

## REGISTRATION

There is no registration fee for the course. Completed registration form along with 1-page write-up (reasons to attend this course) should be sent by Email to:

- [harwin75@gndec.ac.in](mailto:harwin75@gndec.ac.in)
- [sehgal91@gndec.ac.in](mailto:sehgal91@gndec.ac.in)

Please send a **single email** with attachments as:

(a) The 1-page write-up and (b) scanned copy of the filled-in and signed form. The title of the email should be “**AICTE Sponsored FDP on Multivariate Data Analysis**”. Incomplete application forms will not be entertained.

**Note:** Bring duly signed original Registration Form at the time of registration in person if not submitted through post.

## ELIGIBLE PARTICIPANTS

- Faculty Members (AICTE/UGC/MHRD)
- Research Scholars
- Industry Professionals
- R&D Persons

*Personal laptops during the expert lectures and practice sessions will be allowed.*

## IMPORTANT DATES

**Deadline for submitting Application: 20 Nov., 2019**  
(Scanned copy via Email only)

**Notification of Acceptance: 30 Nov., 2019**

**Course Dates: 11– 24 Dec., 2019**

## VENUE FOR COURSE

Seminar Hall, Mechanical Engineering Department, GNDEC, Ludhiana

## COURSE EVALUATION

As per AICTE mandatory requirement a course evaluation test (CET) will be conducted. The certificate will be issued to those participants who successfully attend and qualify CET.

## TRANSPORT, BOARDING AND LODGING

Outstation participants are entitled for to and fro travelling allowance (TA) by the shortest route from their organization to GNDEC, Ludhiana as per AICTE norms. Accommodation will be provided in the students Hostels or Guest House on sharing basis.

## CHIEF PATRON

Prof. (Dr.) Sehijpal Singh (Principal)

## PATRON

Prof. (Dr.) P.S. Bilga (HOD-ME)

## COURSE COORDINATOR

Prof. (Dr.) Harwinder Singh

[harwin75@gndec.ac.in](mailto:harwin75@gndec.ac.in); +91 98151-88044

## COURSE CO-COORDINATOR

Dr. Raman Kumar

[sehgal91@gndec.ac.in](mailto:sehgal91@gndec.ac.in); +91 98551-00530

## MAILING ADDRESS

Prof. (Dr.) Harwinder Singh; FDP-MDA  
Department of Mechanical Engineering,  
Guru Nanak Dev Engineering College, Ludhiana,  
Punjab – 141006

## ORGANIZING COMMITTEE

Faculty and Staff of Mechanical Engineering  
Department

## RESOURCE PERSONS

Academicians of eminence from the various Universities/Institutes (IIT's, NIT's and IIM's etc.) shall share their experiences and expertise with the participants.

**AICTE Sponsored**

**Faculty Development Program**

**on**

# **MULTIVARIATE DATA ANALYSIS**



**December 11<sup>th</sup> – 24<sup>th</sup>, 2019**



**Organized By**

**Department of Mechanical Engineering  
Guru Nanak Dev Engineering College,  
Ludhiana, Punjab – 141006**

## ABOUT THE INSTITUTE AND DEPARTMENT

Guru Nanak Dev Engineering College, Ludhiana (An Autonomous College under UGC Act), established in 1956, oldest and premier institute of Punjab, is providing education in the field of engineering by comprehending the need for upliftment of rural youth in highly competitive, technologically elevated society, in particular, and understanding the thirst for knowledge of students and quenching it in general. The College has been declared an Autonomous College by UGC, New Delhi in 2012. This college has the privilege of starting Ph.D degree under Quality Improvement Programme (QIP) by AICTE, New Delhi. The college has started regular Ph.D program from academic session 2019-20. The college is offering various B.Tech courses vis-a-vis Civil Engineering, Computer Science & Engineering, Electrical Engineering, Electronics & Communication Engineering, Mechanical Engineering, Production Engineering, Information Technology, the institute imparts instruction in eleven Postgraduate M.Tech courses both on regular and part time basis. An excellent platform is provided to the researchers leading to Ph.D degree program.

Department of Mechanical Engineering established in 1957. Since its inception, the department has contributed in a big way to the society by providing technical manpower for various fields in India and abroad. Around 4000 graduates and 300 post graduates from the department are settled in very good positions all over the Globe. The faculty of the department continues to provide new frontiers of technical knowledge to the students in various fields of engineering viz. thermal, industrial, manufacturing and energy studies and is keeping pace with the latest developments in engineering education. Courses offered by the department are B.Tech (ME), M. Tech (ME) and Ph.D (ME).

## ABOUT THE COURSE

Multivariate data analysis (MDA) is a tool to locate patterns and relationships between variables concurrently and it predicts the effect of a change in one/more variable/s on the other variable/s. It involves observation and analysis of more than one variable at a time and their responses. The researchers, engineers and practitioners often face a difficulty that how to handle data when the response is influenced by more than one variable. Nowadays, MDA plays a significant role in data analysis as computational power grows dramatically and has wide range of applications in the field of consumer and market research, quality control and quality assurance, process optimization and process control, and research and development in engineering and social science. Further, MDA techniques provide a powerful test of significance compared to univariate techniques.

## COURSE CONTENTS

- ✓ Introduction to MDA, Basic Matrix Algebra, Probability and Statistics
- ✓ Data Collection, Basics of Design of Experiments (Taguchi Method, RSM etc.)
- ✓ Data Mining, Multiple Regression, Regression Diagnostics and Model Adequacy, Binary and Multinomial Logistic Regression
- ✓ Analysis of Variance (ANOVA) and MANOVA
- ✓ Principal Component Analysis, Factor Analysis, Discriminant Analysis and Cluster Analysis
- ✓ Structural Equation Modeling (SEM) using AMOS
- ✓ Multi Objective Optimization, Significance of Weights of Importance (AHP and Entropy Weights method etc.)
- ✓ Multi Attribute Decision Making (SAW, WPM, WASPAS, TOPSIS etc.)

## COURSE OUTCOMES

The course has the objective of introducing the participants with diverse strategies of managing multivariate data. MDA include an ability to glean a more realistic picture than looking at a single variable. At the end of the course, participants will be able to understand, apply and analyze:

- Fundamental concepts, principles of MDA and various techniques.
- Suitable statistical method associated with MDA.
- Appropriate statistical software like Minitab, Excel Sheet, AMOS and SPSS etc. for MDA.
- Decision making strategies in the presence of multivariate data.

## COURSE COVERAGE

The participants will be exposed to expert lectures on the logic and the theory behind the various techniques of MDA such as multivariate hypothesis testing, dimensionality reduction, latent structure discovery and clustering etc. along with multi attribute or multi objective decision making strategies. The hands on practice will be provided on statistical software like Minitab, SPSS, SYSTAT, Design Expert, Excel Sheet, Quality Companion and AMOS etc. through practice sessions in the laboratory.

AICTE Sponsored

Faculty Development Program

on

## MULTIVARIATE DATA ANALYSIS

December 11<sup>th</sup> – 24<sup>th</sup>, 2019

## Registration Form

Name (in block letters): \_\_\_\_\_

Designation: \_\_\_\_\_

Department: \_\_\_\_\_

Institution/Organization: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

Age: \_\_\_\_\_ Sex (M/F): \_\_\_\_\_

Mobile: \_\_\_\_\_ Email: \_\_\_\_\_

Educational Qualifications: \_\_\_\_\_

Prior Exposure to such program: (Yes / No)

Accommodation Required in Campus: (Yes / No)

Signature of Applicant:

*Certified that the particular furnished by our aforesaid employee are correct and he/she is allowed to join this FDP.*

Signature of Head of the Institute/ Organization

(with date & seal)

**The form should be complete otherwise the application will be rejected.**

**NOTE:** For additional copies of the registration form, use a photocopy of this form or type in as per the given format. For further details: Visit <https://me.gndec.ac.in/> or contact Course Coordinator.