Five-Day Workshop on Design and Analysis of Electrical Machines using Altair Flux™

20th March 2019 To 24th March 2019

- Department of Electrical and Electronics Engineering
- RV College of Engineering

Contents

About Altair•Flux™ Software and the Aim of the Workshop

The workshop helped train the students and faculty alike in the usage of the Flux software, but what is it? And why did we need to conduct the workshop?

Flux is the leading software for electromagnetic and thermal simulations. For more than 30 years, Flux simulation software has been used worldwide in leading industries and university labs. It has become a reference for the high accuracy it delivers. Flux is a versatile, efficient and user-friendly tool that will help to generate optimized and high-performance products, in less time and with fewer prototypes.

The workshop was conducted mainly to increase awareness of this lesser known software amongst students and to train and give hands-on experience to the trainees with the design of electrical machines and their internal workings of the various electrical machines during operations. This would also help foster a reinvigorated interest among the students towards the understanding of the subjects Electrical Machines Analysis – I and Electrical Machines Analysis – II. Since the workshop had both students from semesters 2, 4 and 6 and faculties in training, it would allow their understanding of the mentioned subjects to expand.

> *"The workshop has helped me keep ahead of the pace with semester, it will make it easier for me to understand what we will study in the future semesters."*
>
> -Dhanush G, 2nd semester student of Dept. of EEE

Since the second semester students are yet to take those subjects, the contents of this workshop will help them with a certain push, an advantage as it will help them understand those subjects more easily when they encounter those subjects in subsequent semesters, while the fourth semester students, who are taking those subjects concurrently with the workshop will benefit even more greatly as their understanding of those subjects will become more clear as they are being taught those subjects, since the software helps them visualise and identify the magnetic flux linking inside an electrical machine during operation. Similar to the fourth semester students, sixth semester students who have already taken those subjects now have a better understanding and visualisation of the machines during operation. The faculty participants also stated that they could understand the inner working of said machines better and will have a better time explaining these concepts to their students in class.

The Preparation leading up to the Event

A precursor to the workshop had been conducted the previous semester. The idea was then expanded into a full-fledged workshop for the students, which was publicised across major engineering colleges in Bengaluru.

In the previous semester, during the month of October 2018, a small training session had been held for the interested students of fifth semester, who, at the time, were studying Electrical Machines Analysis – II. This training session was for only two days and did not offer much hands-on with the software itself. In February 2019, it was thought appropriate to conduct an open workshop for participation by all interested people, from engineering colleges in and in the vicinity of Bengaluru. This idea was then expanded into the workshop that was to be carried out over a period of continuous five days.

One main problem with carrying out a workshop, as Prof. K Uma Rao pointed out, is gathering enough interested participants that would at least allow us to break even with the cost of the set-up of the workshop, let alone make any profits. Therefore, the event was well-publicised, with students going to major engineering colleges across Bengaluru to spread awareness about the workshop that was about to be conducted. Special offers for student IEEE members were made, and posters and brochures about the workshop were distributed to the colleges.

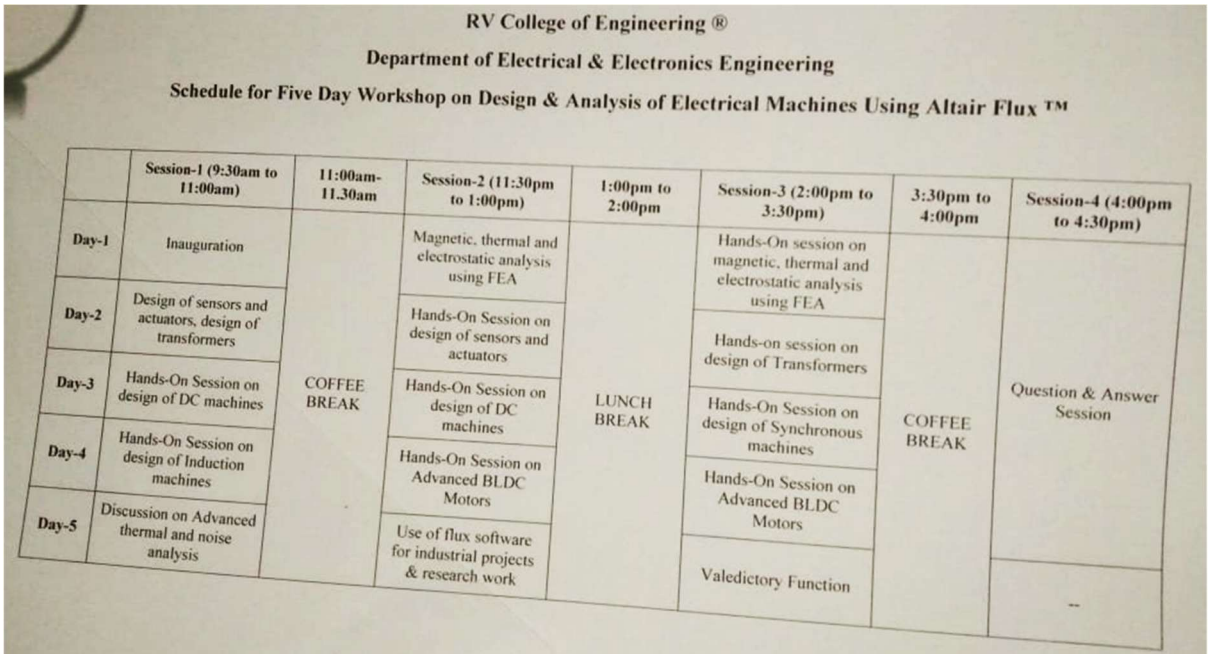
In addition, the registered students were provided with a free trial copy of the software on their own laptop computers so that they could proceed with the training smoothly.

The Event

The event lasted from Wednesday, 20th of March 2019 to Sunday, 24th of March 2019.

The event began on the morning of the 20th of March 2019, at about 08:20. The students, who had failed to acquire a free trial copy of the software previously, were provided with the copy immediately on their laptop computers. The students were also provided with a pen, a notepad, a file and the timetable for the five-day workshop.

Mr. Hemanth D, the trainer from DesignTech Systems Ltd., arrived at about 09:05, and the event formally kicked off at 09:30, with the inauguration ceremony. A copy of the time-table is attached herein.



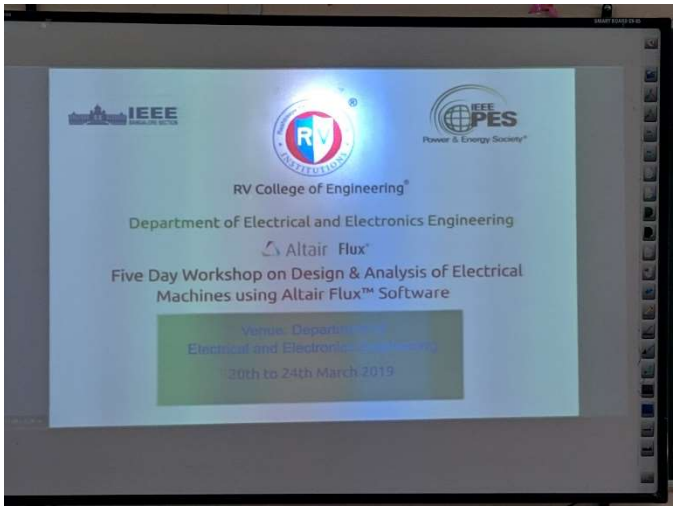
RV College of Engineering ®

Department of Electrical & Electronics Engineering

Schedule for Five Day Workshop on Design & Analysis of Electrical Machines Using Altair Flux ™

	Session-1 (9:30am to 11:00am)	11:00am-11.30am	Session-2 (11:30pm to 1:00pm)	1:00pm to 2:00pm	Session-3 (2:00pm to 3:30pm)	3:30pm to 4:00pm	Session-4 (4:00pm to 4:30pm)
Day-1	Inauguration	COFFEE BREAK	Magnetic, thermal and electrostatic analysis using FEA	LUNCH BREAK	Hands-On session on magnetic, thermal and electrostatic analysis using FEA	COFFEE BREAK	Question & Answer Session
Day-2	Design of sensors and actuators, design of transformers		Hands-On Session on design of sensors and actuators		Hands-on session on design of Transformers		
Day-3	Hands-On Session on design of DC machines		Hands-On Session on design of DC machines		Hands-On Session on design of Synchronous machines		
Day-4	Hands-On Session on design of Induction machines		Hands-On Session on Advanced BLDC Motors		Hands-On Session on Advanced BLDC Motors		
Day-5	Discussion on Advanced thermal and noise analysis		Use of flux software for industrial projects & research work		Valedictory Function		--

The chief guest at the event, Dr. Rudranna Nandihalli, the Head of the Department, Dept. of EEE, Dr. K Uma Rao, Mrs. Jyothi R, Mr. Sudarshan B S, Dr. Anitha G S and Mrs. Sushmita Sarkar, the event co-ordinators, and Mr. Hemanth D, the trainer, all gave a brief description of the Flux software in their own words and the importance of Design and Analysis of Electrical Machines, and as to why the workshop was needed.



The banner

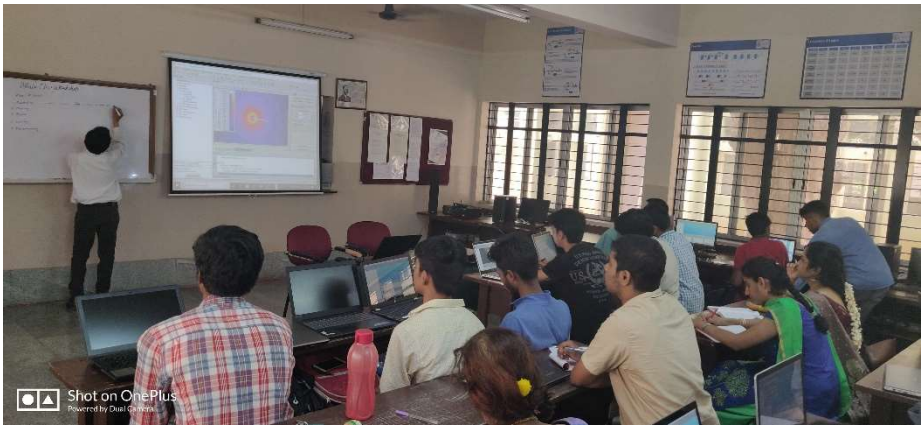
The student as well as faculty presence at the inauguration event

Dr. Anitha G S addressing the students on the importance of Electrical Machine Design

Mr. Hemanth D explaining to the students the benefits of Flux software

After the inauguration, the training session started after a short coffee break. The second session went on after a lunch break and a Q&A session after another short coffee break.

As such, the training sessions went on normally on the 21st, 22nd, 23rd on normal timings, from 09:30 to 16:30 each day.



The Workshop in Progress

The Valedictory Function and The Conclusion

The workshop ended on Sunday, the 24th of March 2019, with a valedictory function.

On the 24th of March 2019, the training sessions proceeded normally from 09:30 to 14:00, but the training sessions ended formally at 14:00.

After the end of the training sessions, the event proceeded with the Valedictory Function, in which the student reviews were asked for and recorded and a few words of thanks were spoken by Mrs. Sushmita Sarkar, Dr. Anitha G S and Dr. K Uma Rao towards Mr. Hemanth D, the trainer and the volunteers, both students and faculty, of IEEE PES chapter that helped them carry out the event smoothly and without much interruptions. Certificates of Participation were distributed to the Participants, and Certificates of Appreciation were distributed to the Volunteers.

The Valedictory Function

Distribution of the Certificates to the Participants

Distribution of the Certificates to the Volunteers (Faculty)

Distribution of the Certificates to the Volunteers (Student)

After a small snack, the event concluded. It was time for farewell, though the participants and the organisers would be keeping in contact with each other, with a Chat Group, to help them solve problems that they may encounter during the usage of the Flux software collectively.

IEEE PES Members involved

The workshop was conducted successfully thanks to the involvement of these IEEE PES members.

1. Shravan Sridhar, Chair of IEEE PES RVCE Students Chapter: Oversaw the whole program, from start to end.
2. Aayush Mohanty, Co-Chair of IEEE PES RVCE Students Chapter: Involved in photography
3. Anand Raj, Secretary of IEEE PES RVCE Students Chapter: Made available the basic facilities, like the notepads, pens, snacks.
4. Shresth Rahul, Treasurer of IEEE PES RVCE Students Chapter: Kept account of all the payments coming through and managing the documents, with Anvit Garg.
5. Anvit Garg, Member of IEEE PES RVCE Students Chapter: Graphic design of early poster, the banner and the certificates and managing the documents, with Shresth Rahul.
6. Varun T Naik, Member of IEEE PES RVCE Students Chapter: Made all the facilities available to the participants and the guests, crucial work in smooth running of the event.