he also explained the importance of pursuing a career in statistics and its bright future. He also focused on how to clear the PG entrance examination in statistics from the most reputed organizations along with career prospects.

## 2. Webinar On Linear Transformation and Its Applications.



The department of Mathematics and Statistics, Bhavan's Vivekananda Collegeunder the DBT Star College scheme organised it's first webinar of this academic year on "Linear transformation and its applications" on 4th October 2021.

Speaker : Dr. Ramana Murthy JV, professor at NIT, Warangal.

No: of participants: 35

Dr. Murthy's specialisations include Fluid Mechanics, Non Newtonian fluid flows, special functions and others. He has published more than 50 publications both, nationally and internationally. He has presented and participated in multiple conferences.

The webinar began with Dr. Murthy explaining the students about vector spaces, their examples. He made sure that students could understand the complex concept and tried explaining it in primitive terms that were easy to comprehend. The webinar covered many topics like Rank Nullity, modulation theorem that are quite useful for the students. Dr. Murthy was completely equipped with knowledge and tools to share this knowledge with an amazing ppt. Students were excited and expressed that the lecture was very informative and educational.


## 2021-22

# 1. 10 Days National Workshop on MATLAB

## Under DBT- Star College Scheme

Online 10 Day National Workshop on MATLAB was conducted by Department of Mathematics and Statistics, Under DBT-Star College Scheme from 20th Oct 2021to 30th Oct 2021. This workshop was aimed at benefiting the faculty, research scholars, and the students of UG, PG students.

**Resource persons details** :1. Dr. Natesan Srinivasan, Professor (HAG),

Department of Mathematics, IIT Guwahati
2.Dr. Tanay Saha, Assistant Professor,
Department of Computer science and Engineering,
Institute of Technical Education and Research,
Siksha 'O' Anusandhan(Deemed to be University), Bhubaneswar.
3. Dr. Sateesh Kumar Deevi, Associate Professor
Dept. Of Mathematics ,KLUniversity, AP.

**No. of participants** : 133

## Day 1(20-10-2021):

Inaugural Session: Ms Mini, Officiating Head,Department of Mathematics&Statistics,BVC, started the meeting by welcoming the dignitaries. Prof Y Ashok, Principal, BVC, Ms B Niraimathi ,Vice principal, BVC, Dr K Anuradha, Co-ordinator DBT-STAR college scheme, Prof N Kishan, Head Department of Mathematics, OU, Chief guest for the inaugural session and the resource persons addressed the gathering.

**Resource person**: Dr. Natesan Srinivasan.

**Topics covered**: Basic characteristics and basic operations in MATLAB etc

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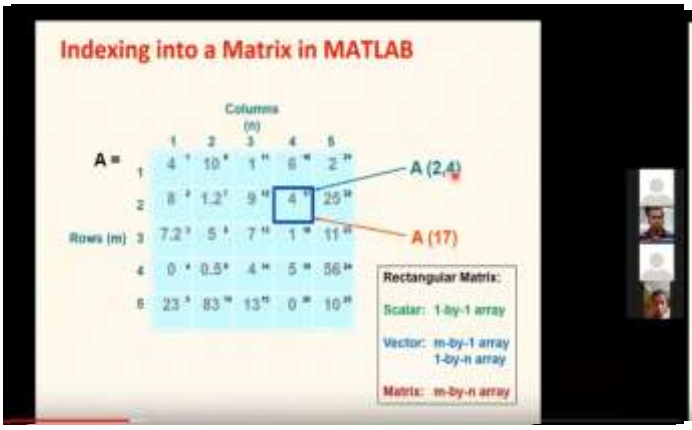
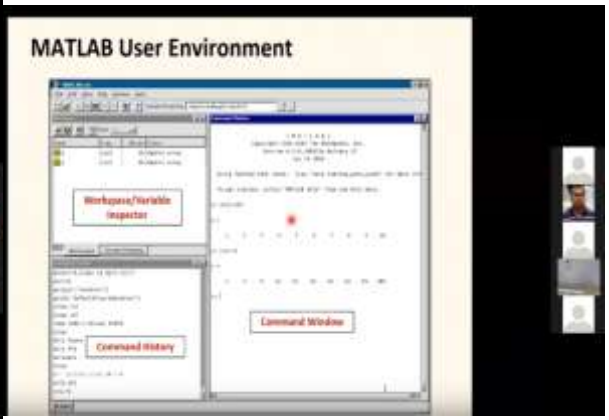
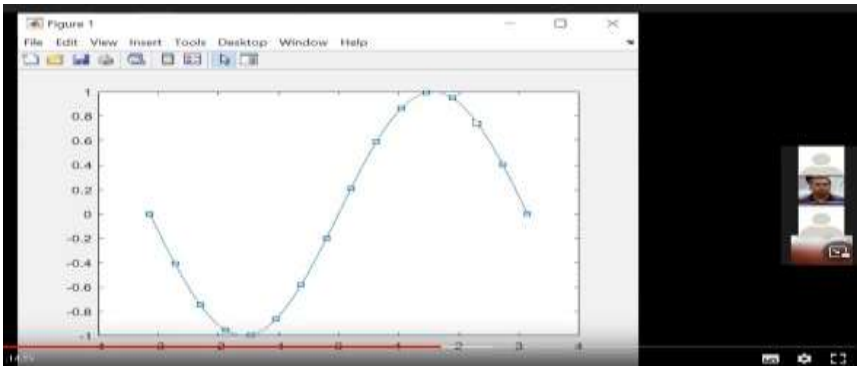
## Day 2(21-10-2021):

Resource person: Dr. Natesan Srinivasan.

Topics Covered: MATLAB user environment such as workspace browser, Command history window etc., Entering numeric arrays, Indexing into a Matrix on MATLAB, Logical indexing, Basic plotting commands.



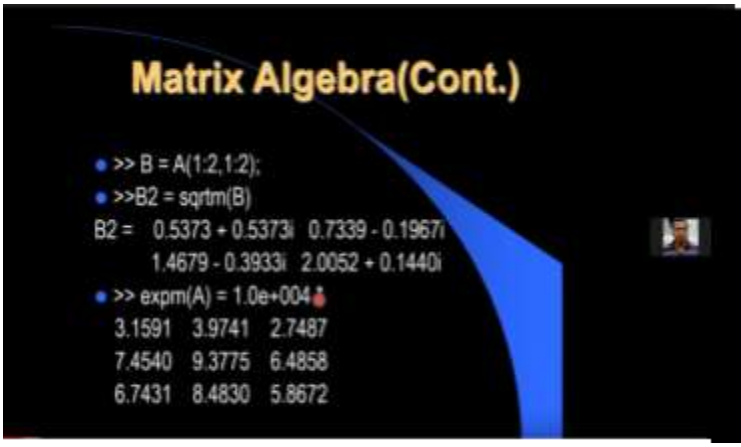



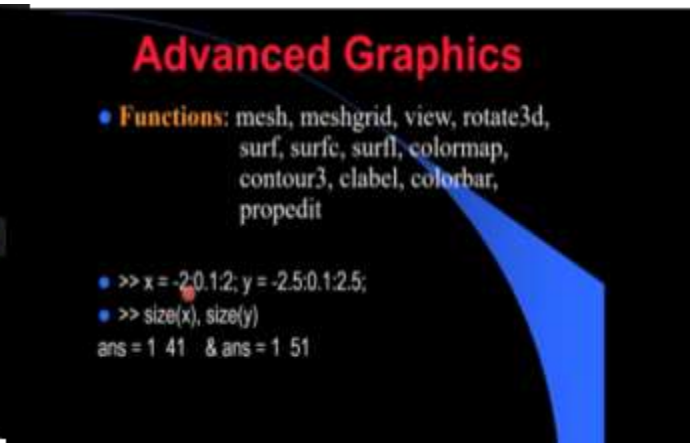




## Day 3(22-10-2021):

**Resource person**: Dr. Natesan Srinivasan.

**Topics Covered**: Matrix Algebra, Advanced Graphics, MATlAB functions, symbolic tool box..etc.

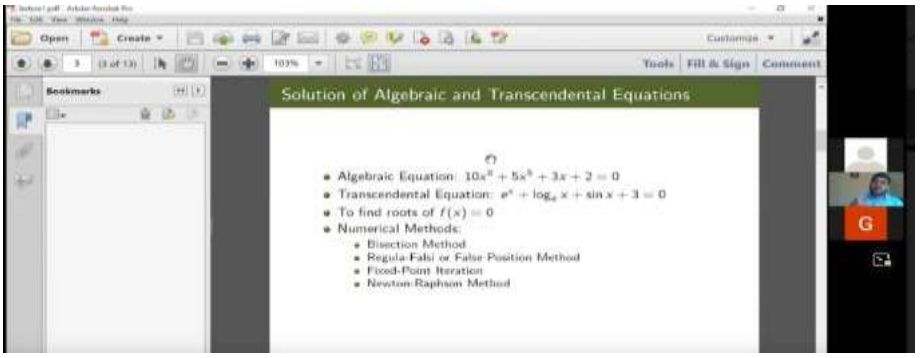


## Day 4 (23-10-2021)

**Resource person**: Dr. Tanay Saha,

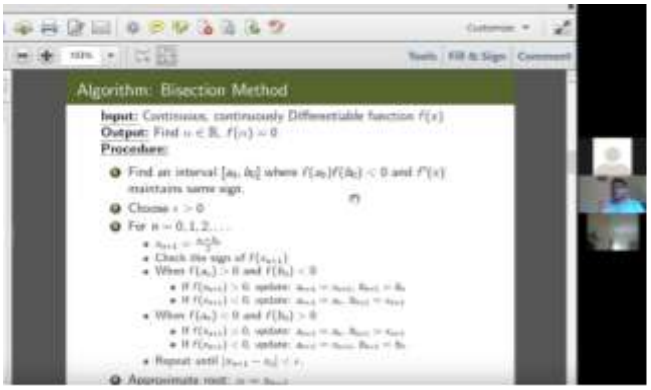
**Topics covered**: Numerical analysis using MATLAB, Solution of Algebraic and Transcendental equations, Interpolation and Curve fitting…etc

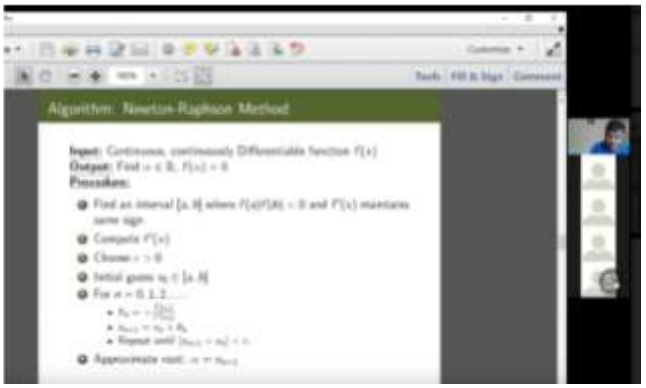



## Day 5 (25-10-2021)

**Resource person**: Dr. Tanay Saha,

**Topics covered**: Numerical analysis using MATLAB, Bisection method, Newton-Raphson Method…etc

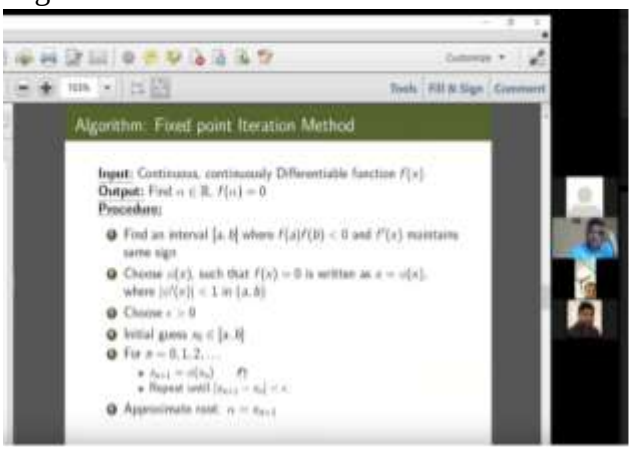


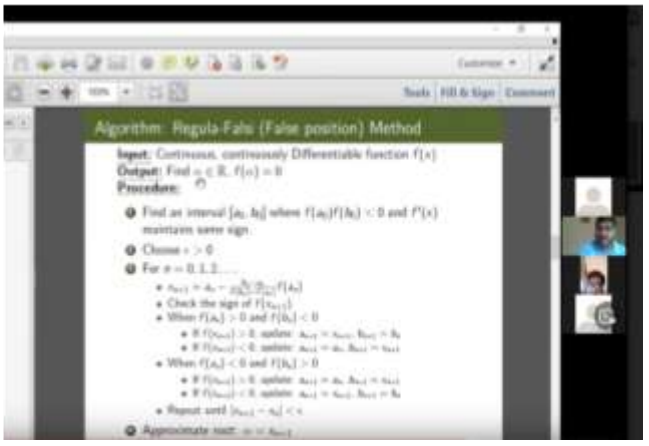




## Day 6 (26-10-2021)

**Resource person**: Dr. Tanay Saha,

**Topics covered**: Numerical analysis using MATLAB, Fixed point iteration method and Regula Falsi method….etc.

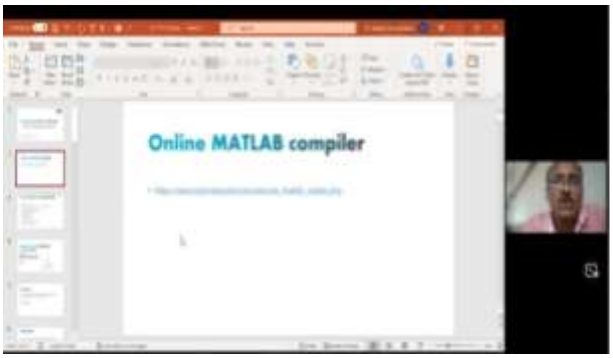


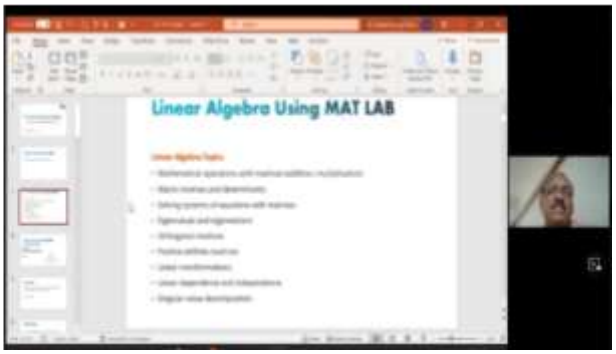



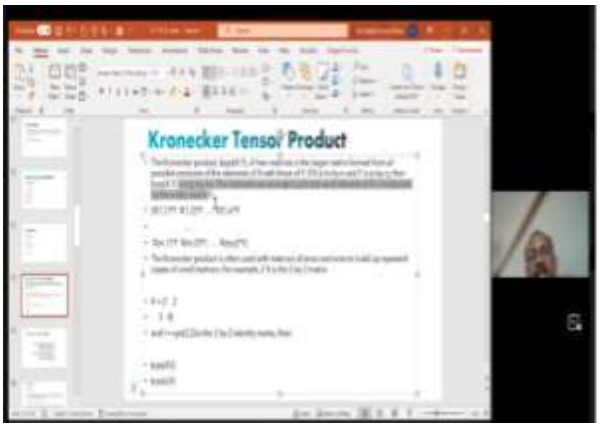
## Day 7 (27-10-2021)

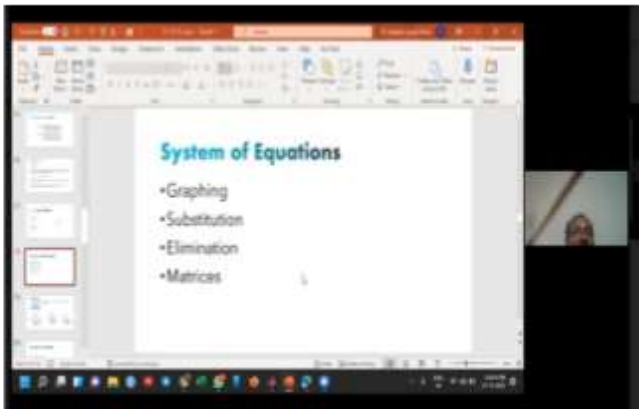
**Resource person:** Dr. Sateesh Kumar Deevi

**Topics Covered:** Linear Algebra Using MATLAB, Online MATLAB compiler, Solving system of equations using MATLAB.



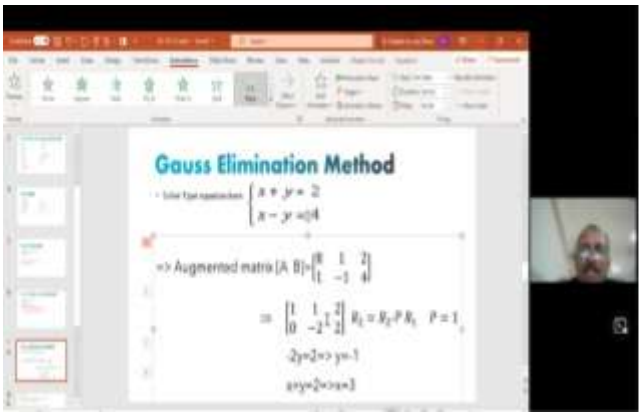



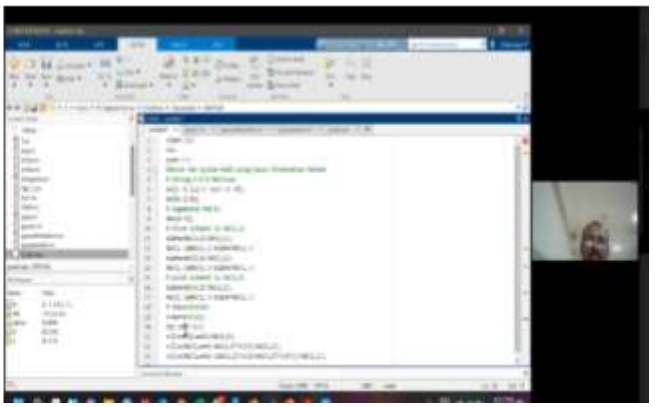




## Day 8 (28-10-2021)

**Resource person:** Dr. Sateesh Kumar Deevi

**Topics Covered**: Linear Algebra using MATLAB, Gaussian Elimination Method.

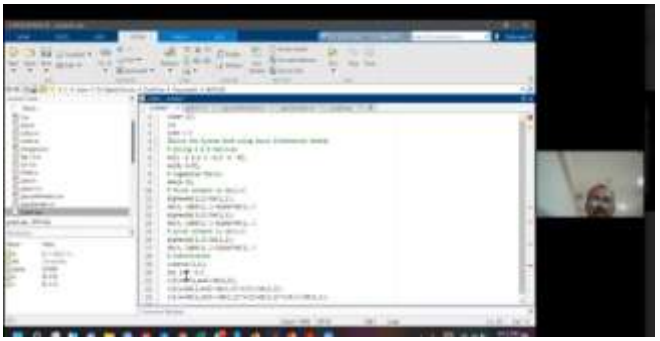


## Day 9 (29-10-2021)

**Resource person**: Dr. Sateesh Kumar Deevi

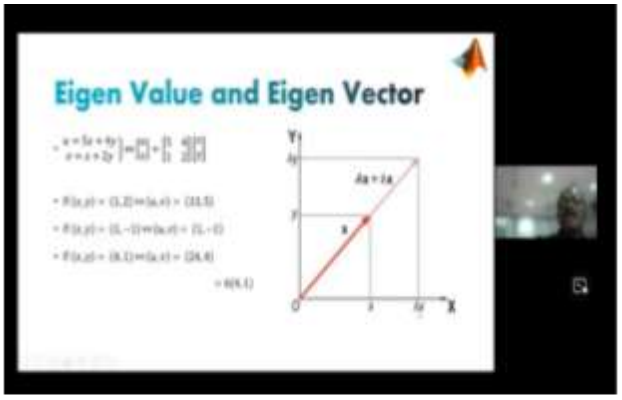
**Topics Covered**: Linear Algebra using MATLAB, Gauss Siedel Method to solve system of Linear equations.

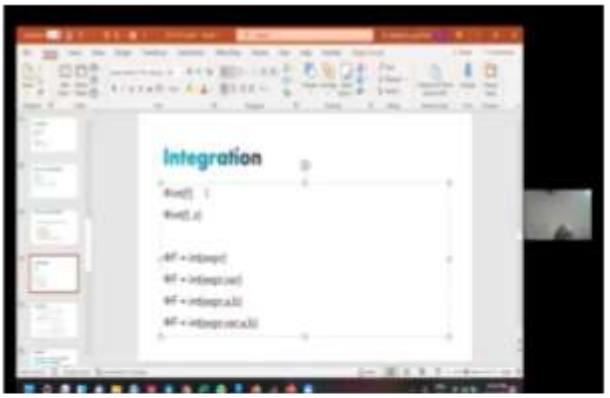


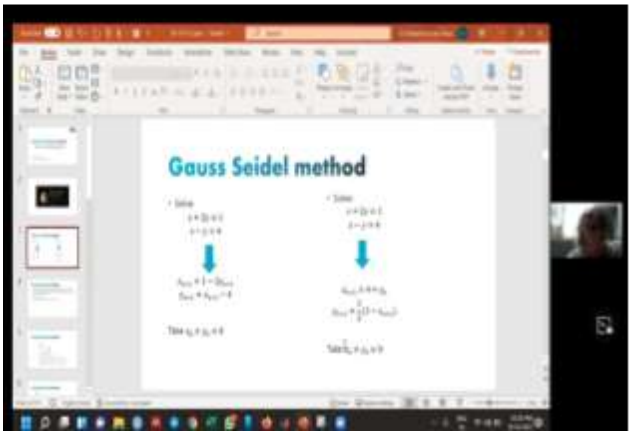
## Day 10 (30-10-2021)

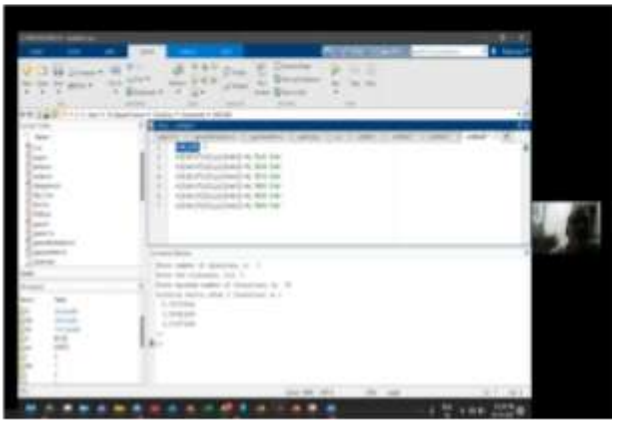
**Resource person:** Dr. Sateesh Kumar Deevi

**Topics Covered**: Linear Algebra and Calculus using MATLAB, Eigenvalues and eigenvectors, Derivatives, Integrals, Solving differential equations…etc



The workshop was concluded by presenting a report by Ms. Lakshmi Harini, and a Vote of thanks by Ms. G Santhi Priya from the Dept of Mathematics and Statistics, BVC.

**2. 5 days National Workshop**

**on**

# "Univariate and Multivariate Data Analysis using SPSS 15th Nov 2021 To 20th Nov 2021

Bhavan

**BHAVAN'S VIVEKANANDA COLLEGE**

**of Science, Humanities & Commerce**

Sainikpuri, Secunderabad - 500094

Autonomous College, Affiliated to O.U.

Accredited with 'A' grade by NAAC

**FIVE DAYS NATIONAL WORKSHOP**

**on**

**"Univariate and Multivariate Data Analysis using SPSS"**

**Faculty, Research scholars, students of U.G, P.G can join**

*15th to 20th November, 2021*

**Organized by**

**Department of Mathematics & Statistics**

**Under DBT-Star College Scheme**

***Resource Person***

**Prof. V. V. Haragopal**

**Professor (Retd.), Department of Statistics**

**Osmania University, Hyderabad**

**Day wise session schedule:**

**Day 1: 15th Nov, 2021 Introduction and Simple Regression (timings 5:00pm to 6:30pm)**

**Day 2: 17th Nov, 2021 Multiple Regression Analysis (timings 5:00pm to 6:30pm)**

**Day 3: 18th Nov, 2021 Factor Analysis (timings 5:00pm to 6:30pm)**

**Day 4: 19th Nov, 2021 Discriminant Analysis (timings 5:00pm to 6:30pm)**

**Day 5: 20th Nov, 2021 Case study on Textual Data Mining (timings 5:00pm to 6:30pm)**

**Whatsapp Link:** Click here

**For Registration:** Click here

*Free Registration*

*E Certificate will be provided*

zoom Platform

***For any queries Contact***

**Mrs. G.S. Mini**

**Officiating Head, Dept. of Mathematics & Statistics**

**Ph: 9848022442**

**Mrs. P. Rajini & N Chandan Babu**

**Lecturers, Dept. of Mathematics & Statistics**

**Ph: 9949021332, 9392252883**

Day 1

First Day started with a theoretical explanation about Regression Analysis followed by a hands-on session case study using SPSS on Simple Regression Analysis and model performance criteria such as coefficient of determination and RMSE values and explained how best the estimated values are significant or not for the t and F test.

Day 2

Day 2 session started with theoretical concepts of Multiple Regression Analysis and Logistic Regression Analysis, followed by a hands-on session using an SPSS case study. Also, the participants were introduced to Model adequacy such $R^2$, Adjusted $R^2$, Multicollinearity, ANOVA based on the case study related to profit based on different types of advertisement.

Day 3:

Day 3 Session started with Multivariate Analysis techniques, theoretical concepts, andtheir applications in various fields, followed by PCA by a hands-on session using SPSS related to factor analysis, a data reduction technique based on the case study related to consumer preference over the star hotel stay data set.

Day 4:

Day 4 Session started with theoretical concepts and applications of Discriminant Analysis. Also, Prof Haragopal Sir explained Cluster Analysis and its basic concepts, methods, and its applications. Finally, a hands-on session using SPSS based on discriminant and cluster analysis are performed on case study Air Quality of different cities related.

There were 128 participants registered and attended the workshop, most of whom were undergraduate students and some faculty members.


REC
P KRISHNAVENI BVC
Dr V V Haragopal
G L HARINI
Sravani Labishetty


REC
Dr V V Haragopal


REC


REC
Sravani Labishetty
Nirsimathi
G Santhi Priya
R. Anusha


REC
G.SRINIVASULU GOUD
G Anitha
Sailaja Addaganti
T. Manjusha


Anusha Madella left
REC
P KRISHNAVENI BVC
Vara Lakshmi
Dr V V Haragopal
G L HARINI

**2020-21**

# Workshops / Training

## 1. Training on MATLAB March 29th – April 9 th 2021

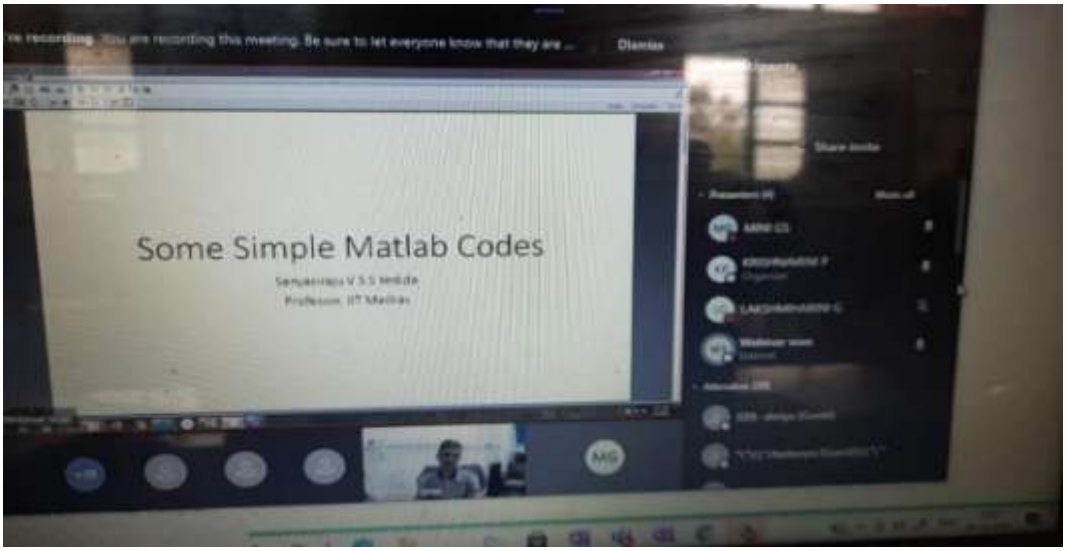
The department of Mathematics and Statistics conducted a 10 day Training on MATLAB.

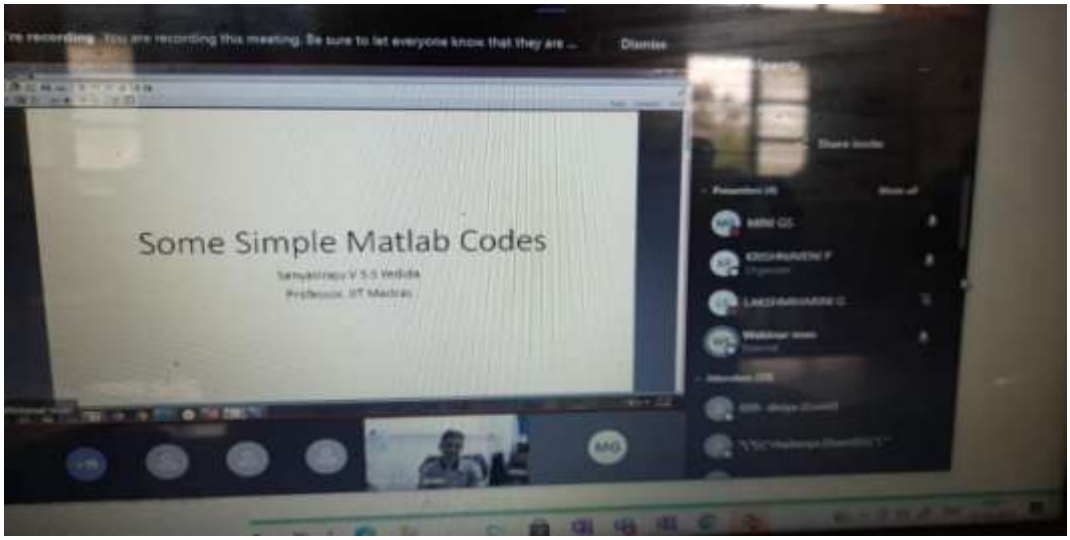
Resource person details :1. Dr.Sanyasiraju VSS Yedida,Professor,
Department of Mathematics ,IIT Madras, Chennai.

**2.**Dr.Sateesh Kumar Deevi, Associate Professor
Dept. Of Mathematics ,KLUniversity, AP.

The topics discussed were Introduction to MATLAB, basic operations, plotting and different types of plotting, image processing, solving differential equations with given conditions,dot product, cross product of vectors, gradient, divergence,curl,integration,
Linear algebra- solving linear systems of equations, Eigenvalues, Eigen vectors.

41 participants from all over the country participated.


Some Simple Matlab Codes


Some Simple Matlab Codes

## 2. 10 day workshop cum training on Data Analytics using R for undergraduatestudents 23rd march - 3rd April 2021

**Organized by** Department of Mathematics and Statistics, Bhavan's Vivekananda college of science, humanities and commerce, Sainikpuri, Sec-bad.

**Resource person:**Dr. R. Vishnu Vardhan, Assistant professor, department of statistics, Pondicherry central University, Pondicherry.

**No. of students applied:** 169,

**No. of students shortlisted:** 72 (Beneficiaries)

Aiming to provide an intense training on theory and practical aspects of statistical data analysis and interpretation using R Programming at undergraduate level for college students, a 10-day online workshop has been held from 23-03-2021 to 03-04-2021by Bhavan's Vivekananda College, Sainikpuri, under DBT Star College Scheme. The Department of Mathematics and Statistics, to promote statistical data analysis, hosted the event, and the workshop was delivered by Dr. R. Vishnu vardhan , Assistant professor, department of statistics, Pondicherry central University, Pondicherry. The workshop has provided a practical hands-on session that helped the participants better understand the concepts. Overall, 169 students registered .Finally, 72 students were shortlisted for hands-on training workshop.

DAY 1: INTRODUCTION TO R AND MATRIX OPERATION.

On Day 1, the participants had to initially perform the installations required to practically implement the concepts being taught. The session started from the basics and went on to provide deep insight on the subject. It was a pretty interactive and informative session, which made the participants want to attend the further sessions.

DAY 2: EXPLORATORY DATA ANALYSIS, DESCRIPTIVE STATISTICS

On Day 2, the session started off with Exploratory Data Analysis using R, which was really interesting as it provided a visual insight on statistically analyzing the data. A lot of charts and graphs have been plotted and analyzed, not just as a subject matter but also in a very practical sense. The correlation concept has also been very keenly explained.

DAY 3: DATA VISUALIZATION

On day 3, deep insight of graphs in R can be created easily, explained about plot commands .Explained about how to plot histogram, line chart, bar chart, box plot and scatter plot.

DAY 4: PROBABILITY AND DISTRIBUTIONS

On day 4, had an explanation about basic probability distributions and how to make use of certain functions that can be useful to fit probability distributions. Explained about binomial, poison, normal, exponential distributions. A lot of programs are written and explained about the various distributions.

DAY 5 : TEST FOR NORMALITY AND HYPOTHESIS TESTING-I

On day 5, a pretty deep insight on the testing of hypotheses has been given using the R Programming. Many of the important tests such as the t-test(one and two samples), Z-test(one and two samples), F-test(one-way) have been used for hypothesis testing. Had an insight about parametric tests like one sample t-test, two sample t-test, analysis of variance, chi square test, paired sample t-test.

DAY 6 : HYPOTHESIS TESTING-II

On day 6, Explained about One way analysis of variance, Two way analysis of variance using different examples and coding part was very interesting . And taught about the non parametric tests with examples.

DAY 7 : REGRESSION MODELLING- SIMPLE AND MULTIPLE

On day 7, It started with R codes for simple linear regression and multiple linear regression and had a deep explanation about regression modeling with R code programming.

DAY 8 : LINEAR PROGRAMMING PROBLEMS

On day 8, the session started with basics of linear programming which is basic mathematical modeling. Talked about some statisticians like Leonid Kantorovich who developed instrumental in developing linear programming ,George B Daunt zig who published simplex method solving linear programming problems. Had an explanation about the structure of LP programming.

DAY 9: CLUSTER ANALYSIS AND LOGISTIC REGRESSION ANALYSIS

On day 9, introduced non-linear regression and performance analytic packages and presented a 3d representation of multiple linear regression. Explained all these with codes in R programming which was very useful and interesting.

DAY 10: DIMENSIONALITY REDUCTION TECHNIQUES

On day 10, which was the last day of the workshop, we started off with a vote of thanks and gave an assignment to all students to be done in that session itself. It was a very informative session and was very useful.


## 3. Day National Level Faculty Development programme

## Under DBT Star College Scheme

Online 5 Day National Level Faculty Development programme on MATLAB was conducted by Department of Mathematics and Statistics, Under DBT-Star College Scheme from 23 Feb 2021to 27 Feb 2021 between 2:00 PM to 3:30 PM. This webinar was aimed at benefiting faculty.
The resource person Dr. Sateesh Kumar Deevi, Associate professor from KL Deemed to be University Vaddeswaram, Guntur, AP. The session plan followed for the five day FDP is given below:

Day1: 23-02-2021 Introduction to MATLAB & Basic Terminology with Examples
Day2: 24-02-2021 Roots and Solutions of Equations
Day3: 25-02-2021 Differential Calculus
Day4: 26-02-2021 Plotting 2D
Day5: 27-02-2021 Functions, loops and conditional operations.
Numerical analysis, Importing data.

Day-1(23-feb-2021):
Ms. Santi Rohit Rao, Assistant Professor, Department of Mathematics & Statistics started the meeting. Ms. G. S. Mini Officiating Head, Department of Mathematics & Statistics welcomed the Principal Prof. Y. Ashok and chief guest Dr. Sateesh Kumar Deevi, then Principal Prof. Y. Ashok addressed the gathering.

No. of participants: 55

Introduction to MATLAB & Basic Terminology with Examples

- MATLAB is a program for doing numerical computation. It was originally designed for solving linear algebra type problems using matrices. It's name is derived from MATrixLABoratory.

- MATLAB has since been expanded and now has built-in functions for solving problems requiring data analysis, signal processing, optimization, and several other types of scientific computations. It also contains functions for 2-D and 3-D graphics and animation.

Cleve Moler:

- The idea for MATLAB was based on his 1960s PhD thesis.
- Moler become a math professor at the University of New Mexico
- Started developing MATLAB's initial linear algebra programming 1967 with his one-
- time thesis advisor, George Forsythe. This was followed by Fortran code for linear

Equations in 1971:

- The first early version of MATLAB was completed in the late 1970 John N. Little and StreveBangert
- 1980 John Little and programmer StreveBangert re-programmed MATLAB in C.

- Created the MATLAB programming language.
- Developed features for toolboxes.
- 2016 including the MATLAB Live Editor notebook
- Present version of MATLAB 2020

MATLAB HeadQuarters:
Middlesex County, Massachusetts, United States, Near (16km) west of Boston.By 2018 the company had around 3,000 employees.

What are we interested in:
MATLAB
1. m-files: series of MATLAB commands
a) functions: Input/Output
2. Command Line: Command execution like DOS Command window
3. mat-files: Data storage/loading

MATLAB:
MATLAB consists of 3 windows:
1. Command window
2. Editor window
3. Figure window

MATLAB symbols:

>> prompt
... Continue statement on next line
, Separate statement on next line
% Start comment which ends at ends at end of line
; (1) Suppress output

(2) Used as a row separator in a matrix

: Specify range

MATLAB Special Variable:

ans Default variable name for results
pi Value of π
eps Smallest incremental number
inf Infinity
NaN Not a number e.g. 0/0
i and j i=j=square root of -1
realminThe smallest usable positive real number
realmaxThe large usable positive real number

MATLAB supports three logical operators.

not ~ % highest precedence
and & % equal precedence with or
or | % equal precedence with and

Math & Assignment Operations:

Power ^ or .^ a^b or a.^b
Multiplication *or .* a*b or a.*b
Division / or ./ a/b or a./b
Or \ or .\ a\b or a.\b
NOTE: 56/8=8\56

MATLAB Matrices:
MATLAB treats all variables as matrices. For our purposes a matrix can be through of an array, In fact, that is how it is stored.
Vectors are special forms of matrices and contain only one row OR one column.
Scalars are matrices with only one row AND one column

Day-2(24-feb-2021):
No. of participants: 48
Professor started day-2 by Quotation:
MATHEMATICS is not about numbers, equations, computations, or algorithms: it is about UNDERSTANDING. By William Paul Thurston.
TOPIC: Roots and Solutions of Equations:

- Solving System of equations.
- Rank, Echelon form, LU
- Decomposition.
- Roots of a polynomial.

Day-3(25-feb-2021):
No. of participants: 45
Professor started day-3 by Quotation:
Without mathematics, there's nothing you can do. Everything around you is mathematics. Everything around you is numbers.
TOPIC: Differential Calculus and Differential equations:

- Derivative
- Integrations
- Solving Differential Equations
- Differentiation-MATLAB

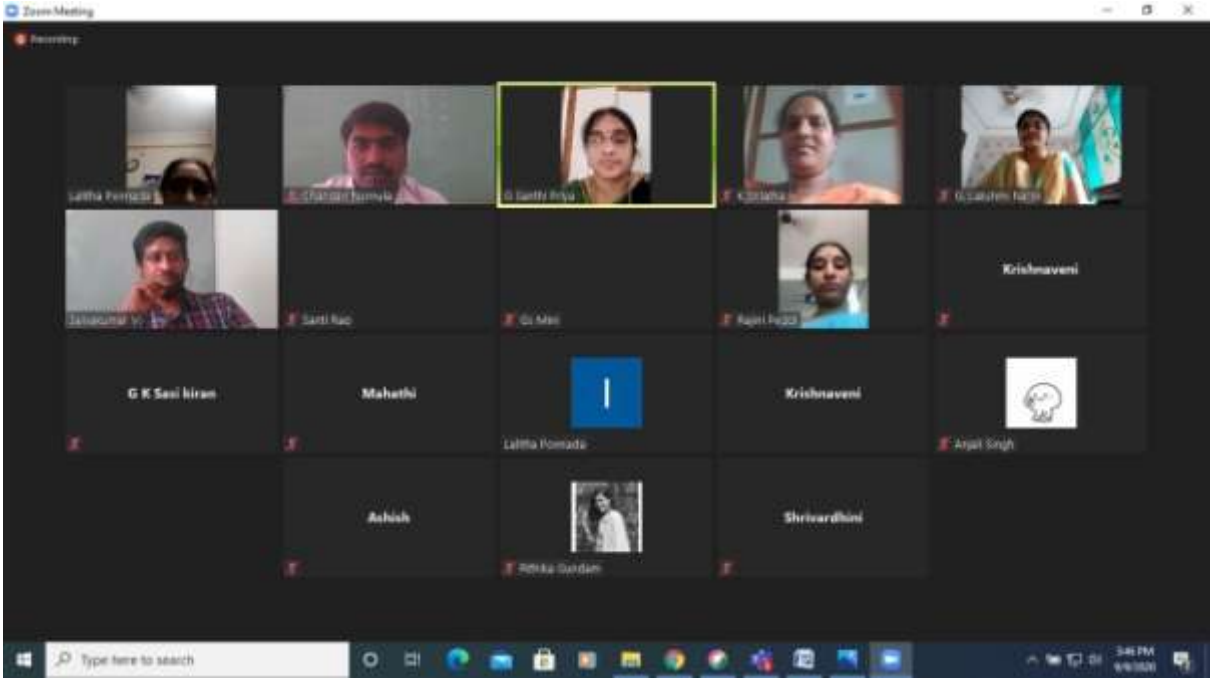
Mathematical Operator MATLAB Command

df
dx

diff(f) or diff(f, x)

df
da

Diff(f, a)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Lalitha Ponnada
G Santhi Priya
Gs Mini

## 4. Training Programme on Linear Algebra-Usage of ICT Tools Linear Algebra Toolkit

Department of Mathematics and Statistics Organised a Training programme on "Usage of Linear Algebra Toolkit" for undergraduate students on 30-01-2021 under DBT Star College scheme. Mrs G Santhi Priya, Assistant Professor, Bhavans' Vivekananda College, was the resource person. Mrs Santhi Priya explained the importance of improvising the skills to learn using the online tools for Mathematics.

Most of the concepts of Linear Algebra for UG courses of BSc Physical sciences were briefly explained with examples. Different modules in Linear Algebra Toolkit: Row Operations, Echelon Forms, Solving System of Linear equations, Linearly Independent & Linearly dependent Sets, Basis, Null Space, finding kernel and range of Linear Transformations were explained with plenty of examples. It was also mentioned that usage of Online tools has to enhance the understanding of the concepts rather than just using it as a substitute.

Mrs. G S Mini, Officiating HOD Dept of Mathematics & Statistics, other faculty members of the department, 103 students of III year BSc Physical Sciences(MPCs,MSCs&MECs) from various colleges were present for the webinar.


Zoom Meeting
Participants (52)
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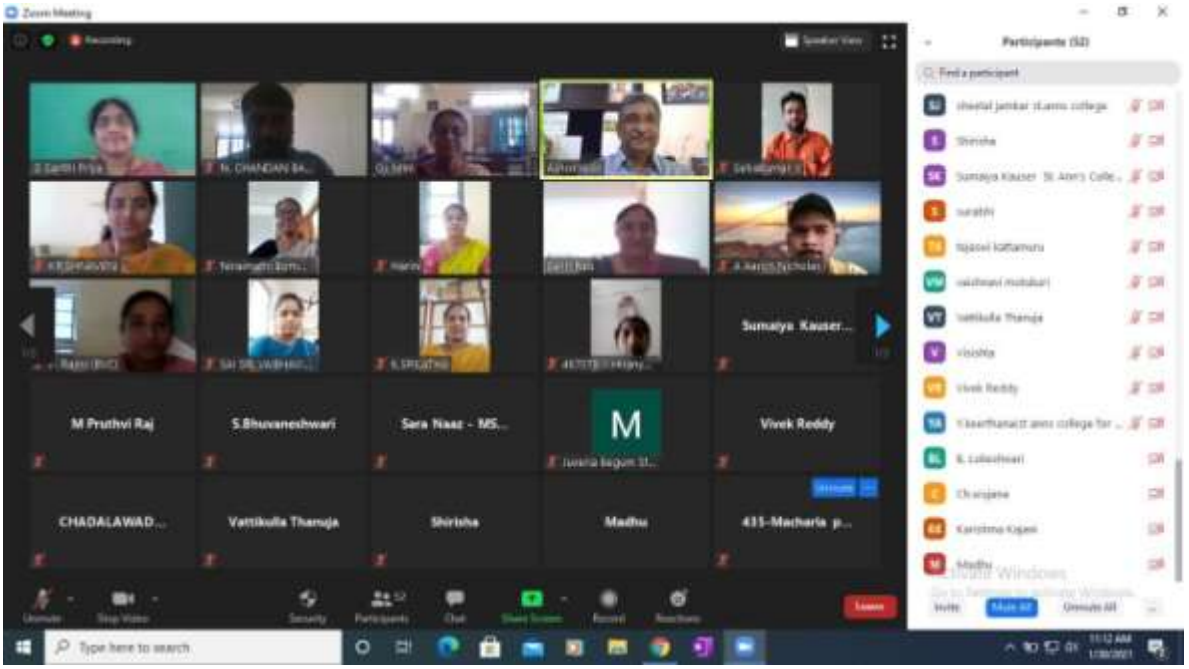
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S.Bhuvaneshwari
Sara Naaz - MS...
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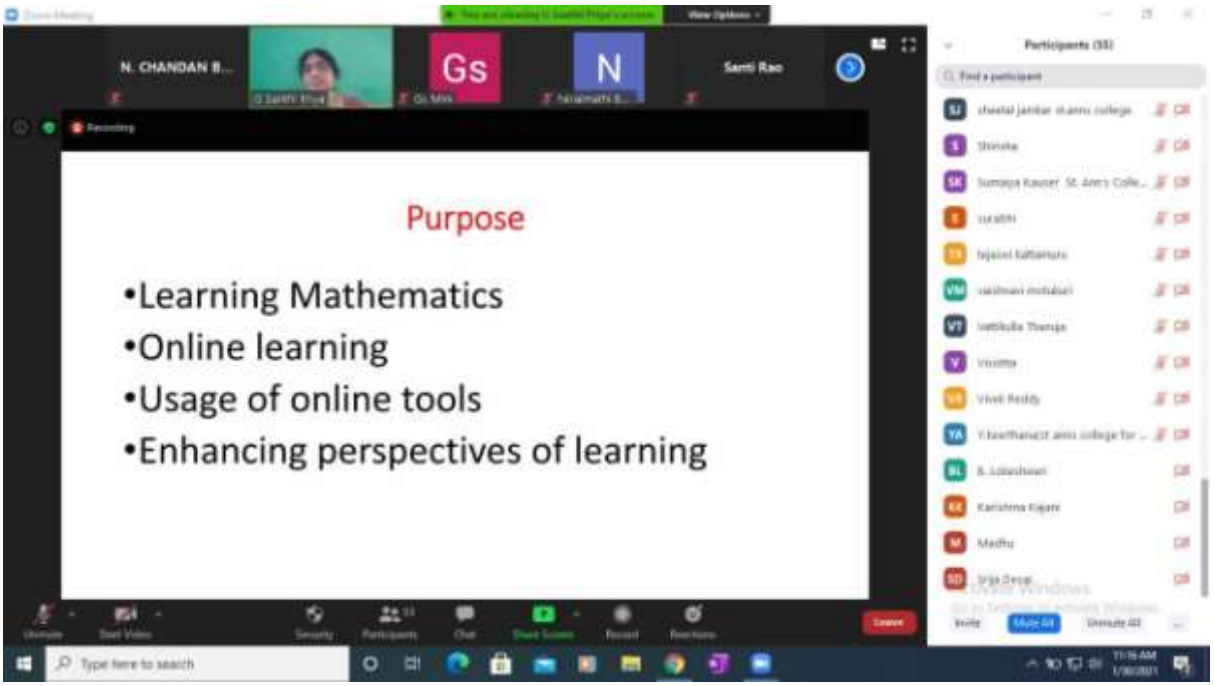
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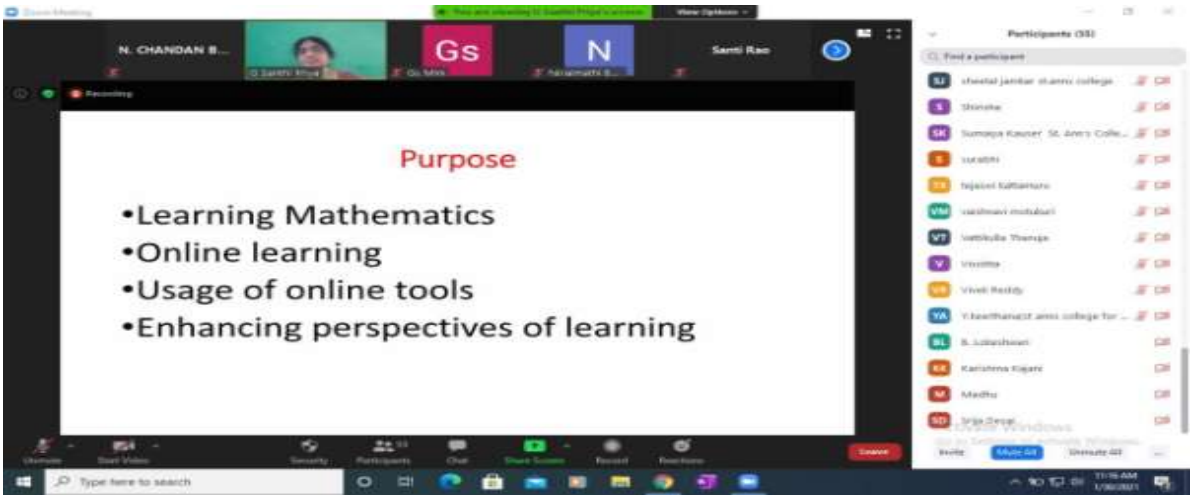
Purpose
•Learning Mathematics
•Online learning
•Usage of online tools
•Enhancing perspectives of learning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Purpose
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# 5.4 day's workshop / Hands on Training on MATLAB

Online 4 day's workshop / Hands on Training on MATLAB was conducted by Department of Mathematics and Statistics, Under DBT-Star College Scheme from 27 Jan 2021 to 30 Jan 2021 between 2:30 PM to 4:00 PM. This webinar was aimed at benefiting faculty. 15 faculty have attended this workshop.

The resource person was from Capricot Technologies, Hyderabad. The session plan followed for the four day training is given below:

## Introduction to MATLAB

MATLAB is a high-performance language for technical computing. It integrates computation, visualization, and programming in an easy-to-use environment where problems and solutions are expressed in familiar mathematical notation. Typical uses include:

- Math and computation
- Algorithm development
- Modeling, simulation, and prototyping
- Data analysis, exploration, and visualization
- Scientific and engineering graphics
- Application development, including Graphical User Interface building

MATLAB is an interactive system whose basic data element is an array that does not require dimensioning. This allows you to solve many technical computing problems, especially those with matrix and vector formulations, in a fraction of the time it would take to write a program in a scalar non-interactive language such as C or FORTRAN.

The name MATLAB stands for matrix laboratory. MATLAB was originally written to provide easy access to matrix software developed by the LINPACK and EISPACK projects, which together represent the state-of-the-art in software for matrix computation.

MATLAB has evolved over a period of years with input from many users. In university environments, it is the standard instructional tool for introductory and advanced courses in mathematics, engineering, and science. In industry, MATLAB is the tool of choice for high-productivity research, development, and analysis.

MATLAB features a family of application-specific solutions called toolboxes. Very important to most users of MATLAB, toolboxes allow you to learn and apply specialized technology. Toolboxes are comprehensive collections of MATLAB functions (M-files) that extend the MATLAB environment to solve particular classes of problems. Areas in which toolboxes are available include signal processing, control systems, neural networks, fuzzy logic, wavelets, simulation, and many others.

MATLAB is a fourth-generation programming language and numerical analysis environment. Uses for MATLAB include matrix calculations, developing and running algorithms, creating user interfaces (UI) and data visualization. The multi-paradigm numerical computing environment allows developers to interface with programs developed in different languages.

MATLAB is used by engineers and scientists in many fields such as image and signal processing, communications, control systems for industry, smart grid design, robotics as well as computational finance.

## MATLAB System

MATLAB system consists of five main parts:

## MATLAB language

This is a high-level matrix/array language with control flow statements, functions, data structures, input/output, and object-oriented programming features. It allows both "programming in the small" to rapidly create quick and dirty throw-away programs, and "programming in the large" to create complete large and complex application programs.

## MATLAB working environment

This is the set of tools and facilities that you work with as the MATLAB user or programmer. It includes facilities for managing the variables in your workspace and importing and exporting data. It also includes tools for developing, managing, debugging, and profiling M-files, MATLAB's applications.

## Handle Graphics

This is the MATLAB graphics system. It includes high-level commands for two-dimensional and three dimensional data visualization, image processing, animation, and presentation graphics. It also includes low-level commands that allow you to fully customize the Appearance of graphics as well as to build complete Graphical User Interfaces on your MATLAB applications.

## MATLAB Application Program Interface (API)

This is a library that allows you to write C and Fortran programs that interact with MATLAB. It includes facilities for calling routines from MATLAB (dynamic linking), calling MATLAB as a computational engine, and for reading and writing MAT-files.

## 27 Jan 2021

### Day-1

- Introduction to MATLAB
- What is MATLAB?
- The dominance of MATLAB over other languages
- Power of Matrix computations
- The application of MATLAB in various fields of engineering MATLAB Environment
- Basic matlab commands
- Arithmetic Functions in MATLAB
- Matrices and Vectors
- Creating Matrices and Vectors
- Matrix Operation
- Array Operation

Link:
https://capricottechnologies.webex.com/capricottechnologies/j.php?MTID=me3 a91e19c6cce83d2e0f1e9b509237ff

## 28 Jan 2021

### Day-2

- Practice and revision on arithmetic, relational and logical operation
- Introduction to basic programming structure
- Introduction to Image Processing
- What is Image Data?
- Image Processing Toolbox
- How to Display Image
- Image Operations
- Introduction to Graphical User Interface
- Application and Demos

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https://capricottechnologies.webex.com/capricottechnologies/j.php?MTID=m9c e9be4684b7e36d14764faed5bbeefb

## 29 Jan 2021 and 30 Jan 2021

### Day-3 and 4

Simulink is a simulation and model-based design environment for dynamic and embedded systems, integrated with MATLAB. Simulink, also developed by MathWorks, is a data flow graphical programming language tool for modelling, simulating and analyzing multi-domain dynamic systems. It is basically a graphical block diagramming tool with customizable set of block libraries.

It allows you to incorporate MATLAB algorithms into models as well as export the simulation results into MATLAB for further analysis.

Simulink supports −

- System-level design
- Simulation
- Automatic code generation
- Testing and verification of embedded systems

There are several other add-on products provided by MathWorks and third-party hardware and software products that are available for use with Simulink.

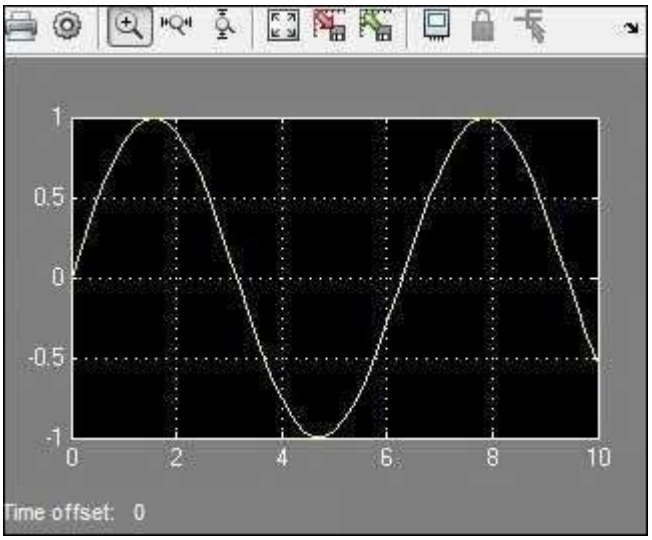
The following list gives brief description of some of them −

- **Stateflow** allows developing state machines and flow charts.

- **Simulink Coder** allows the generation of C source code for real-time implementation of systems automatically.
- **xPC Target** together with **x86-based real-time systems** provide an environment to simulate and test Simulink and Stateflow models in real-time on the physical system.
- **Embedded Coder** supports specific embedded targets.
- **HDL Coder** allows to automatically generate synthesizable VHDL and Verilog.
- **SimEvents** provides a library of graphical building blocks for modelling queuing systems.

Simulink is capable of systematic verification and validation of models through modelling style checking, requirements traceability and model coverage analysis.

Simulink Design Verifier allows you to identify design errors and to generate test case scenarios for model checking.

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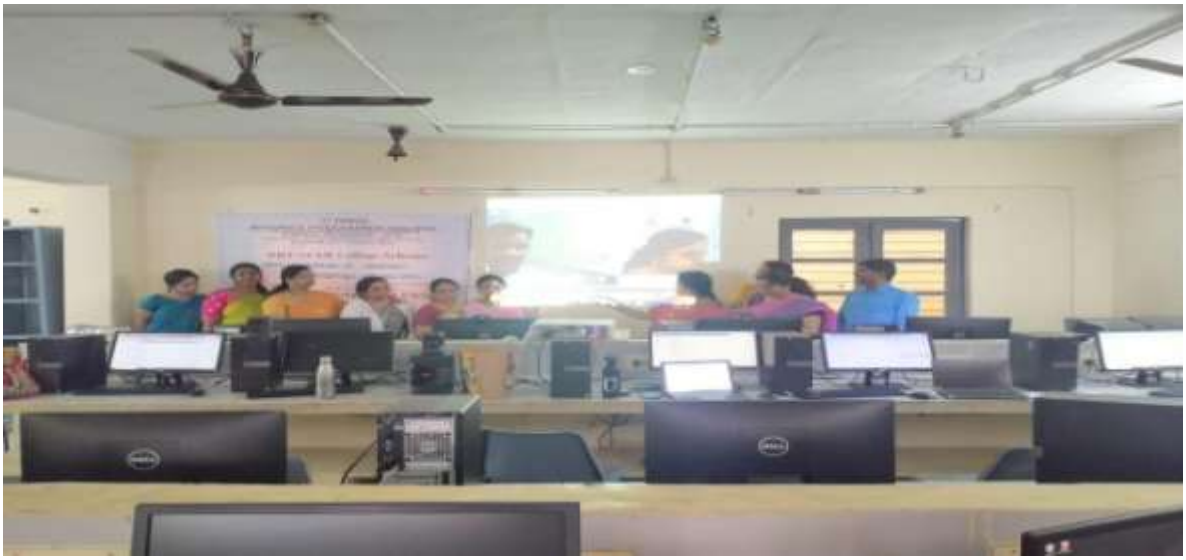

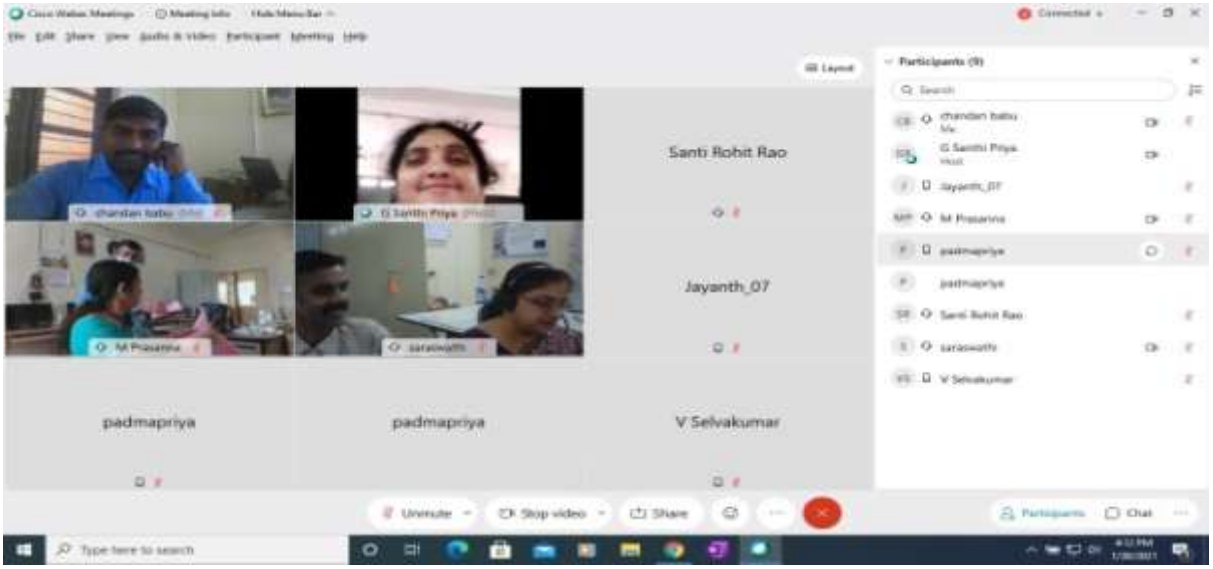
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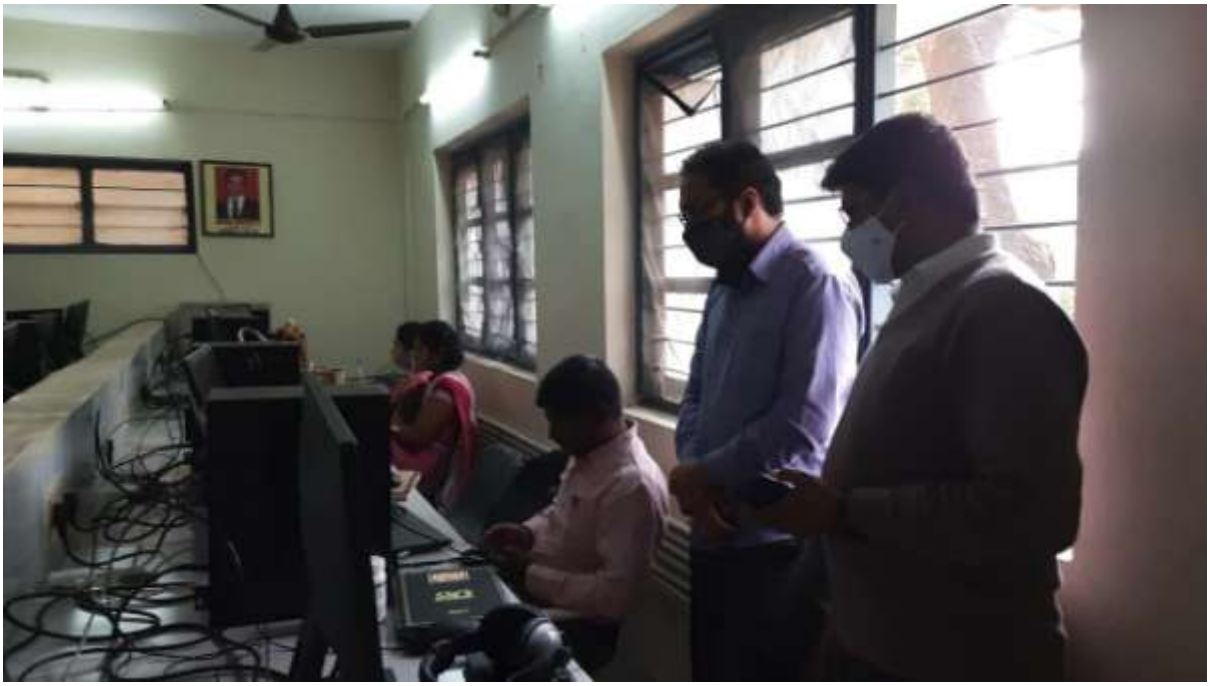

6. **ONLINE THREE-DAY NATIONAL WORKSHOP ON**

**"STATISTICAL THINKING THROUGH PYTHON" FOR**

**UNDERGRADUATE and POSTGRADUATE STUDENTS**

**Held during 16-19 January,2021**

**Organizedby : Department of Mathematics and Statistics, Bhavan'sVivekananda College of Science, Humanities and Commerce, Secunderabad**

**Resource Person: Kantam Srikanth**

**Data Consultant: Larsen & Toubro Infotech Limited (L & T)No.**

**of Students Applied: 147**

**No. of Students Shortlisted: 60 (beneficiaries)**

Aiming to provide an intense training on theory and practical aspects of statistical data analysis and interpretation using Python at undergraduate level for college and university students, a three-day online workshop has been held on the days 16th, 18thand 19th January, 2021 by Bhavan's Vivekananda College, Sainikpuri, under DBT Star College Scheme.Department of Mathematics and Statistics, to promote statistical data analysis, hosted the event, and the workshop has been delivered by Kantam Srikanth, Data Consultant, Larsen & Toubro Infotech Limited. The workshop has provided a practical hands-on session that helped the participants better understand the concepts. Overall, 147 students registered from various states. Finally, 60 students are shortlisted for hands-on training workshops.

- **DAY 1 : INTRODUCTION TO PYTHON**

On Day 1, the participants had to initially perform the installations required to practically implement the concepts being taught. The session started from the basics and went on to provide deep insight on the subject. It was a pretty interactive and informative session, which made the participants want to attend the further sessions.

- **DAY 2: EXPLORATORY ANALYSIS WITH PYTHON**

On Day 2, the session started off with Exploratory Data Analysis using Python, which was really interesting as it provided a visual insight on statistically analyzing the data. Multiple important modules, including OS, NumPy, Pandas, Matplotlib, and Seaborn,have been imported and worked with. A lot of charts and graphs have been plotted and analysed, not just as a subject matter but also in a very practical sense. The correlation concept has also been very keenly explained.

- **DAY 3 : APPLICATION OF HYPOTHESIS TESTING USING PYTHON**

On day 3, which was the last of the sessions, a pretty deep insight on the testing of hypotheses was given using the python language. Many of the important tests such as the t-test(one and two samples), Z-test(one and two samples), F-test(one-way) have been used for hypothesis testing. The decision-making process in the hypothesistesting has been clearly taught and monitored by Prof. Srikanth, who has also given visual and practical reasoning for the same.