1. Introduction

IIT Bombay has conducted many large-scale teacher training workshops under the Train 10,000 Teachers (T10KT) programme, sponsored by the National Mission on Education through ICT (NMEICT), MHRD, Govt. of India, and trained over 2,00,000 teachers.

Another successful technology developed at IIT Bombay is Spoken Tutorial, using which about 50 lakh students have been trained on various ICT topics. The effectiveness of this method can be seen from the testimonials available here: https://spoken-tutorial.org/testimonials/media/?foss=70 and this TEDx talk. The Spoken Tutorial project is also implemented successfully at IIT Bombay, with funding from NMEICT, MHRD.

It is now proposed to offer the highly effective Spoken Tutorial based ICT training to a large number of teachers, across the country, through the T10KT methodology, with IoT series training being taken up next. The first workshop in the IoT series will be on eSim. eSim is a free/libre and open source EDA tool for circuit design, simulation and PCB design. It is an integrated tool built using free/libre and open source software such as KiCad and Ngspice. eSim is released under GPL. eSim offers similar capabilities and ease of use as any equivalent proprietary software for schematic creation, simulation and PCB design, without having to pay a huge amount of money to procure licenses. Hence it can be an affordable alternative to educational institutions and SMEs. It can serve as an alternative to commercially available/ licensed software tools like OrCAD, Xpedition and HSPICE.

The FOSSEE (Free/Libre and Open Source Software for Education) project at IIT Bombay (https://fossee.in) has been promoting eSim, and other Free/Libre and Open Source Software (FLOSS), such as Scilab, OpenFOAM, Python, Osdag, OpenModelica, DWSIM & R, and Open Source hardware, such as Arduino and OpenPLC. FOSSEE is also funded by NMEICT, MHRD.

The first workshop in the IoT series which is on eSim, is organised by the Teaching Learning Centre (TLC) at IIT Bombay, funded by the Pandit Madan Mohan Malaviya National Mission on Teachers and Teaching (PMMMNMTT), MHRD, Govt. of India. As Spoken Tutorial method offers hands on practice, with 100% active learning, those who undergo this training will be able to start using eSim immediately after the workshop. They will also be able to conduct eSim workshops for their students, using Spoken Tutorials, on their own, without requiring any help from anyone else. The one day eSim Coordinators' workshop will be conducted on Saturday, 27 July 2019 at IIT Bombay. This will be a blended training programme that uses Spoken Tutorials to teach how to use eSim. Details of the workshop will be announced later. The medium of instruction for this workshop is English.

The above mentioned training will be provided to the teachers who fulfil the below criteria.

1. The teacher should be from Electronics or allied engineering fields and should have basic electronics circuit design knowledge.
2. Have learnt eSim software using the Spoken Tutorials.
3. Installed eSim in their laptops.
4. Created a Gerber file for an electronic circuit using eSim.
5. Upload the project files through the Google form.
6. The details of the circuit and submission will be intimated once a coordinator is nominated.

Only those teachers who have uploaded the Gerber files, will be eligible to register and attend the eSim workshop at IIT Bombay. It is mandatory for the teachers to bring their laptops with eSim installed in it. These teachers will conduct the main workshop, which is scheduled on **Saturday, 21 September 2019.** This will be a blended training programme that uses A-VIEW for live interactions and Spoken Tutorials to learn to use eSim. Details of the main workshop will be announced later.

2. Methodology of the Coordinators' Workshop

The coordinators' workshop will be conducted at IIT Bombay on **Saturday, July 27, 2019.** It is mandatory for each participating Remote Centre to send a teacher, who will act as the "domain expert" for the main workshop for teachers. The participating RC should take care of the travel expenses of the above mentioned teachers who would be coming to IIT Bombay for the Coordinators' workshop. The PMMMNMTT project will provide free accommodation and lunch/refreshments for all the participants. The participants of this workshop should go back to their respective centres and help organize the main workshop.

3. Outline of the workshop

The workshop will have two parts:
(a) About 2.5 hours will be used in Learning eSim from Spoken Tutorials.
(b) About 30 minutes will be used to learn about the excellent eSim content, developed by FOSSEE.
(c) About 2 hour will be given to verify the simulation results of eSim using hardware.
(d) About 1 hour for practising more examples on eSim.

3 (a). Learning eSim from Spoken Tutorials

The following tutorials are available under eSim series:

1. Schematic Creation and Simulation.
2. Device Model creation and Simulation.
3. Mapping Components with Footprints.
4. Setting Parameters for PCB designing.
5. Laying Tracks on PCB.

3 (b) . Useful eSim content developed by FOSSEE

A significant issue with the acceptance of open source software on a large scale by academia, is due to the lack of documentation. We had proposed and implemented a novel/unique approach to solve this problem through the Textbook Companion (TBC). The eSim TBC is a repository of simulations of solved examples from standard Engineering and Science textbooks coded using eSim. These solved simulations are freely available.

Apart from the TBCs, another activity under eSim is the Circuit Simulation Project. Students, faculty and practitioners of electrical and electronics and allied fields can rebuild existing circuit design and simulations using eSim, through the Circuit Simulation project. The contributors are awarded certificate and honorarium. Currently, we have more than 50 simulations available for download and use.

4. Teaching faculty:

This workshop will be conducted using Spoken Tutorial methodology. Participants will learn eSim by listening to the Spoken Tutorials and practicing them on 'eSim'. The teaching faculty will be **Prof. Kannan Moudgalya,** Principal Investigator, PMMMNMTT and Spoken Tutorial Project, IIT Bombay

5. Course fee

The course fee for the Coordinators' workshop is Rs. 200/-, which has to be paid at the time of online registration.

Please note that the registration fee once paid is neither refundable nor adjustable under any circumstances.

6. Who should attend?

It is mandatory for each participating Remote Centre to send a **teacher,** who will act as the "domain expert" for the main workshop. The teacher should be from Electronics or allied engineering fields and should have basic electronics circuit design knowledge. He / she should have learnt eSim software using the Spoken Tutorials and should have installed, practiced eSim and uploaded the requisite project files. The last date of remote centres' acceptance is **2 July 2019**. The registration link for the coordinators' workshop will be sent only to those teachers who fulfil the above conditions.

7. Criteria for issuing Certificates

E-certificate will be provided to the participants after successful completion of the workshop and filling up the feedback form.

8. Duration and Venue

The Coordinators' workshop will be conducted at **IIT Bombay on Saturday, 27 July 2019, from 9.30 AM to 6.00 PM.**

9. How to apply?

Enrollment will be strictly online, and no other mode of application will be entertained. The online registration for coordinators' workshop will start on **3 July 2019.** The last date of registration is **15 July 2019.** The URL for registration is:
http://www.it.iitb.ac.in/nmeict/announcements.html

Register on Spoken Tutorial Website:

1. Participants should register on **ST** website to be eligible to participate in Forums. Click on the **Register** link in this URL - https://spoken-tutorial.org/
2. Fill up the registration form and submit.
3. You will get an email.
4. Activate your account by clicking the link in the email.
5. Note down your Username and Password.

Note

- IIT Bombay will NOT bear the travel expenses of the participating representatives. RCs have to bear the travel expenses.
- The PMMMNMTT project will provide **free accommodation (for one night only), lunch and refreshments** for all the participants during the workshop.
- Participants are required to bring **earphones,** as they will have to listen to video tutorials. For those who don't bring, low-cost earphones will be made available at the venue for a cost of Rs. 50/- each.

Address for communication

Dr. Kalpana Kannan
Project Coordinator, ESOS Project
Department of CSE, Kanwal Rekhi Building,
Indian Institute of Technology Bombay,
Mumbai - 400 076
Tel.: +91-22-2576 4989
Fax: +91-22-2572 0022
Email: eoutreach@it.iitb.ac.in

One Day Coordinators' Workshop

Under 'Pandit Madan Mohan Malaviya National Mission on Teachers and Teaching' (PMMMNMTT)**, Funded by the Ministry of Human Resource Development, Government of India**

on

eSim, a First Course in the IoT Series

27 July 2019

Conducted by

IIT Bombay

Course Coordinator

Professor Kannan Moudgalya
Department of Chemical Engineering
Indian Institute of Technology Bombay
Mumbai – 400076