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CONTENT AND OPERATION OF THE ITEK TRAINING

ITEK (IMPROVEMENT OF TECHNICAL EDUCATION IN KAZAKHSTAN) IS AN ACADEMIC PROGRAM OF COOPERATION BETWEEN KAZAKHSTAN AND FRANCE, AIMING AT MODERNIZING THE TEACHING METHODS AND TOOLS AVAILABLE TO FACULTY MEMBERS FROM SCIENTIFIC AND TECHNOLOGICAL UNIVERSITIES IN KAZAKHSTAN, AND TO ESTABLISH SCIENTIFIC CONTACTS, SO THAT THEY CAN BEST ENSURE THE VARIOUS TASKS AND RESPONSIBILITIES THAT WILL BE THEIRS, DURING THEIR WORKING LIVES. THIS program WAS SPECIFICALLY DESIGNED TO PROVIDE AN ADDED VALUE TO THE EDUCATION OF PARTICIPANTS.

PROJECT ORIGIN

The lack of qualified technical staff arriving each year on the labour market in Kazakhstan is a limiting factor for economic development.

The profile of graduated students no longer meets the needs of modern companies, subject to a global competition: knowledge deficiencies concern corporate business, team-work habit, project management principles and autonomy. This mismatch leads to a problem of unemployment among the young graduates.

This observation raises the question of modernizing the content, methods and objectives of technical education in Kazakhstani universities. This can be achieved through adjustment of curricula to better take into account economic parameters and changes in teaching methods.

Today, the technical higher education in Kazakhstan faces several challenges. On the one hand, the notable deficit in technicians and skilled workers continues to grow with the rise of the industrial sector, on the other hand, low wages makes teaching unattractive, resulting in a concern about teachers ageing (59 years old on average) and work overload (50% more on average). It is urgent to train new teachers and provide them with career opportunities.

The idea of this ITEK program is to provide, each year, a group of 15-20 Kazakhstani teachers with a training that enables them to improve their skills as teachers and researchers, and to acquire teaching practices in accordance with the needs of the business world. Such a training should contribute to the adaptation of higher education to society and economy and give to these teachers an international dimension which may induce new ambitions.

TRAINING CENTER, WELCOME

The training will start in early January 2013 and will last six months. It will take place in Nancy, in the premises of the CPP (Cycle Préparatoire Polytechnique, one of the eleven components of the Lorraine-INP collegium¹). The original mission of CPP was to train the best students coming from the secondary school, on the basis of a high-level education in science, to enable them to access one of the 29 graduate schools of engineering of the Polytechnic National Institutes (INP) network. From today, it will also offers training to foreign teachers, either relying on its own strengths or by appealing to teachers and researchers from the ten other components of the Lorraine-INP collegium (graduate schools of Chemistry, Electricity, Mechanics, Geology, Agriculture and Food Industry, Engineering Science and Management, etc).

ITEK will facilitate the visa procedure upstream, thanks to the support of the Embassy of France in Astana. It offers a customized support to trainees, in French or English, throughout their stay, with special attention on their arrival in order to facilitate their integration in Nancy: welcome at the railway station, drive to the booked accommodation, registration to the university restaurant, assistance in obtaining the residence permit, opening a bank account, subscription to any health insurance, etc.. A contact will be available to inform trainees about French customs, transport, recreation and any other matters that may arise during their stay in France, or to assist them in case of emergency. This individual attention is part of the quality management system developed under this program.

¹ Formerly "Institut National Polytechnique de Lorraine", today integrated in a larger structure, the University of Lorraine.

UPDATING SCIENTIFIC AND TECHNICAL KNOWLEDGE (160h)

This part of the course relies on the skills developed by the CPP and the different graduate schools of the collegium, and is oriented according to the specification drawn up by French professors aware of the situation in Kazakhstani universities. However, these specifications can however be easily modified according to the needs expressed by the Ministry of Education and Science of Kazakhstan (changes in the topics or education level etc) :

> the program includes two blocks (scientific and technological) of 80h, in classes. The scientific block is divided into Mathematics (30h), Physics (30h), Electricity (10h), Chemistry or Mechanical Processes (10h). The technology block is divided into a common core of 44h dedicated to Digital Computation and Applied Physics, plus 36h of elective courses according to the profiles of trainees (course content will be available at: <http://www.tempus-itek.org>),

> vulgarization conferences will be held in order to complete the general scientific culture,

> training will also include introduction to online literature search methods (the objective: help create new courses, individually or in group projects, associated with pedagogical reflection),

> finally, sessions of familiarization to computer use will be offered according to the needs (databases, Excel macros, etc.).

Throughout this sequence the trainees will be put in teaching situations.



TEACHING SKILLS DEVELOPMENT (64h)

This part will be performed at the Ecole des Mines de Nancy, a graduate school which has a long tradition of innovative teaching methods in the field of engineering education.

The trainees will be initiated through courses, conferences, testimonies, visits and simulations, to different teaching methods used to train students in science and technology:

- > able to manage a high level of scientific knowledge,
- > able to innovate, adapt and lead the changes in all aspects of business,
- > fit to team-work in a complex environment,
- > animated by the entrepreneurship spirit, self-reliant.

This training will outline the pedagogy to be implemented to train engineers and managers responsible and humanistic. This includes not only the pure scientific knowledge, but also the know-how and the interpersonal skills. Teaching methods combine self learning time complemented by supervised learning time (the teacher is, under educational exercise, a mediator between the student and the knowledge to transmit, orienting his actions for the student to be a true actor of his own training).

We shall introduce (9h) the advantage of Matrix Education, combining lessons for the acquisition of scientific and technical knowledge, and lessons on methodologies of thinking and acting, through different crossing disciplinary topics, in order to develop the ability to create and manage complexity.

The trainee will be taught in Pedagogy through Action (39h), to learn acting out, i.e. risk-taking and exercise of responsibility (the interest is that the student is placed under situation of the action itself):

> training in educational projects (project management and group management - methods for creativity and innovation management - experimental approach and design – work on multidisciplinary and complex topics),

> presentation of the tool “relationship with industry”: objectives, defining the mutual obligations and expectations of the three partners (student, school and company), testimonies, visits, assessments (report and defence),

> presentation of the teaching tool “role-playing games” (example of crisis management).

Finally, pedagogy implementation will raise the question of living in society and responsibility (18h):

> conception of tools (tutorials, practical projects, etc.), of elements of quality, risks, and sustainable development, in addition to mobilizing basic scientific knowledge, developing a methodological mind and adaptability,

> tutoring (assistance to prepare lectures, to build career path etc.), simulating job interviews, meetings and conferences with business executives, dealing with careers in engineering,

> establishing criteria for assessing students: knowledge, know-how, interpersonal skills,

> accountability of students in the life of their home institution: students are invited to comment and make suggestions (i.e. assessment of teaching quality, participation in discussions on evolution of teaching methods).

The entry into university or internships is often experienced as anxiogenic by students.

During these moments of insecurity, the call into question of competencies can go up to the questioning of pursuing studies. The student must have the support of student associations. ITEK wants to shed light on the potential acquisition of new knowledge and skills thanks to involvement in these associations. The teacher may encourage students to actively participate to these extracurricular activities, which can boost their self confidence and develop initiative and creativity.

AWARENESS OF CORPORATE CULTURE (50h)

Technical higher education aims at training executives to fit companies' needs, to ensure production as a first step and then to develop new products in a second step: it must not only train technicians and production engineers but also senior technical staff able to design the products of tomorrow. The teachers will acquire in France a basic knowledge about industry, in order to better understand the business environment in which their students will work.

This will be done first through the discovery of industrial settings, by company visits, lectures by executives, participation in events where education and economy meet. The goal is then to better understand the corporate business, its needs, its requirements (quality) and its environment (sustainable development, health and safety etc.).

Then trainees will be aware of the university-business relationships in order to understand the importance of industrial internship in their students' curriculum. The internship is an opportunity to associate methods and scientific knowledge to the practice of responsibilities and participation in projects: these internships are sources of professional experience, thus pledges for the future. The success of the internship will enable to assess the quality of the education at university: this underlines the importance of a common definition of the subject of the internship between university and industry.



LABORATORY PROJECT PERIOD (8 WEEKS)

The objective of this program sequence is to familiarize or even initiate trainees to research, by letting them follow the successive steps of the scientific process (state of the art, problematic, assumptions, design of experiments likely to check them, practical implementation, presentation of results and critical analysis, discussion and conclusion). This internship must develop the connection between practice and theory, as will be done also during the practical sessions at the CPP.



Each trainee will spend eight weeks in a laboratory within the university, participating in an experiment, in tandem with a PhD or a permanent member of the laboratory. The choice of topics is very broad since the university of Lorraine hosts 19 renowned laboratories, divided into five research groups (Agronomy, Food Science, Biotechnology / Geosciences / Mechanics, Energy, Process Engineering, Chemistry, Innovation / Materials and metallurgy / Computer Science, Control, Electronics and Mathematics). On its own, the Institut Jean Lamour (Materials and Solid State Physics) represents 450 people including 150 permanent researchers and 150 PhD students.

A report will be asked to each trainee, report which will be prepared within the framework of a scientific publication. It will be presented to a panel of researchers. An appendix will be devoted to an analysis of the organization and the operation of research in France in general, and in particular that conducted in the host laboratory. The evaluation of the research activity will be based on :

- > the laboratory work (attendance, relationships with the research team, ability to manipulation, assimilation of research topics etc..)
- > the report quality,
- > the oral defence.



The report will permit to assess the skills acquired during this long enough presence in the laboratory (analysis, reflection, modelling, and critical thinking, in connection with their teacher-researcher profession).



COMMUNICATION, ECONOMICS AND MANAGEMENT (120h)

This block aims to provide the trainees with the communication tools essential to the practice of their profession of teacher and researcher.

The first tool is language. The mastery of English is essential in science, either for reading international literature or for communication with foreign colleagues. The Lorraine-INP collegium has tools particularly well suited to train foreign people, providing excellent training both in science and in language. Optional English classes will be proposed in addition to the basic French necessary for a better adaptation of trainees in Nancy, delivered by the CAFOL². During the early years of the program, the trainees might not master enough French or English to be able to attend courses taught in one of these languages: a Franco-Russian translator will be hired for the duration of the training. In the following years, candidates will have enough time to prepare themselves in order to reach a A2 level in French, in order to benefit from French courses in France prior to the training, financially supported by the Bolashak Foundation.

The second tool is the mastery of both written and oral communication (how to make a more lively presentation using the computer media, how to write a complete but short report, etc.).

The third tool relates to team work: lectures on project management are planned to improve trainees' ability in that field. Finally, since the teachers are intended to train technical staff for Kazakhstan industry, it seems appropriate to teach them how to decode the economic environment and to introduce this concern in their teaching: a business management simulation and an introduction to micro and macro economy analysis are proposed (course content will be available [http:// www.tempus-itek.org](http://www.tempus-itek.org)).

This program sequence will also be used to put the trainees in teaching situations.

EVALUATION AND PROGRAM MONITORING

In order to satisfy the expectations of program participants and Kazakh institutions that support the trainees (Bolashak), the Lorraine-INP collegium has set up a system of quality management according to ISO 9001 which ensures continuous evaluation training. All of these assessments, associated with the analysis of performance indicators and the outcome of educational commissions, will provide a continuous improvement in the training quality and a high level of service. This system of quality management is described in the "Quality Manual" which will be available on the ITEK website.

With this in mind, Kazakhstani teachers and all ITEK partners will be required to evaluate the delivery that has been supplied, both at the administrative level (assistance for administrative issues, arrival in France, quality of administrative services) and at the educational and scientific level (courses, laboratory project, company visits, facilities, media and academic tools). The implementation of the quality process throughout the training will allow a personalized assessment of each trainee, and of the training itself as well.

Back home, the Kazakhstani teachers will always rely on the expertise of collegium's teachers: such a support is included in the quality management plan. At the educational level, the provided training will greatly facilitate the international accreditation of teaching methods in the Kazakhstani University. In terms of research, links will be established between French laboratories and universities in Kazakhstan: they may invite professors from Lorraine, for expertise or to give lectures or conferences (universities have the financial resources dedicated to that). Clearly, ITEK will play a catalytic role for international cooperation between Lorraine and Kazakhstan: the existing relations in Geosciences (KazNTU, KazNU and Nancy Graduate School of Geology), production management (KSTU, SKSU, KazNTU and Ecole des Mines de Nancy), biotechnology (KazNU and Nancy Graduate School of Agronomy) will grow in the near future, particularly at PhD level.

MORE INFORMATION?

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² Welcome and language training center, integrated to CPP, which offers French courses at all levels, from A1 to C2 according to the European Framework of Reference for languages.



CALL FOR APPLICATION 2012

This academic cooperation program between Kazakhstan and France is proposed by the Lorraine-INP collegium of the University of Lorraine, supported both by the Cooperation and Cultural action of the Embassy of France and by the JSC Center for International Programs of the Ministry of Education and Science of the Republic of Kazakhstan.

The ITEK program objectives

The program lasts 6 months and is laid out as follows:

- updating scientific and technical knowledge (160h),
- teaching skills development (64h),
- awareness of corporate culture (50h),
- laboratory project (8 weeks)
- communication, economic and management (120h).

The call for application is open to young Kazakhstani teachers, in science or engineering in Kazakhstani universities. Before applying, candidates must seek permission from the Rector of their university, and meet all the criteria required to obtain the French visa (<http://www.ambafrance-kz.org>).

Applications written in Russian must necessarily be accompanied by an English or French version in order to facilitate the evaluation.

Selection

The call for application is made on an annual basis. For 2012, all files should have been sent to the JSC Center for International Programs **before the 24th July 2012**.

The presented candidatures will be assessed by French scientific experts chosen by the Lorraine-INP collegium of the university of Lorraine.

The main selection criteria are:

- the candidate's motivation,
- the priority area of education,
- fluency in English and/or French.

Applicants can follow free courses of French within the "Alliances Françaises" in Kazakhstan. Note that for this year, and exceptionnaly, all courses of the ITEK program will be "live" translated into Russian by an interpreter.

JSC Center for International Programs will consider the conditions of eligibility for funding of the selected files.

Costs

The cost of the ITEK program is € 12.000 per trainee, distributed as follows:

- tuition fees for the six-month training (€ 7.000),
- amount granted to laboratories (experimental investment, personal tutoring) (€ 4000),
- visits to manufacturing facilities and industrial laboratories (€ 1000).

Funding

- Travel and accommodation expenses, visa process, health and liability insurances, are under the responsibility of candidates,
- Bolashak Foundation reserves the right to award a grant to the selected candidate to cover training and living expenses.
- In 2012/2013, the embassy of France will support the training in French language at "Alliances Française" in Kazakhstan.



Deadlines for submission of applications and schedule

- Opening date of the call for applications: [June 25, 2012](#)
- Closing date of the call for 2012 applications: [July 24, 2012](#)
- Selection results release: [September 15, 2012](#)
- Beginning of training : [early January 2013](#)

Required documents

- A form duly fulfilled (page 7),
- a detailed curriculum vitae (CV),
- a statement of purpose underlining the applicant's professional project,
- a copy of passport (or of the National Identity card).

Only electronic applications will be considered. Please send it to the following addresses before the closing date:

- **Mr Rustem NURMAGANOV** (JSC Center for International Programs): nurmaganov@edu-cip.kz
- **Mr Jean-Pierre LAVIGNE** (Lorraine-INP collegium of the university of Lorraine): jean-pierre.lavigne@univ-lorraine.fr

Contacts



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Application form

Photography

Family name (s):	
Given name (s):	
Date and place of birth:	
Home address:	
Home telephone number:	
Office telephone number:	
e-mail address:	
Passport number (or ID card):	
Awarded degrees (from the most recent to the least recent):	
Employing university:	
languages, level? (speaking, writing):	
Teaching field(s):	
Research field(s):	

I the undersigned *(Mr or Ms)* *(full name of the applicant)*, hereby certify the accuracy of the above information, and declare myself candidate to the ITEK program.

Date:

Signature:

I the undersigned, *(Mr or Ms)* *(full name of the Rector)*, Rector of *(name of the university)* authorize *(Mr or Ms)* *(full name of the applicant)* to participate in the ITEK program.

Date:

Signature:

*Documents to enclose: a detailed Curriculum Vitae (CV), a statement of purpose and a photography