Cooperation Agreement

for

Aiding Construction of Professionals of Railway Engineering and Railway Transport

between

Beijing Jiaotong University

and

Rajamangala University of Technology Thanyaburi

Beijing Jiaotong University

Rajamangala University of Technology Thanyaburi

June, 2011

Client: Rajamangala University of Technology Thanyaburi

Address: 39 Moo 1, Klong 6, Thanyaburi, Pathumthani 12110 Thailand

Legal representative: Assoc.Prof.Numyoot Songthanapitak, Ph.D.

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Trustee: Beijing Jiaotong University

Address: No. 3, Shangyuan Village, Xizhimenwai Street, Haidian District, Beijing

Legal representative: Ning Bin

Tel: +86 10 51682923

This agreement is made and entered into by and between the parties of Rajamangala University of Technology Thanyaburi (hereinafter referred to as Party A) and Beijing Jiaotong University (hereinafter referred to as Party B) on the basis of equality and mutual benefit, Party A commissions Party B to provide assistance in the construction of the "two professionals of Railway Engineering and Railway Transport" on terms and conditions mutually agreed upon as follow:

1. Project description

1.1 Name

Cooperation project about providing assistance by Beijing Jiaotong University in the construction of the two professionals of Railway Engineering and Railway Transport in Rajamangala University of Technology Thanyaburi

1.2 Aiding construction objectives

Party B will assist Party A to open the Department of Railway Engineering, support it to establish the professionals of Railway Engineering and Railway Transport, strive to help Party B to finish the establishment of the professionals of Railway Engineering and Railway Transport and realize self-teaching within 5 years, through joint education, deepen the friendly bilateral cooperation, promote the extensive exchanges about education, teaching and scientific research.

1.3 Contents to be aided: see Annex 1.

1.4 Working language: English-based, bilingual teaching, Chinese as supplement.

1.5 Period

The initial period of the agreement is 5 years. After the expiry of the agreement, the two parties shall, based on the mutual assessment on the professions aided, determine whether to renew through joint consultations between the two parties.

2 Duties and Obligations of Party A

2.1 Reviews and passes the professional aiding construction program (Annex 1)

2 Duties and Obligations of Party A

2.1 Reviews and passes the professional aiding construction program (Annex 1) proposed by Party B.

2.2 Responsible for the enrollment of the two professionals in Thailand, selects teachers and students from Thailand to study in China, transacts the passports for the visiting and studying personnel to China and other related issues, pays the plan tickets for Thai personnel to go and fro China (including fuel surcharges and airport construction fee). During the period of cooperation, absorbs student representatives from Beijing Jiaotong University to participate in the work of the Teaching Committee of the corresponding professionals.

2.3 Responsible for inviting teachers from Party B to visit and teach in Thailand and the corresponding reception work, provides Party B with necessary working and living environment and conditions, ensures the smooth implementation of various activities of the aiding construction project in Thailand, as well as the security of the personnel of Party B when they stay in Thailand.

2.4 Assists Party B to manage the students, ensures the smooth implementation of various activities as well as the security of the students in China.

2.5 Fully pays the cost and expenses required by Party B to provide aiding construction according to the provisions of the agreement.

2.6 Personnel studying in China shall be covered with related insurances, the medical expenses incurred during diseases and personal consumption shall be paid by the personnel of Party A themselves.

2.7 Supervises and inspects the implementation of the aiding construction project by Party B and fulfills other related obligations specified in the agreement.

2.8 Party A shall ensure the minimum number of the students for each professional.

2.9 Respects the religious beliefs and customs of the teachers from Party B.

3 Duties and Obligations of Party B

3.1 Proposes professional aiding construction program (Annex 1) on the requirement of Party A.

3.2 Responsible for the construction of the two professionals and the training of students and teachers, selects Chinese teachers to teach in China and Thailand, conduct the passports for the personnel of Party B going to Thailand and other related issues, pays the plan tickets for personnel of Party B to go and fro Thailand (including fuel surcharges and airport construction fee). During the period of cooperation, sends student representatives to participate in the work of the Teaching Committee of the corresponding professionals of Party A.

3.3 Responsible for inviting teachers from Party A to visit and teach in China, provides Party A with necessary working and living environment and conditions, ensures the smooth implementation of various activities of the aiding construction project in China, as well as the security of the personnel of Party A when they stay in China. Open Chinese lanuage, Chinese Culture and other courses for personnel of Party A studying in China.

3.5 Respects the religious beliefs and customs of the teachers from Party A.

3.6 In accordance with relevant regulations, buy personal accident insurance for the students receiving training in China.

3.7 Issuing completion of study certificates or degree certificates for the personnel of Party A who are judged to be qualified through training.

3.8 When studying in China, the students of Party A shall be responsible for their own accommodation expenses, Party B will offer an accommodation environment of international student apartments and the price will be charged according to the cost agreed within Party B.

4 Agreement effects and miscellaneous

4.1 The parties shall strictly enforce the agreement, in case of larger changes, they should be resolved through mutual consultants by and between the parties.

4.2 The agreement shall take effect from the date of signature and remain valid until the date on which both Party A and Party B fully performs all obligations under the agreement.

4.3 Matters not covered in the agreement shall be negotiated and settled by both parties, the specific coordination of the professional aiding construction shall be settled by the Standing Committee formed by three representatives from each party for each professional through negotiation.

4.4 The agreement is singed on June 8, 2011 in Beijing and prepared in quadruplicate with each party holds 2 (including 1 Chinese copy and 1 English copy), All eight copies enjoy the equal legal effects, in case of any discrepancy, the Chinese agreement shall prevail.

Signature: _____

Date: 08 June 2011

Assoc.Prof. Numyoot Songthanapitak, Ph.D.
Chancellor
Rajamangala University of Technology Thanyaburi

Signature: _____

Date: _____

Ning Bin
President
Beijing Jiaotong University

Signature: _____

Date: 08 June 2011.

Assoc.Prof. Somchop Chaiyavej, Ph.D.
Member of RMUTT University Council
Witness

Signature: _____

Date: _____

Prof Sun Quanxin , School of Traffic and Transportation
Prof Wei Qingchao, School of Civil Engineering
Witness

Appendix 1

A1 Settlement and Payment

A1.1 The cost of the aiding construction project shall be calculated in RMB and the payment shall be translated into U.S. dollars according to the exchange rate of that day.

A1.2 Party A shall pay the tuition fees for the students

Teaching method	Education type	Minimum number	Cost standard (10,000)	Per year	Years of schooling	Cycles	Total (10,000)
Chinese	Undergraduate	15	4	60	2	4	480
		20	3	60			480
		30	2.2	66			528
	Master	5	5	25	2	4	200
		10	4	40			320
		15	3	45			360
Bilingual	Undergraduate	15	5	75	2	4	600
		20	4	80			640
		30	3	90			720
	Master	5	7	35	2	4	280
		10	5.5	55			440
		15	4	60			480

A1.3 Expenditure of Party B

Salaries of teachers;

Costs for course establishment and publishing of textbooks;

Multimedia classroom equipments costs

Costs for library boos, journals and teaching aids

Teaching laboratory equipment costs, materials costs;

Communications networks, computer and video conferencing costs;

Costs for visas of teachers going to Thailand, transportation, etc;

Administrative expenses;

Project meeting fees, travel expenses and office expenses;

Contingencies

A1.4 Party A shall pay 30% of the total payment for each stage to Party B as the deposit, after receiving the deposit from Party A, Party B shall sent teachers to teach in Thailand and send invitation letters to students going to study in China. The remained expenses for each stage shall be one-time paid before the students coming to China or after the teachers arrive in Thailand.

A1.5 Any unforeseen expense occurs during the cooperation period of the aiding construction shall be solved with an additional agreement through friendly

consultation by both parties.

A1.6 Any default penalty shall be agreed by both parties and paid by the party in breach to the other party.

A1.7 Receivable accounts of Party B

Beneficiary: Beijing Jiaotong University

Bank: ICBC, Xinjiekou Branch

Account number: 02000029090144819l4-06

Remark: *1. The statement and payment will be active after the project has started.*

2. Part A shall process the curriculum of Railway Engineering and Railway Transport under supervision of Part B

Appendix 2

A2 Liabilities for breach of Agreement

A2.1 In case both parties fail to fulfill the respective obligations described in Clause 2 and 3 and result in any economic losses or other accidents, the responsibility shall be investigated and the corresponding compensation shall be paid to the other party.

A2.2 If the project can not be continued due to lacking of students for the reasons of Party A, the deposit will not be refunded to Party A.

A2.3 In case Party A delays to pay Party B without reasonable causes, Party A shall pay default penalty to Party B on the basis of 0.5%/day of the total unpaid amount.

A2.4 No party shall bear any liability when the aiding construction project can not be implemented in time due to the occurrence of force majeure.

Appendix 3

A3. Cooperation Plan

A3.1. Purposes and goals

BJTU will support RMUTT to establish programs in Railway Engineering and Railway Transportation, and endeavor to enable RMUTT to deliver teaching independently within 4 years. Through this education cooperation, BJTU and RMUTT hope to deepen cooperation and friendship, as well as to promote broad exchanges in teaching, education and research.

A3.2. Main contents

A3.2.1. Program establishment

BJTU and RMUTT will jointly work on the development of curricula, courses and teaching materials, the preparation of faculty and technical staff, and the establishment of specialty laboratories.

A3.2.2. Student training

There will be 2 phases as follows.

1st Phase: 2+2 mainly in China, where starting from 2011, RMUTT will select sophomore students of relevant background and send them to BJTU to study in Railway Engineering and Railway Transportation for 2 years. Once they successfully complete the study at BJTU, they will be conferred with dual bachelor degrees from both BJTU and RMUTT.

2nd Phase: 2+2 mainly in Thailand, where starting from 2013, BJTU will select and send teachers to RMUTT to deliver the specialty courses, while RMUTT teachers assist the teaching till they can deliver such courses independently.

A3.2.3. Teacher training

RMUTT will select and send teachers to BJTU to study the specialty courses at undergraduate level as well as to assist teaching. The backbone teachers of RMUTT may pursue a doctoral degree at BJTU through negotiations between the two universities.

A3.3. Schedule

Mar 2011 – Sep 2011, preparation: cooperation framework will be finalized and agreement be signed.

Sep 2011 – Jul 2014, the first and second cohorts of RMUTT students will come to study at BJTU; relevant teacher training will take place.

Sep 2011 – Jul 2015, RMUTT will independently recruit undergraduate students for Railway Engineering and Railway Transportation in Sep 2011. The first 2 years of foundation courses will be taught at RMUTT. The rest 2 years of specialty courses will be taught at BJTU, assisted by RMUTT teachers.

Starting from Sep 2015, RMUTT will deliver all teaching independently.

The implementation plan will cover such aspects as studying abroad at BJTU, teaching abroad at RMUTT, teacher training, textbook writing and publishing, laboratory developing, etc. The scheduling is as follows.

Time		Work		Target	Remarks
		BJTU	RMUTT		
Preparation 6 months		• Set up work group • Study, communicate and sign agreement • Draft and finalize the education program and teaching plan • Draft the development scheme for specialty laboratories • Select teachers • Design textbooks in English	• Set up work group • Discuss and sign agreement • Participate in finalizing the education program and teaching plan • Participate in drafting the development scheme for specialty laboratories • Select the 1st cohort of students from sophomores • Select teachers • Finish preparation for recruiting students	• Sign agreement • The 1st cohort of RMUTT students and teachers come to BJTU in September very year • Finish preparation for specialty teaching	1st cohort: 20-30 students and about 5 teachers for each program
2+2 Mainly in China	10 months	• Finalize specialty laboratory scheme and launch the development • Finish the preparation on teachers • Train the 1st cohort of Thai teachers • Finish preparation for core courses • Organize to write textbooks for core courses and publish them in English	• Discuss with BJTU on developing specialty laboratories, courses, textbooks, etc. • Start to build specialty laboratories • Start to recruit specialty students and deliver foundation courses • The 1st cohort of students start to study at BJTU • The 1st cohort of teachers start to receive training • Select the 2nd cohort of students and teachers	• Finish recruiting specialty students • Finish the preparation for building specialty laboratory	2nd cohort: 20-30 students and about 5 teachers for each program

	10 months	• Deliver courses for the 1st and 2nd cohorts of students and finish education for the 1st cohort • Deliver training for 1st and 2nd cohorts of teachers • Finish the development of specialty laboratories and the training for lab teachers • Publish all the textbooks of specialty courses in English	• The 1st and 2nd cohorts of students study at BJTU • The 1st and 2nd cohorts of teachers receive training • Participate in the development of specialty laboratories and training of lab staff	• Publish text books • Finish the development of specialty laboratories • Students finish specialty study at BJTU • 1st cohort of teachers finish training	1st cohort of students graduate and receive dual degrees
2+2 Mainly in Thailand	10 months	• Teach and finish education for the 2nd cohort of students • Train the 2nd cohort of teachers • Go to Thailand to teach newly recruited students • Assist the establishment of the two programs	• The 1st cohort of teachers finish their training at BJTU and return to RMUTT to assist teaching • The 2nd cohort of students continue their study at BJTU and graduate • The 2nd cohort of teachers receive training	• Chinese teachers go to Thailand to teach • Finish the training of the 2nd cohort of Thai teachers	2nd cohort of students graduate and receive dual degrees
	10 months	• Go to Thailand to teach newly recruited students • Assist the establishment of the two programs	• Thai teachers participate in the entire process of teaching	• Realize joint teaching by BJTU and RMUTT	Educate students in Thailand completely
Independent teaching			• Teach independently	• Realize independent teaching by RMUTT	Carry out further cooperation

Appendix 4

A4. Education Plan

A4.1. Railway Engineering

Railway Engineering is an engineering discipline covering a broad range of knowledge. Railway engineering works are generally grand in scale, and usually require cooperation among professionals of many different disciplines. The completion of a railway engineering project involves the solution of technical problems in which uncertainty of information and myriad nontechnical factors often play a significant role. The most common subsystems in a railway system include civil infrastructure system, communication and control systems, vehicle system, power supply system and management and operation systems. Railway engineers are concerned with bridges, terminal or station buildings, embankments, tunnels, railway line and track way systems.

The railway engineering program comprises five main disciplines: construction engineering and management, construction materials engineering, geotechnical engineering, structural engineering, and transportation engineering. Although each discipline has its own special body of knowledge and engineering tools, they all rely on the same fundamental core principles. Railway engineering projects often draw expertise from many of these disciplines.

A4.1.1. Basic requirements for the bachelor degree

The railway engineering curriculum is designed to develop engineers who have a strong background in mathematics and science, engineers who are articulate, and engineers who understand the nature of their special role in society and the impact of their work on the progress of civilization. The curriculum is designed to guarantee a certain breadth of knowledge of the railway engineering disciplines through a set of core courses and to ensure depth and focus in railway disciplines through areas of specialization. The curriculum develops the basic engineering tools necessary to solve problems in the field of railway engineering.

The curriculum requires 149 credits (16 class hours per credit unit), and is organized into required courses, mathematics and science, civil engineering technical courses, railway engineering special courses and other electives. The first two years of study for undergraduate students build the base needed for the civil engineering education: students take physics, math, chemistry, theoretical and applied mechanics, and some general engineering courses. Students can also take several electives at this time. The last two years of study involve primarily railway engineering courses, requires 75 Credit Units.

A4.1.2. Objectives

The objectives of the program reflect the mission of the Department of Civil Engineering and the importance placed on successful professional practice, the ability to pursue advanced degrees, the assumption of professional and societal leadership roles, and a commitment to lifelong learning.

Graduates of the program will be able to:

1) Successfully enter the railway engineering profession as practicing engineers and consultants with prominent companies and organizations in diverse areas that include bridge, tunnel, geotechnical, embankment, railway line and track system, construction management, or other related or emerging fields.

2) Pursue graduate education and research at major research universities in railway engineering or related fields.

3) Pursue professional licensure.

4) Advance to leadership positions in the profession.

5) Engage in continued learning through professional development.

6) Participate in and contribute to professional societies and community services.

A4.1.3. Curriculum (4-year program, 149 credits required)

First Year	**Fall**	**Spring**
Calculus I and II	5	5
Linear Algebra	2	
Chemistry	2	
Physics I II	4	4
Physics Laboratory	1	1
Applied Computing		4
Engineering Drawing	2	2
Electives: Humanities / Social Studies [1]	2	2
Introduction to Railway Engineering [2]	*1*	*1*
Minimum credits required	**18-19**	**18-19**
Second Year	**Fall**	**Spring**
Engineering Mechanics I and II	4	4
Engineering Geology	3	
Engineering Systems & Sustainability		2
Structure & Properties of RE Materials	3	
Engineering Surveying		3
Engineering Surveying Practice		2
Probability Theory & Statistics	3	

Elementary Fluid Mechanics	3	
Engineering Economics		2
Engineering Project Management		3
Electives: Humanities / Social Studies 1	2	2
Minimum credits required	**18**	**19**
Third Year	**Fall**	**Spring**
Mechanics of Structures I II	4	2
Railway System Engineering	3	
Fundamentals of Concrete Structures	4	
Soil Mechanics	3	
Foundation Engineering		2
Track System Engineering		3
Embankment Engineering		2
Planning & Design of Railway Lines	3	
Slope and Earth-retaining Structures		3
Bridge Engineering		3
Tunnel Engineering		3
Electives: Humanities / Social Studies 1	2	2
Minimum credits required	**19**	**20**
Fourth Year	**Fall**	**Spring**
Urban Track System Design	2	
Railway Yard and Station Engineering	2	
Railway Engineering Construction	3	
Railway Engineering Practice	3	
Introduction to High Speed Railways	2	
Bridge Structure Design Tunneling Design Track System Design Railway Line Design Railway Embankment Design	4	
Railway Works Maintains	2	
Dissertation for Bachelor Degree in Railway Engineering		16
Minimum credits required	**20**	**16**
Total credits	**149**	

Notes:
1. Should meet the requirement of the National Education Policy.
2. May be taken in either semester.

A4.2. Railway Transportation

The program is set in consideration of railway transportation system operation. We aim to bring up the advanced engineering and management talents who master the basic theory, the specialized knowledge and key technology in the field of railway transportation demand survey analysis, transportation network planning and design, transport capacity resources configuration, and operation management and control. After graduation, students can fulfill jobs in railway transport policy-making, planning, design, operation management and control, etc. Meanwhile, they will also have the integrated transportation thoughts and abilities to offer satisfactory service for passengers and/or cargo owners by combining railway transportation with other modes of transportation.

A4.2.1. Basic education system

This is a 4-year program for a bachelor degree.

A4.2.2. Basic specifications and requirements

A4.2.2.1. Requirements on knowledge

(1) The graduates can grasp the tool knowledge, engineering and technical knowledge, and economic management knowledge, which are all related with the railway transportation. They also should have the potential of creatively applying knowledge in railway transportation planning and design, operation management and control.

(2) On the basis of systematically mastering the common theory and methods of transportation system, the graduates should specially know and master the theory and methods of policies and regulations standard, demand survey analysis, transportation network planning and design, capacity resources configuration, operation management and control about railway transport system.

A4.2.2.2. Requirements on engineering application abilities

(1) The ability to acquire knowledge: the graduate can apply all sorts of means to acquire data, information, track the trend of the latest technology in this field, be able to check their own development demands, to formulate and implement continuing professional development program, to expand knowledge and keep learning continuously.

(2) The ability to apply knowledge: the graduate should own the ability to comprehensively apply knowledge to solve the practical problems of railway transportation, the required abilities include establishing mathematical and physical model of railway transport problems, formulating railway transport policies and regulations standard, surveying and analyzing railway transport system demand, planning and designing the network of railway transport system, configuring railway transport system capacity resources, managing and controlling railway transport system

operation, applying the computer information technology and software to solve the practical problems of railway transportation.

(3) Innovation ability: the graduate should have strong innovation consciousness and creative thinking ability, and fully show them in concrete work.

A4.2.2.3. Requirements on skills of presentation, communication and team management

(1) Have good written and oral expression skills.

(2) Have good interpersonal skills.

(3) Have good abilities of organization and coordination, teamwork and team management.

A4.2.3. Curriculum framework

A4.2.3.1. Basic framework

To meet the requirements of the major of Railway Transportation on education specifications, the theory combined with practice should be considered when we design the curriculum system. The curriculum system can be divided into two parts: fundamental education and specialty education.

Fundamental education should be accomplished in the early two years, including Computer Technology and Application, Writing and Oral Communication, Scientific Literature Review, Civil Engineering, Information and Control Engineering, Economy and Management besides Math and Physics.

Specialty education will be set in the junior year and senior year. This module of curriculum system contains two parts: the first part of courses are both theoretical and practical, such as Transportation System Planning and Location, Traffic Hub Design, Transport Organization, Transport Economics and Traffic Safety etc, which not only foster students to have essential theory and capabilities, but also help them to have scientific thinking mode and research methods, develop a railway transport feature under the background of integrated transportation. The other part of courses includes Railway Transportation Infrastructure and Technical Equipment, Railway Station Yard and Hub, Railway Transport Organization, Freight Transport, Passenger Transport, which all focus on combining theory with practice. This part of courses aim to help students establish a holistic knowledge framework about railway transport systematic engineering, understand the huge scale integrated knowledge on railway transportation and create a composite knowledge system. In this way, students gradually grasp a systemic, comprehensive and creative thinking quality from railway transport policy, planning, design, construction, equipment manufacturing to operation control and management. Besides, students' ability to notice and solve problems will be improved either.

It is recommended to require 144 credits of in-class teaching totally in the major of

Railway Transportation, which contain 74 credits for fundamental education and 70 credits for specialty education. In the theoretical curriculum, 1 credit equates to 16 credit hours; in the practical curriculum, 1 credit equates to 2 weeks.

A4.2.3.2. Practice

The major of Railway Transportation has very strong practicality, so engineering practice and training should be strengthened in the teaching. Practice teaching is divided into Curriculum Experiment, Curriculum Design, Integrated Experiment, Integrated Design, Cognitive Practice, Production Practice, Graduation Project Design, Writing Training, Oral Training, etc. Through practical training, students' understanding about the practical engineering can be strengthened, and their ability of using knowledge and modern tools to solve practical problems can be improved.

A4.2.4. Curriculum (4-year program, 149 credits required)

First Year	**Autumn**	**Spring**
Calculus I	5	
Geometry and Algebra	4	
Engineering Drafting	2	
Advanced Computer Language Programming	4	
The Scientific Literature Review	2	
Calculus II		5
Physics and Physics Experiment I		4
Engineering Measuring and Experiments		4
Computer Network and Internet		4
Courses on Humanities and Social Science		2
Courses on Humanities and Social Science	2	
Minimum credits required	**19**	**19**
Second Year	**Autumn**	**Spring**
Probability and Statistics	4	
Physics and Experiment II	4	
Circuit and Electronic Technology and Experiment	4	
Databases Principals and Application Technology	4	
Operations Research on Management		4
Data Analysis Methods and Modeling		2
Automatic Control Theory		4
Software Engineering		4
Management Principles and Methods		4
Courses on Humanities and Social Science	2	
Minimum credits required	**18**	**18**
Third Year	**Autumn**	**Spring**
Transportation System Planning and Location	4	
Traffic Hub Design	4	
Transport Organization	4	

Railway transportation Infrastructure and Technical Equipment	4	
Train Performance Calculation and Design	2	
Practice courses on Railway Transport System Network Planning and Design	1	
Railway Station Yard and Hub Design		4
Railway Transport Organization		4
Freight Transport		4
Passenger Transport		4
Practice courses on Traffic Hub Design		1
Practice courses on Railway Train Organization and Control Design		1
Practice courses on Freight Transportation Organization Design		1
Practice courses on Passenger Transportation Organization Design		1
Minimum credits required	**19**	**20**
Forth Year	**Autumn**	**Spring**
Transport Economics	4	
Traffic Safety	4	
Train Performance Control System	2	
Transport Business	2	
Container Transport and Multimodal Transport	2	
Practice course on Cognitive Practice on Railway Transportation	1	
Practice course on Comprehensive Experiments on Railway Transport	2	
Practice course on Railway Transport Safety and Meet Emergency Design	1	
Modern Logistics Technology and Management		2
Logistics System Analysis, Planning and Design		2
Supply Chain Management		2
Practice course on Railway Transportation Production Practice		2
Practice course on Graduation Project Design/Dissertation		5
Minimum credits required	**18**	**13**
Total credits	**149**	