



TECHNICAL EDUCATION QUALITY IMPROVEMENT PROGRAMME

(TEQIP)

PHASE-III

INSTITUTIONAL DEVELOPMENT PROPOSAL

of

PUNJAB ENGINEERING COLLEGE

(Deemed to be University)

CHANDIGARH



for

Sub-component 1.3

***Twinning Arrangements to Build Capacity and Improve
Performance of Participating Institutes***

1. INSTITUTIONAL BASIC INFORMATION

1.1 Institutional Identity

- Name and address of the Institution : **PEC University of Technology,
Deemed University (Formerly Punjab
Engineering College), Sector 12, Chandigarh
(U.T) - 160012**

- Year of establishment : **1921 in Lahore as Mugalpura College of
Engineering**

- Is the Institution AICTE approved? : **Yes**
Furnish AICTE approval No. : **1-2519066781**

- Type of Institution : **Grant – in – Aid under UT Administration,
Chandigarh**

- Status of Institution : **Autonomous Institute (Deemed to be
University) under section 3 of UGC Act**

- Name and Designation of : **Dr. Manoj K. Arora, Director**
Head of the Institution
(Full time appointee)

1.2 Academic Information:

- **Engineering UG and PG programmes offered in Academic year 2016-17:**

S.No	Title of programmes	Level (UG, PG, PhD)	Duration (Years)	Year of starting	AICTE sanctioned annual intake	Total student strength in all years of study
1.	Aerospace Engineering	UG	4 years	1960	30	121
2.	Civil Engineering	UG	4 years	1947	75	322
3.	Computer Science & Engineering	UG	4 Years	1988	75	362
4.	Electrical Engineering	UG	4 Years	1947	75	321
5.	Electronics & Communication Engineering	UG	4 Years	1967	75	343
6.	Mechanical Engineering	UG	4 Years	1947	75	359
7.	Materials & Metallurgical Engineering	UG	4 Years	1967	60	211
8.	Production and Industrial Engineering	UG	4 Years	1965	40	141

9.	Computer Science & Engineering	PG	2 Years	2002	25	105
10.	Electronics Engineering	PG	2 Years	1995	25	100
11.	Transportation Engineering	PG	2 Years	1959	18	74
12.	Structural Engineering	PG	2 Years	1964	18	76
13.	Mechanical Engineering	PG	2 Years	1959	25	106
14.	Electrical Engineering	PG	2 Years	1995	25	96
15.	Industrial Metallurgy	PG	2 Years	1996	18	68
16.	Production & Industrial Engineering	PG	2 Years	1995	18	74
17.	Water Resources Engineering	PG	2 Years	1959	18	71
18.	Environmental Engineering	PG	2 Years	1989	18	54
19.	Electronics (VLSI Design)	PG	2 Years	2012	18	73
20.	Information Security Engineering	PG	2 Years	2010	25	92
21.	Industrial Design Engineering	PG	2 Years	2011	18	46
22.	Quality Engineering & Management	PG	2 Years	2011	18	35

- NBA Accreditation Status of UG and PG programmes as on 31st December 2016:**

Total no of programmes eligible for accreditation (at least one batch pass out): **18**

Number of programmes accredited: **11**

Number of programmes applied for accreditation: **07**

- **Status of Faculty Associated with Teaching Engineering Students (Regular & Contract) as on 31st December 2016:**

No. of Sanctioned Regular Posts	Present Status : Number in Position by Highest Qualification												Total Number of regular faculty in Position	Total Vacancies	Total Number of contract faculty in Position
	Doctoral Degree				Masters Degree				Bachelor Degree						
	Engineering Disciplines		Supporting Disciplines (Physics, Chemistry, Maths and English/ other languages)		Engineering Disciplines		Supporting Disciplines (Physics, Chemistry, Maths and English/ other languages)		Engineering Disciplines		Supporting Disciplines (Physics, Chemistry, Maths and English/ other languages)				
	R	C	R	C	R	C	R	C	R	C	R	C			
1	2	3	4	5	6	7	8	9	10	11	12	13	14= (2+4+6+8 + 10+12)	15=(1-14)	16= (3+5+7+9+ 11+13)
162	63	5	10	2	3 4	1 8	3	3	1	-	-	-	111	51	28

R=Regular, C=Contract

2. INSTITUTIONAL DEVELOPMENT PROPOSAL (IDP) (Implementation period: April 2017- March 2020)

2.1 Executive Summary

PEC University of Technology is one of the India's leading Institutions providing quality technical education in the field of engineering and technology, for more than 95 years. Having its roots in Lahore since 1921, the institute was mentored by University of Roorkee (now IIT Roorkee) from 1947 to 1953. The institute started operating from its present 146 acres campus from 1953. It remained affiliated to Panjab University till 2003, when it became a Deemed University, under Section 3 of UGC after a Gazette notification from MHRD. The institute has also been listed in 12th plan of Gol to get converted into an institute of national importance similar to IITs and NITs. In last years NIRF ranking, the institute has been ranked 38, which is above many of the NITs in the country and above all the NITs in the region.

Currently, the institute is running 8 UG and 14 PG programmes in Engineering and Technology, and also PhD programmes in Engineering, Sciences, Humanities and Management. The current student strength across all courses stands at 2700. With recent increase in UG intake in place, the strength will increase to 4000 in the year 2020. The admissions to UG programmes are through national level JEE (Mains) test and to PG and PhD programmes are through national level GATE examination. The academic and administrative practices of the institute are similar to IIT (e.g., i) the academic curriculum is based on Choice Based Credit System with flexibility in choice of electives, inclusion of minor and major specialisations, inclusion of MOOCs, credit transfer scheme, industrial internship and industrial visits, proper emphasis on basic and engineering sciences, humanities, management, communication skills, ethics and value systems and co-curricula, ii) the institute has a Board of Governors, Director on a 5 year tenure, Deans, Senate and other bodies with delegation of power).

The institute puts tremendous emphasis on student learning, creating learning environment, faculty and staff upgradation, research and development, entrepreneurship and incubation, industry interaction and alumni networking. There are 9 academic departments (8 engineering and one applied sciences department), one academic center in Humanities and Management, 2 Centers of Excellence; Cyber Security Research Center, and COE in Industrial and Product Design (the later established under TEQIP II), Computer Center providing high end network and data services to the whole campus (majorly for the support under TEQIP II), Central Library (made RFID enabled under TEQIP II), entrepreneurship and incubation center, 4 Boys Hostels, 2 Girls Hostels, faculty and staff residences (about 50% live on campus), sports facilities and other amenities.

*The vision of the institute is **"To become centre of excellence in technical education and research and to occupy a place amongst the most eminent institutions of the nation"**. The institute has also set-up mission statements aligned with the vision of the institute with the ultimate goal of providing high quality value based technical education inclusive of all stake holders viz. students, faculty, staff, alumni and society in general.*

The participation under TEQIP II sub-component 1.2 (enhancement in quality of PG education) during 2012-2017 with a total funding of INR 17.5 Crores (initial INR 12.5 Crores and Additional INR 5 Crores), has greatly benefitted the institute on all fronts, i.e., student teaching and learning, faculty and staff upgradation, research and development, industry interaction, student employability, creation of state of the art computing and library facilities, creation of new PG laboratories and upgradation of existing PG laboratories, starting of new PG

programmes etc. The COE in Industrial and Product Design established under TEQIP II with a funding of INR 5 Crores is also doing exceedingly well and has earned name for itself.

TEQIP II has indeed changed the work culture of the institute from traditional teaching to research and entrepreneurial, and design based thinking. It is due to this reason that the faculty of the institute have earned Sponsored Research and Consultancy projects worth Crores of rupees from various research organisations such as DST, DRDO, DEITY, ADA, ARB etc. as well as industries. The Indian Railways has established a Chair (with an endowment fund of INR 10 Crores) in the thematic area of Geospatial Technology. The institute has also been shortlisted for Atal Incubation scheme of Niti Aayog of GoI. The institute is also acting as a Spoke with a funding of INR 1.5 Crore to Design Innovation Center established by MHRD in Panjab University. The industries and alumni have contributed laboratories in Electrical Engineering, and Electronics and Communication Engineering, and Mechanical Engineering departments. Recently, two USA based alumni have made a commitment of US \$ 1.25 Million for development works and modernisation of laboratories at campus. The institute is in the process of setting up of a unique Smart City Innovation Center with support of Ministry of Urban Development, UT Administration and industry, which is expected to come up by May 2017.

Thus, with a long and cherished legacy and a focussed aptitude of imparting quality and modern education in this fast changing world, the institute is on the path of progress, and therefore is very well equipped in all manner to act as mentor institute to other engineering institutions in the region. Under the twinning arrangement programme of TEQIP III, the institute is poised to provide mentorship to the engineering institutes in the State of Himachal Pradesh, which are geographically accessible. The objective will be to upgrade the quality of technical education in these institutions through improvement in teaching/learning keeping in mind equity and with a focus on outcome based education (OBE), faculty and staff training and upgradation, academic and administrative reforms, improving students skills and employability, creating sense of entrepreneurial and design based thinking amongst students, creating a research culture amongst faculty and students, connecting the institute with industries in the region and bringing in ICT based environment in teaching learning processes.

In order to fulfil the objective stated above, the existing facilities of our institute will be upgraded in a systematic manner. It is therefore proposed,

- i) To establish an ICT ready Center for Development of Teaching and Learning (CDTL) with aim to impart training to faculty and teaching assistants on pedagogy and also to help advance use of technology in teaching and learning practices.*
- ii) To establish a Doctoral Training Center (DTC) to provide dedicated support for academic research in all disciplines of engineering, sciences and social sciences for postgraduates, early career researchers and postdoctoral fellows, to run pre-PhD courses and to improve engagement with external partners including industries.*
- iii) To establish Center for Career Development and Guidance (CDGC) to provide support and guidance to students on their career ambitions, to assist them in developing necessary skills in order to enhance their proficiency and to facilitate corporate partners to interact with young and dynamic students.*
- iv) To establish Center for Assistance and Peer Learning (CAPL) to promote peer learning, to build a system of passing knowledge from seniors to juniors, to employ a proper faculty mentorship model, to expose students early on to the*

inter-disciplinary research and innovation in engineering with emphasis on societal applications.

All these centers will be remotely linked with the mentee institution through ICT infrastructure envisaged to be created with industry partnership, and will act as virtual centers to the mentee institution. The existing research, innovation and incubation facilities in our institute will also be networked with these centers and be made available to the mentee institution in an organised manner.

2.2 Provide an action plan with timelines for : (not more than 1 page for each sub-activity)

(a) Improving the learning outcomes of the students

Item 2.2 (a).1: Faculty training (qualification upgradation, subject upgradation & research competence, pedagogical training, participations in conferences, seminars/workshops etc.

The faculty occupies the most important place in an academic institution and is regarded as the soul of the institution, if the institute has to excel. This can only be achieved by hiring quality faculty on continual basis, upgrading the qualification of existing faculty by allowing them to attain higher education either inside the institute or outside the institute, running faculty development programmes in their subject areas as well as pedagogy, allowing them to participate in national and international conferences for their professional growth and providing them a research culture to enhance their research competences.

In recent past, the institute through TEQIP II funding and the in-house resources, has been able to achieve success in all the fronts by taking following initiatives,

- i) Hiring new faculty through regular advertisement and rolling advertisement on the patterns of IITs.
- ii) Creating in-house research schemes to support faculty to work on cutting edge research problems.
- iii) Research initiation project award scheme for the new faculty to provide them seed grant to create a sense of research aptitude in them.
- iv) Provision of professional development allowance @ INR 1 Lakh per year for purchase of books, computing resources, participation in international and national conferences, FDPs in subject domain and pedagogy and management programmes, professional memberships etc.
- v) Provision of study and sabbatical leaves to assist the faculty in upgradation in qualification and research competence.

The institute will continue with the above practices. In addition to this, it is planned to establish a Center of Development of Teaching and Learning to exclusively focus on subject based and pedagogical training of the faculty of both mentor and mentee institutes. A Doctoral Training Center is also proposed to provide support not only to the faculty to enhance their research competences but also to support the postgraduates and the research scholars in their pursuit to research in order to make them ready for potential academic career thereby creating capacity to overcome the shortage of quality teachers in engineering institutions. Further, both the centers will be attractive destinations for training of the faculty and research scholars in the

engineering institutions in the surrounding region thereby acting as a good revenue generation resource centers.

Item 2.2 (a).2: Staff Training (Technical and Administrative Staff).

If the faculty is the soul of the institution, the technical and administrative staff are the backbone of the institution. These staff manned the laboratories and all the administrative offices. In this changing world, the laboratory upgradation is a continuous phenomenon and a complete automation in the processes is the need of the hour. In order to achieve this, the training of existing technical and ministerial staff becomes mandatory. The institute though has been making efforts in upgrading the skills of both technical and ministerial staff but a lot has to be done in this direction. During TEQIP II, a number of staff members have gone for training at different places but this has to be increased manifolds. It is therefore proposed,

- i) To increase the frequency of staff training programmes in subject domain and office automation
- ii) To enhance their digital literacy by conducting workshops
- iii) To increase the duration of training from current 5 days to one month as per the needs
- iv) To approach industries to provide at least one year of handholding in imparting on-site training to staff.

Item 2.2 (a).3: Increasing capacity of UG, PG and Ph.D education (Increasing enrolment and starting new UG, PG and PhD programmes)

The students are the main beneficiaries of an academic institution. Providing quality technical education is the mandate. The students admitted in our institution are meritorious at all levels; UG, PG and PhD. The students passing out from this institute have excelled in all fields and have served the nation and the globe in different capacities in all sectors. It is therefore our duty that we produce as many quality students as we can. Keeping this in mind, the institute has increased its intake in UG programmes from earlier 385 to 730 including students admitted under Direct Admission of Student Abroad (DASA) from the session 2016-17. The institute also runs 14 postgraduate programmes with an average intake of 20 per programme. The institute is in the process of revamping postgraduate education and has set up a committee to this effect. The terms of reference of the committee is to propose new postgraduate programmes, to weed out obsolete postgraduate programmes, to rationalise the intake in each postgraduate programme, to propose executive postgraduate programmes for working professionals on the lines of IIMs and to propose a flexible and industry oriented PG curriculum. The institute also has a policy of allocating upto 8 PhD students with each faculty member. Keeping this in mind, it is therefore proposed,

- i) To start at least two new PG programmes in inter-disciplinary areas with an intake of 15 students to start with.

- ii) To revamp existing PG programmes in terms of subject content and rationalisation of intake capacity.
- iii) To start executive PG programmes for working professionals in order to attract them towards academics and make it as their career.

Item 2.2 (a).4: Investing in smart class rooms, campus Wi-Fi (24*7 broad band connectivity and Wi-Fi access in all academic and administrative buildings and hostels (with a minimum of 2MBPS speed for each connection)), e-library etc.

The institute is aware about the need to providing digital infrastructure, if it has become technology enabled teaching learning institute of excellence. During last 5 years, the institute has been able to enhance its capacity in this direction through TEQIP II and in-house resources. At present, our institution is equipped with campus-wide networking including both high speed wired and wireless internet connectivity. A connection from local ISP with bandwidth of 32 Mbps (1:1) provides internet connectivity in all academic departments, hostels and other facilities. We are also a part of the National Knowledge Network (NKN) which is a project that aims at establishing a strong and robust Indian network which provides secure and reliable connectivity. At present, the NKN has provided 1Gbps connectivity. The institute is also equipped with Web Servers, E- Mail Server, Security Wall, Bandwidth Management and Data Servers. A new data center and cloud computing facility has also been procured under enhanced grant of TEQIP II. At three locations, the smart classroom facilities have been created. The institute has recently constructed a new academic block consisting of big classrooms of 120 capacity, PG classrooms, computer clusters, language laboratory, conference and seminar rooms, center of humanities and management and center for total quality management. However, the whole academic block has to be made ICT ready. The increase in intake of UG programmes has further put load on expanding academic infrastructure as well as hostels. Additionally, the institute is planning to convert open green spaces into learning spaces to provide knowledge to students from 'anywhere and anytime' basis. The central library although has been made RFID ready but needs to be augmented with digital resources. The campus is also being put on e-surveillance through an IP based hardware system. The institute therefore needs to continuously upgrade to make it a smart campus on the lines of academic campuses in the world such as the NUS in our close proximity. It is therefore proposed,

- i) To make the new academic block ICT ready and converting all classrooms into smart classrooms.
- ii) To make all the green spaces BOYD (Bring Your Own Device) ready so that students can learn any time and from anywhere.
- iii) To create 'Digital Lounges' in the central library for easy access to the digital resources available through National Digital Library, INDEST-AICTE consortium, SWAYAM platform and many more.
- iv) To create tele-presence facility at both ends (i.e., mentor and mentee institutions) for online discussions with the management and online classroom teaching.

- v) To increase the NKN bandwidth from current 1 Gbps to 10 Gbps to support academic communities at mentor and mentee institution.

Item 2.2 (a).5: Improving the academic performance of SC/ST/ OBC/ Academically weak students through innovative methods, such as remedial and skill development classes, peer assisted learning for increasing the transition rate, non-cognitive skills and pass rate.

The admissions to various UG and PG programmes are through national level examinations. There is reservation of seats for SC, ST and PD candidates as per the UT Administration policy. Some seats are filled through DASA to admit wards of Indians settled abroad. It has been observed that some students across all the categories including general category remain academically weak. The number is determined based on their national level test scores (in the first semester) and on the basis on their performance in semester examinations. The lists are produced to the Senate, which decides on further course of action to improve the academic performance of these students. This is done through

- i) Extra classes in science subjects during evenings
- ii) Tutorial classes embedded in each course
- iii) Communication and technical communication courses embedded in the curriculum
- iv) Workshops of 2 to 3 days to improve soft skills
- v) peer learning groups under the student chapters of different professional societies
- vi) Student mentorship scheme operated through Dean of Students Affair office
- vii) Re-examination scheme within one month of the semester examinations
- viii) Reducing the semester load to accommodate the back paper load after taking due consent from the parents.

Thus, although some processes in the system are in place, this needs to be further enhanced. It is therefore proposed to establish Center for Assistance and Peer Learning with the following objectives,

- i) To conduct diagnostic tests to identify the academic weak or deficient students in subject domain, soft and non-cognitive skills.
- ii) To provide a platform for peer learning.
- iii) To liaison with different organisations who are involved in offering webinars on in subject domain, soft and non-cognitive skills, and running those webinars in specially designed classrooms for the benefit of the students.
- iv) To conduct regular workshops in a structured manner.
- v) To take over the student mentorship scheme from Dean of Student Affairs for its effective implementation.

- vi) To facilitate faculty, students and parents to provide them a discussion platform to deliberate on the poor performance of the students and take remedial measures.
- vii) To act as a grievance redressal office
- viii) To expose students to the inter-disciplinary research and innovation in engineering with emphasis on societal applications

The center is expected to have a close association with the other Center for Development of Teaching and Learning (where teachers will be trained exclusively to improve performance of academically weak students), and the Center for Career Development and Guidance, which focusses on preparing students for their career in different sectors.

Item 2.2 (a).6: Instituting academic and non-academic reforms including NBA accreditation, programme flexibility (is there any meet to revise the curriculum? When it was last revise).

The institute has adopted UG curriculum as implemented in IITs. The last revision has been made from 2014-15 session. The salient features of this curriculum are,

- i) More flexibility with regard to choice of courses
- ii) Increase in percentage/component of department core courses and elective courses
- iii) Credits to the Co-Curricular Activity courses (such as NCC, NSS, NSO, Sports and other Proficiency)
- iv) Courses on communication skills, technical communication and ethics and self awareness
- v) Basket of humanities and management courses
- vi) Basket of basic sciences courses
- vii) Basket of engineering science courses
- viii) Concept of minor specialization
- ix) Concept of major specialization
- x) Full semester internships in industry
- xi) Industrial visits
- xii) Reduced load in the final year
- xiii) Continuous evaluation of students through assignments, quizzes, proctored examinations
- xiv) 10 point grading system.

The feedback from all stakeholders viz. students, faculty, industry and alumni was taken. Workshops on curriculum development with participation from industry and alumni were conducted. The curriculum adopted by IITs and International universities of repute was consulted. However, there is a challenge for its proper implementation. Further, the academic reforms is a continuous process and involvement of industrial populace and training to teachers for effective implementation becomes mandatory. It is therefore proposed,

- i) To conduct regular training sessions on teaching and learning methodologies for teachers under the ambit of proposed Center for Development of Teaching and Learning.
- ii) To hire visiting and emeritus faculty with more than 20 years of industrial and research experience.
- iii) To hire adjunct faculty working in industries to spend time at campus (in particular during weekends) and interact with students on special problems and case studies.
- iv) To approach industries to design 1 credit and 2 credits courses on current subjects and teach the students by conducting classes through ICT infrastructure.
- v) To approach alumni to have online sessions with the students and faculty on curriculum design and development.
- vi) To setup an online feedback mechanism for faculty appraisals.
- vii) To encourage faculty in organizing courses under the existing continuing education programme of the institute.

With regard to non-academic reforms, most of the processes, as listed in the reference document of TEQIP III, are in place in our institute. The institute is therefore rightly placed in mentoring other institutions on all fronts.

Item 2.2 (b).1: Increasing interaction with industry (What are the Industry located in vicinity? What roll of Industry is perceived for the Institute?)

Industry participation is one of the strong components of any engineering institution. When hospitals are operating from the campuses of medical colleges, why cannot industries be present in the campuses of engineering and technology institutes. There is no doubt that a clear distinction between education (mandate of institute) and training (mandate of industry) has to be made in producing engineers. It is therefore necessary to meticulously integrate the industry in the teaching and learning processes of an engineering institutes. Our motto to promote Institute-Industry-Integration and not just to increase Institute-Industry-Interaction. The institute has taken several measures to involve industry throughout the academic cycle of the students. Some of them are,

- i) Full semester internship in industry by allocating 20 credits (60% evaluation by the industry)
- ii) Setting aside one week in each semester for teaching by industrial personnel in classrooms
- iii) Specially designed courses by industry and their teaching by the industry personnel
- iv) Industrial visits of students throughout their stay
- v) Allowing PG students to spend time in industry for their project problems
- vi) Appointing industry personnel as co-supervisors on project problems
- vii) Conducting workshops by industrialists and alumni
- viii) Setting up of laboratories by the industries and alumni at campuses.

Whereas, the institute continues to involve industry in different ways, the role of industries needs to be further strengthened. It is therefore proposed,

- i) To approach industries to open Centers of Excellence at campus in different thematic areas by providing equipment and handholding under their Corporate Social Responsibility.
- ii) To hire upto 20% of faculty from industries as per the mandate given by AICTE and UGC.
- iii) To improve online teaching and learning facility under the ambit of Center for Development of Teaching and Learning so that industry personnel may be engaged with faculty and students on continual basis.
- iv) To work on joint research and development problems with industries.
- v) To facilitate industrial personnel to upgrade their educational qualifications.
- vi) To launch joint PG programmes with industries in specialised areas.
- vii) To start executive programmes exclusively for the industrial personnel.
- viii) To conduct FDPs of faculty in the industries.
- ix) To get associated with the industry to work on innovative problems which have potential to get converted into technology and product.

It may also be mentioned that Chandigarh region surrounded by four states of Punjab, Haryana, Himachal and Jammu & Kashmir provides a great industrial eco-system in many sectors viz. Information Technology, Agriculture, Pharmaceuticals, Consulting, Manufacturing and Defence sectors. A number of companies are present in these sectors and is increasing every day.

Item 2.2 (b).2: Student career counselling and placement.

The ultimate product of the Outcome Based Education is the engineer who is employable. It is disheartening to note that as per one of the reports of McKenzie, only 15% to 20% of 13 Lakhs of engineers produced every year are employable. Fortunately, campus placement scenario in our institute is good. Last three years have seen almost 100% placement of UG students with an average salary of INR 7.00 Lakhs per annum and the number of companies visiting the campus is also increasing. Nevertheless, the placement of PG students is a concern, which stands at about 40% to 50% in recent years. Further, many of the students opt for higher studies and Civil Services, and want to become entrepreneurs too. It is due to this reason that the institute has proposed to convert the existing Training and Placement Office into a Career Development and Guidance Center with the following mandate,

- i) To guide the students on various career options available to them and to encourage them to adopt a career based on their passion.
- ii) To facilitate students by conducting finishing schools on soft skills and non-cognitive skills.

- iii) To act as a bridge between faculty/students and the industries/potential employers.
- iv) To conduct joint training programmes with industries in association with the proposed Doctoral Training Center and Center for Assistance and Peer Learning.
- v) To promote culture of webinars by the industries to improve the professional skills of the students on regular basis starting from 3rd year onwards.

The center is expected to work closely with the upcoming Entrepreneurship and Incubation Center and the Smart City Innovation Center at the campus.

Item 2.2 (c).1: Sponsored research, consultancy and other revenue generating activities.

The institute has a Deans office of Sponsored Research & Industrial Consultancy (SRIC) to facilitate the faculty in acquiring sponsored research and consultancy projects from different funding agencies both government/NGOs and Industries as well as International organisations. The in-house and research initiation project awards provide seed grants to faculty for research to encourage them to submit sponsored research and consultancy projects. The guidelines to execute projects of different nature are in place and duly approved by the BoG. About 20% to 25% of the total cost of the project is set aside as institute overheads, and is a good source of IRG. This is appropriately divided into Institute Development Fund, Department Development Fund and Professional Development Fund as prevalent in IITs of the country. The Continuing Education Cell of the institute is also attached with the Dean SRIC office to promote the conduct of FDP and short term courses for the teachers of other academic institutions and industry personnel as well. The office also closely works with the office of Dean Alumni, Corporate and International Relations in approaching industries and research organisations both within India and abroad. This, however, has to be further strengthened.

It is therefore proposed to establish a PEC Extension Center in Delhi-NCR region as an extension center similar to IIT Roorkee and IIT Kanpur, to carry out many outreach activities. This will significantly increase the IRG of the institute.

Item 2.3 (1): Is there an ERP/MIS system existing, if yes, then any improvement, Modification suggested.

At present, the institute does not have an ERP system. The institute has made efforts in this direction by approaching different vendors but all in vain, as none of the vendors has been able to provide a customised ERP, since the academic processes and other activities are dynamic in nature. Recently, the institute has developed PEC Information System, after having learnt from the NPIU MIS, which covers partial activities. The institute has therefore decided to develop a cloud based in-house ERP system. A PEC Student IT Team has been created to work directly under the mentorship of Head, Computer Center, which will be responsible for the development of Academic Information System, Human Resources System, Hostel Management System, Faculty Hiring System etc.

Item 2.3 (2): Is there any mechanism i.e. special classes being conducted in the institution for improving the GATE score.

At present, there is no such mechanism in place. However, the proposed Career Development and Guidance Center will be mandated with this responsibility also, which can liaison with different GATE coaching classes in the city to facilitate students who are interested in writing not only GATE but other examinations such as GRE, GMAT, TOEFL, ELTS, Civil and Defence Services, CAT etc.

Item 2.4: Please identify some endeavors and joint activities that you would undertake with the institution of focus state under sub-component 1.1 for twinning arrangement from among the ones listed below and/or any further ones and provide the yearly action plan for 3 years:

S.No	Suggested Activity/Indicator	Proposed Action	Target (number, %age, stage etc.) for institution under sub-component 1.1 over the baseline, if applicable		
			2017-18	2018-19	2019-20
1	Increase in student graduation rates	Mentoring to initiate programs at mentee institute for improvement of the academic performance of weak students and enhancement of non-cognitive skills (Deputing PEC faculty to work with team at mentee institute, and also making use of proposed Centers for Development of Teaching and Learning and Center for Assistance and Peer Learning.	01 faculty of PEC	01 faculty of PEC	01 faculty of PEC
2	Improved Placement of graduates a) Placement Rate b) Placement Package	Conduct of Finishing school for improving employability and also to give access to the activities by the proposed Center for Career Development and Guidance	01	01	01
		Conducting Job fair at PEC campus		01	01
3	Increase in GATE qualified graduates	Conducting specialized classes on GATE in liaison with various GATE coaching institutes in the region, through Career Development and Guidance Center.	01	01	01
4	Smart classrooms	Sharing experience of creating smart class rooms at PEC campus and guiding the mentee institute in		02	

		establishment of these.			
5	e-books and e-Journals	Providing online access to the existing library resources in the institute.			
6	Increase in publications in refereed journals	Mentoring faculty and students through proposed Doctoral Research Center and Center of Assistance and Peer Learning.	At least 10 SCI journal publications	At least 10 SCI journal publications	At least 10 SCI journal publications
7	Seminars, meetings and conferences for students and faculty for training and academic development	Conduct short term courses & workshops	5	5	5
		Conduct one day seminars workshop, symposium on niche areas	5	5	5
		Facilitate organizing seminar, symposium, conference with themes in Educational development, instructional design, communication skills, pedagogy, ethical practices in research and teaching, personality development	5	5	5
8	Sharing of faculty for teaching processes	Short term modules in specific subjects by PEC faculty at mentee institute	1 to 2	1 to 2	1 to 2
9	Faculty exchange for research and development purposes	Visiting faculty training & mentoring program	10 visitors faculty/research scholars (2-3 per Dept)	10 visitors faculty/research scholars (2-3 per Dept)	10 visitors faculty/research scholars (2-3 per Dept)
		Long leave stay to teachers and researchers from mentee institute	5 visitors for 1 per Dept.	5 visitors for 1 per Dept.	5 visitors for 1 per Dept.
		Facilitate faculty of mentee institute to explore pursuing ME/PhD related work	1 to 3	1 to 3	1 to 3

		at PEC			
10	Student exchange at the PhD, Masters and Undergraduate levels	Student mentor program for students of mentee institute (for good academic-administrative practice)	01	01	01
		Short term internships	10-15	10-15	10-15
		Research Scholar-Alumni Symposium	01	01	01
11	Joint supervision of PhD and/or Masters' student	Facilitate Joint supervision	02	04	06
12	Joint activities with industry for joint R&D, internships and placement activities	Workshops and seminars on Campus Internship and placement mentorship	01	01	01
		Facilitate organizing Industry-Academia Collaboration event at mentee institute	-	01	01
		Conduct Job fair at PEC for students of mentee institute	01	01	01
		Facilitate PEC-mentee institute student joint innovation projects on rural area or local industrial problems	01	02	03
13	Seminars and learning forums on improving governance practices	Management Conclave event	-	01	-
		Interactive round table conference	01	-	01
		Workshop on Good Governance	-	01	-
14	Improvement in NBA accreditation (including applied for cases)	Conduct workshop on Programme Educational Objectives (PEOs) and Programme Objectives (POs)	01(for UG)	01 (PG)	-
		Facilitate mentee institute to conduct curriculum development workshop	01 (UG)	01 (PG)	-
15	Helping in Grant of UGC	Interactive sessions of senior functionaries of	As per requirement	As per requirement	As per requirement

	Autonomy for non-autonomous institution	PEC with management of mentee institute			
16	Any other form of endeavour	Mentoring for procurement, MIS and TEQIP project execution	As per requirement	As per requirement	As per requirement

Item 2.5: Identify the outreach programmes and systems which are already in place in your Institute to succeed in your role of twinning for strengthening of other institutions viz. related to faculty/students/non-teaching staff/Industry etc.

PEC strives to reach out beyond student's community to the larger society. This reflects the institute's commitment to work for the benefit of society. As such the institute has many such programs or activities that reflect the institute philosophy. These are enumerated below,

- i) The institute is proud partner of Chandigarh Region Innovation and Knowledge Cluster (CRIKC) with PEC Director as the Vice President, and spearheading the promotion of engineering education and research.
- ii) The institute is executing several projects of societal importance for Chandigarh Administration.
- iii) The institute has earned many projects from various research organisations and agencies namely DRDO, DST, ADA, DEITY and others.
- iv) The institute has signed MoUs with a number of industries who are supporting the institute in different ways.
- v) The two centers of excellence and other inter-disciplinary research groups are engaged in cutting edge research and development and have established liaison with industries and other government organisations for joint research and development projects as well as capacity building.
- vi) The continuing education cell of the institute is responsible in organising FDPs and short terms courses for the academic community and industry personnel in the surrounding regions.
- vii) The activities of Entrepreneurship and Incubation Center are expanding and is currently incubating two companies.
- viii) The UG curricula implemented by the institute in 2014-15 has been adopted by majority of the academic institutions coming under CRIKC, so that uniformity in teaching/learning is maintained. This also facilitates in optimising the human and laboratory resources in the region.
- ix) Industries are approaching the institute to establish centres of excellence on campus and have also designed a few courses to be taught by them.

Thus, with a visible involvement of PEC in various outreach activities clearly indicates that the institute has lot of potential to act as mentor institute to other engineering institutions in the region and is ready to leverage its resources in a methodical manner.

Item 2.6: Identify the academic and/or administrative challenges that you anticipate in your role of twinning and the mechanism that you have put in place and/or intend to put in place, to address these challenges.

After becoming Deemed University, the institute has faced many challenges in terms of governance and academic reforms, funding from different agencies, dealing with regulatory bodies such as UGC and AICTE, and internal administrative issues. Although, the institute has been able to overcome most of the challenges, a learning, which will tremendously come useful when it comes to mentoring of the institutes in the region. However, there will always be some challenges, which the institute perceives for proper implementation of twinning mechanism in place. These include,

- i) Changing the mindset of the faculty and students of mentee institute from traditional teaching towards research, innovation, design based and entrepreneurial thinking.
- ii) Persuading the faculty and students of mentor institution to adapt to the role of mentorship to the faculty and students in a structured manner.
- iii) Timely release of grants to the mentor and mentee institutions.
- iv) Providing full autonomy to the mentee institute whether it is academic, financial and administrative autonomy particularly in case of Government institutions.

Item 2.7: Is there any difficulty in Recruitment and selection of high-quality faculty? If yes, what are the reason & action plan to solve the issue?

The hiring of quality faculty has always been a challenge. Nevertheless, the institute has taken several measures in this direction, which are as follows,

- i) The selection committees are constituted by drawing faculty members from IITs and NITs.
- ii) The advertisement for vacancies is out once a year, which needs to be increased to twice a year.
- iii) The Career Advancement Scheme for promotion of internal faculty is in place and meets once a year.
- iv) The BoG of the institute has approved the concept of Rolling Advertisement which will allow the institute to call selection committees at least on quarterly basis.
- v) The institute plans to approach IITs and International Universities to conduct placement interviews at their campuses for hiring faculty.
- vi) Formation of search cum selection committees is also a step in this direction.
- vii) Provision of visiting and emeritus professorships on semester and yearly basis is in place.
- viii) The industrial personnel are being approached to act as adjunct faculty in the institute for a short term assignment.

Item 2.8: Give an action plan for long term strategic partnership with the mentee institute after the end of the Project.

The institute plans to engage with the mentee institution on regular basis on all fronts upto a period of two years after the project ends. During this period, the mentee institute will be allowed to access all the facilities of the institute, to engage with the faculty on regular basis and to take guidance on academic, administrative and financial reforms. It is always advisable to exit the mentorship at an early date so that the institute develops independently for its own growth

and progress. Nevertheless, the joint research and innovation projects will continue even after a period of 5 years of hand holding.

Item 2.9: Describe briefly the participation of departments/faculty/students in the IDP preparation.

This draft of the IDP has been prepared by taking inputs from major stakeholders (i.e., faculty and students) either directly or indirectly, and based on the data and guidelines available with the institute duly approved by various bodies such as BoG, Senate, Deans Committee, Library Advisory Committee, Building and Works Committee, Training and Placement Office, Centers of Excellence in research and development, TEQIP II experiences etc. The proposal will also be presented to the Deans and Heads Committee. Following personnel have been involved directly in preparation of draft IDP,

- i) Director
- ii) Deputy Director
- iii) Dean Faculty Affairs
- iv) Dean Sponsored Research and Industrial Consultancy
- v) Dean Alumni, Corporate and International Relations
- vi) Dean Academic Affairs
- vii) Registrar
- viii) TEQIP II Coordinators
- ix) Head, Computer Center
- x) Training and Placement Officer
- xi) Convener, Students Affair Council