

Program for Bachelor and Master degree at the Technical University of Hamburg-Harburg and possibility of using this concept in Vietnam

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Abstract

In the past universities in Vietnam used the educational programs that were similar to the programs used in the former Soviet Union and the program for Dipl-Ing degree used in the Federal Republic of Germany. Since 1986 these programs have been changed toward the concept used in England and United States. This formation consists of two degrees: Bachelor and Master. However we are dealing with many problems in the processes of reconstruction.

At present in many universities in Germany the program for Bachelor and Master degree is discussed and modified also according to the program of England and United States. We have studied many new programs of University of Karlsruhe, University of Stuttgart, Technical University of Wien, and Technical University of Dresden etc.

In this contribution the educational program of the Technical University Hamburg-Harburg is introduced. This program has many ideas very closed to the program constructed in 1987 by the Ministry of Education and Formation of Vietnam. According to this program students have common courses in the first three semesters. In the fourth semester courses differ about 10% for different specializations. From fifth semester students have various courses. There is a possibility of flexible changing for students of the classical and new programs. We hope that technical universities of Vietnam can gain a lot from experiences of the program of the Technical University Hamburg-Harburg.

1. Introduction

In this contribution we will focus our attention mainly to study programs in technical universities. The concepts for these programs in technical universities over the world can be divided into 2 systems: the first one is the system of the European continent and the second one is the system of England and United States. This first system has been used in Germany, France, Italia, Czechoslovakia, former Soviet Union, Vietnam, China etc. while the second one has been used in England, United States, Japan, Canada, Australia etc.

In the first system, after education in the secondary school, students attend 5 – 5.5 years in universities. Completing the study program they obtain the Diploma of Engineers and can go to work in corporations or research institutions etc.

In the second system the university education consists of 2 degrees: Bachelor degree (3-4 years) and Master degree (1.5-2 years). After finishing the Bachelor study program students can continue in the Master degree programs or can go to work in factories where they can get more professional education.

At present time some countries, such as Russia, China, Poland etc., have already changed the educational system from the first concept to the second one. In Germany there exist currently both systems of education in technical universities. In Vietnam the study programs of the first concept is being changed to the second one, however, this process of reconstruction meets a lot of difficulties. Therefore the experiences from other countries are necessary and will be helpful information for universities in Vietnam in order to avoid mistakes and to achieve quickly the tendency of university education of leading countries.

2. The system of education of technical universities in Vietnam

The Hanoi University of Technology (HUT) was established in 1956 and is the largest technical university in Vietnam. At present HUT has about 20,000 attendants including graduate, postgraduate and doctorate students. In the past the system of university education of HUT is formed according to the system of former Soviet Union with regarding to additional experiences from countries of Eastern Europe. Since 1987 HUT has embarked upon the reconstruction of education program from the system of the Europe continent to the system of England and United States.

According to the new programs build in 1987 students of different branches (Mechanical Engineering, Electrical Engineering, Informatics, Chemistry etc.) have common obligatory courses in the first academic year. In the second year the courses are also principally common and obligatory. According to the specification of chosen branches students have different courses which are about 10% of total credit units in the academic year. For example students of Mechanical Engineering have Engineering Mechanics, students of Chemical Engineering have Chemical Technology etc.

These reconstructed programs are, however, realized only in the first two academic years. In following years from the third to fifth year the study programs are principally unchanged. The study programs for the fifth year and the programs for the Master degree, in many cases, are similar.

According to these new programs the total educational time is too long: 7 years for obtaining Diploma of Master degree. Moreover this is valid only for excellent students who can continue in the Master study programs immediately after finishing graduate education with Diploma of Engineers. For average student or even very good students this length time is prolonged to 9 or 10 year since they are not allowed to continue immediately but have to go to work somewhere for some time. In our opinion it is illogical and should be changed.

3. The study programs of the Technical University of Hamburg-Harburg, Germany

In recent years, many countries of the Eastern Europe and Russia have changed the programs from the first concept to the second one. Technical universities in the Federal Republic of Germany, such as Technical University Hamburg-Harburg, University of Karlsruhe, University of Stuttgart, Technical University of Wien, and Technical University of Dresden etc, are constructing the study programs by modules (according to the second system) parallel with the study programs of classical system (first concept).

In the first academic year students have common courses. In the second year they have also principally common course, only about 10% of courses differ for different specializations. After completing 3 year they will obtain the Diploma of Bachelor degree or go abroad to study in some foreign university or continues with classical study programs. With this new concept the international transferability is at high level.

Below we will present the study programs of the Technical University Hamburg-Harburg.

3.1 Study programs for first two years in the Technical University Hamburg-Harburg

In the first two academic years students of all specialization have principally common obligatory courses. Each specialization has only different courses with 10 credit units (1 credit unit = 1 hour per week x 15 weeks).

The list of common courses is in the Table 1:

Course	First semester Lect. + Sem.	Second semester Lect. + Sem.	Third semester Lect. + Sem.	Fourth semester Lect. + Sem.	Total credit units Lect. +Sem.
Mathematics I-III	4 + 2	4 + 2	4 + 2		12 + 6
Physics for engineers	2 + 1				2 + 1
Chemistry for engineers	2	2			4
Engineering mechanics	4 + 3	3 + 2			7 + 5
Heat engineering		2 + 2	2 + 2		4 + 4
Fundamentals of electrical technology I-II	3 + 2	3 + 2			6 + 4
Fundamentals of science of materials		2	2		4
Fundamentals of design theory	2 + 1	2 + 1			4 + 2
Informatics for engineers I-II		3 + 1	4 + 1		7 + 2
Fundamentals of system theory				3 + 1	3 + 1
Non-technical courses				2	2
Eligible courses according to specialization			x	y	10
Probation		2	2	2	6
Total	26	31	19+x	10+y	96

Tab.1

Eligible courses according to the specialization are listed in the Table 2:

(CU= credit unit)

Specialization	Third semester	Fourth semester
Electrical engineering	Network theory (4 CU)	Mathematics (6 CU)
System engineering	Network theory (4 CU)	Mathematics
Chemical engineering	Engineering mechanics of fluid (3 CU)	Heat and mass transfer (2 CU) Multiphase thermodynamics(2 CU) Fundamentals of biomechanics and molecular biology (3 CU)
Science of materials	Electrical materials I (2 CU) Material testing (2 CU)	Electrical material II (2 CU) Material testing II (2 CU)
Machine manufacturing	Engineering mechanics III (4 CU)	Machine elements and fundamentals of mechanical technology (6 CU)
Aircraft engineering		
Informatics engineer	Informatics for engineers III (3 CU)	Mathematics IV (6 CU)

Tab.2

3.3 Study program of the third year in the Technical University Hamburg-Harburg

For illustration, below we will present study program of two specialisations in third year of the Technical University Hamburg-Harburg: Electrical Engineering (Table 3) and Theory of Machine Manufacturing (Table 4).

a. Specialization: Electrical Engineering

Course	Fifth semester Lect. + Sem.	Sixth semester Lect. + Sem.	Total
Theory of electrical technology	3 + 1	2 + 1	7
Theory of power	2 + 1		3
Energy technology		3 + 1	4
Control technology I	2 + 2		4
System theory II	2 + 1		3
Telecommunication I		2 + 1	3
Electronic components	3 + 1		4
Semiconductor circuit technology		3 + 1	4
Numerical processing systems	3 + 1		4
Total of principal courses	16 + 6	10 + 4	36
Non-technical courses	4	3	7
Project		x	
Total	26	17 + x	43 + x

Tab.3

b. Specialization: Theory of Machine Manufacturing

Course	Fifth semester Lect. + Sem.	Sixth semester Lect. + Sem.+ Lab.	Total
Theory of technical vibration	3 + 1		3
Hydromechanics	2 + 1		3
Control technology I	2 + 2		4
Control technology II		3 + 1 + 0	4
Measuring technology		2 + 1 + 0	3
Finite element method and Boundary element method		2 + 1 + 0	3
Nonlinear dynamics		2 + 1 + 0	3
Theory of plasticity and strength I	2 + 0		2
Hydrostatic and hydrodynamic transmission	2 + 1		3
Electrical machine	2 + 1		3
Heat transport	2 + 1		3
Measurement and control experiment		0 + 0 + 2	2
Total of principal courses	14 + 7	9 + 4 + 2	36
Non-technical courses	2	4	6
Project		x	
Total	23	19+x	23+x

Tab.4

3.4 Master study program in the Technical University Hamburg-Harburg

After attending 3 years students obtain the Diploma of Bachelor. They can continue in Joint Master Program of the Technical University Hamburg-Harburg with other universities abroad, for example in United States, Canada, England, Sweden, Denmark, Finland, Russia etc. They can also continue in the fourth or fifth year according the classical program in Germany, see Fig.1 and Fig.2.

More details about Master degree of the Technical University Hamburg-Harburg can be found in the general information of study program of the Technical University Hamburg-Harburg. Some examples of Master programs are: Materials Science, Mechatronics, Information and Communication Systems, Process Engineering etc.

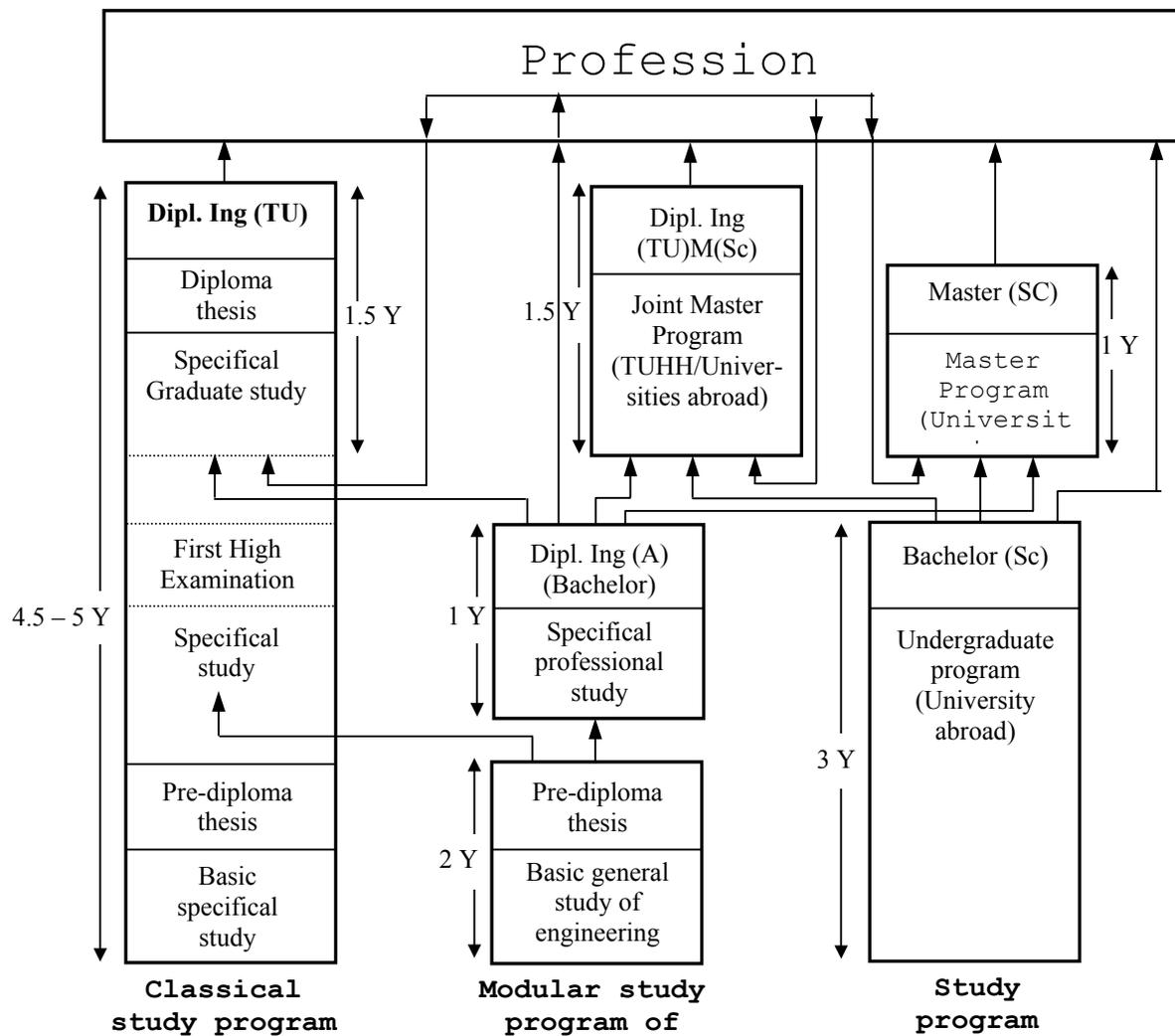


Figure 1: Structure of “modular study” of TUHH in relation with classical study program as well as with master programs of foreign universities

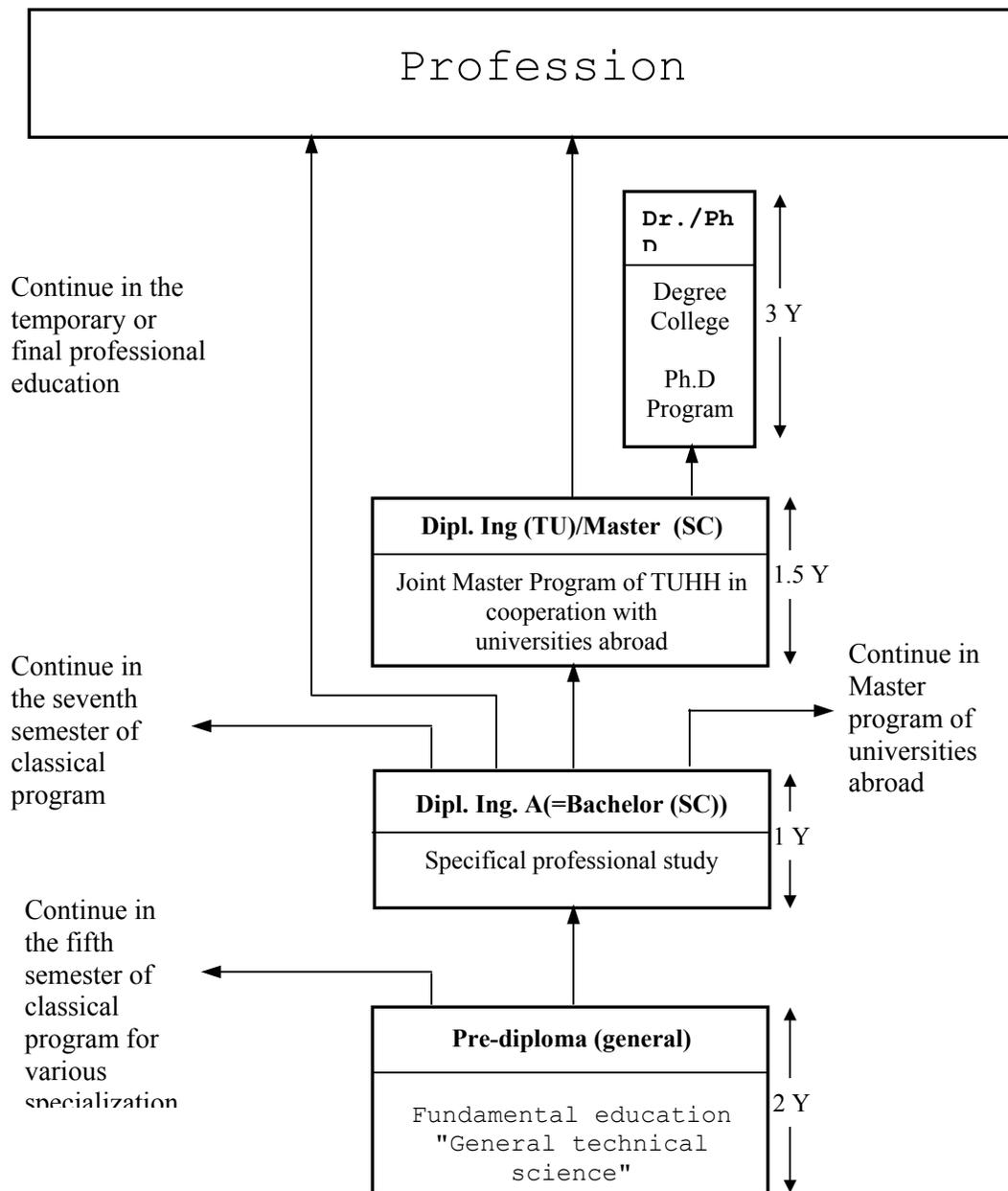


Figure 2. Structure of “modular study program” with various possibility of study

4. Conclusion

In this paper the study program of the Technical University Hamburg-Harburg was presented. This program has many ideas very closed to the program constructed by the Ministry of Education and Formation of Vietnam in 1987, at the beginning of reconstruction process. Hence the experiences of the program of the Technical University Hamburg-Harburg are valuable for universities in Vietnam. We hope that we can avoid mistakes and provide the flexible changing from the classical and new program.