Report

TEQIP-III Sponsored

Short Term Course on

"Introduction to MATLAB, PSCAD and LaTex for Researchers"

June 24-28, 2019

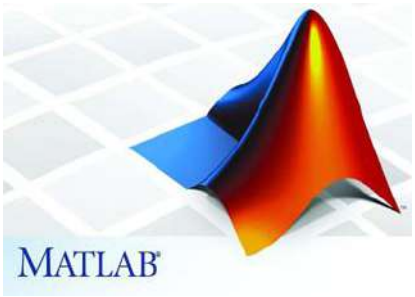
Organized by

Department of Electrical Engineering

National Institute of Technology Srinagar

Prof. A. H. Bhat Dr. Neeraj Gupta Dr. Ravi Bhushan
(Coordinators)

Prof. A. H. Bhat
(Head of Department)



Contents

1 About the short term course

The objective of this workshop is to enhance the knowledge of programming and writing skills and help the students, researchers and faculty to learn PSCAD and MATLAB from industry perspective point of view and write effectively using LaTeX. MATLAB is a high-level computer language for scientific computing and data visualization built around an interactive programming environment. It is becoming the premiere platform for scientific computing at educational institutions and research establishments. The great advantage of an interactive system is that programs can be tested and debugged quickly, allowing the user to concentrate more on the principles behind the program and less on programming itself.

PSCAD (Power Systems Computer Aided Design) is a powerful and flexible graphical user interface to the world-renowned, EMTDC electromagnetic transient simulation engine. PSCAD enables the user to schematically construct a circuit, run a simulation, analyze the results, and manage the data in a completely integrated, graphical environment. If a required model does not exist, PSCAD provides avenues for building custom models. These factors make PSCAD excellent tool for teaching and research.

LaTeX is a typesetting system and it uses source code to generate a document which can be a conference/journal paper, thesis or any technical report. With LaTeX we can edit a file and then typeset it to generate a specified output which can be PDF. In the academic and scientific community, LaTeX is generally the typing document of choice because it can be used to produce a high-level or professional typesetting and structure.

2 Topics Covered

1. Basics of MATLAB/SIMULINK
2. Problem solving using MATLAB

3. Basics of advanced neural network and support vector machine.
4. Basics of PSCAD.
5. Modeling and problem solving using PSCAD.
6. Application of MATLAB and PSCAD in power system engineering
7. Basics of LaTeX, research paper/thesis writing.

3 Lab Sessions Conducted

1. Modelling and design with MATLAB/SIMULINK
2. Simulating physical systems in MATLAB with Neural Network and Support Vector Machine.
3. Modelling and design of power system with PSCAD.
4. Research paper, thesis writing, preparing presentations with LaTeX.

4 Course Coordinators

Prof A. H. Bhat

Professor and Head,

Department of Electrical Engineering,

National Institute Technology Srinagar.

Email:- bhatdee@nitsri.net

Dr. Neeraj Gupta

Assistant Professor,

Department of Electrical Engineering,

National Institute Technology Srinagar.

Email:- neerajgupta@nitsri.net

Dr. Ravi Bhushan

Assistant Professor,

Department of Electrical Engineering,

National Institute Technology Srinagar.

Email:- rbhushan@nitsri.net

5 List of Speakers

Dr. Anil Kumar Singh

Professor and Head,

Department of Computer Science,

Motilal Nehru National Institute Technology Allahabad.

Email:- ak@mnnit.ac.in

Dr. Divya Kumar

Assistant Professor,

Department of Computer Science,

Motilal Nehru National Institute Technology Allahabad.

Email:- divyak@mnnit.ac.in

Dr. Pushker Tripathi

Assistant Professor,

Department of Electrical Engineering,

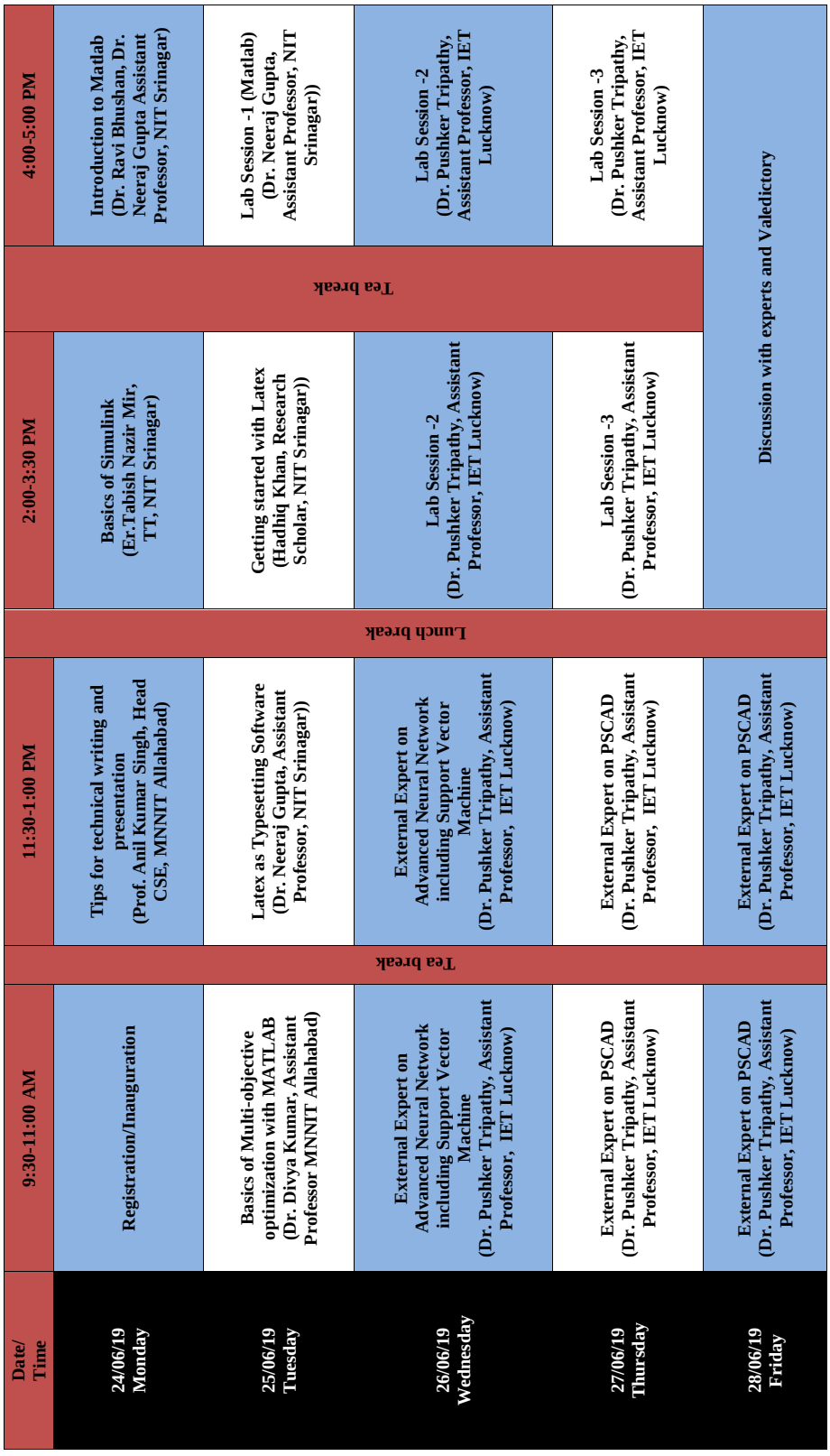
Institute of Engineering and Technology Lucknow.

Email:- pushkar.tripathi@ietlucknow.ac.in

6 Participating Institutes outside NIT Srinagar

State	Institutes	Participants
Jammu and Kashmir	Kashmir University	03
	BGSB University	02
	PDD	01
	SMVDU	01
	SKUAST	01
U. P.	Bipin Bihari Degree College, Jhansi	01
	BIET Jhansi	01
	Motilal Nehru National Institute Technology Allahabad	02
Rajasthan	Govt. Women Engineering College, Ajmer	09
	University College of Engineering and Technology Bikaner	03
Punjab	Guru Nanak Dev Engineering College, Ludhiana	02
	LPU	01
Delhi	Jamia Millia Islamia, New Delhi	02
	Zakir Hussain Delhi college, University of delhi	01
	Sharda University Noida	01
Telangana	Maulana Azad National Urdu University Hyderabad	02
Total		33
10 Ph.D. students and four faculty members of NIT Srinagar also participated in the STC		

7 Schedule



Date/ Time	9:30-11:00 AM	Tea break	11:30-1:00 PM	Lunch break	2:00-3:30 PM	Tea break	4:00-5:00 PM
24/06/19 Monday	Registration/Inauguration		Tips for technical writing and presentation (Prof. Anil Kumar Singh, Head CSE, MNNIT Allahabad)		Basics of Simulink (Er.Tabish Nazir Mir, TT, NIT Srinagar)		Introduction to Matlab (Dr. Ravi Bhushan, Dr. Neeraj Gupta Assistant Professor, NIT Srinagar)
25/06/19 Tuesday	Basics of Multi-objective optimization with MATLAB (Dr. Divya Kumar, Assistant Professor MNNIT Allahabad)		Latex as Typesetting Software (Dr. Neeraj Gupta, Assistant Professor, NIT Srinagar))		Getting started with Latex (Hadhiq Khan, Research Scholar, NIT Srinagar))		Lab Session -1 (Matlab) (Dr. Neeraj Gupta, Assistant Professor, NIT Srinagar))
26/06/19 Wednesday	External Expert on Advanced Neural Network including Support Vector Machine (Dr. Pushker Tripathy, Assistant Professor, IET Lucknow)		External Expert on Advanced Neural Network including Support Vector Machine (Dr. Pushker Tripathy, Assistant Professor, IET Lucknow)		Lab Session -2 (Dr. Pushker Tripathy, Assistant Professor, IET Lucknow)		Lab Session -2 (Dr. Pushker Tripathy, Assistant Professor, IET Lucknow)
27/06/19 Thursday	External Expert on PSCAD (Dr. Pushker Tripathy, Assistant Professor, IET Lucknow)		External Expert on PSCAD (Dr. Pushker Tripathy, Assistant Professor, IET Lucknow)		Lab Session -3 (Dr. Pushker Tripathy, Assistant Professor, IET Lucknow)		Lab Session -3 (Dr. Pushker Tripathy, Assistant Professor, IET Lucknow)
28/06/19 Friday	External Expert on PSCAD (Dr. Pushker Tripathy, Assistant Professor, IET Lucknow)		External Expert on PSCAD (Dr. Pushker Tripathy, Assistant Professor, IET Lucknow)		Discussion with experts and Valedictory		

8 Organizers Report

Report on TEQIP-III Sponsored Short Term Course on Introduction to MATLAB, PSCAD and LaTex for Researchers 24^{th}-28^{th} June 2019 at NIT Srinagar

Background

The Electrical Engineering Department, NIT Srinagar has organized a short term course on Introduction to MATLAB, PSCAD and LaTex for Researchers. In the present scenario data is available in large amount, it can be predictive data and experimental data. Data analytics is one of the promising fields nowadays. By analyzing the data the complex models can be solved. The aim of this STC is to give basic knowledge about MATLAB programming/SIMULATION to the budding researchers. Also, with the growth of power industry, complexities increases. By simulating in the environment like PSCAD will give the objective view of the problem to an electrical engineer to think objectively. Writing is very important aspect of a researcher and typesetter like LaTex can be beneficial in saving the precious amount of time of a researcher. The three packages were helpful for the researchers and faculties as a whole.

8.1 Day 1

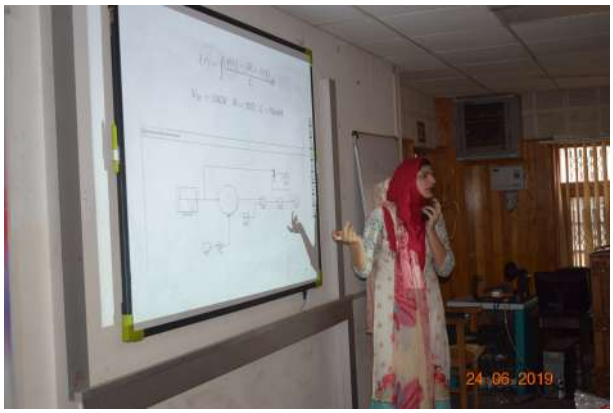
8.1.1 Welcome and opening addresses

The STC commenced with Dr. Ravi Bhushan coordinator of the course welcoming all the guests and participants and emphasized various aspects of the course. Prof. Rakesh Sehgal, Chairman, and Director, NIT Srinagar was the Chief Guest and Prof. Anil Kumar Singh, Professor and Head, Computer Science department, Motilal Nehru National Institute of Technology Allahabad was the Guest of Honor. Prof. Sehgal stressed the importance of use of data sciences in today's world and emphasized its use in research and development activities. Prof. A. H. Bhat, Head, EED presented an overview of the department and STC. Prof. M. F. Wani, Coordinator, TEQIP-III, NIT, Srinagar also welcomed all the participants and congratulate the organizers for such an event. He talks about state-of-the-art on-campus facilities funded by TEQIP-III. Prof. Aijaz Ahmed, Dean R&C congratulate the organizers and gives the overview of various R&D activities of the institute.

Prof. Singh appreciates the role of organizers by strongly emphasizing the need to organize such workshops in the country. About 33 participants from outside institute and 4 internal faculty and 10 research scholars of NIT Srinagar have registered for the short term course. Dr. Javed Iqbal, Dr. Abid Bazaz along with many other faculty members were present in the audience. The inauguration was ended with the vote of thanks by Dr. Ravi Bhushan Course Coordinator.

The first session of the STC started off with the invited lecture by Prof. Anil Kumar Singh from MNNIT Allahabad. Prof. Singh in his invited lecture talked about "Tips for technical writing and presentation". He talked about the skills with which we can make our presentation more effective and interesting for the audience. He also gives the overview about the do and don'ts of technical writing.

The second lecture was delivered by Er. Tabish Nazir Mir, Teachers Trainee, NIT Srinagar. The topic of the discussion was the "Basics of Simulink". She started from the basic to advanced level and discussed about modeling the physical system in simulink with hands on interactive session. The session ended with the lecture on basics of MATLAB by Dr. Ravi Bhushan and Dr. Neeraj Gupta, Assistant Professor EED.



The first day of the short term course was a great success and the organizers look forward to four more days to make this workshop a better platform for budding researchers.

8.2 Day 2

The second day starts with the talk of Dr. Divya Kumar, Assistant Professor, MNNIT Allahabad. The topic of the talk was "Basics of Multi-objective optimization with MATLAB". He talked about the basics of multi-objective optimization and

how it can be modelled in MATLAB coding environment. The second session on "LaTex as Typesetting Software" started by Dr. Neeraj Gupta, Assistant Professor, EED. He gives the hands-on experience to participants on research paper writing, thesis writing, referencing, making presentation on LaTex etc.

The lecture on the latex as "Getting started with LaTex" was continued by Er. Hadhiq Khan, Research Scholar, NIT Srinagar. The second day ended with Lab session on MATLAB by Dr. Neeraj Gupta.

8.3 Day 3

The third day was the marathon session by Dr. Pushkar Tripathi, Assistant Professor, IET Lucknow. It was the session on advanced neural network and support vector machine. He started with the concepts of machine learning covering conventional and modern techniques and how machine learning can be used in the problem of physical systems particularly power systems. He explained the details of advanced neural network techniques and support vector machine, its need, mathematical modeling and applications. The afternoon sessions were the simulation lab sessions of the advanced neural network techniques and support vector machine in MATLAB. The day ended with the hands-on Lab session on neural network and support vector machine in MATLAB.

8.4 Day 4

The session of Day 4 was conducted by Dr. Pushkar Tripathi. It was a session on PSCAD. PSCAD (Power Systems Computer Aided Design) is a powerful and flexible graphical user interface to the world-renowned, EMTDC electromagnetic transient simulation engine. Thirty temporary licenses was given by PSCAD inc. for this session to the participants to make them aware of the excellent capabilities of PSCAD for teaching and research. The session includes the basics of PSCAD, downloading and installation. The expert gave live

session about how to schematically construct a circuit, run a simulation, analyze the results, and manage the data in a completely integrated, graphical environment. The participants also learned how to build custom models, if required model does not exist. The lab session of PSCAD were conducted in the afternoon to acquaint the participants about the problem solving like fault analysis etc. by building circuits.

8.5 Day 5

The morning session of last day was again conducted by Dr. Tripathi. It was a mixed session on PSCAD and MATLAB which involved problem solving, discussion and question answering session. The Valedictory session was held on 28th June 2018 at 2:00 P.M, Dr. Pushkar Tripathi, IET Lucknow was the Guest of honor. Prof, A. H. Bhat, Head EED and Patron of the STC presented the overview of the STC. Dean R&C emphasized the need to organise such STCs in the valley. Dr. Sheikh Shahid Salim gives an overview about different facilities and activities funded by TEQIP-III. While, appreciating the role of organizers in organizing such programs for budding scientists, Guest of honor said that there was a strong need to organize such type of STCs in the country. All the participants have shown their satisfaction with respect to content, delivery and presentations of all the topics covered during the program. A number of participants suggested about the regular conduction of these types of workshops in the future. The certificate to all the participants were presented. The valedictory function ended with the vote of thanks by Dr. Ravi Bhushan.

9 About funding agency-TEQIP-III

The funding for this course was provided by TEQIP-III. We are grateful to TEQIP-III Coordinator Prof. M. F. Wani for providing the funding for this course. Third phase of Technical Education Quality Improvement Programme (TEQIP-III) is integrated with the Twelveth Five-year Plan objectives for Technical Education to improve the quality of engineering education in existing institutions with a special consideration for Low Income States and Special Category States (SCS). Moreover, it provides support to strengthen few affiliated technical universities to improve their policy, academic and management practices. Its main focus is to improve quality and equity in engineering institutions, system-level initiatives to strengthen sector governance and performance which include widening the scope of Affiliating Technical Universities (ATUs), and twinning arrangements to build capacity and improve performance of institutions and ATUs participating in focus states. We are also thankful to Dr. Mukund Dutt Sharma of TEQIP-III for the support during this course.

10 Support from the facilities

All the sessions were conducted in the High-Tech 2. Lab sessions were also conducted using various facilities that were available in the institute. A team of the M. Tech and Ph.D., students assisted in conducting the practical sessions on MATLAB, PSCAD and LaTex. Thirty temporary licensees were given by PSCAD inc. for assisting in this course.

neeraj gupta <neerajgupta@nitsri.net>

Fwd: Request to offer temporary PSCAD license for the participants and resource person of STC at NIT Srinagar.

1 message

Pushkar Tripathi IET Lucknow <pushkar.tripathi@ietlucknow.ac.in> Wed, Jul 10, 2019 at 1:58 PM
To: neeraj gupta <neerajgupta@nitsri.net>

Dear Sir,

Please go through trailing mail.

---------- Forwarded message ---------
From: <ashwin@nayakpower.com>
Date: Sat 22 Jun, 2019, 1:19 PM
Subject: RE: Request to offer temporary PSCAD license for the participants and resource person of STC at NIT Srinagar.
To: Pushkar Tripathi IET Lucknow <pushkar.tripathi@ietlucknow.ac.in>
Cc: <sales@nayakpower.com>

Dear Dr. Tripathi,

We are pleased to provide 30 training licenses for PSCAD v4.6.3 Educational Edition for your upcoming workshop. Please forward this to all the participants. This licensing is valid to June 28, 2019.

Also, I have set up a 1 Professional Edition license for your use which is valid until June 28, 2019.

We recommend that you set up the software on your computer as soon as possible, to avoid any delays during this workshop. This may also allow you to try the software ahead of time.

Software Setup

- Set up your software as per the instructions listed in the following article:

  Setup instructions

  Note
  At Step (d), please use the following Join Code to join the training license to your MyCentre account:
  0306e bc3b8 7c523 eb2d9

We hope you enjoy using this software. If you have any questions on setup or usage, please contact our Support Desk (support@pscad.com). To expedite assistance, please ensure to specify the name of your workshop in your request, "PSCAD Training for NIT Srinagar".

If you have any further enquiries, please feel free to contact me.

Thank you!
Ashwin Damle

11 Plan

There were total of 33 external participants out of which 25 were from outside the state. The group of participants was a mix of faculties, Ph.D., M.Tech. students and participants from industry. The course was well received by the participants. Looking at the response and feedback received from the participants, we would like to continue conducting these type of short term courses with further improvements such as more lab sessions in near future. This would require longer duration for the course and more funds.

12 Acknowledgments

We were able to completely focus on the course along with logistics, accommodation, food, etc. because of the support and impeccable arrangements made by Ph.D. students and faculty members of the EED. Support from departmental Ph.D. students is highly appreciated. This workshop would not have been successful without the constant and active support of TEQIP. This also motivates us to conduct more courses under the TEQIP program. The very presence of Honorable Director, despite his extremely busy schedule, is a reflection of the importance that is attached to the commitment in the growth of the institute. We also acknowledge Prof. M. F. Wani, Coordinator TEQIP and his office for the smooth conduct and his support in every matter of the STC. Any academic function in the department cannot be organized without the support of the student volunteers. Thank you, dear students, for your contributions and enthusiasm in each and every aspect of the event. Last but not the least thank you all administrative and support staff and everyone who has contributed in making this STC a success.

13 Outcome

This course received an awesome response from institutes/universities in neighboring states. Teachers and students from various backgrounds attended this course. After completion of the workshop, participants get themselves motivated to model and Code their problem in MATLAB to find the possible solution. The participants understand the main features of the MATLAB, PSCAD and LaTeX. They are able to use LaTeX effectively for paper/thesis writings and presentations. They can design simple algorithms to solve problems, and also able to write simple and effective programs in MATLAB and solve power system problems in PSCAD.

14 Feedback

The feedback forms filled by participants are also enclosed.

Thank you

Prof. A. H. Bhat, Dr. Neeraj Gupta, Dr. Ravi Bhushan (Coordinators) **Prof. A. H. Bhat (H.O.D)**