

# **Guru Nanak Dev Engineering College, Ludhiana**

An Autonomous College u/s 2(f) and 12(B) of UGC Act 1956)

## **Department of Mechanical Engineering**

### **Consolidated report on Faculty development program**

The faculty development program was organized by the mechanical engineering department on dated, 31<sup>st</sup> May, 2016 to 4<sup>th</sup> June, 2016 under the guidance of Director GNDEC Ludhiana & Head of the dept. Mechanical engineering GNDEC Ludhiana (sponsorship by TEQIP-II) on topic **Research methods for engineers**. The programme was designed especially for the faculty & researcher in different fields of mechanical engineering.

The experts from IIT's, NIT's & other reputed institutions were delivered lectures followed by practice sessions on relevant software's. About forty participants from all regions were successfully attended this programme and enhanced their knowledge theoretically as well as practically. The expertise mainly focused on the practical sessions so that the researcher and academicians took the required benefits. Around 45 participants were present in this FDP.

### **Objective of the programme**

1. To enhance the capabilities of teaching faculty in the domain to choose better research methods for their research applications.
2. Practice on software applications like SPSS & MINI TAB.

### **Sessions of the programme**

Session I: 09:30 a.m. TO 11.00 a.m.

Tea break (11:00 a.m. to 11:45a.m.)

Session II: 11:15 a.m. TO 12.45 p.m.

Lunch (12:45 p.m. to 01:30 p.m.)

Session III: 01:30 p.m. TO 03.00 p.m.

Tea break (3:00 p.m. to 03:15p.m.)

Session IV: 03:15 p.m. TO 4.45 p.m.

### Key points of the programme

- Introduction to engineering research
- Literature review
- Statistical analysis
- Optimization techniques
- Simulation modeling
- Survey methods
- Experimental techniques
- Design of experiments
- Research communication
- Practical sessions on different software's

### Programme schedule & topic covered

		Speaker's	Contents
Day1	Session1 Registration & inauguration	Dr. Sehijpal Singh	Introduction about FDP
		Dr. A.P. Singh(Dean P.T.U)	Applications of research
		Dr. M.S. Saini(Director GNDEC)	Advancement in engineering and innovation
	Session 2	Dr. J.S. Khamba (Director COE Pbi. Uni.)	Introduction to engineering research. <ul style="list-style-type: none"><li>• What is research?</li><li>• Criteria for good research</li><li>• Problems in research</li><li>• Research process</li><li>• Research design and methodology</li><li>Etc.</li></ul>



	Session 3	Dr. Seema Sharma.(IIT Delhi)	Hypothesis testing •ANOVA and MANOVA. •One-Way ANOVA •Factorial design
	Session 4	Dr. Seema Sharma.(IIT Delhi)	Hypothesis testing •Two way ANOVA •Hypothesis testing •Null Hypothesis •Alternative Hypothesis
Day 2	Session1	Dr. M.K. Barua(IIT Roorkee)	Multi Variate analysis(part-1) •Factor analysis •Factor analysis design process •Rotational approach
	Session2	Dr. M.K. Barua(IIT Roorkee)	Multi Variate analysis(part-1) •Scree test for HBAT •component analysis •Two sample test and ANOVA
	Session 3	Dr. Khushdeep Dharni.(PAU, Ludhiana)	Data analysis by SPSS, And excel sheet.
	Session 4	Dr. Khushdeep Dharni.(PAU, Ludhiana)	Hand on experience on excel sheet
		Dr. Harwinder singh.(GNDEC )	Implementation of ANOVA. •Statistical techniques
Day 3	Session1	Dr. R.K .Garg(NIT Jalandhar)	Design of experiments. •Design of Experiments (DOE) •Basic Idea •Factorial Design
	Session2	Dr. R.K .Garg(NIT Jalandhar)	Design of experiments. •Fractional Factorial Design •Simple Design

	Session 3	Dr. Harkesh Kumar Kansal.(UIET PU)	Hand on experience on DOE software's •Taguchi techniques. •RSM.
	Session 4	Dr. Harkesh Kumar Kansal.(UIET PU)	Hand on experience on DOE software's •Mini tab 16.0
Day 4	Session1	Dr. Jagwinder singh (NIT Jalandhar)	Multi Variate analysis(part-II) •Cluster Analysis •Discriminant analysis.
	Session2	Dr. Jagwinder singh (NIT Jalandhar)	Multi Variate analysis(part-II) •Factor analysis on SPSS. •Multiple regression
	Session 3	Dr. Inderdeep singh.(IIT Roorkee)	Imaging as a research tool •Finite modelling and analysis. •Introduction about Composite.
	Session 4	Dr. Inderdeep singh.(IIT Roorkee)	Imaging as a research tool •Applications of composites
Day 5	Session1	Dr. Rupinder Singh (GNDEC Ludhiana)	Research communication funding opportunities.
	Session2	Dr. Rupinder Singh (GNDEC Ludhiana)  Dr. S.P.Singh(IIT Delhi)	Research communication funding opportunities. •Funding agencies in India.  Modeling & Simulation. Simulation based engineering.
	Session 3	Dr. Akshay Girdhar(GNDEC)  Dr. Sehijpal singh.(GNDEC)	Handling Plagiarism issues in research.  Basics of research paper writing and publishing •Hourglass Model •Basics of research paper

			•Writing and publishing of technical paper
	Session 4	Dr. Pardeep kumar.(IIT Roorkee)	Taguchi methods •Applications of research methods

## Organizing Committee

Patron

Prof. (Dr.) M.S. Saini (Director)

Chief Co-ordinator

Prof. (Dr.) Sehijpal Singh (HOD)

Coordinators

Prof. (Dr.) Harwinder Singh

Prof. (Dr.) Paramjit Singh

Co- Coordinators

Prof. Ardamanbir Singh

Prof. Aprinder Singh

Organizing committee (Faculty GNDEC Dept. of ME)

Hi,