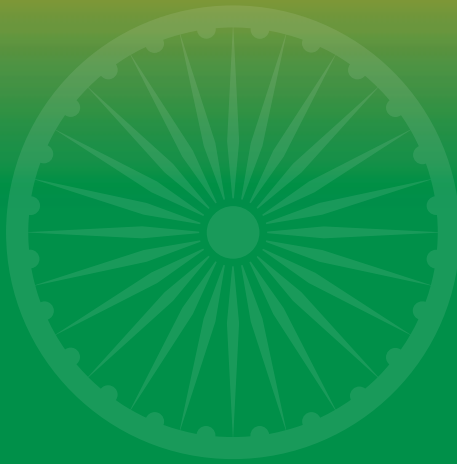




**Re-Inventing Japan Project**

**Cooperative Engineer Education Program  
with South Indian Universities  
based on the Long-Term Internship Experience**





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## Greetings

Nagaoka University of Technology's (NUT) application for the "Cooperative Engineer Education Program with South Indian Universities based on the Long-Term Internship Experience" was successfully selected for the Japanese Ministry of Education, Culture, Sports, Science and Technology's Re-Inventing Japan Project FY2014: Support for the Formation of Collaborative Programs with Russian and Indian Universities. The Re-Inventing Japan Project aims to foster the development of human resources capable of playing an active role at the international level, as well as strengthen the global developmental ability of university education. The objectives of this project are to ensure the quality of higher education and to support the mechanisms for international educational collaborations with universities in Asia, the US, and Europe.

NUT's relationship with India is marked by long-term numerous collaborative achievements (including the *Jitsumu-Kunren* internship) with institutions such as the Indian Institute of Technology Madras (IITM) and the Indira Gandhi Centre for Atomic Research. In this new program, we plan to build upon these past achievements to establish a quality-assured cooperative educational system based on a mutual credit transfer system and a joint-degree program with IITM and its sister school – the Indian Institute of Information Technology, Design & Manufacturing, Kanchepuram (IIITD&M). The Head of the Metallurgical and Materials Engineering Department at IITM and the Director of IIITD&M are both NUT alumni. The establishment of a mutual credit transfer system and a joint degree program will provide a framework that will allow NUT students to experience overseas studies in India without the need to extend their enrollment period.

The population of India currently exceeds 1 billion, and is projected to soon surpass that of China. In addition, India is enjoying high economic growth, and is even expected to replace Japan as the world's third largest economy by GDP in the near future. As such, there will be an inevitable rapid increase in the exchanges between our two countries. The main focus of this program is South India, where many Japanese companies (e.g., automobile manufacturers and electrical / electronic-related companies) have already established a strong presence, and are expected to make further expansions. We hope that students will actively participate in this program, develop their own sense of globalization, become engineers with in-depth knowledge regarding India, and play a leadership role in the globalization of Japanese industries and global development.



Executive Director and Vice President, Nagaoka University of Technology

**Yoshiki MIKAMI**

## Project Objective and Overview

### 〈Project Objective〉

#### To produce innovative and practical global engineers through a cooperative educational program with universities in India

This program aims to produce innovative and practical global engineers who can assume leadership roles in Japanese and local companies through the development of a quality-assured cooperative educational program, as well as an industry-academia-government collaboration network based on this program.

- Establishment of a cooperative *Gigaku* educational system that includes a quality-assured credit transfer system and joint degree program
- Training of practical global engineers through a cooperative educational program that includes overseas *Jitsumu-Kunren* internships
- Development of global human resources capable of proposing solutions with cross-cultural understanding
- Production of practical Indian engineers who are sought after by Japanese companies based in India
- Future global development modelled on the joint degree program framework actualized from these concepts





## The Type of Global Human Resources that We Aim to Train

This program seeks to develop practical and innovative global engineers who can lead and communicate with an understanding of diverse values. As a result, India is the optimal location for this program, with a culture and customs that are so vastly different from those of Japan. In addition, it provides NUT students with an ideal environment for improving their English language ability.



### 〈Specific Abilities to be Acquired by Students〉

- International research ability
- Communication ability as an engineer (including English language ability)
- Creativity and innovation

### Please experience India!



I spent five months on a *Jitsumu-Kunren* internship at the Indian Institute of Technology, which is located in Chennai city in the state of Tamil Nadu, South India.

“India...this could be interesting”

Based only on this sense of curiosity, I decided to spend five months of my life in India. Those five months were filled with amazement, and I’d like to share a portion of my experiences here.

First, there was the price of things. Prices in India are low when compared with Japan. A movie ticket costs only about 250 yen. When I returned home to Japan, I suddenly felt that everything was expensive.

Next, there was the food. I used to think that India only had curries and naans, but I found that there was a wide variety of delectable cuisine, such as *Gobi Manchurian*, which is fried cauliflower seasoned with a flavor reminiscent of Japan’s *Ebi Chilli*, or shrimp in chilli sauce.

Then there is “Indian time”. As being punctual would only serve to confuse people, everyone shows up at the meeting place 30 minutes after the agreed time, and just take it easy from there. I felt that this was far less stressful than in Japan.

While I’ve written quite a bit, the saying “seeing is believing” applies here. I hope that you will visit India and experience it first-hand for yourself.

Department of Electrical, Electronics and Information Engineering **Akira OKAMOTO**

### India Travel Journal



When I was in my 4th undergraduate year at NUT, I participated in the Overseas *Jitsumu-Kunren* internship. During this internship, I conducted research over the course of six months at the Indian Institute of Technology Madras (IITM) in Chennai city.

As IITM is an internationally-renowned technical university, the difficulty and quality of research was extremely high. However, the characteristic affability and kindness of the Indian people provided the strong support that enabled me to successfully complete my project.

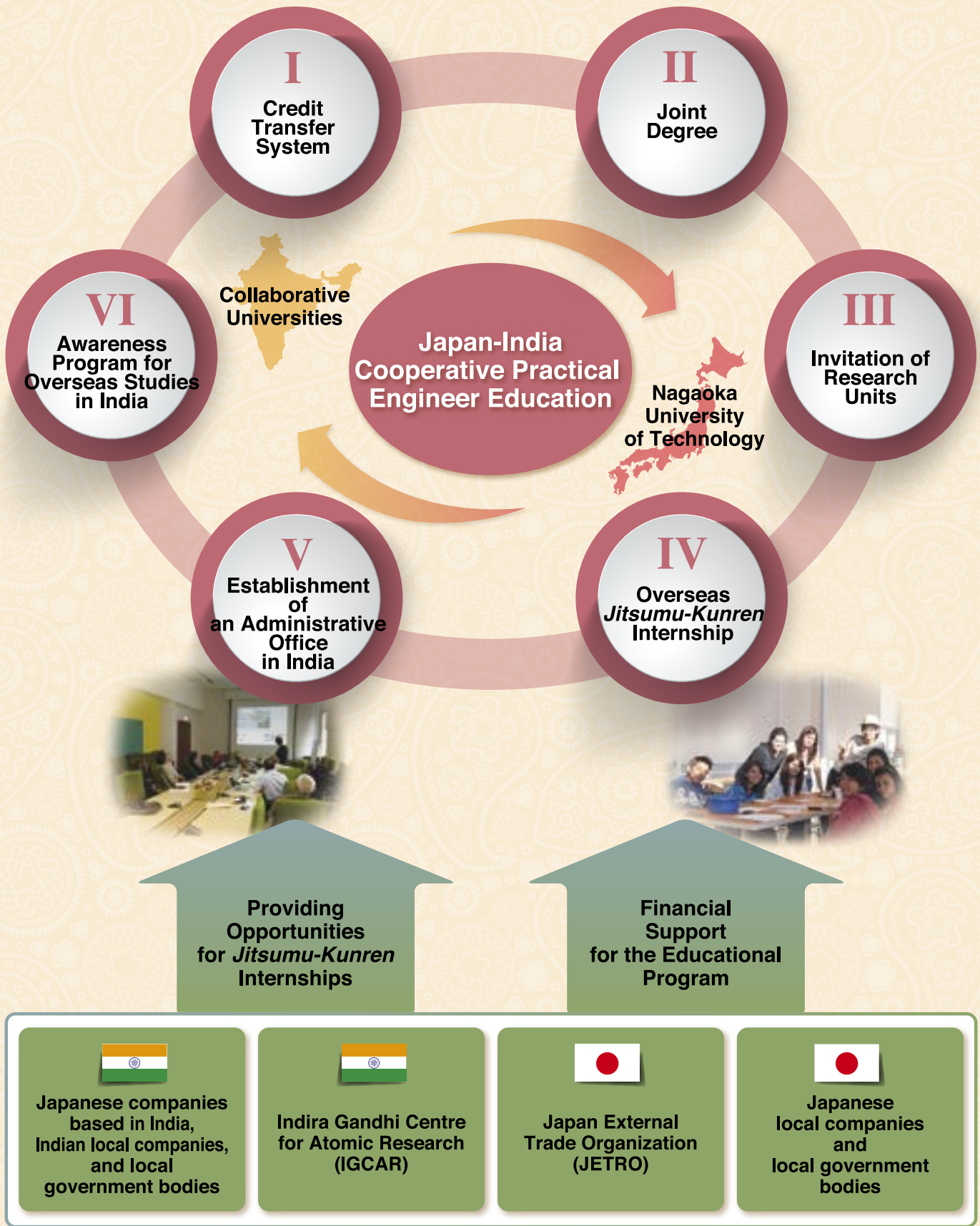
With regard to life in India, there were the delicious curries that represent Indian cuisine, as well as a varied and unique food culture. As a result, I was never bored with my meals. For sightseeing,

there are over 30 world heritage sites in India, and there was nowhere near enough time to visit all the holy places and temples related to Buddhism and Hinduism.

It was by chance that I was able to participate in this program, and the stimulating and fun daily life I experienced in India would not be possible in Japan. For those students who are reading this – wouldn’t you like to experience India for yourself?

Department of Mechanical Engineering **Nao KOMATA**

# Initiatives for the Development of Practical Global Engineers





## **I Establishment of a Quality-Assured Credit Transfer System**

A quality-assured credit transfer system will be established with the following three departments at NUT: the Department of Mechanical Engineering; the Department of Electrical, Electronics and Information Engineering; and the Department of Information and Management Systems Engineering. Under this system, graduate students will be encouraged to participate in mutual exchange programs for six months or more. Through the application of the credit transfer system, there will be no need for students to defer their graduation due to overseas studies.

## **II Establishment of a Joint Degree Program**

Through the establishment of a joint degree program, NUT and the collaborative Indian universities will cooperatively provide an education and confer a joint degree to students who complete the program. This program will facilitate the development of engineers and researchers with a master's or doctoral-level education from both India and Japan, as well as facilitate high-level postgraduate research while maximizing the strengths of both universities.

## **III Invitation of Research Units (Mobile Laboratories)**

Exceptional research laboratories from the Indian partner universities will be invited to NUT, and advance their educational and research activities as part of the staff and students at NUT. Both universities will therefore in effect be able to cooperate in conducting world-class research, and mutually elevate each other's level of research.

## **IV Expansion of Industry-Academia Collaborative Overseas *Jitsumu-Kunren* Internships**

By advancing Japan as a *Jitsumu-Kunren* internship destination for Indian students and mutually expanding the overseas *Jitsumu-Kunren* internship system, we can increase cross-cultural understanding as well as develop practical engineers who can play an active role at the international level. Through the implementation of *Jitsumu-Kunren* internships for Indian students in Japanese companies and Japanese students in Indian companies, the students will be able to deepen their understanding of the corporate culture in their counterpart countries. In this way, we are able to train engineers who can contribute to the collaborations and cooperation between both countries' industries.

## **V Establishment of an On-Site Administrative Office**

With cooperation from the Japan External Trade Organization (JETRO), NUT will set up an on-site administrative office in Chennai, and assign a coordinator to support overseas students from Japan and to act as a contact for Indian students seeking to study in Japan.

## **VI Development of an Awareness Program to Motivate Students to Study in India**

By holding discussions with senior students regarding their experiences in India, and through special lectures by specialists with expertise in Indian life and education, this program aims to motivate students to participate in overseas studies in India.

## Introducing the Indian Collaborative Universities



Chennai, located in the southern region of India, is known as the “Detroit of India” due to its excellent harbor and high-quality workforce. Many Japanese companies (including automobile manufacturers and electronics / EMS manufacturers) have established a presence there, and it is therefore an ideal location for training practical global engineers. As a result, Chennai was selected as a strategic overseas base for NUT. Through a shared understanding of the *Gigaku* concept, NUT strengthened collaborations with the Indian Institute of Technology Madras and the Indian Institute of Information Technology, Design & Manufacturing, Kancheeperum.



### Indian Institute of Technology Madras (IITM)

<https://www.iitm.ac.in>

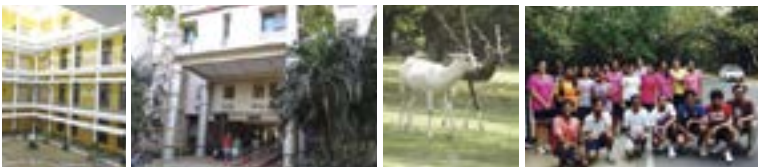


Chennai 600 036, India

Indian Institute of Technology Madras is one among the foremost institutes of national importance in higher technological education, basic and applied research. In 1956, the German Government offered technical assistance for establishing an institute of higher education in engineering in India. The first Indo-German agreement in Bonn, West Germany for the establishment of the Indian Institute of Technology at Madras was signed in 1,959.

IIT Madras is a residential institute with nearly 550 faculty, 8,000 students and 1,250 administrative & supporting staff and is a self-contained campus located in a beautiful wooded land of about 250 hectares. It has established itself as a premier centre for teaching, research and industrial consultancy in the country.

The Institute has sixteen academic departments and a few advanced research centres in various disciplines of engineering and pure sciences, with nearly 100 laboratories organised in a unique pattern of functioning. A faculty of international repute, a brilliant student community, excellent technical & supporting staff and an effective administration have all contributed to the pre-eminent status of IIT Madras. The campus is located in the city of Chennai, previously known as Madras. Chennai is the state capital of Tamilnadu, a southern state in India.



### A Message from the Head of the Metallurgical and Materials Engineering Department

Head of Department, IITM  
**Prof. M. Kamaraj**

The needs of the current world are increasing at an ever faster rate and the demand from the research and academic community has never been greater.

This is a unique collaborative research program between Nagaoka University of Technology (NUT), Japan and Indian Institute of Technology Madras (IITM) which will give graduates/scholars a platform to exchange ideas, discover novel opportunities, reacquaint with colleagues, meet new friends, and broaden their knowledge in the area of Electrical /Mechanical/Metallurgical and Materials Engineering. Research today has to be contemporary and contextual, catering to the demands of today while making steady progress of knowledge.

I congratulate NUT and IITM for their enthusiasm with which they have gone about organizing this collaborative research program and wish them all success.







## ⟨Indian Collaborative Universities⟩

### Collaboration with internationally influential engineering universities in India

With our collaborative achievements accumulated over the years, we are striving to fulfill the project objectives and collaborate with internationally influential engineering universities in India (the Indian Institute of Technology Madras and the Indian Institute of Information Technology, Design & Manufacturing, Kancheepuram) through the shared concept of “*Gigaku*”.

#### Regarding *Gigaku*

#### “*Gigaku*” is the scientific approach to technology

In the natural sciences, natural phenomena are studied using a scientific approach, whereas in “*Gigaku*” (an amalgamation of *Gijutsu Kagaku*, or “science and technology”), the scientific approach is adopted to study technology, which leads to technological innovation and the creation of new industries.

#### Regarding the *Jitsumu-Kunren* Internship

#### Long-term (approximately six months) internship system based on the Practical Engineer Development Program

Since its founding, NUT has implemented the *Jitsumu-Kunren* (long-term internship) system for the past 37 years (25 years for overseas internships). Under this system, all students advancing to graduate school participate in an internship in companies based either in Japan or abroad for approximately six months during the latter half of their 4th undergraduate year at NUT.



### Indian Institute of Information Technology, Design & Manufacturing, Kancheepuram (IIITDM)

<http://www.iiitdm.ac.in>



Melakottaiyur,  
off Vandalur-  
Kelambakkam Road,  
Chennai - 600 127, India

IIITDM Kancheepuram is a young Institute established by Government of India in 2007 and declared as the ‘Institute of National Importance’ recently. IIITDM Kancheepuram offers Design Centric Engineering Design oriented academic programs leading to undergraduate (B Tech), dual degree (B Tech+M-Tech), and post graduate (M Des) degrees in the computer, electronics, and mechanical engineering specializations in addition to doctoral programs in interdisciplinary areas. The innovative academic programs and equipped laboratories attract best brains from all over India. Located at the outskirts of vibrant city, Chennai, the green rated campus is experiencing dynamic growth in the state of the art academic, residential and recreational infrastructure development.

#### A Message from the Director

Director, IIITDM

#### Prof.R.Gnanamoorthy

The dynamics of market and technology demand the new product development in a short period and Industry’s look for young and creative minds to meet the expectations.

The technical education at IIITDM is through experiential learning approach facilitating enhanced interactive learning that imparts design thinking much needed for the next generation engineers. The interactive teaching learning process followed in the Institute encourages learning from the real world by facilitating interaction with peer groups, open resources and discussion.

Situated at the outskirts of dynamic city, Chennai, the energy efficient new Institute campus provides best environment for learning and safe and enjoyable for the students who arrive from different parts.

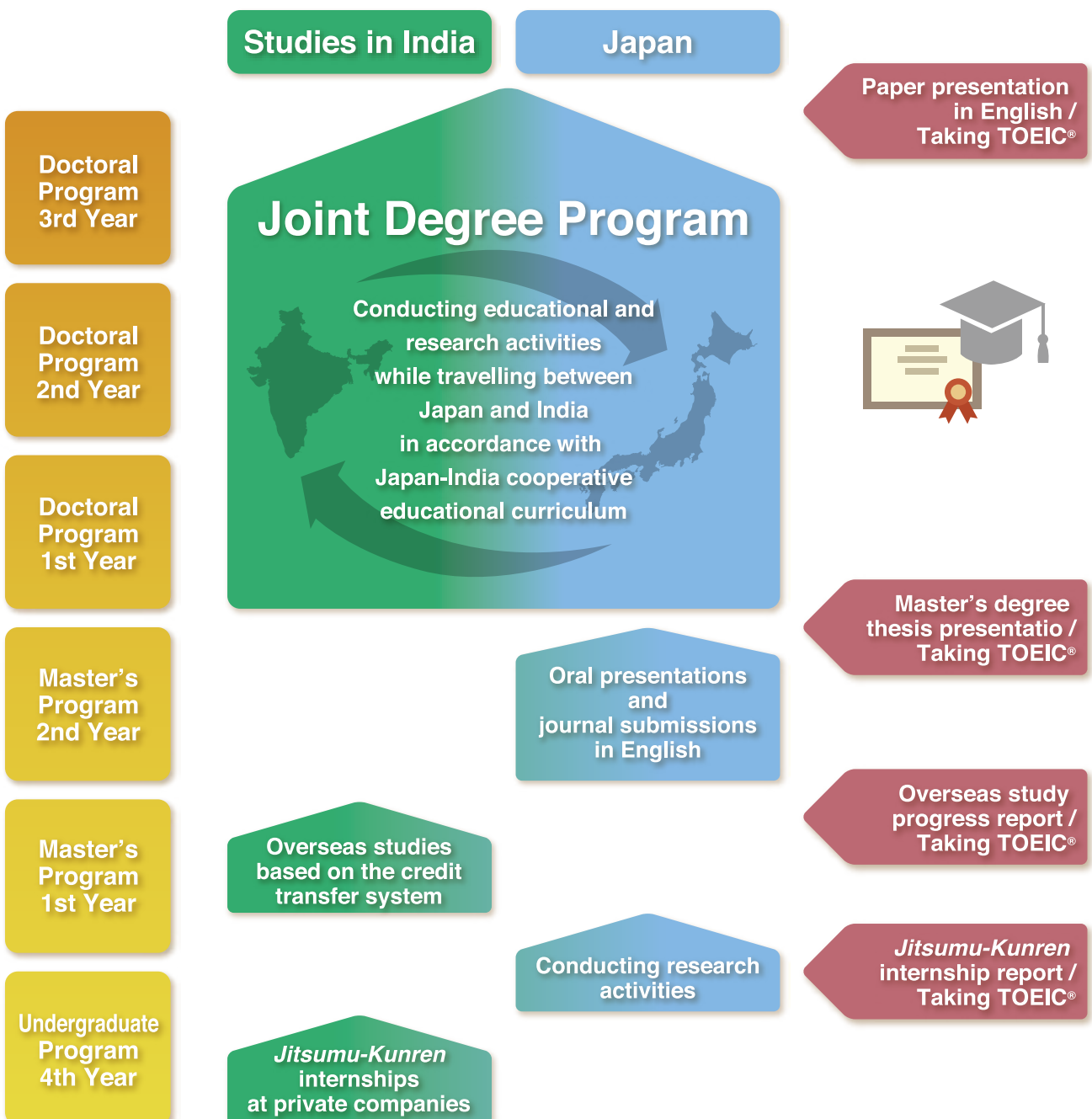


## Human Resource Development Flow (Model Case of a Japanese Student)

This program strives to develop practical global engineers by fully utilizing the overseas *Jitsumu-Kunren* internship system, credit transfer system, and joint degree program. The program will ascertain the level of accomplishments in research ability and English language ability through presentations on research results and TOEIC examinations.

### Performance Targets

- To produce practical global engineers who have experienced India several times
- Acquisition of joint degrees from universities in both Japan and India



\*In addition to the aforementioned periods, students may also take TOEIC® at other times



# Future Developments

## 〈Global Development of Educational Programs〉

Through future global development of educational programs modelled on the joint degree program framework actualized from these concepts, students will be provided with the opportunity to conduct education and research activities in countries and universities that match their personal goals.



Laboratory at IITM

## 〈Tripartite Agreement between NUT, the Indian Universities, and Private Companies〉

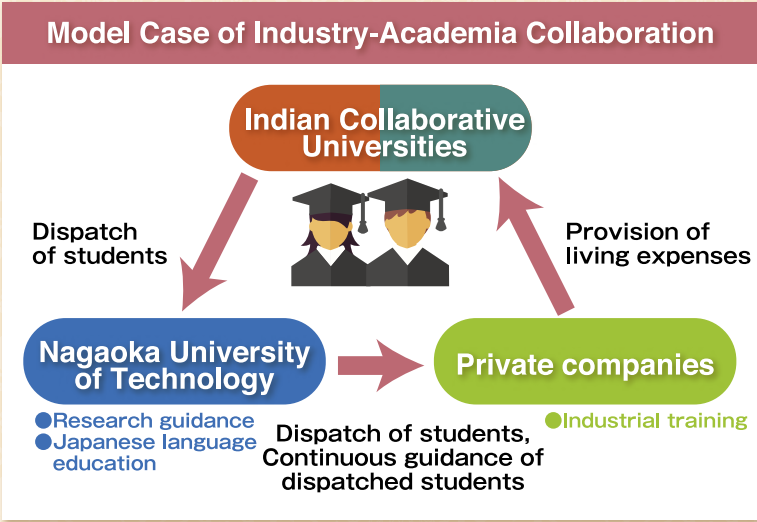
NUT is already associated with various companies, and an NUT-Indian Universities-Private Companies tripartite agreement will establish a support system for overseas students by companies, and further increase the number of participant companies.



Lectures by NUT academic staff at IITM



Lectures by NUT academic staff at IIITD&M



## Regarding the Re-Inventing Japan Project

The Re-Inventing Japan Project was established by the Japanese Ministry of Education, Culture, Sports, Science and Technology with the aim of fostering the development of human resources capable of playing an active role at the international level, as well as to strengthen the global developmental ability of university education. The project supports the mechanisms for international educational collaborations with universities in Asia, the US, and Europe that conduct overseas study programs for Japanese students, and undertakes the strategic acceptance of foreign students to Japanese universities.

NUT's application to implement a quality-assured exchange program with Indian universities was approved to receive Support for the Formation of Collaborative Programs with Russian and Indian Universities in FY2014. (A total of 14 universities had applied for the FY2014 project, from which only four universities, including NUT, were selected.)

(Period of Project Implementation: FY2014 to FY2018)

# INDIA



**Garam Masala** : mixed spices used in Indian Cuisine



**Taj Mahal** : a white marble mausoleum



**Gateway of India** is located in Mumbai on the shores of Arabian Sea



Bathing in the **Ganges River**



**Mahabalipuram Monuments** (World Heritage Site)



**Krishna's Butter Ball** in Mahabalipuram



**Mahabalipuram Monuments** (World Heritage Site)



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