

A
Report
on

One week Faculty Development Programme approved by Gujarat Knowledge Society and
organized by the Department of Mechanical Engineering on

Computational Methods for Mechanical Engineers using MATLAB

Date: 11th–15th March, 2019 | Venue: PDV LAB, SIEMENS- CENTRE OF EXCELLENCE

ORGANIZING COMMITTEE

CHIEF PATRON

Dr. G. P. Vadodaria
Principal, L.D.C.E., Ahmedabad

CONVENER

Dr. N.M.Bhatt
Head of the Department
Mech. Engg. L.D.C.E., Ahmedabad



PROGRAMME COORDINATOR
Dr. S .S.Pathan (ASSOCIATE PROF.)
Mech. Engg. L.D.C.E., Ahmedabad

COURSE COORDINATOR
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Mech. Engg. L.D.C.E., Ahmedabad

Gujarat Knowledge Society approved one week FDP on “Computational Methods for Mechanical Engineers using MATLAB”.

ABOUT LDCE

L D College of Engineering was started in the year 1948 with the vision to emerge as a ‘center for excellence’ offering technical education and research advancement of society and humankind. We dedicate and commit ourselves to achieve, sustain and foster unmatched excellence in Technical Education. The Institute also offers post graduate programmes in Mechanical Engineering and Computer Engineering to develop scientific and engineering manpower. The programmes are designed to include courses of study, seminars and project/thesis through which a student may develop his/her concepts and intellectual skills. To, this end, we will pursue continuous development of infrastructure and enhance state-of-the art equipment to provide our students a technologically up-to-date and intellectually inspiring environment of learning, research, creativity, innovation and professional activity and inculcate in them ethical and moral values.

ABOUT MECHANICAL DEPARTMENT

Mechanical Engineering Department is the one of the oldest and active departments of LDCE and is imparting quality education since 1948. The department has well qualified and experienced faculties with Ph.D degree from IIT, NIT and M.Tech/M.E degree from NIT, Nirma and other prestigious Universities. Institute has excellent departments and offering research and consultancy services to various industries. The department runs an under graduate programme and four post graduate programmes with specialization in CAD/CAM, CRIOGENIC ENGINEERING, IC ENGINE & AUTOMOBILE.

ABOUT STTP

The one week long FDP programme provided participants a comprehensive understanding of ‘**Computational Methods for Mechanical Engineers using MATLAB**’ and conducting scientific programming. The programme was designed to be generic in nature for satisfying the needs of students and faculties, of Mechanical Engineering of various Government Engineering Colleges situated in the state of Gujarat, to increase their programming skills and analysis capabilities.

OBJECTIVES OF THE PROGRAMME

- To explicate the quality education through imparting knowledge to the well conversed and senior faculties of Mechanical Engg. of various Govt. Engg. Colleges of the state of Gujarat, for making them proficient in getting acquaintance through the soft skills.
- To acquaint the participants about the powerful capability of MATLAB as a language of Technical computing for the modelling and simulation of various mechanical systems.
- To impart knowledge to the students as an end user such that they can enhance their soft skills to be able to cope up the technological changes and challenges taking place in the modern world.
- To increase their employability by further strengthening their problem solving skills by improving knowledge of mathematics and physics.

ABOUT PARTICIPANTS

Faculty members of mechanical engineering from various government institutions were invited to attend this FDP. There were 28 participants who have availed the said training and they are expected to propagate the knowledge they have acquired through this exhaustive in-house training.

COURSE CONTENTS

- ☐ Introduction to MATLAB and its interactive development environment
- ☐ Variables, arrays and expressions
- ☐ Use of plotting and Graphics functions
- ☐ Simple script writing in MATLAB environment
- ☐ Decision Making, Branching and looping
- ☐ MATLAB Simulink and usage
- ☐ Ordinary differential equation solving
- ☐ Linear algebraic equation solving
- ☐ Numerical integration and its applications in engineering.
- ☐ Laboratory sessions for hands on practice for better understanding of the software.

FACULTIES OF THE INSTITUTE & EMINENT SPEAKERS FROM RENOWNED INSTITUTE
Details of expert faculty members for FDP

External	Internal
<p>1. Dr. Reena R. Trivedi Associate Professor Department of Mechanical Engineering School of Engineering, Nirma Institute of Technology, Ahmedabad</p>	<p>1. Dr. S S Pathan Asso.Professor, Mechanical Engineering Department, LDCE, Ahmedabad</p>
<p>2. Dr. Jatin Dave Asst. Professor Department of Mechanical Engineering School of Engineering, Nirma Institute of Technology, Ahmedabad</p>	<p>2. Dr. U A Patel Mechanical Engineering Department LDCE, Ahmedabad</p>
<p>3. Dr. Mihir M Chauhan Asst. Professor Department of Mechanical Engineering School of Engineering, Nirma Institute of Technology, Ahmedabad</p>	

FDP SCHEDULE
COMPUTATIONAL METHODS FOR MECHANICAL ENGINEERS USING MATLAB

L.D.College of Engineering - Ahmedabad
Mechanical and Automobile Engineering Department

Duration: 11/3/2019 to 15/3/2019 (1 Week)

Date(Day)/Time	10:30 To 12:00	12:00 To 1:30	1.30 To 2.30	2:30 To 3:50	3.50 To 4:10	4:10 To 5:30
11/3/2019 (Monday)	Interaction of participants and Introduction to MATLAB and its environment (Dr. S.S.Pathan)	Variables, arrays and expressions (Dr. S.S.Pathan)	LUNCH BREAK	Use of plotting and Graphics functions (Dr. S.S.Pathan)	TEA BREAK	Simple script writing in MATLAB environment (Dr. S.S.Pathan)
12/3/2019 (Tuesday)	Decision Making, Branching and looping (Dr. U.A.Patel)	Practice on Simple to complicated programs (Dr. U.A.Patel)		MATLAB Simulink and usage (Dr. U.A.Patel)		Practice on Simulink blocksets (Dr. U.A.Patel)
13/3/2019 (Wednesday)	Reading and writing excel files & Modular Programming (Dr. S.S.Pathan)	Practice on Reading and writing excel files & Modular Programming (Dr. S.S.Pathan)		Linear algebra and applications (Dr. Jatin Dave)		Practice on Linear algebra and applications (Dr. Jatin Dave)
14/3/2019 (Thursday)	Mathematical Modelling and Solution of Ordinary Differential Equations (Dr. U.A.Patel)	Practice on Ordinary Differential Equations (Dr. U.A.Patel)		Solution of Partial Differential Equations (Dr. Reena Trivedi)		Hands on practice of Partial Differential Equations (Dr. Reena Trivedi)
15/3/2019 (Friday)	Numerical Integrations Techniques (Dr. Mihir Chauhan)	Working with Numerical Integrations (Dr. Mihir Chauhan)		Demonstration of Case Studies and Test (Dr. S.S.Pathan & Dr. U.A.Patel)		Discussion and Valedictory function

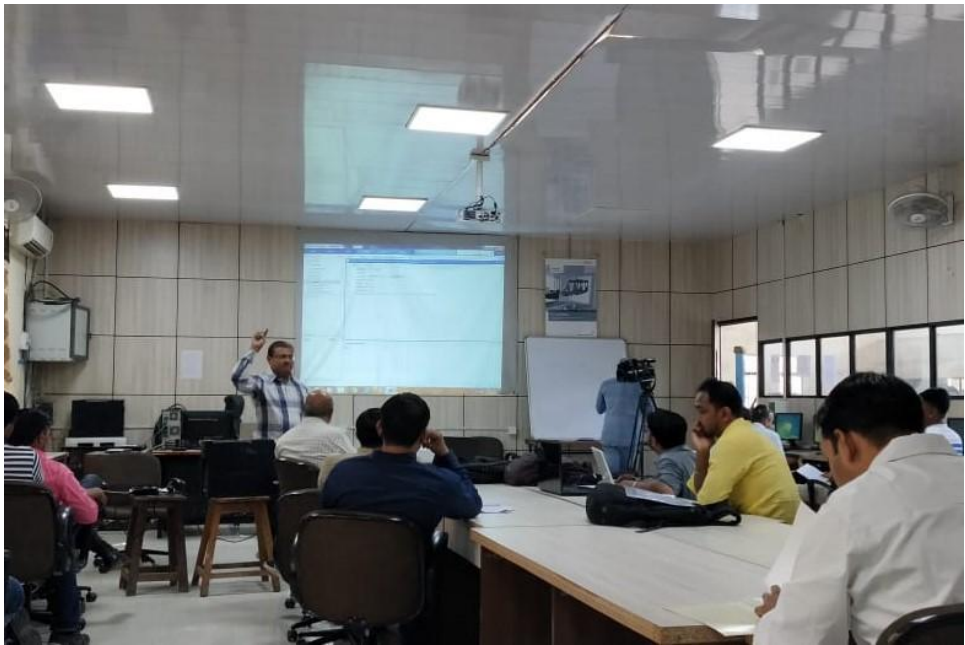
Day 1: First session was conducted by Dr. S S Pathan and he introduced an IDE (Interactive MATLAB Environment). He explained the importance and scope of the MATLAB for modelling and simulation of mechanical systems. Second session on the same day was concerned with introducing the use of variables and expressions to be used in MATLAB. This ensured the participants to write system equations and how to convert those mathematical formulations into MATLAB scripts. After converting ideas into mathematical models, the researcher needs to visualize the results of simulations. This may be possible by exploring the effects of various governing system parameters by having graphical outputs and then interpretation of the results can be enhanced through very powerful plotting capabilities of MATLAB. In the post-lunch session, Dr. Pathan talked on plotting and graphics functions used in MATLAB and for script writing with various in-built graphics' functions of MATLAB.

Day 2: Once the participants get an overall idea about how to make use of an IDE, it is always necessary to apply the technical knowledge of the faculties for various options to be identified and effectively used. Hence, the second day was started with an exposure to the decision making and branching by Dr. U A Patel. He delivered a talk on “Decision Making Branching and Looping”, second session was focused on hand-on practice for some simple to complicated problems. As another approach of programming, Simulink block modelling was also an area which was taught to the participants. In the afternoon session, Dr. U A Patel explained different aspects of “Simulink Block Set” and later the participants were allowed to have practice on making Simulink block models.

Day 3 : During the course of writing scripts to simulate real life problems, we may encounter many problems of reading large amount of data. Further, it would be better if we don't have to input values of many variables at a time and that too frequently. To avoid this file management has got significant impact on the simulation time. So, keeping in view file management aspect, Dr. S S Pathan gave speech on “Reading and writing excel files. He also concentrated on Modular Programming concept for not only managing data files but also improve related scripts' writing. In a second session, the participants were given exercise on writing scripts based on reading-writing data to go for hands on practice. Afternoon session was carried by Dr. Jatin Dave, Asst. Prof., Nirma Institute of Technology. He delivered his speech on “Linear algebra and its application”. Last session of the day was completed with hands on practices pertaining to the topic covered in the previous session, in similar line-up of the training programme.

Day 4: Dr. U A Patel gave speech on his first session on “MATLAB for solving ordinary differential Equations” and second session for its hands on practice. Afternoon session was carried by Dr. Reena Trivedi, Associate Prof. in Mechanical Engg., Nirma Institute of Technology, on various functions of solving PDEs (Partial differential Equations) and then they had hands on practice.

Day 5: Dr. Mihir Chauhan addressed different aspects of “ Numerical Integration Techniques” followed by hands on practice in second session. In a post-lunch session, to check the knowledge gained by the faculties during this entire FDP, using short questions, program outputs and preparing program on their own, was arranged in the form of a suitably designed quiz which was carried out to conclude the training part of this special FDP.



Dr. U.A.Patel delivering an expert lecture.



Dr Reena Trivedi delivering an expert lecture on a PDE.



Dr Mihir Chauhan delivering lecture.

VALEDICTORY PROGRAMME

The Faculty Development Programme was concluded with a valedictory function on 15th march, 2019. In the valedictory function, Hon. Commissioner of Technical Education Ms. Avantika Singh, Principal Dr. G.P.Vadodaria, Dr.M.B.Dholakiya and Dr.M C Chudasma were present. Hon. Commissioner Madam addressed to the audience regarding the importance of five FDPs successfully organized by different leading departments of the institute. She emphasized more on updating the faculties through imparting them training on state of the art technologies. This was necessary as the faculties will have to propagate the same to the students. With a view to take up the challenges of real life and to make aware the students the scenario of ever changing world. Principal sir and Dr. M B Dholakiya addressed the participants regarding the importance of finishing school as a part of enhancing the skills of final year students of various Government Engineering Colleges. Vote of thanks, on behalf of all the organizing committee members of the institute was given by Dr. M C Chudasama to conclude the valedictory programme.