



# कॉलेज ऑफ इंजीनियरिंग रूड़की COLLEGE OF ENGINEERING ROORKEE

Affiliated to UTU, Dehradun  
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## CRITERIA 7.2.1

Describe two best practices successfully implemented by the Institution

**BEST PRACTICES**



## **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, caring 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 members technically sound in emerging 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 enrolment is nearly 2000. COER has more than 150 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 academic enrichment 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**

#### **a) Knowledge Upgradation:**

##### **(i) Faculty development programs**

The Faculty Development Programs (FDPs) are short term courses for the faculty members to enhance their knowledge of the emerging areas. The FDPs provide additional learning opportunities from experts which can be used in teaching contents for benefit of students. 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. 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. The faculty member delivers a talk, to interested faculty members group, after completing the FDP for dissemination of the knowledge gained.

**(ii) Organising and Attending Conferences/ Workshops**

Faculty members are encouraged to attend the conferences/ symposiums/ workshops at other institutions to get exposure of current technologies and research. They are also encouraged to organise such activities at the Institute.

**(iii) Foreign visits of faculty members**

Institute also supports faculty members to visit Indian and foreign universities for presentation of their research papers in national and international technical events.

**(iv) Research support**

College provides seed grants to faculty members to support their research projects.

**(v) Self-Learning through online certification courses**

The faculty members are encouraged to pursue online certification courses offered by NPTEL and Coursera with a goal of enhancing knowledge in emerging technologies.

**b) Faculty motivation through facilities, awards and welfare programmes:**

Facilities such as healthcare, transport, accommodation, etc are provided for the benefit of the faculty members.

**(i) Faculty motivation**

Institute also gives motivation awards to the faculty members with 100% students passing in the subject(s) being taught by them. Apart from this, the faculty members are also recognized for their meritorious services and awarded on completion of 5 years, 10 years, 15 years and 20 years of teaching at the Institute on the Foundation Day of the Institute.

**(ii) Special increments**

Performance based increments are given to the faculty members to appreciate and support their dedication towards development of the College.

**(iii) Faculty welfare**

To develop a wholesome working environment, birthdays of faculty members are celebrated in the College campus enhancing the bond among the members of COER. Often, family dinners are organized for the faculty members of COER.

**5. Evidence of Success**

Since 2015–2016, more than 100 faculty members have participated in different FDPs and conferences. This FDP support has been successful in improving the students' learning curve.

On Nov. 20-21, 2019, COER faculty members organized an International Conference on Artificial Intelligence and Applications and got an opportunity to meet and connect with eminent resource persons from the US, IITs and other reputed organisation.

Recently one faculty member visited Oxford University, England (March 2019) while three went to Russia (May 2019) for academic pursuits.

More than 35 papers have been published in reputed international journals and conferences including publication of 10 patents during 2019-2020. This year 10 externally funded projects have been awarded with sanctioned amount of more than Rs. 22 Lakhs from TEQIP-III.

In the year 2019, COER has provided Rs. 1,40,000/- as seed research grants and also provided financial support for professional body memberships such as Computer Society of India (CSI), IEEE, ISHRAE, etc.

Students of COER, have designed and fabricated an e-vehicle that is being used in the College campus.

In the year 2020, 56 online certification courses offered by NPTEL and Coursera were successfully completed by 30 COER faculty members.

## **6. Problems Encountered and Resources Required**

There were initial problems in creating a robust FDP roll-out process. One challenge was identifying FDP-faculty compatibility. Another major problem revolved around creating a system 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. They have gradually been overcome now.

## **7. Note**

Faculty empowerment through short term knowledge enabling programs should be integral part of an institute of higher learning. The Institute needs to draw a calendar for these activities in the beginning of the academic year and review it periodically. Following parameters will help in empowering the faculty members:

- a) Faculty Development Program
- b) Organising invited lectures of experts from industry and academia
- c) Faculty participation in conferences in India and abroad
- d) Organisation of conferences by the faculty members
- e) Online certification courses by faculty members and students
- f) Qualification improvement

The annual appraisal of faculty members be so designed that above parameters are covered with appropriate weightage.

## **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 students. The key path to such objective lies in bridging the gap between industry and academia. Value Added Programs (VAP) under Centre of Excellence (CoE) and other learning platforms such as workshops based on emerging technologies, industrial visits, conferences and guest lectures are provided to students and faculty members for updated learning.

### **3. The Context**

The growing demand for training in emerging trends of engineering graduates in India indicates a mismatch between academic education and industry requirements. COER is an affiliated college of Uttarakhand Technical University and is not free to introduce new courses in curriculum. However, there is need for additional learning to meet industry requirement. Based on feedback from stakeholders (students, alumni, employers, parents), it is observed that the digital transformation of industries require 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. On the other side, core engineering companies need engineers who are having knowledge of Industry 4.0.

In view of this, COER has come up with the concept of Centre of Excellence (CoE) based on various technologies. These centres are now established and functional.

### **4. The Practice**

The key achieving the objective lies in providing value addition in knowledge to the students beyond prescribed syllabi. COER is doing it with the help of state of art based Centre of Excellence (CoE) resulting in positive effects on the employability of students in core as well as in software industries, helping students become entrepreneur, helping the corporate sector, finding solutions related to latest technological problems and training on, 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. The benefit is that students as well as industry personnel undergo industry oriented capacity building so that they can walk in pace with the new advancement of technology. It has benefitted a lot of students in past and will definitely benefit more students in future as a

gateway for alignment with new technologies.

COER under centre of excellence provide complete solution and deals into major industrial training programs as, summer training programs in latest and innovative technological fields, workshops and special lectures for all students that cover almost all aspects of industrial expectations. 15 different state of the art based technological centres have been established, as below:

1. Centre for Technology on Space Applications Development and Research (SDNx)
2. Centre for Industry 4.0 Application Studies and Research
3. Centre for Agriculture Internet of Things (Smart Agriculture)
4. Centre for Plastic and Polymer Research (NABL Accredited)
5. Centre for High Performance Computing (Knowledge Enabled)
6. Centre for Big Data Analytics, Cloud Services and Business Intelligence (IBM)
7. Centre for Cyber Security Technologies
8. Centre for Industrial Technology on Hydraulic Application & Valve Research
9. Centre for Industrial Technology on Pneumatic Application & Valve Research
10. Centre for Sensoric Technology & Application
11. Centre for PLC- Training & Application
12. Centre for Refrigeration & Air Conditioning Technology & Application Research
13. Centre for Computer Hardware and Networking
14. Centre for Advance Surveying Application and Research
15. Centre for Renewable Energy- Bio Fuel Research

For inculcation of research culture among faculty and students a College Research Committee has been constituted in conjunction with COE. Seed grants are provided to the college students and faculty members to initiate the research projects.

COER has established a Do It Yourself (DIY) centre open for 24 hours to inculcate the habit of problem solving and self-learning.

Regular workshops, seminars, hackathons and competitions are organized for the students to encourage design thinking among them.

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**

The students and faculty have benefited from this program by publishing articles / case studies in reputed journals, and conferences. More than 35 papers have been published in reputed international journals and conferences including publication of 10 patents during 2019-2020. This year 10 externally funded projects have been awarded with sanctioned amount of more than Rs. 22 Lakhs from TEQIP-III. Following major facilities have been created from these funds:

1. Bomb Calorimeter
2. Microcontroller Based Portable Flue Gas Analyzer
3. Experimental Setup of Smart Hybrid Solar Kitchen
4. Combustion analyzer
5. Smoke meter
6. Plastic Melting Machine
7. Tile Abrasion Machine
8. Multi-parabolic flat plate solar collector setup
9. Data Logger

The placement offers obtained by the students of COER portrays the impact of initiatives taken by COER for bridging the gap between industry and academia. Students of COER are changing the trend of joining the industry by building their own start-ups, thus becoming entrepreneurs.

## **6. Problems Encountered and Resources Required**

There were initial difficulties in 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 not from the university syllabus, scheduling of classes is another challenge. College also faced problem due to lack of adequate skill-sets for Industry 4.0. For that the expertise of our faculty members was enhanced by providing them special trainings from industries.