K.L.N. COLLEGE OF ENGINEERING
Department of Electrical and Electronics Engineering

BEST PRACTICES:

Title of the Practice: Industry Collaborative Lab: Texas Instruments (TI) Innovation Lab

Objectives of the Practice:

- The main objective is to facilitate the students to have hands on experience on the current technology in the domain of Electronics by using the following Platforms.

    - Analog System Design & Power Management for Electronics Circuits
    - 16 bit energy efficient Microcontroller MSP 430
    - 32 bit Real Time Controller C2000
    - 32 bit ARM Cortex-M4
    - IoT Application Lab

Context:

- An **Memorandum of Understanding (MoU)** was signed between **Texas Instruments (TI) India** and **K.L.N. College of Engineering** via. **STEPS Knowledge Services**, Coimbatore, Authorized Training partners of TI-India on 23.12.2015. This MoU was proposed to establish a teaching lab facility in the area of TI MCU MSP 430 at the College with technical support from STEPS. The college set up a lab entitled **'Texas Instruments MSP430 based MCU lab".**

- Since then numerous workshops, training programs, value added course, which are completely hands-on, using Texas Instruments MCU platform based on Engineering curriculum are regularly conducted. Also, guest lectures were given to the students of K.L.N.C.E and other colleges around Madurai on free and paid basis.

- Many project kits are provided by TI on donation basis, which would cost around Rs. **3 Lakhs**. Few donated items are mentioned below.

- MSP 430, ALSK Pro, Development Board, Innovation Lab Board, Wall brochures, Pedagogies, Lab Manuals etc.

- The state of art **TI Innovation lab** is established in our institution on August 2017 with a budget of   Rs.5.8/- Lakhs.

- Drish TI provides a competitive advantage to students by enabling them to learn, analyze and apply the theoretical concepts acquired in a class room environment by making it more exciting, relevant and valuable to the student.

Expected Outcomes

Following are the core objectives of the proposed Innovation Lab

- To provide an Opportunity to the student to work on the current technology used in the industry
- Students to showcase their innovations in terms of projects which can be engineered as product
- Designing a solutions to the industry problems
- Research activities in this domain
- Develop IoT applications
- Students will get the opportunity to learn, analyze, apply their theoretical knowledge, develop skills and earned a E-certificate, by participating in Drish TI online contest.

The practice: (activities carried out)

Workshop Organized
- WEBENCH
- Hands on Workshop on MSP 430 Launch Pad Kits. - Faculties
- Training Program on "MSP430 Energy Efficient Microcontroller" – Students
- Hands on Workshop on "Analog and Digital System Design"
- Hands on Workshop on "Embedded Systems and IoT applications" etc.
- "TI Robotics Systems Lab kit (RSLK)using MSP432"

For detailed activities, refer http://klnce.edu/Departments/UG/Eee.aspx

No. of students/Faculty participated: (2018-2019)

Date	Participants
24.01.2019 & 25.01.2019	35 Students+1Faculty
18.06.2018 to 20.06.2018	44 Students
11.06.2018 to 15.06.2018	25 Students

Evidence of Success: (outcome)

- Students of EEE, ECE, EIE, CSE & IT are regularly attending Drish TI online contest, and earn certificates.

- Certificate of appreciation awarded to faculty by TI, for successfully organizing Drish TI contest for the students, every year.

- Students are doing projects, making use of TI kits and participated in the Mini project contests conducted in the department, college, and won best project award.

- Project proposals are submitted to funding agency, using TI kits.

- Mr.Vidhyatharan and Mr.Yavalakshmanan of B.E/EEE (2015-2019 Batch) guided by Dr.Mahalakshmi, AP/EEE, participated in the semifinals of TI Innovation desifn contest. They are awarded with TI kits for free worth Rs.15, 000/- (2018-2019)

- DrishTI online contest winners (2015-2019 Batch): R ARAVINDASAMY, Booma Mariappan, Muthubharathi M, Nandha Kumar S, Ashok Kumar T S, vasuki kalidass, Seeni vasan. (2018-2019)

- DrishTI online contest winners (AUG 2017) – Vignesh M, Vishali, Seeni Vasan, Thaiyal Nayagi, Sivanathan, Reena Riha, Hari Preethy, Ponmuthu Lakshmi, Vishnu Vardhan (2018-2019)

- DrishTI online contest winners (March 2018) – EEE: Lakshmanan R, Saravanakumar R, Haripreethy R, Booma, Chandraleka, Jaffrin Banu. CSE: Suryapreethi, Shravanthi (2018-2019)

- Certification of appreciation for organizing DrishTI contest: Dr.S.M.Kannan, HOD/EEE, Dr.S.Rajalingam, AP/EEE, Manoj A, AP/EEE, Ranjith S, Lab Assistant/EEE – August 2017.

- R. Hari preethy (2014-2018 Batch) B.E-EEE has received MSP430 F5529 Launchpad from Texas Instruments in the Workshop "Embedded systems and IoT applications" during December 2017.

- R. Hari Preethy (2014-2018 Batch) B.E.-EEE is awarded with a cronos TI watch worth Rs. 6, 000/- for winning in Drish TI contest of Texas Instruments, India, during December 2017.

- R. Hari Preethy (2014-2018 Batch) B.E.-EEE has won MSP430EZ430 chronos watch worth R. 6,108/- from Texas Instruments, 'Drish TI contest on MSP 430' during December 2016

- T.K.Rishikesh Kamalamoorthy (2013-2017 Batch) B.E. -EEE was awarded with a cheque of Rs. 11,750/- for winning in the WEBENCH contest during December 2017.

- T.K.Rishikesh Kamalamoorthy (2013-2017 Batch) B.E. –EEE has won a cash award of Rs.13,000/- from TI, under TI University Program for WEBENCH 7th Design Contest held at 26.10.2016. He was declared as a winner along with 7 other students from other colleges in India on December 2016.

Problem encountered:

- Training given for minimum number of students, need to improve in terms of number of students participation.

- Drish TI contest awareness not reached effectively.

- Organizing DrishTI or Texas Instruments innovative challenge contest in college level is highly challenging as the process involved from registration to participation is cumbersome.

- TI kits are too costly to own by students. Hence few kits are purchased by college to supply for students.

- Very few tutorials are available online for TI kits. Hence finding trainer every time is difficult and costly.

- TI must give admin login for the college/department SPOC's for effective organization of their contests and workshops.

Resources required:

- Sensor based equipment, advanced process, permanently fitted projector, audio systems and dedicated lab with computers.

Date	Participants	Topic	Resource person
24.01.2019 & 25.01.2019	Internal: 36 [35Students+1Faculty] [IV Year / VIII Sem (2015-2019Batch)11Nos III Year/VI Sem(2016-2018 Batch)-12Nos. II Year/IV Sem2017-2021 Batch)-12Nos B.E.-EEE Students]	**"TI Robotics Systems Lab kit (RSLK)using MSP432"**	Mr.Madhusudan Kumar Engineer,Steps Knowledge Services, Coimbatore. R.Prasanna Kumar, Theni(Dt).
18.06.2018 to 20.06.2018	Internal:44 [I Year B.E.-EEE Students - 2017-2021Batch]	Three Days Hands on Workshop on "Analog and Digital System Design"	Mr.M.Srinivasan, Assistant Engineer, Mr.T.Dinesh Kumar, Assistant Engineer, STEPS Knowledge Services, Coimbatore.
11.06.2018 to 15.06.2018	Internal:25 [II Year B.E.-EEE Students - 2016-2020 Batch]	Five Days Hands on Workshop on "Embedded Systems and IOT applications"	Mr. M. Srinivasan, Assistant Engineer, Mr. T. Dineshkumar, Assistant Engineer, STEPS Knowledge Services, Coimbatore.

Prize winners of Texas Instruments' DrishTI Online contest organized by K.L.N.C.E in Association with STEPS Knowledge Services, Coimbatore (Authorized Training Partners of of TI, India) under TI University Program.