Prakalp-A joint venture of BVBCET and Sankalp Semiconductors Private Limited to enhance teaching-learning in engineering education

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Abstract: **This paper presents a case study of BVBCET which helped in bridging the gap between industry and institute and preparing students ready for any industry. It is collaboration between Electronics and Communication Engineering department of BVBCET and Sankalp Semiconductor Pvt. Ltd. ventured as Prakalp. In "Prakalp" students interested in the field of VLSI were selected through screening test and trained intensively by industry experts on fundamentals and advance courses of VLSI to carry out the industry level projects. Best performing students got recruited by Sankalp.**
Keywords— Prakalp, industry-institute

Introduction

Interaction between technical institutions and industry is the need of the hour. This will have a great impact on the engineering curriculum, it will expose engineering students to the industrial atmosphere and help subsequent placement of young graduating engineers in industries . There is a need to prepare engineering students for jobs in multinational companies and exposing them to new technologies and engineering methodologies. These objectives can only be achieved well by bridging the gap between industry and the academia.

A joint collaboration between Electronics and Communication Engineering department of BVBCET with Sankalp Semiconductor Pvt. Ltd. ventured as "Prakalp" in 2012, has observed that

1) There is only small number of students pursuing their study in the field of VLSI (Very Large Scale Integration). These students are not exposed to industrial experience and standards.

2) The placements for core VLSI companies are less compared to that for the software companies. In a survey it has been found that there are less than 5,000 analog VLSI. professionals in India. This difference can be attributed to poor technical knowledge among the students with VLSI.

3) Semiconductor industry is incurring huge amount of investment and time required towards training for the recruits. Presuming the future requirement of VLSI engineers and with the objective of bridging the gap between institute and industry, Prakalp floated the projects in the area of analog VLSI and provided all support to carry out the projects.

I. Case Study

Prakalp in 2012 floated ten analog VLSI projects for the students of ECE, IE and E&E branches. Interested pre-final year and final year students in a batch of four started working on these projects. Each batch was assigned a mentor from as Sankalp along with the Dept. guide. Required training to carry out the project was done by an industry expert. These trainings were conducted by Technical Director of Sankalp Dr. P. Subbanna Bhat,

The students were trained students for 40 hours. Sessions were on fundamental courses like Analog, Circuits, Signals, Control engineering and VLSI. Sankalp engineers helped in exploring and mastering the simulation tool (cadence). Every fortnight reviews were conducted by Sankalp mentors along with Dept. guides. Five projects were implemented during their final year. The projects involved circuit design, simulation and layout. A paper presented in Cadence Analog Design contest 2013, secured Runners-up prize. A total of 133 entries from 45 Engineering institutes were narrowed down to 13 finalists by the expert committee. It was of great motivation to us.

The second batch of Prakalp (2013-14 final year batch) also underwent the same process of project implementation. Four projects on analog VLSI were implemented during their final year. A paper published from this batch secured first place at BITS, Goa. With an objective of having full chip design experience to students Prakalp started third batch in 2013 for 2nd year students. During the vacation of 3rd semester students were trained on fundamentals concepts on Analog, signals, circuit theory for two weeks and in long term vacation of 4th semester one month training on Analog VLSI was given. Four hours of theory sessions in the morning and four hours of practical sessions were conducted by the senior students under the guidance of Prakalp co-coordinator. This batch had 4 full semesters to carry out the projects. This long duration involvement helped students to have in- depth understanding of the project.

Fourth batch of Prakalp started in 2014 again for 2nd year students. A written test consisting of basic subjective questions on network analysis and RC circuits was conducted to filter the interested and passionate students. A training session focused on learning basics of VLSI as well as exploring the cadence ICFB tool was conducted for these students, thus a right proportion of learning theory and being able to correlate it practically was achieved. Most of the training sessions were conducted by the senior Prakalp students and faculty of BVBCET and few were conducted by the experts from Sankalp semiconductors Pvt. Ltd. This training went on for a month long duration and the feedback from the students reflected an overwhelming response. Again the projects were given to the students but here the aim was to complete the chip level. i.e., the students were exposed to the full design and layout cycle of the VLSI. The mentors from Sankalp Semiconductor Pvt. Ltd., were assigned for each project. Regular interactions were conducted for the students with their respective mentors and valuable feedback was received. The design phases of the projects were completed successfully and the layout and verification procedures are due to complete in the ensuing semester.

II. Analysis and Reflections

This section analyses the outcome of the conducted program, and reflects upon some better practices relevant for engineering education. From the Prakalp
1st batch, two students got the direct recruitment opportunity, depending upon their performance of the execution of their Prakalp projects. From the Prakalp 3rd batch, three students (2015 batch) were offered direct recruitment opportunity depending upon the performance during their execution of the projects. An increase of 50 % can be observed from the previous mentioned batch, which attributes as a success of the Prakalp's 2nd batch.

Several achievements have been accomplished by the students of this program. Some of the exceptional cases are 1) First place in cadence™ analog design contest was secured by a

team of 3 students from the 1st batch of Prakalp 2) First place in paper presentation at BITS, Goa was secured by a team of 3 students of 2nd batch of Prakalp.

The Table 1 below highlights the increase in number of the students interested to take up VLSI project projects, as part of this program.

Sl no.	Prakalp batch No.	Number of students
1	Batch 1	17
2	Batch 2	20
3	Batch 3	28
4	Batch 4	32

Fig1: Increase in % of students interested in Prakalp.

Practices reflecting new trends in engineering education have come up in execution of Prakalp program from the very beginning. Some of the salient practice features of this program are,

1. Industry is directly involved in the mini and major projects of the students. This has lead to quality projects, i.e., the projects being accomplished are closer to the industry level of execution.

2. Students involvement in training the juniors in the field of VLSI. This has created a feedback kind of environment wherein students contribute in making the junior understand what they have learnt. It gives them an opportunity to share their ideas and knowledge they have acquired.

3. Problem solving skills is found to have been increased among the students after the Prakalp program. Profound interest towards the Analog VLSI among the students is seen.

4. More number of students is ready to be the part of this ever growing mixed signal industry.

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