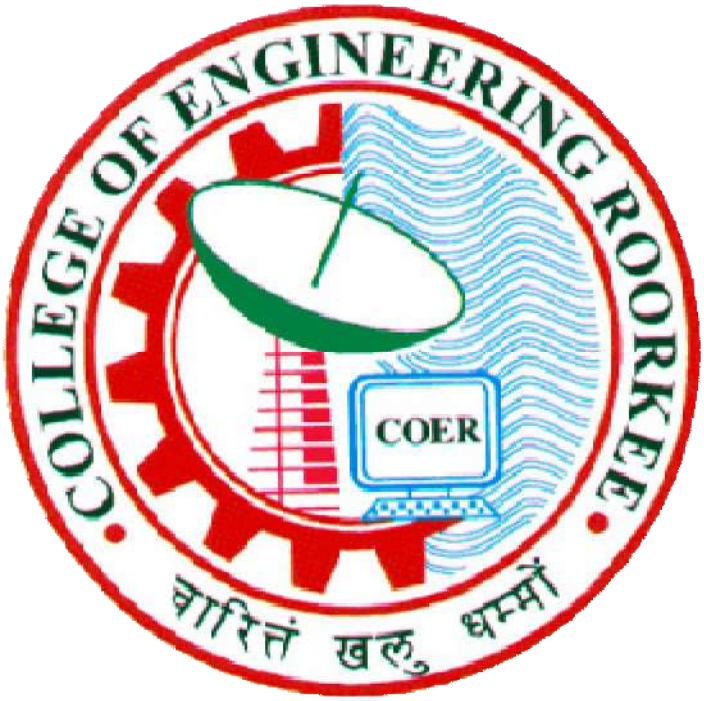
BEST PRACTICES



COLLEGE OF ENGINEERING ROORKEE

AUGUST 2019

BEST PRACTICES OF COLLEGE OF ENGINEERING ROORKEE

Best Practice - 1

1. Title – Faculty Empowerment

2. Objectives of the Practice:

One of the important ingredients in providing quality education is skilled human resource. This includes innovative administrators, effective teaching staff and efficient non-teaching staff. Any organization which identifies and develops such resources can become successful in providing sustainable quality education. The objective is to make faculty technically sound in current technological areas and to inculcate good values in all staff to create a good working culture.

3. The Context:

Since its inception, COER has marked its name in India and abroad through its noted alumni both in Engineering and Management disciplines. The current student enrollment is nearly 2000. COER has more than 170 qualified faculty members in various disciplines, like Image processing, Artificial Intelligence, Pattern Recognition, Environmental Engineering, Earthquake and Disaster management, Manufacturing Science, Structural Analysis, Machine learning etc. The College emphasizes on integrating teaching and research, and developing its linkages with the outside world of academia and industry, for the larger interest of the faculty and students. The testimony to these linkages is evident from a large number of active MoUs with industries and an international University.

4. The Practice:

1. Faculty development programs:

   This program is an initiative wherein the practical exposure and involvement in the emergent technologies enables the faculty members to enhance their knowledge of the area beyond the curriculum specified by the University. The students in turn are benefitted with skills to be industry-ready. The institution absorbs the cost incurred on the faculty member(s) and provides duty leave to attend such FDPs. Faculty members are regularly informed of such opportunities by the Institute Web Coordinator. The interested faculty member proposes to the head of department who takes a decision in consultation with the Dean academics and the Director. Recently, our faculty members were encouraged to avail the opportunity of research internship for non-PhD teachers at IIT Delhi. A faculty member delivers a talk, to interested faculty members group, after completing the FDP for dissemination of knowledge gained.

2. Attending Conferences/ Workshops

   Faculty members are encouraged to attend the conferences/ symposiums/ workshops at other institutions to get exposure of current technologies and research conducted in other institutes.

3. Faculty motivation awards:

   Institute also gives motivation awards to the faculty with 100% result of students in the subject(s) being taught by them. Apart from this, the faculty members are also recognized and awarded on completion of 5 years and 10 years of teaching at the Institute on Foundation Day of the Institute.

4. Foreign visits of faculty members:

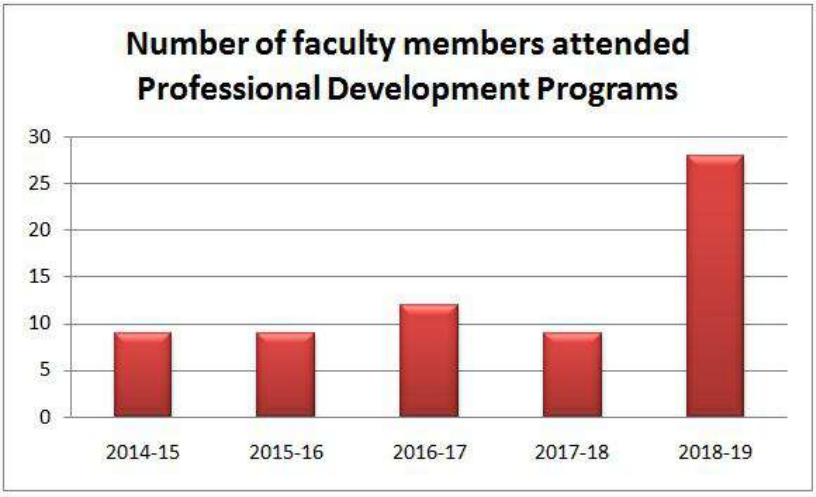
   Institute also supports faculty members to visit Indian and foreign universities for presentation of their research papers and for attending national and international technical events. Recently one faculty member visited Oxford University, England while three went to Russia in these pursuits.

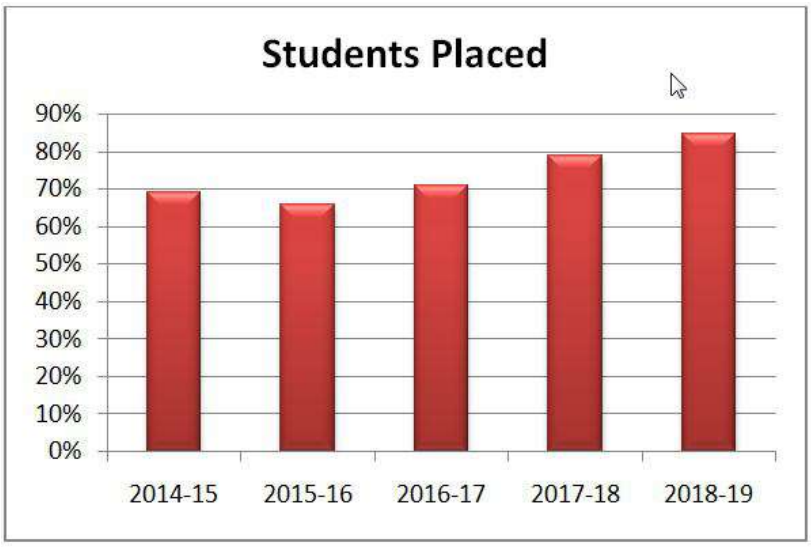
5. Research support:

   College provides seed grants to faculty members to support their research projects. In the year 2019, COER has provided Rs. 1,40,000 as seed grants to the faculty members for their research projects. The institute also provides financial support to its faculty members for professional body memberships such as CSI, IEEE, ISHRAE, etc.

5. Evidence of Success:

Since 2014–2015, around 70 faculty members have participated in different FDPs and conferences. Further to the numbers, the final outcome is the successful placement/employability of the students. It has been heartening to observe that since the start of the program, the number of skilled students for the domain industries have been on the rise. The feedback from the industry about COER students' skill set has been well-documented and suggests that, among other factors, this FDP support has been successful in improving the students' learning curve.





Mr. Thomas Mathew, Assistant Professor, Dept. of Mechanical Engineering, along with students of COER, has manufactured an e-vehicle that is being used in the college campus. Dr. Siddharth Jain, Associate Professor, Department of Mechanical Engineering, has published his research on "Water Purification System" as a patent in Indian Patent Journal.

The faculty members have worked on several projects and are consistently making efforts to further their research such as development of e-vehicle, implementation of antenna for improved connectivity, smart energy controller using IoT, improvement of pineoil based biodiesel fueled engine, etc.

6. Problems Encountered and Resources Required:

There were initial growing pains for creating a robust FDP roll-out process. One challenge was identifying FDP-faculty compatibility. Another major problem revolved around creating systems for sharing FDP learning with other faculty in the department. There were also instances where departments faced problems scheduling classes of faculty members whose FDP lasted for a week.

Best Practice - 2

1. Title – Bridging of the gap between industry and academia

2. Objectives of the Practice

College of Engineering Roorkee (COER) is committed to develop the employability skills in its students. The key path to such objective lies in a single phrase that is to reduce the gap between industry and academia. Value Added Programs (VAP) under Centre of Excellence (CoE) and other learning platforms such as recent technological based workshops, conferences and guest lectures are provided to students and faculty members for better learning.

3. The Context

The huge demand for corresponding training in emerging trends of engineering graduates in India indicates a mismatch between academic education and industry requirements. COER is an affiliated college from UTU therefore is not independent to introduce new courses in curriculum, however, based on feedback from stakeholders (students, alumni, employers, parents) it was observed that a clear majority of companies surveyed believe that the digital transformation of industries, will increase their competitiveness and at the same time, it is required to have skilled manpower with a preliminary knowledge of the platforms and technologies. Software industries need some special training in Artificial Intelligence, Cyber Security, Data Analytics etc. However on the other side, core engineering companies need engineers who are having knowledge of Industry 4.0.

In view of the this, COER aimed of preparing the students industry ready and for the same we have came with the concept of Centre of Excellence (CoE) based on various technologies, however while staring these centers, college faced many challenges in establishment of centers and training of faculty members and students.

4. The Practice

The key path to such objective lies in a single phrase that is supplementary value addition to the students. In COER is doing it with the help of state of the art based Centre of Excellence (CoE) which will have its positive effects on the employability of students in core as well as in software industries, helping students become entrepreneur, help in handling social responsibilities,

improving the corporate structure, finding solutions related to latest technological problems, software skills etc. CoE is a capacity centre with state of art facilities and infrastructure in collaboration with internal and external domain experts under one roof. Its benefit is that we provide students as well as industry people to undergo industry oriented capacity building so that people can walk in pace with the new advancement of technology that is observed at a fast rate in today's scenario of the industries. It has benefitted a lot of people in past and will definitely benefit more students in future as a gateway for transfiguring technologies into actuality.

COER under centre of excellence provide complete solution and deals into major industrial training programs as Value Added Program (VAP), summer training programs in latest and innovative technological fields, workshops and special lectures for all student that covers almost all aspects of industrial demands. In this regard, we have started 13 different state of the art based technological centres as below:

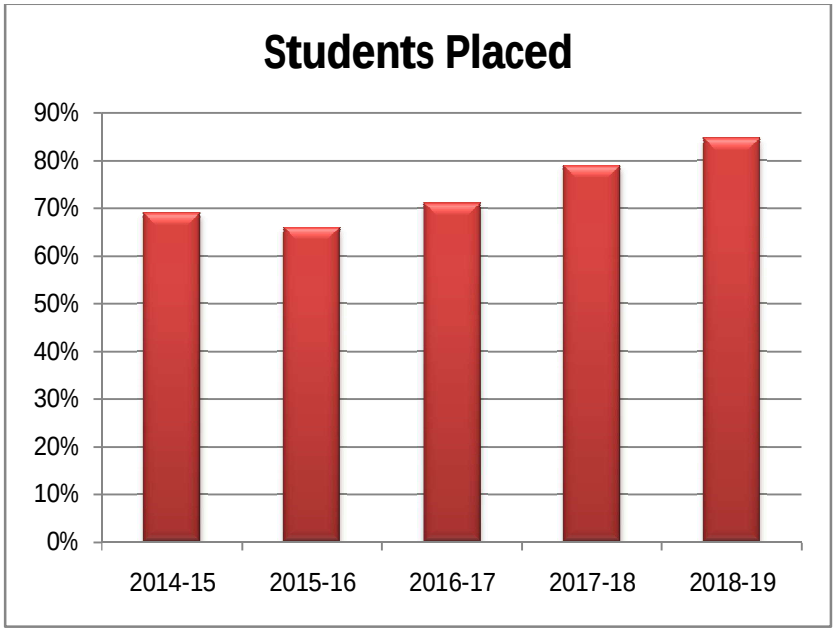
1.Industrial Hydraulic Technology & Application
2.Industrial Technology on Hydraulic Application & Valve Research
3.Industrial Pneumatic Technology & Application
4.Industrial Technology on Hydraulic Application & Valve Research
5.Sensoric Technology & Application
6.PLC- Training & Application
7.Refrigeration & Air Conditioning Technology & Application
8.NABL Accredited Plastic and Polymer Lab
9.High Performance Computing
10.Computer Hardware and Network Centre
11.Advanced Survey Lab
12.Renewable Energy- Bio Fuel
13. IBM software Lab for Cloud Computing, Big Data & Business Intelligence

For the inculcation of research culture among faculty and students a college research committee has been established in conjunction with COE. To inculcate and motivate research, seed grants are provided to the college students and faculty members to initiate the research projects. College faculty members also do write the research grant projects to government of India.

Foreign and Industry collaborations: To provide the exposure to our students and faculty members, College also has done collaborations with international universities/ institutes and industries.

5. Evidence of success

Since its inception in 2014-15, 13 different state of the art based technological centers and value added programs have been started in college which have already mentioned in the practice.



In collaboration with these CoEs, college has conducted workshops during this year in different latest technologies including python, automation, animation and photoshop, data analytics, etc. Further to the numbers, the final outcome of this program is the successful placement/employability of the students. It has been heartening to observe that since the start of the program, the number of skilled-enough students for the domain industries have been on the rise. The feedback from the industry about COER students' skill set has been well-documented and suggests that, among other factors, COE has been successful in increasing the students' learning curve.

Furthermore, the students and faculty have benefited from this program by publishing articles / case studies in reputed journals, providing consultancy, and completing other such activities. More than 20 papers have been published in reputed international journals and conferences including publication of one patent. This year 5 externally funded projects have been procured with sanctioned amount of Rs. more than 10 Lacks from TEQIP-III.

To provide the exposure to our students and faculty members, College also has done collaborations with international universities/ institutes and such as KubSAU, Russia and Industries Texplas Ltd, IBM, Infosys etc.

6. Problems Encountered and Resources Required

There were initial growing pains for creating a robust system for COE. One challenge was identifying the areas/ labs/ courses for implementation of industry 4.0 for each branch. Another major problem revolved around creating courses for each Centre of excellence and its integration with industries. As these courses are out of the university syllabus, scheduling of classes is the another challenge. College also faced problem due to lack of adequate skill-sets to expedite the march towards fourth industrial revolution. For that we enhanced the expertise of our faculty members by providing them special trainings from industries.