

**TECHNICAL EDUCATION QUALITY IMPROVEMENT
PROGRAMME (TEQIP)**

PHASE-III

INSTITUTIONAL DEVELOPMENT PROPOSAL

For

**Sub-component 1.1
Institutional Development for Participating Institutions**

National Institute of Technology of Sikkim

1. INSTITUTIONAL BASIC INFORMATION

1.1 Institutional Identity

- Name and address of the Institution : **National Institute of Technology Sikkim
Ravangla, South Sikkim, Sikkim 737139**
- Year of establishment : **2010**
- Is the Institution AICTE approved? : **Yes/No Not Required (Comes under NITSER Act 2007)**
Furnish AICTE approval No. **NA**
- Type of Institution : **NIT**
- Status of Institution : **Autonomous Institution Status under NITSER Act.**
- Name and Designation of Head of the Institution : **Prof. Ajoy Kumar Ray, Director (In-Charge)**
(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	B Tech	UG	4 Yrs	2010	215 (Academic yr 2016)	402 Ongoing + 207 Pass out (3 batch)
2	M Tech	PG	2 yrs	2015	30 (Academic yr 2016)	28
3	PhD	PhD	5 yrs	2014		60

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

Total no of programmes eligible for accreditation (at least one batch pass out): 01

No. of programmes accredited: NIL

No. of programmes applied for accreditation: NIL

- **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			
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)
38	10	2	8	1	11*	4	0	0	0	0	0	0	29	9	7

R=Regular, C=Contract

*Purely on Contract

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

2.1 Give the Executive Summary of the IDP (max 2 pages).

The present proposal aims to strengthen the academics as well as the infrastructure of the Institute to provide quality education and professional training to its students with the ultimate objective to improve science & engineering learning, particularly in the State of Sikkim. The state of Sikkim, in spite of having enormous natural resources, has been unable to exploit its potential to the fullest, primarily due to lack of proper educational/technical Institutes with state-of-the-art facilities. Availability of rich Himalayan bio-resources, rivers, challenging transportation provide ample opportunity to the students/researchers of Biotechnology, river science, transportation, communication etc. to overcome the obstacles and exploit the resources. Being a premier engineering Institute of the state, National Institute of Technology Sikkim can play decisive roles in several areas, viz., generating employment by improving the employability of its students, providing innovative solutions for transportation, judicious use of the rivers for producing hydroelectric power, improving telecommunication and other e-facilities in the state.

In order to improve the employability of the students of the Institute, research and training facilities are to be made available keeping in view the demands and requirements of the job market. The laboratories are to be equipped with the required sophisticated instruments and frequent interactions with the industries are to be ensured. In order to achieve these goals, the proposal also aims to create an atmosphere where the faculty/staff members will be encouraged to take up research challenges related to the issues that need innovation in different fields of engineering and science. Workshops, symposiums with Industry-academia partnership are to be organized to train the faculty/staff members of the Institute, which, in turn, is expected to improve the learning outcomes of the students.

The objectives of the proposal will be achieved through the procurement of the state-of-the-art facilities, software etc. to upgrade the existing laboratories of the Institute. The curriculum will be designed based on the requirements of the job market. Academic development of the faculty/staff members will be ensured by creating platforms for innovative research and industry-academia interactions.

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

National & international level symposiums/conferences will be organized encompassing several areas such as Internet Security, VLSI Design, earthquake resistant building construction, river technology, transportation, renewable energy, catalysts for industrial need etc. Special emphasis

will be given to motivate the faculty members to engage themselves in research to tackle the problems related to human health, environment, energy and industrial need. These activities will be taken up periodically throughout the duration of the project. At the same time, training will be provided to the Technical & Administrative staff of the Institute to ensure better time management & smooth functioning of the Institute.

National Institute of Technology Sikkim is presently offering B.Tech, M.Tech & PhD courses in different fields of engineering and science. In order to provide proper trainings, laboratories are to be upgraded. The Institute is presently being operated from its temporary campus and lack of proper infrastructure which includes state of art laboratories, equipments, software and other related facilities are hindering its academic growth. This needs special attention so as to enhance the employment potential.

Special efforts are to be devoted to construct smart classrooms with interactive e-platforms. Efforts are to be made to improve the internet connectivity throughout the campus. A dedicated server for uninterrupted internet connection will have to be set up. The competence and skills of the students can be improved by imparting them training enabling them to get hands-on experience on any real-life problem. This is expected to improve their understanding of the core subject, which, in turn, will enhance their employability.

The present proposal also aims to host important software in a dedicated server of the Institute. All the students and the faculty/staff members will be given free access to these software. This is expected to improve the research outcomes and also simulate inter-disciplinary research.

Innovative learning mechanisms will be in place to cater for the academic need of academically weak students. Special remedial classes will be organized. Eminent persons from the academia and industry will be engaged in providing training to the students. This can be achieved through organizations of Guest Lectures, Seminars, Workshops, Visits, and Training Programs etc.

The Institute is presently offering PG programs in Computer Science & Engineering and Electronics & Communication Engineering. Several interdisciplinary subjects such as Earthquake Engineering, Nanotechnology, Transportation Engineering, River Technology, Biotechnology *etc.* will be offered in near future as specialized M.Tech courses. The Institute is all set to offer M.Tech in Electrical & Electronics Engineering and M.Sc. in Chemistry in the upcoming semester. M.Sc. in other disciplines of basic sciences & humanities will be offered to cater to the needs of the students primarily from the backward states of N.E including Sikkim.

Training of the students shall be done in the laboratories of the NIT Sikkim and also in other industries. There is a need to revamp the curriculum in order to include those elements which are needed to enhance employability. This must be in accordance with the demands and requirements of the employers. Latest equipments and software are required to be acquired so that the students and the faculty have experience of working on them.

(b) Improving employability of the students

The State has a huge potential for industry in areas where the State enjoys a comparative advantage. The State of Sikkim has plenty of natural resources. The state is an innovation landscape of high importance with so many small and micro industries working relentlessly towards the economic growth of the country. Inspired by this creative spirit of the SME's, this proposal aims to provide state-of-the-art facilities to the aspiring small scale industries of the region to develop new materials, explore new chemical processes, which will ultimately result in innovation and technology transfer. In the state of Sikkim, many pharmaceutical industries are located. Apart from this, several SME's are involved in breweries, food production/preservation, manufacturing of agro-based products etc. This gives an advantage particularly for the students and faculty members of the Dept. of Biotechnology & Chemistry to collaborate with the industries. Food preservation, exploring the endemic herbal plants of Sikkim, biofuels etc.

In this context, creation of a Research & Technology Development Hub in the Institute to provide a constructive collaboration between NIT Sikkim and the SME's to translate research works into innovation for the welfare of the people, is important. This will provide technical support to student/faculty researchers as well as the small & medium scale industries for carrying out competitive technological research to translate new ideas into marketable products. The specific objectives of the proposed Common Research and Technology Development Hub at NIT Sikkim are as follows

- To provide a constructive collaboration between NIT Sikkim and the SME's to translate research works into innovation for the welfare of the people.
- To provide infrastructural facilities to the SME's to develop new, improved materials related to Pharmaceuticals, Natural products from Himalayan bio resources, Food Preservation, etc.
- Research to elucidate molecular pathways leading to the therapeutic benefits or the toxicological effects of biologically active compounds. Understanding these pathways will help to develop safer drugs, plastics and agricultural chemicals.
- To provide technical support to the MSEs for carrying out competitive technological research to translate new ideas into marketable products.
- To establish pilot scale level extraction and purification unit for natural products.
- Establishment of sophisticated instrumental facilities for testing, quantification of yields and process development.
- The research hub shall also be useful for the development of bio-fertilizer industry.

The State has also a huge potential for hydroelectric power generation. Innovative solutions for the optimal use of the rivers are important making the most of the emerging opportunities to

realize the State's potential for industry. NIT Sikkim is expected to play a vital role in this regard by providing able engineers to provide innovative solutions.

(c) Increasing faculty productivity and motivation

The faculty members at NIT Sikkim are dedicated to excellence in education, research and public welfare. We are committed to provide world-class teaching, research facilities to address issues related to human health, energy and environment.

NIT Sikkim is one of the fastest growing NITs among the newly established ones in the field of promotion of research activities, and within the first five years of its establishment, has already received 6.3 crores of research fund.

The faculty of the Institute is well qualified, and motivated with a strong commitment to teaching and research. Faculty members of Chemistry department alone are supervising three (03) DST sponsored & one (01) CSIR sponsored projects related to very advanced problems in the area of experimental chemistry. Thrust areas of research of the Chemistry department at NIT Sikkim include extraction of bioactive natural products, synthesis of fine chemicals of industrial importance, photo catalytic water oxidation for alternate source of fuels etc.

The Institute will spend some of the fund available under this scheme to buy necessary equipments and software, provide suitable space for research so that more faculty members can devote significant time and effort in research and undertake more sponsored research projects.

The Civil Engineering Department of the Institute has recently completed a consultancy project for the state of Sikkim. A guideline for consultancy projects is being prepared with similar guidelines of premier technical institutes as reference. Consultancy projects are beneficial for both the faculty members and the Institute, and all Departments of the Institute will be encouraged to take up more consultancy projects.

2.3 Provide an action plan with timelines for

- 1. Academic Autonomy-** NIT Sikkim has academic autonomy as it takes admission of the students based on their performance in JE (Mains) Examination.
- 2. NBA accreditation-** Efforts are to be made to accredit courses in the near future.

2.4 Describe the following in brief:

1. Is any enhanced assistance / mentoring that the institution is looking forward from its ATU?
2. Does your BoG need strengthening, if yes, then how?
3. Is there an ERP/MIS system existing, if yes, then any improvement, modification suggested.

4. Is there any mechanism i.e. special classes being conducted in the institution for improving the GATE score?
2. NIT Sikkim aims to achieve transparency in all its academic, administrative and financial procedures. It also likes to have the maximum participation of all of its stakeholders.

Managerial Autonomy- The BOG of NIT Sikkim is in a process of delegating suitable Academic, Financial and Administrative powers to various institutional functionaries and it will also frame rules for accountability at each level. The BOG will empower the Director to form committees, sub-committees and advisory committees to support the BOG. The BOG has financial autonomy with regard to preparation, sanction and expenditure of the budget to achieve institutional objectives.

Administrative Autonomy- BOG of NIT Sikkim will evolve norms for deputation of faculty to attend seminars, conferences and industrial training programs. The Director may delegate some of his powers to Deans, Heads of Department and other faculty members as the case may be.

Financial Autonomy- Adequate financial powers shall be delegated to the Director and other functionaries by the BOG of NIT Sikkim in order to carry out day-to-day working of the institute.

3. Presently, there is no ERP/MIS System in the Institute. A comprehensive ERP/MIS system is to be purchased and implemented for the smooth functioning of the academic, financial and administrative works of the Institute.
4. The faculty members of the Institute engage themselves in special classes to encourage the students for GATE & related examinations. Special lectures are to be arranged where subjects/topic relevant for the exams will be taught. Mock examinations will be arranged for the students.

2.5 Provide a Twinning Plan with a high performing institute with the objective of capacity building knowledge transfer and developing long term strategic partnerships. (Twinning plan will be formalized into Twinning agreement after finalizing the twinning partner).

National Institute of Technology Sikkim is one of the ten new NITs established in 2010 by Ministry of Human Resources (MHRD), Govt. of India. The Institute has been declared as an Institute of National Importance. It was established under NIT Act 2007 of Parliament and is an autonomous institute registered under Societies Act. The present campus of NIT

Sikkim is situated at a place called Ravangla, South Sikkim at an elevation of approximately 2100 Mt. The Institute lacks proper infrastructure which includes state of art laboratories, equipments, software and other related facilities. Therefore, developing a long term strategic partnership with a high performing Institute like IIT Kharagpur or IIT Guwahati is envisioned to help NIT Sikkim in achieving academic excellence.

The students and the faculty may opt for virtual presence through technical support from the professionals at the high performing institute. This includes access to the sophisticated instrumental facilities, state-of-the-art laboratories, softwares etc.

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

Yes.

Due to the lack of research, medical, accommodation, school education and some other facilities, recruiting and retaining high-quality faculty may become a problem in the near future. The availability of the necessary equipments, laboratories and other related infrastructure can potentially improve the scenario. Most importantly, land for a permanent campus at a suitable location may solve a lot of problems.

2.7 Give an action plan for ensuring that the project activities would be sustained after the end of the Project.

After successful implementation of the project, the Institute will ensure proper utilization of the Infrastructure generated during TEQIP-III. Proper record of money spend from the project will be maintained and the sophisticated instruments/software will be utilized in the future student and faculty research projects.

2.8 Describe briefly the participation of departments/faculty/students in the IDP preparation.

The students and the departments have actively participated in preparation of the proposal. The complete analysis has been carried taking into consideration the views of all stakeholders of the departments. The departments will continue to have very important role in curriculum development, industrial interaction and training. Their feedback will also be utilized for fixing up the line for future actions.

Prof. Ajoy Kumar Ray
Director (Acting)
National Institute of Technology Sikkim