

Educational Globalization: the European Credit Transfer System

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Abstract:

Just as globalization is an issue for industry, many educational institutions are trying to make their students more aware of global issues, in many cases by offering experiences overseas. For institutions and students interested in courses at European technical universities and institutes, an understanding of the European Credit Transfer System (ECTS) is necessary.

The ECTS was mandated by the Bologna Declaration of 1999, although it was initially set up in 1989¹. Many European universities and institutes now subscribe to the ECTS, whose intent is to facilitate the ability of students to transfer credits amongst various European institutions of higher education. From a Vilnius University document: “ECTS credits are based on a principle that 60 credits measure the workload of a full-time student during one academic year and one ECTS credit stands for around 25 to 30 working hours.”² The workload and definition of credits can include learning outcomes, class contact hours, assignments, independent study, research and/or other assigned work. The typical school year under the ECTS will amount to 60 credits, with this amounting to approximately 1500-1800 hours of overall workload.

The author will report his understanding of the definition of modules within the ECTS framework, based on work and discussions with two European institutes. The description of both time and work for a given module is at the discretion of the institute and the instructor. Within the framework of the ECTS, a module in a (e.g.) 14-week term may consist of:

- All lectures
- All laboratories
- Dissertation/thesis work
- X weeks of lecture followed by Y weeks of lab, $X + Y = 14$
- Concurrent courses for X weeks, followed by combined lessons for Y weeks

The paper will discuss ways for US institutions to understand possible equivalencies between the US and ECTS systems.

Background

Being concerned about the overall nature and competitiveness of European education, four Education Ministers from France, Germany, the UK, and Italy came together in 1998 to sign the Sorbonne Declaration on higher education. These concerns evolved into a meeting in Bologna in 1999 attended by twenty-nine Education Ministers from European countries. This meeting resulted in the Bologna Declaration. Both these events were in response to what was seen as the relative successes of the US and UK approaches to higher education, and a desire to set up a European-based system that would result in an overall European Higher Education Area (EHEA) and would “increase the international competitiveness of the European system of higher

education”³. The following are the objectives stated in “The Bologna Declaration of 19 June 1999”⁴:

- Adoption of a system of easily readable and comparable degrees.
- Adoption of a system essentially based on two main cycles, undergraduate and graduate.
- Establishment of a system of credits – such as in the ECTS system – as a proper means of promoting the most widespread student mobility...
- Promotion of mobility by overcoming obstacles to the effective exercise of free movement.
- Promotion of European co-operation in quality assurance...
- Promotion of necessary European dimensions in higher education, particularly with regards to curricular development, inter-institutional co-operation, mobility schemes and integrated programmes of study, training and research.

It is important to note that the Declaration is a commitment by each signatory country to reform its own education system, not a reform imposed on them. It is also important to note that while many of the twenty-nine signatories to the Declaration are from countries that are members of the European Union (EU), the signatories include many countries that are not members. They are countries on the continent of Europe that are concerned with the higher education process, and are not limited to EU countries nor was their work subject to formal EU approval. However the European Commission (EC) actively supports the goals of the Bologna Declaration.

The progress toward the EHEA continues to be monitored by the participating Ministers. Since the Bologna Declaration in 1999 they have met three times to monitor and assess their own progress toward the EHEA – Prague in 2001, Berlin in 2003, and Bergen in 2005. They will meet again in London in 2007.

Introduction

There is increasing interest in the part of educational institutions to develop relationships with institutions outside of their own country, often called by a term such as “internationalization”. For many US institutions, this includes working with European institutions. To be able to work effectively with European institutions, a US educator must understand the European Credit Transfer System – the ECTS. The reader should note that the system has been expanded to become a credit accumulation system, and as such it is alternately known as the European Credit Transfer and Accumulation System, although the same ECTS acronym is used.

Given that the ECTS is defined by the participating European countries, the Ministers of Higher Education of participating European countries issued this statement during their meeting of 2003: “Ministers stress the important role played by the European Credit Transfer System (ECTS) in facilitating student mobility and international curriculum development. They note that ECTS is increasingly becoming a generalized basis for the national credit systems. They encourage further progress with the goal that the ECTS becomes not only a transfer but also an accumulation system, to be applied consistently as it develops within the emerging European Higher Education Area”.

The purposes of the ECTS are to both attach consistent credits to work at European universities so that those credits can be transferred among the institutions as well as to allow accumulation of those credits in the pursuit of a degree. The credits in the ECTS are based on the student workload required to achieve the objectives of a course or program. Typically these are specified in terms of learning outcomes and competencies to be acquired (1).

The author must also state that the entire system is still, like many EU directives, in a state of flux. Therefore the data presented are representative of the system but are not necessarily equal amongst all players. And also, with his limited exposure to the system, the author should not be considered an expert on its makeup.

Credits within the ECTS

More fully defined at the Berlin meeting of 2003, a bachelor's degree within a ECTS-participating university consists of a minimum 180 credits, with one academic year normally consisting of 60 credits. A maximum requirement of 240 ECTS credits is allowed for the first level, equivalent to a bachelor's degree. Therefore the typical bachelor's diploma will require 3 years of study. To the best of the author's knowledge this three-year bachelor's diploma is accepted in the U.S. as equivalent to a four-year bachelor's degree. This is true for acceptance to the Graduate School at the author's home university.

The ECTS also defines a standard grading scale:

- A: best 10% of students
- B: next 25%
- C: next 30%
- D: next 25%
- E: next 10%
- F and FX: fail

In this scheme FX means "fail-some more work required to pass" and F means "fail-considerable further work required".

The second level, or master's degree, is to require 90-120 ECTS credits, with a minimum of 60 of those credits at the second level. No credit range has been defined for third level, doctoral, degrees.

As would be expected, the countries that make up the EHEA developed an educational quality standard, the "Standards and Guidelines for Quality Assurance in the European Higher Education Area", available at http://www.bologna-bergen2005.no/Docs/00-Main_doc/050221_ENQA_report.pdf.

Internationalization

There is a great deal of interest among US universities to establish or increase their students' participation in international education activities, and these are certainly issues not unique to American institutions⁵. And of course in the technical disciplines the International Association for the Exchange of Students for Technical Experience (IAESTE) has been active for years in facilitating both paid and unpaid international student exchanges. Started in 1948 IAESTE has grown to include institutions in 80 nations. IAESTE United States notes that their mission is "developing global skills in tomorrow's technical leaders"⁶

Those not familiar with the European technical institutes should note that a major difference between US and European schools is the examination technique. Commonly (although not universal) in European schools the semester/term is completed with no examination. There is then a defined study period of several weeks, and then the students return for a comprehensive

examination in each class they have taken. If they fail the exam, there is a period to retake it prior to the start of the next academic term.

Technical Institutes

In general, European engineering-related schools fall into two categories:

- The universities, which teach a very theoretical curriculum
- The institutes of applied science, which teach an applied curriculum intended to allow their graduates to immediately segue into the engineering job market.

The author is familiar with two institutes of applied science, the Fachhochschule Braunschweig/Wolfenbüttel in Wolfenbuettel, Germany, and the Hochschule für Technik+Architektur Luzern (HTA Luzern) in Lucerne, Switzerland. The English equivalents they use for their names are the University of Applied Sciences Wolfenbuettel and University of Applied Sciences of Central Switzerland. The rest of this paper will examine in more detail the module system used to allow credit transfer amongst the European universities with the ECTS.

Module System

The module system on which much of the technical education is based can be best shown with an example in graphical form. The three-year course sequences shown in figure 1 are those used at the HTA Luzern, the University of Applied Sciences of Central Switzerland.

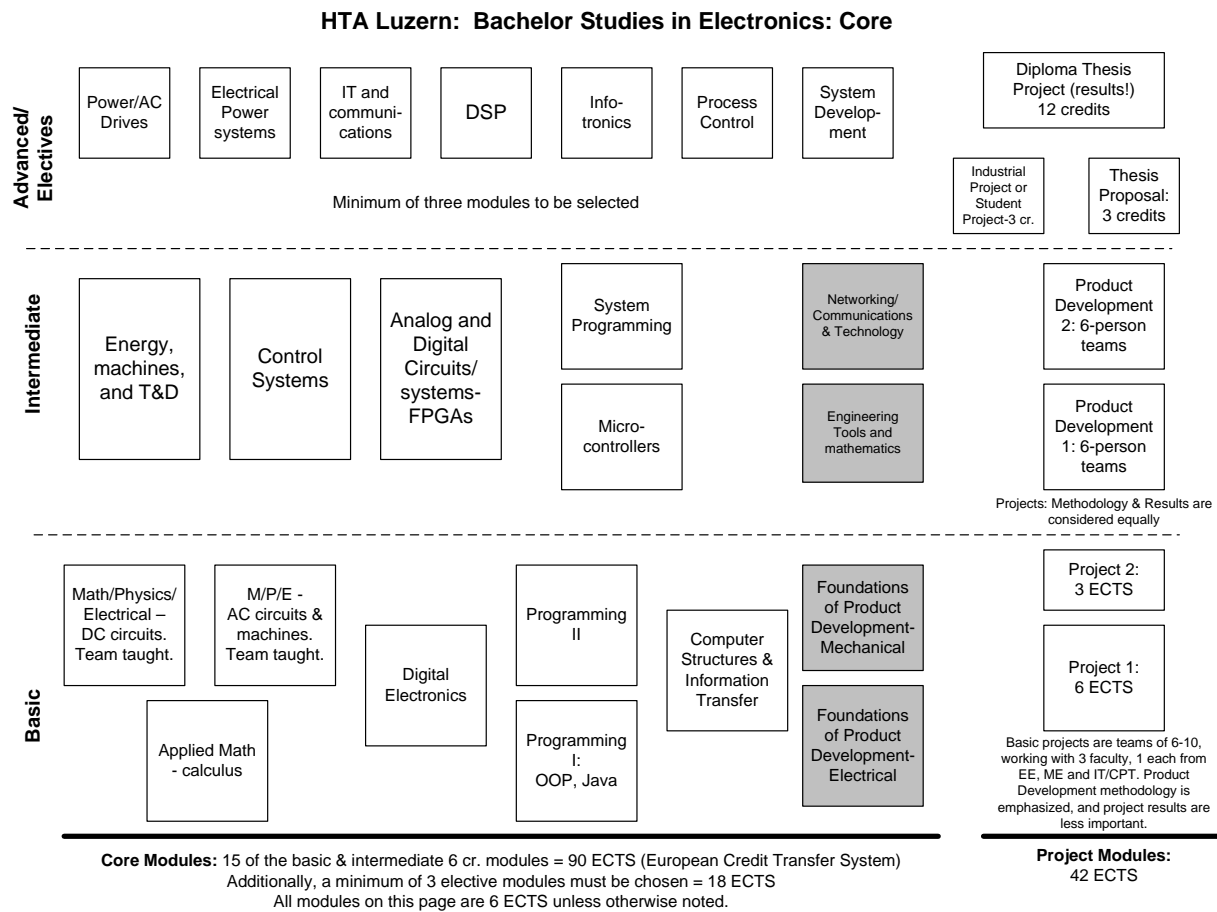


Figure 1. Example of a three-year modular system

In the example shown in Figure 1, the “Basic” modules would be first-year modules, the “Intermediate” modules would be second-year modules, and the “Advanced/Elective” modules would be third year modules. Note the inclusion of projects or development modules each year, and the Diploma Thesis, which is typically a project worked on in teams of two that occupies the students full-time for 8-10 weeks, and results in a formal thesis at its conclusion. It is not a research project but rather a development project. During this project period no classes are taken.

In looking at the modular system, it is important to recognize these general ECTS definitions/requirements:

- A minimum of 180 ECTS credits are required to receive a Bachelor’s diploma
- A credit is defined as equivalent to 25-30 workload hours, defined as a combination of lecture hours, lab hours, independent study hours, research hours, and/or other assignments. Student workload is the time necessary to complete all planned learning activities.
- A full semester/term consists of 30 ECTS credits, therefore requiring 750-900 workload hours. Semesters are typically 14-15 weeks of class time plus the examination time.

The credits as noted above are not typical of the credits issued at U.S. schools. For most schools in the U.S. on the semester system, which has a 14-15 week term similar to the ECTS terms, a credit hour is equivalent to one lecture hour each week for 14-15 weeks, or one laboratory period each week for 14-15 weeks. A full term is typically defined as at least 12 credit hours. Out of class time is not considered in assigning credit hours at U.S. schools.

Most courses are taught in modules of 3 credits or 6 credits. Within the modules, the instructor may define the contact hours as lecture hours, lab hours, project hours, or a combination of all, plus the out-of-class hours. Within the modules then there may be (e.g.) 5 weeks of lecture, followed by 5 weeks of lab activities, followed by 4 weeks of a project.

Teamwork, both on the parts of the students and the faculty, is common. For example, in the basic math/physics/electrical courses shown in Figure 1, a faculty member from each of the three disciplines is involved in teaching the topics. In the basic Project courses, the students work in teams of 6-10, with guidance from 3-faculty teams from the various disciplines.

The 6-credit modules are defined as being taught the equivalent of one full week day each week of the semester, which may be scheduled as, e.g.:

- A full day, broken into 55-minute lessons
- A half-day on Monday and a half-day on Wednesday, broken into 55-minute lessons
- Another combination of times, which may include laboratory periods that will equal one full day.

At Wolfenbittel, the academic schedule is based on a four-year pattern, and includes several instances of industrial practice, as noted in their brief overview schedule shown in figure 2.

It is interesting to note that the pattern of module is at the discretion of the instructor at many institutes, and the department head is responsible for scheduling resources accordingly. It is also interesting to note that typically, for a scheduled laboratory period, there is no instructor present. The instructor is typically available in his/her office to answer questions, but essentially the students are presented with a set of deliverables they are expected to accomplish, and they are to then work together to meet their goals.



Schedule of Academic Studies

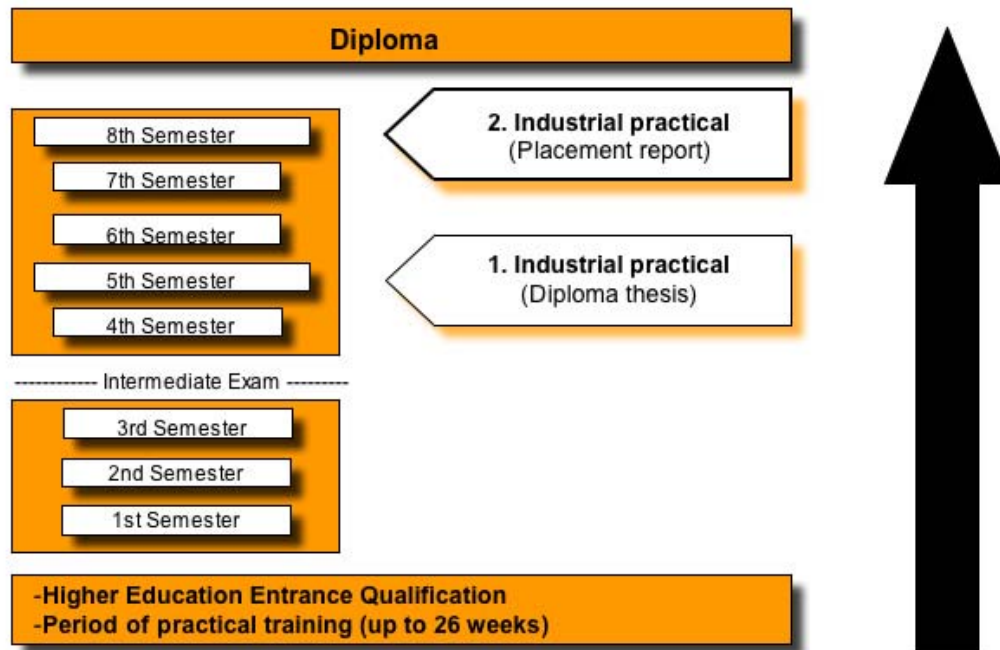


Figure 2. Schedule of Academic Studies at Fachhochschule Wolfenbüttel.

The German and Swiss schools with which the author is familiar have schedules considerably different from typical US university schedules. A typical schedule would be for the spring term to begin in February/March and end in July/August, then a 3-5 week study period after which the students return for written exams. The fall term would begin in September/October and end in January/February. This makes it difficult to set up abilities for US students to take classes full-time for a term in Germany or Switzerland and likewise difficult for European students to take full-time classes in the US. It is the author's understanding that these schedules are similar in other European countries. At this point the ECET and MET departments at Purdue have had the most success scheduling project and short 1 or 2-week full-time courses, full-time meaning 40-hour weeks.

Hopefully the reader with an interest in interacting with European schools has a better understanding of the ECTS and the typical modular approach of a term. Further information about the two schools discussed here can be found at their web sites:

Wolfenbüttel:

English:

<http://www.fh-wolfenbuettel.de/cms/en/>

German;

<http://www.fh-wolfenbuettel.de/cms/de/>

HTA Luzern:

English:

http://www.hta.fhz.ch/frames/stud_index.htm?page=/rektorat/international/rek_international.htm

German:

<http://www.hta.fhz.ch/index.htm>

The author would also like to note that the emphasis on teaching and research is handled completely different at the European institutes of applied science. These universities have departments of, e.g., electrical engineering, and the faculty in the departments are responsible for teaching. Each department has one or more corresponding Institutes, and the faculty at the Institutes are responsible for applied research and industrial-based projects and/or technology transfer. As examples, at Wolfenbuttel:

<http://www.fh-wolfenbuettel.de/cms/en/overview/portfolio.html>

and at Lucerne:

http://www.hta.fhz.ch/frames/allg_index.htm?page=/rektorat/international/rek_institutes.htm

Conclusion

This paper presents an overview of the European Credit Transfer and Accumulation System (ECTS) and presents examples from two schools of implementation of the ECTS. It is intended to provide U.S. faculty who have an interest in

¹ -----; "ECTS – European Credit Transfer and Accumulation System". Available at http://ec.europa.eu/education/programmes/socrates/ects/index_en.html#3.

² -----; "ECTS and National Credits". Available at www.vu.lt/en/international/bologna_process/ects.

³ Adam, Stephen, 2001. "A Pan-European Credit Accumulation Framework – Dream or Disaster?". Higher Education Quarterly, v55 3, July 2001, pp292-305.

⁴ -----; "The Bologna Declaration of 19 June 1999". Available at http://www.bologna-berlin2003.de/pdf/bologna_declaration.pdf.

⁵ Libhaber, A., and Greene, RM, 2006. "Internationalizing Higher Education in South Africa". International Higher Education, #45, Fall 2006, pp. 17-18

⁶ -----, "About IAESTE". Available at www.iaesteunitedstates.org.

Biography:

Glenn Blackwell has been teaching in the Electrical and Computer Engineering Technology (ECET, nee EET) program at Purdue University since 1981. In that time he has taught in many of the topical areas, most recently in the areas of project management, electronic prototyping, and surface mount technology. He is interested in international topics and has hosted students from HTA Luzern which they performed their diploma thesis project at Purdue in West Lafayette, and has twice visited HTA in Lucerne, on one visit giving an invited one-day seminar on ball grid arrays. He has also sent two students to HTA to work on aspects of their senior design projects.