OAQ/Cti Audit

Self-Assessment Report
24-27 November 2014

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List of Acronyms

ACIDE	EPFL Association of Research Scientists and Lecturers (Association du Corps intermédiaire de l'EPFL)
AE	EPFL Assembly
AMBA	The Association of MBAs
AUF	Agence Universitaire de la Francophonie
BaMA	Bachelor and Master School
CAPE	Teaching Support Center (Center d'Appui à l'Enseignement)
CARE	Center Asiatique de Recherche sur l'Eau
CAS	Certificate of Advanced Studies
CC	Career Center
CCMX	Competence Center for Materials Science and Technology
CdF	Federal Audit Office
CDH	College of Humanities
CDM	College of Management
CdS	Conference of the Directors of programs (Conference des directeurs de section)
CEPF	ETH-Board: ETH Domain's strategic management and supervisory body
CESAER	Conference of European Schools for Advanced Engineering Education and Research
CFA	Chartered Financial Analyst
CH	Switzerland
CIB	Center Interfacultaire Bernoulli
CLUSTER	Consortium Linking Universities of Science and Technology for Education and Research
CMS	Special Mathematics Course (Coura de Mathématiques spéciales)
CODEV	Cooperation & Development Center
COSEC	Specific training for security correspondents
CRAFT	Teacher support unit and Research lab on training technologies
CREM	Center de Recherches Energétiques et Municipales
CRM	Risk Management Committee
CRUS	Rector's Conference of the Swiss Universties (Conférence des recteurs des universités suisses)
CSEM	Swiss Center for Electronics and Microtechnology
CTI	Commission for the Promotion of Innovation
CULF	Center Universitaire Lausannois en Finance
CURES	Center Universitaire de Recherche sur l'Energie pour la Santé
DAF	Educational Affairs (Domaine de la formation)
DAS	Diploma of Advanced Studies
DDC	Data Distribution Center
DTU	Technical University of Denmark
EADI	European Association of Development Research and Training Institutes
EAWAG	Swiss Federal Institute of Aquatic Science and Technology
EC	European Commission
ECAL	Cantonal University of Art and Design (Ecole cantonale d'Art de Lausanne)
ECP Paris	Ecole Centrale Paris
ECTS	European Credit Transfer and Accumulation System
edX	Platform for Online (MOOCs) courses
EMPA	Swiss Federal Laboratories for Materials Science and Technology
ENABLE	Program of the Technology Transfer Office
ENAC	School of Architecture, Civil and Environmental Engineering
ENS	Ecole Normale Supérieure Paris
ENSPY	Ecole Nationale Supérieure Polytechnique de Yaoundé
EPFL	Swiss Federal Institute of Technology in Lausanne (Ecole Polytechnique fédérale de Lausanne)
EPUL	Ecole polytechnique de l'Université de Lausanne
ERC	European Research Council
ETH	Swiss Federal Institutes of Technology
ETH-Board	Board of Swiss Federal Institute of Technology (= CEPF)
ETHZ	Swiss Federal Institute of Technology in Zurich (Eidgenossiche Technische Hochschule Zürich)
EUGA	EPFL UNIL Golf Association
FIT Act	Federal Act on the Federal Institute of Technology
FOBS	Compulsory Basic Safety Training

FSB	School of Basic Sciences
GRI	Global Report Initiative (GRI
GULF	The Global University Leaders Forum
HEI	Graduate Institute of International and Development Studies (Institut universitaire de Hautes études Internationale)
HES	University of Applied Sciences
HKUST	Hong Kong University of Science and Technology
HPC	High Performance Computers
HR	Human Resource
IC	School of Computer and Communication Sciences
ICC	Information, Computation and Communication
IDIAP	Dalle Molle Institute of artificial and perceptive intelligence
IdM	Association Ingénieurs du Monde
IMT-NE	Institute of Microtechnology in Neuchâtel
IRO	Research Institute in Ophtalomology (Institut de Recherche en Ophtalomologie)
ISAE	Institut Supérieur de l'Aéronautique et de l'Espace
ISCN/GULF	International Sustainable Campus Network / Global University Leaders Forum
ISO	International Organization for Standardization
IEC	International Electrotechnical Commission
ISREC	Swiss Institute for Experimental Cancer Research
ITER	Project aimed to lead to international cooperation on the development of a new form of energy
KAIST	Science & Technology Office Seoul - Korea
KAUST	King Abdullah University of Science and Technology - Saudi Arabia
KFPE	Commission for Research Partnerships with Developing Countries
KTH	Royal Institute of Technology - Sweden
MAS	Master of Advanced Studies
MIPT	Moscow Institute of Physics and Technology
MIT	Massachusetts Institute of Technology
MOOCs	Massive Open On-line courses
MTE	Master in Management, Technology and Entrepreneurship
NCCR	National Competence Centers for Research
NRF	National Research Foundation
NTU	Nanyang Technological University - Singapore
NUS	National University of Singapore
OAQ	Swiss Accreditation office (Organe d'accrédititation des Hautes Ecoles Suisses)
OGIF	Organisation et Gestion Informatique de la Formation
PATT	Professor Assistant Tenure Track
PhD	Doctor of Philosophy
PMU	Policlinic Medical University
PPP	Public Private Partnership
PSI	Paul Scherrer Institut
QA	Quality Assurance
QCM	Question à choix multiples
QMS	Quality Management System
RC	Research Commission
RCFE	Réseau romand de conseil en formation et évaluation pour l'enseignement universitaire
RESCIF	Network of Excellence in Engineering Sciences of the French-speaking Community (Réseau d'Excellence des Sciences de l'Ingénieur de la Francophonie)
RUMBA	Swiss Federal Government Program for Resource and Environmental Management
SAE	Department of Student Affairs (Service des affaires estudiantines)
SAP	German company, leader in enterprise software and software-related services.
SdA	Management meeting of the VPAA central administration (séance de l'administration académique)
SEFRI	State Secretariat for Education, Research and Innovation
SHS	Humanities and Social Sciences
SMEs	Small and Medium Enterprises
SNSF	Swiss National Science Foundation
SPE	Study Programs Promotion Service
STEM	Science, Technology, Engineering and Mathematics

STI	School of Engineering
SUVA	Swiss Accident Insurance
SV	School of Life Sciences
Swiss TPH	Swiss Tropical and Public Health Institute
TTO	Technology Transfer Office
TU/e	Eurotech Universities
TUM	Technical University of Munich
UAE	United Arab Emirates
UK	United Kingdom
UNESCO	United Nations Educational Scientific and Cultural Organization
UNIBE	University of Bern
UNIGE	University of Geneva
UNIL	University of Lausanne
VNU-HCM	Vietnam National University - Ho Chi Minh City
VPAA	Vice Presidency for Academic Affairs
VPIV	Vice-presidency for Innovation and Technology Transfer
VPPL	Vice-Presidency for Planning and Logistics
VPSI	Vice-presidency for Information Systems
WSL	Swiss Federal Institute for Forest, Snow and Landscape Research

1. The Higher Education Institution
A list of all acronyms can be found under Annex 1.

Vision

Founded in 1853 as the École Spéciale of Lausanne, by former students of French engineering schools (particularly Mines), the institution was incorporated in the first half of the twentieth century in the University of Lausanne and became EPUL (Ecole Polytechnique de l'Université de Lausanne). It then began a dramatic growth, becoming EPFL, Ecole Polytechnique Fédérale de Lausanne (Swiss Institute of Technology at Lausanne) in the late 1960s. Forty years after its federalization, EPFL is now internationally recognized as a cutting-edge institute of technology that bases its development on an innovative education, for technological research contributing to the resolution of global issues, as well as on innovative partnerships with industry and the economy.

In geopolitical terms, EPFL campus is close to the European backbone (from the London area, centerd along the Rhine, passing from Basel and Zurich to Lombardy) which comprises the productive capacity and wealth of Europe. It is also close to Lyon and Grenoble, regional metropolis. On this solid basis, the aim of the school is to become by 2020 one of the ten best technological universities in the world. EPFL intends to contribute to the emergence of a highly competitive Swiss university system on a global scale, combining international culture, its European roots and its regional and national anchoring in an original development model. This ambition is concretely reflected in the following objectives:

a) become a technological university of reference when it comes to educational innovation;
b) be positioned in areas of specific and cross-disciplinary research, in complementarity with specific evolutions in the various disciplines constituting the heart of the school's activities;
c) attract the best students and researchers from all backgrounds;
d) enhance our visibility and international presence.

Meanwhile, EPFL wants to maximize its contribution to the economy and society in Switzerland. This will be achieved by:

a) strengthening our industrial partnerships with export companies and domestic and foreign investors willing to collaborate with EPFL;
b) developing regional hubs in Switzerland around specific subjects, in connection with the specificities of the regional economy, in collaboration with other academic institutions and in partnership with the municipal and cantonal authorities in question;
c) asserting our role as ambassador of Switzerland abroad.

Strategy

The development of a modern Switzerland is increasingly moving towards the establishment of a metropolis of 8 to 10 million people, whether on a societal, urban or industrial level, as well as in the field of transport and mobility. In parallel, our country is experiencing the emergence of several unifying clusters, one of them comprising the region by Lake Geneva and Western Switzerland, the other including the Zurich-Basel-Lucerne region, and the third involving the Italian-speaking part of the country near Milan.

At the heart of the diverse and international Lake Geneva region, the roots of EPFL are deeply anchored in the European culture. The institution is proud of its multicultural dimension and its academic diversity, contributing to its wealth, visibility and attractiveness. With this basis and in a rapidly changing world, EPFL has always had a proactive and pragmatic attitude, flexibility and an innovative capacity, shown the spirit of a pioneer and entrepreneur. In this context, EPFL's strategy aims to combine this regional integration with the international culture and European roots of the school, and bring together science, technology, culture and art.

In a changing and unstable economic climate, and in line with the basic missions of EPFL, this strategy asserts itself in the following ways:

- by contributing to solving the major challenges that our society faces through our commitment to our core missions;

- by continuing a phase of EPFL qualitative and quantitative growth, without compromising quality and excellence;
- by enhancing our visibility and continuing the progression of EPFL among the best universities, while preserving the institutional and cultural identity of the institution;
- by maintaining a dynamic, flexible, entrepreneurial and pragmatic approach, in order to also adapt developments as a function of opportunities.

Academic goals

Since the early 2000s, EPFL has lived a profound change in its orientation to become a research-intensive technological institute. This results, as strategically decided by EPFL general management, from a significant renewal of its professors hired at the highest international level in order to either refresh existing or develop new research domains. This move has brought with it a new breath not only in research but also in education. However, due to the multicultural background and strong research orientations of new professors, EPFL is currently finalizing such profound mutation and fully integrating it into a new cultural identity. The latter will be essential, in particular for new educational approaches that have to nurture more and more their roots at the frontiers of research and innovation. Eventually, by deciding an irreversible move towards the adoption of English as the only language to convey knowledge at the master and PhD level, EPFL wants to become not only innovative and multicultural, but also definitely open to the world for both education and research.

- Education is the primary mission of EPFL. The training of young engineers, scientists and architects aims to enable researchers, leaders and entrepreneurs, so needed by society, to address key challenges. This mission is standardized, at a national and European level, through the Bologna Process, implemented at EPFL in the mid-2000s. Recent reflections on education have helped develop measures going from a strengthening of the technological basis to a coming-together with the world of employment and innovation, as well as substantive work on the consistency of the curricula and their structuring based on learning outcomes.

- The overall strategy of EPFL when it comes to research is not rigidly fixed, but is rather carried out through a variety of stimuli, including competitive recruitment in key areas. In this scalable and flexible context, several general areas have been defined to focus initiatives across the institution, such as around the convergence of the "nano-bio-info-cogno" technologies, life sciences and bioengineering, energy, green technology and sustainable development, advanced manufacturing technologies, as well as research-based simulation and digital sciences.

  Several initiatives have been launched in recent years to support synergies between disciplines and encourage transdisciplinarity. This is why for example the *EPFL Energy Center*, the *Space Center*, the *EPFL-ECAL Lab* (engineering and design), the *Center for Neuroprotheses* or the *Social Media Center* have been created.

  This evolutionary strategy is based on large-scale initiatives at the regional, national or international level, with examples such as the *NCCR – National Competence Centers for Research* of the Swiss National Fund for Scientific Research, national programs such as *Nano-Tera* or *CCMX*, as well as the *Human Brain Project*, the flagship project of the European Union around the simulation of the brain for which EPFL provides leadership. This large-scale impact approach results not only from the provision of equipment and technology platforms shared among researchers, but also, from the very synergistic actions conducted by internationally-recognized opinion leaders in the field who can work cooperatively.

- Innovation, development and transfer of technologies represent the third pillar of EPFL. Heterogeneous in terms of their scope and content, activities related to the institutional mission range from simple research contracts to the definition of collaborations and partnerships with both large companies and SMEs. They also involve supporting entrepreneurship and the creation of startups. A privileged receptacle of these activities, the *EPFL Innovation Park* now hosts 13 major companies and more than 100 startups on campus.

Regional extensions of the EPFL Campus

Alongside the academic goals and its internationalization, EPFL has affirmed its commitment to accelerate the transfer of technology by taking advantage of the strong balance between existing scientific and technological developments of the ETH schools and specializations of the Swiss economy. Given the role of the regions of Western Switzerland, their specific skills and potential for thematic development, EPFL has in recent years strengthened its collaborations with the "Romands" (French-speaking) cantons of Geneva, Fribourg, Neuchâtel and Wallis, through a policy of development of regional institutes (see fig. 1-1). This strategy is part of a coherent framework asserting itself around the "EPFL hub". Current developments will enhance the visibility of Swiss research and increase the benefits for the Swiss economy as a whole. In addition, beyond occasional and specific projects, the creation of regional EPFL institutes will also structurally enhance interactions and synergies between academic institutes of technology and universities of applied sciences (HES).
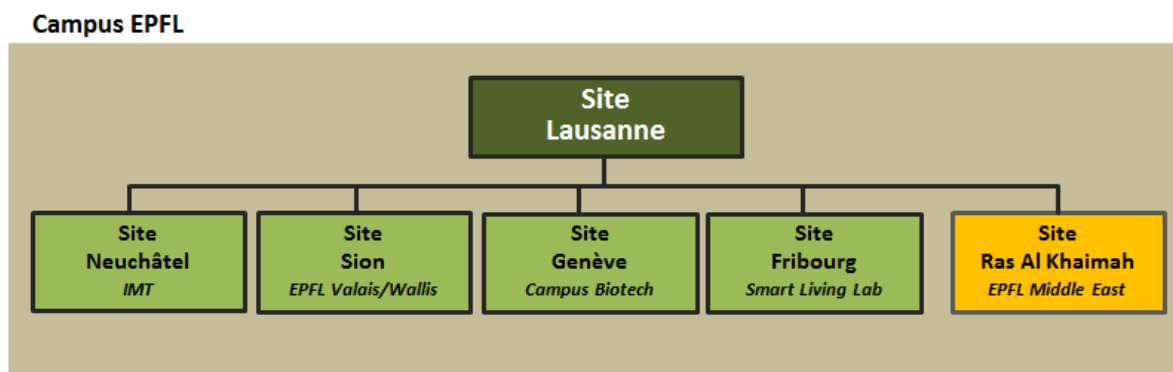
Figure 1-1: EPFL Campus with the four regional institutes and Middle-East antenna

IMT Neuchâtel
In the case of Neuchâtel, it should be noted that the microtechnology cluster there has existed since the nineties in close collaboration with the cantonal University of Neuchâtel and CSEM (Center Suisse d'Electronique et de Microtechnique). The creation of EPFL's Neuchâtel institute, the EPFL Institute of Microengineering, in 2009 is thus the development of the synergy between our school and existing technological research activities (microengineering) of the University of Neuchâtel, in line with the activities of CSEM and of regional industries.

EPFL Valais
Similarly, the collaboration with several institutions located in the Canton of Valais (IDIAP institute of Human and Media computing, Institute IRO of Research in Ophtalmology, center CREM of urban research in energy) has existed for several years. To this was added more recently a desire to strengthen the collaboration between EPFL and HES Valais as well as with SUVA (Federal Accident Insurance and Prevention Office). On this basis, the authorities of the canton affirmed their interest to develop their ability for research and development, and thus the capacity to innovate in this region of the country. It is in this context and on their initiative that the project "EPFL Valais Wallis" materialized in Sion.

Biotech Campus
When it comes to the proposed Biotech Campus in Geneva, it was developed on the basis of the many collaborations that for numerous years have existed in the Lake Geneva region, namely between EPFL and the Universities of Lausanne and Geneva, as well as the two cantonal hospitals. Its rapid implementation in May 2013 was made possible thanks to the involvement and contributions of various external partners. This office, which is currently being deployed, will in the short term host the Human Brain project as well as the Wyss Center for Bio- and Neuro-engineering.

Smart Living Lab
Finally, EPFL's Fribourg regional institute will develop a close cooperation with both the University and University of Applied Sciences of Fribourg and will support research and development in the fields of architecture and sustainable construction.

Campus development
The current decade should help to clarify the contours of the EPFL campus by urban achievements whose purpose is threefold:

- bring together science, technology and culture;
- strengthen the membership in the global EPFL community;
- make EPFL a laboratory of contemporary urbanism.

The urban design of the "EPFL hub" should be understood as an expanded campus with travel times of about an hour compared to the Ecublens site:

- a multi-site campus, but integrated and governed by a single culture,
- a common and consistent approach in the spirit of sustainable development that accompanies the extension phase and growth of EPFL.
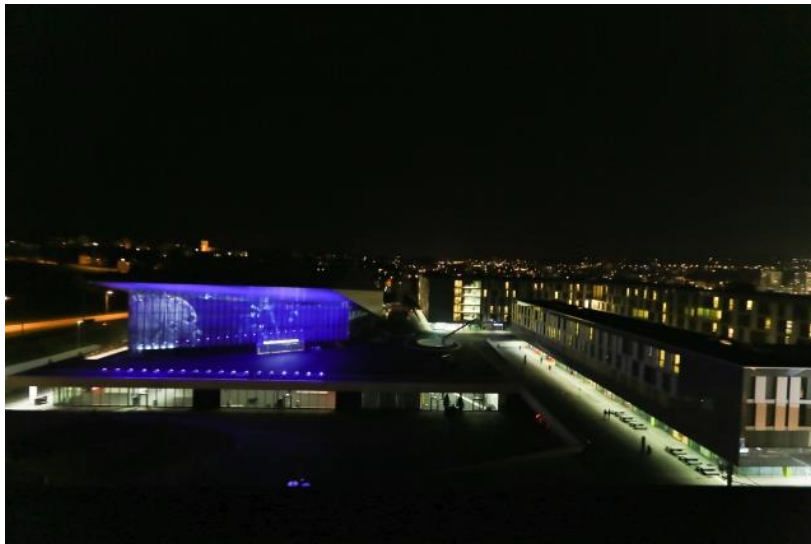
Figure 1-2: Inauguration of the (EPFL) SwissTech Convention Center, April 2 2014

Governance
Since its inception, the governance of EPFL[i] is defined by a presidential system tempered by a broad participation. In short, the present structure is segmented as follows (cf. detailed information in chapter A):

a) The management of the institute of technology has a presidency supported by a Vice-president of Academic Affairs (Provost)' s office, and a team of three vice-presidents, running EPFL infrastructure and logistics, Innovation and Technology Transfer, and Information System. Schools and colleges that report to the EPFL presidency are headed by deans or directors with extensive responsibilities.

b) The research and education, under the Vice-president for academic affairs (Provost), is carried out in the institutes and the teaching sections respectively attached to a School or a College. The institutes include research units and laboratories and specialized service-providing centers support their activity.

c) Under the guidance of the Provost, specific "transversal" dean's offices are in charge of the execution of specific bachelor, master or doctoral programs and report to EPFL Senior Management. The Dean of the bachelor and master programs coordinates the activities of Directors of programs (in French: Directeurs de section) integrated in the EPFL Schools and Colleges, in charge of the operational management of the education.

Quality Management System

This point is outlined in chapter 4, further developed in item F, especially in F4 and even more so in F5, but also in the items A to E. EPFL's quality system was implemented decisively at the first OAQ/Cti quality audit in November 2006. It involves the education, research, innovation and technology transfer. It also deploys several hierarchical from the level of employees to the whole ETH domain, in which EPFL is one of six institutions. Its main facets are the management of the education through sections that include QA of the teaching and programs, taking into account the views of advisory committees, innovations in terms of research, peer review evaluations of the faculties and colleges, satisfaction surveys to internal (students, PhD students and EPFL employees) and external (mostly alumni) stakeholders.

History of past audits and accreditations

Although EPFL maintains relations with Cti since 1992 and with OAQ since 2003, it wasn't until late 2006 that a joint audit (the first) of the two European agencies was conducted on the basis of a common quality standard. This audit resulted in 2007 in the Cti accreditation for 13 master degrees in professional engineering (Cti notice 07/06-13 regarding the approval by the state of engineering degrees awarded by EPFL) as well as an accreditation by the OAQ of the school's bachelor and master programs.

Since the Cti notice granted accreditation for three years for the two degrees in Life Sciences and Technology and in Bioengineering, a reduced audit combining the two agencies was held in the spring of 2010: the self-assessment document prepared for this purpose also included the follow-up of remedial actions recommended by both agencies, and a folder for the authorization of a new master degree in Technology Management, but also the request to extend the accreditation for the EPFL engineering degrees until 2016.

Upon completion of this audit, the extension of the accreditations for these two degrees was granted, approval was given by the two agencies regarding EPFL's implementation of remedial actions, the master degree in technology management received an accreditation for a period of 3 years, and EPFL's 13 master degrees received the label Eur-Ace; the accreditation period for other engineering degrees was extended until 2016 (Cti notice of 2010/05-10 for the engineering education of EPF Lausanne).

Finally, a self-assessment report concerning a two-year extension of the accreditation of the master degree in Management of Technology from January 2014 was sent in 2013; it was approved (see Annex 1-1, decision of the Cti from November 13, 2013 and Annex 1-2, letter from the French Ministry of Higher Education and Research of January 23, 2014).

Since EPFL should be subject to a quality audit of the OAQ in 2014, it was decided by mutual agreement between the two agencies to renew the experience of a joint audit in November of this year, on the basis of a common standard accepted by all parties in December 2013

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[i] http://direction.epfl.ch/en/presentation

2. Motivation for requesting Cti accreditation

The motivation for renewing the accreditation by the Cti and the French ministries of higher education and research for EPFL's engineering degrees is based, as in the past, on the following:

a) EPFL belongs to the French-speaking part of Switzerland, which for centuries has had close economic, scientific and cultural exchanges with France and its academic world. Obtaining such recognition can only facilitate these contacts.

b) The proportion of EPFL graduates working in France, as well as that of French students studying at EPFL, is substantial.

c) EPFL wishes to benefit from the experience when it comes to the management and quality system accumulated by a recognized accrediting agency for engineering education not only at a European but also at a global level.

d) EPFL aims to renew the existing recognizance of the French Ministry of High Education, giving full professional recognition to the EPFL diploma in engineering.

The application for renewing the accreditation of the engineering degrees currently recognized, as well as for considering three new degrees including financial engineering, computational engineering, and energy management and sustainability, was sent by EPFL to the Cti on March 25, 2013 (see Annex 2-1).

3. The process for self assessment

Under the auspices of Dr. Michel Jaccard, Head of the Office of Accreditation and Quality, the accreditation project was initiated in the spring of 2013 by setting up an accreditation project office responsible for organizing the EPFL self assessment process and the accreditation visit by the OAQ/Cti agencies. The project office, chaired by Dr. M. Jaccard (MJ until December 2013, Prof. William-F. Pralong, EPFL Delegate for Quality, co-sharing it from January 14) includes the Director of Educational Affairs, Daniel Chuard, the adjunct to the Dean Ba / Ma, Dr. Pierre-André Besse, and the director of the Teaching Support Center (CAPE), Dr. Roland Tormey, as well as Dr. Barbara Baumann, administrator of the College of Management of Technology.

A steering committee was then established in order to count in the process with representatives of all internal stakeholders. The Dean Ba/Ma chaired this committee. The committee included a representative of our direction, of program managers (directeurs de sections), of professors, one member of the intermediary body, one member of the technical and administrative body, and one PhD student and two undergraduate students.

The actions undertaken by the project office and the steering committee, including member lists, all minutes of meetings, and the transmitted information, are accessible online on a dedicated wiki for the Accreditation Project EPFL 2014 I (see wiki accred2014). This turned out to be an excellent way to ensure the good dissemination of the required information throughout the school and to mobilize all internal stakeholders.

At the various stages of the auto-evaluation process, all members of the steering committee were invited to transmit the information and to exchange views among their colleagues. Moreover, for the generation of the auto-evaluation report, they were asked to proofread the different versions of the document during its maturation and to bring their own comments or complements of information as internal reviewers.

The main actions conducted by our committees included chronologically:

- Constitution of the Project Office

- Project management with agenda of the different steps for the audit preparation

- Online publication (Wiki) of all documents related to the accreditation to facilitate the information for all internal stakeholders.

- Analysis of the common referential for the auto-evaluation report and related discussions leading to a common agreement with the accrediting with OAQ / Cti agencies.

- Establishment of the table of contents for the auto-evaluation document with specific contents and editorial form and their communication to the various stakeholders involved in the edition of the self-assessment report (School executives, program mangers, heads of administration). The project office assigned the expected editorial tasks to all stakeholders produced. A specific effort was done for the auto-assessment documents to be presented by program managers with new tools for the presentation of curriculum according to learning outcomes and a new grid of evaluation.

- Appointment of a Steering Committee (COPIL) with a representative of all internal stakeholders approved by EPFL direction.

- The Project office (and especially the EPFL Delegate for Quality) undertook specific efforts to disseminate the project information to internal stakeholders and to communicate on the accreditation process through multiple presentations done in front of the EPFL direction, our school assembly, meeting of the EPFL "chefs de service", during faculty meetings in all Schools and Colleges, and in one-to-one meetings with all program managers and staff.

- When collected from the different contributors, the elements of the self-evaluation report were formatted and control-edited and then send for English proof-reading to a professional translator.

- The Project office has prepared all the logistic of the OAQ/Cti visit, according to a time schedule established in collaboration with both agencies, invitations of participants, room and hotel booking, schedule for the audition of all school stakeholders, etc.

- Approval of the self-assessment document by the steering committee and presentation for approval to the EPFL direction.

4. The EPFL Quality Management System

This item is covered comprehensively in Chapter A to F and detailed in F 5. EPFL's QMS (Quality Management System) follows a waterfall system, affecting each hierarchical level, from the highest levels of the federal government – at SEFRI, to single employees at EPFL, which provides it with a strong consistency. The figure below provides a "cockpit view".

Organ/ Person	Content/ Level	Reference document	Type of evaluation	Frequency
SEFRI/ Federal Council		Message FRI 2013-2016	Final eval.	Once every 4 years
CEPF		Performance mandate 13-16 Strategic plan 13-16	Intermediate and final eval.	Once every 2 years
			SEFRI reporting	Once a year
EPFL		EPFL convention of objectives 2013-2016	DIALOG and CEPF Reporting	Once a year
			Satisfaction surveys	Once every 4- 6 years
Schools and Colleges		Selfassesment doc. for audit	School/College eval.	Once every 4 -6 years
		EPFL convention of objectives	Assesment with EPFL Senior Management	Once a year
Institute		Autoeval. Doc. for audits Strat. doc. of Schools and Colleges	School and College Eval. Institute Eval.. Discussion with the Dean	4-6 years as the need may occur Minimum once a year
Sections		Programme content; tools of continuous improvement; competences Grid ; education comm. ; academic comm.; advisory committee (pv)	Self assesment by the Programme Director	Once a year Accreditation audit (once every 4-6 yrs)
Teaching staff		Syllabus Teaching Content	Student evaluations	Once per semester
Managers, Collaborators		Personal specifications, List of annual goals	discussion and personal assesment	Once a year

(Content/Level column: STRATEGIC and OPERATIONAL)

EPFL's quality management system especially covers the following key activities and major tasks of EPFL:

- o Management and strategy, reaching its goals, items F 2.1 and F 2.2.
- o Education, divided into QA of teaching and programs, see items F 3.1 and F 3.2.
- o Research, including the quality assurance of the PhD program, see item F 4.
- o Resource management, see items F 2.4, F 3.4, F 5.
- o Innovation and technology transfer: the Vice-Presidency for Innovation and Technology Transfer conducts an annual reporting (see item B 2.2). This mission will also for the first time be put through a comprehensive evaluation within the ETH domain by SEFRI in the reporting to the Federal Council of the objectives of the 2012-2016 performance mandate (intermediary evaluation 2014).
- o Others elements of the EPFL QMS are provided in items A to E delineating for instance the Quality assurance associated to main support processes (finances, logistics, informatics and communication, etc.)

The tools available to the QMS of EPFL are mainly the following:

- a) **When it comes to the institutions (strategy and management):**
  reporting by EPFL to the ETH Board with regard to achieving the goals set out in the convention of objectives from 2012 to 2016;
  1. intermediary and final evaluation of the achievement of the performance mandate 2012-2016 by SEFRI.
  2. evaluation of the faculties and colleges of EPFL by peer review with reporting to the ETH Board.

b) When it comes to the education:

1. teaching evaluation by the students,
2. program evaluation by the academic committee,
3. program evaluation by the advisory committee,
4. program and teaching assessment by the education committee, and alumni surveys,
5. as well as the definition of the learning outcomes of the program and the implementation of learning outcomes of the teachings, respectively the establishment of a competences matrix which is a key element of operational management of the education.

c) When it comes to research:

1. evaluation of the EPFL School and Colleges,
2. external and internal quality assurance of EPFL's research,
3. annual reporting by the dean of research to the management by using ad-hoc indicators,
4. academic rankings,
5. quality assurance of PhD programs.

d) When it comes to internal and external stakeholders: satisfaction survey to students, PhD students and EPFL employees, satisfaction survey to new graduates (on an annual basis) and graduates up to 10 years after the end of their studies (periodicity of 6 years, survey conducted during evaluations of the faculties and colleges). The opinion of external stakeholders is not only formally obtained from advisory committees of institutes for research and sections for education, but also in terms of strategic advice from the faculties and from members of the ETH Board.

5. Analysis of the Quality Standard

A. STRATEGY AND IDENTITY

A 1 Identity

A 1.1 EPFL, an Institution of the ETH Domain

EPFL[i] was created in 1853[ii]. Foremost an engineering school according to the model of the French "Hautes Ecoles", EPFL currently has the status of a technological university. EPFL is one of the 6 institutions of the ETH Domain[iii], which includes the Swiss institutes and universities for scientific and technological research:

- ETH Zürich[iv];
- Paul Scherrer Institute[v];
- EMPA[vi];
- WSL[vii];
- EAWAG[viii],
- as well as competence centers[ix].

The Federal Law on the Federal Institutes of Technology (FIT/ETH Act)[x] specifies the status, organizational structure and tasks of the ETH Domain. The Federal Council gives a performance mandate to the ETH Domain, based on the Message of the Federal Council related to the promotion of education, research and innovation. The ETH domain is strategically managed by a federal body, the ETH-Board.

Status and legal framework of EPFL

By law, EPFL is an autonomous public-law institution and has the power to establish and enforce its own ordinances and regulations[xi]). The main legal foundations are:

- At the ETH Domain level:
  - Federal Act[xii] of October 4, 1991 on the Federal Institutes of Technology (FIT/ETH Act) 414.110.2;
  - Ordinance[xiii] of November 19, 2003 on the ETH domain (Ordinance on the ETH domain) 414.110.3;
  - Ordinance of the ETH board of November 13, 2003 on the Federal Institutes of Technology in Zurich and Lausanne (Ordinance on ETH and EPFL[xiv]) 414.110.372.
- EPFL has developed its own organization with the following legal foundations:
  - Ordinance of March 1, 2004[xv] on the organization the Institute of Technology of Lausanne; EPFL structure is specified in this document[xvi];
  - Directive on the EPF School Councils[xvii] of March 25, 2005 (as of March 31, 2013).

This status allows EPFL to effectively fulfill its mission of education, research and technology transfer contained in the ETH Federal Act.

A 1.2 Strategy

The ETH Domain is a cornerstone of scientific research and innovation in Switzerland. In this context, key EPFL activities for the period 2013 to 2016 are mostly included in the Message on the Promotion of Education, Research and Innovation[xviii] for the years 2013 to 2016, prepared by the State Secretariat for education, research and innovation (SEFRI[xix]) which, in Chapter 2 of the message (item 2.2.1), sets 10 targets to be achieved by the institutions of the domain.

More specifically, the vision and strategy of the ETH Domain are described in the following documents for the ongoing performance period:

- Performance Mandate[xx] 2013-2016 of the Federal Council of the ETH Domain;
- Strategic Plan[xxi] 2012-2016 of the ETH-Board for the ETH Domain.

And particularly for EPFL, the vision and strategy are divided into:

- The convention of objectives 2013-2016 between the ETH-Board and EPFL (see Annex A1.2-1);
- The development plan 2012-2016 for EPFL (see Annex A1.2-2).[1]

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[1] The convention of objectives is the official document binding EPFL to CEPF, which is based on the goals of the performance mandate. It therefore sets out the objectives that EPFL should achieve during 2013-2016. The development plan is an EPFL document, approved but not co-signed by the CEPF, which describes the

EPFL overall vision and strategy is presented in item *1.The Higher Education Institution* of the present self-assessment document.

Content of the EPFL educational strategy
Objective 1 of the performance mandate relates to teaching. In its convention of objectives, EPFL has as a particular goal to strengthen its technological base, to define learning outcomes for OAQ/Cti accreditation and to expand tutoring to all large technological first-year courses; goals that are already partially achieved. These points are shown in the Development Plan of the EPFL, which states that the accreditation process has enabled to develop concrete measures to maintain excellence in the provision of education for which the implementation and monitoring in close collaboration with the professors will take several years. The plan also mentions the enactment of a renewed policy regarding the quality of education and the promotion of educational performance.

EPFL National Network and participations[xxii]
EPFL has close collaborations with the institutions of the ETH domain, particularly through competence centers[xxiii] of the ETH domain or through joint professors and PhD students of EPFL working in research institutes in the ETH domain. Exchanges of students in the ETH domain are enhanced by a program[xxiv] currently funded by CEPF for 3 years.

EPFL is involved presently[2] in inter-university coordination led by the Rectors' Conference of Swiss Universities (CRUS). Among its major projects, CRUS[xxv] is responsible for the national coordination and monitoring of education in Swiss Universities.

Under Art.15 of the Law for the Encouragement of Research and Innovation, EPFL has alliances, giving it a certain academic responsibility (cf. B 4, list of institutes).

Organization of the ETH Domain
The Federal Law on the Federal Institutes of Technology (FIT Act[xxvi]) specifies the status, organizational structure and tasks of the ETH Domain. The Federal Council gives a performance mandate to the ETH Domain, which is based on the Message of the Federal Council related to the promotion of education, research and innovation[xxvii]. The strategic and monitoring body of the ETH Domain is the ETH Board (anagram in French: CEPF[xxviii]). The reporting system used by the ETH Board is based on an annual management report (cf. Annex A1.2-3) and self-assessment reports, which focus on the degree of achievement of the performance mandate and which are presented in the middle and at the end of the performance period (presently 2013-2016); please refer to the ETH-Board website to consult the key documents[xxix] . These are subject to approval of the Federal Council and Parliament.

A 1.3 Autonomy

Thanks to the Federal Act on the Federal Institutes of Technology, EPFL has the authority to establish and enforce its own ordinances and regulations (see A 1.1), it has a large degree of autonomy[3], and thus much room to maneuver when it comes to utilizing its financial (it has its own budget, cf. A 5.3), organizational, academic and personnel management skills. It determines its own structures, defines its own teaching methods, courses and curricula.

For example, thanks to its autonomy in organizing and education, the EPFL was able to develop a strategy for the extension of the campus to regional and international institutes, which include [4]:
- In Ras Al Khaimah (UAE): EPFL Middle East[xxx] specializes in energy and sustainability (2004);
- in Neuchâtel (CH; 2007): Institute of Microtechnology — Microcity[xxxi];
- in Sion (CH; 2012): EPFL Valais[xxxii] academic cluster on energy;
- In Geneva (CH; 2013): Biotech Campus[xxxiii] dedicated to neuroscience and neuroengineering;
- in Fribourg (CH; 2013): Smart Living Lab[xxxiv], dedicated to the habitat of the future.

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development of EPFL in a broader manner. The reporting of EPFL to CEPF therefore relates primarily the objectives contained in the Convention of objectives.
[2] This mode of coordination will evolve in 2015, since a new version of the Federal Act on Funding and Coordination of the Swiss Higher Education Sector will be in place, reinforcing the role of OAQ.
[3] This autonomy was largely the consequence of the introduction of the New Public Management in the ETH domain at the end of the 90's.
[4] The deployment of the sites Sion, Geneva and Fribourg is in progress.

Please refer to the item *1 The Higher Education Institution* of this self-assessment document for further information on the regional campus extensions.

A 2 Education Offer

EPFL offers a choice of 22 Master[xxxv] programs[5].

A 2.1 Education policy for the bachelor and master programs

The EPFL management, mainly the Dean of bachelor and master, the conference of the directors of programs, and the Educational Affairs, provides the overall cohesion of the training and gives it an identity of the highest level. Its policy is a balanced education between universality and depth. The goal is a scientific, technological, open and flexible education, oriented toward design and entrepreneurship. The humanities and social sciences are integrated into all bachelor and master programs; the master program provides an introduction to research. At the master level, the pedagogical approach is designed to encourage an active participation of students, particularly through projects in research labs and during the Master thesis.

The implementation of the Bologna process is defined by the Ordinance on the bachelor and master programs at EPFL[xxxvi]. This text defines the structure of the education, the principles of evaluation of knowledge, the conditions for obtaining degrees, etc.

The range of fields taught at EPFL is the result of a constant observation of the main sectors of activities of engineers, scientists and architects. Thus, EPFL is requesting a first Cti "habilitation" for the new programs in financial engineering, computational sciences as well as the management of energy and sustainability, since they correspond to new expectations of the labor market. Nevertheless, EPFL's master programs will not be excessively increased; their design makes it possible to customize the curriculum and complete the education in a very flexible manner with minors and specializations (see the structure of the studies below).

A 2.2 Organization

The organization and management of the studies are treated in A 3.4.

A 2.3 Admission requirements

(see also Chapter D)

Admission[xxxvii] to a bachelor program requires a cantonal or federal high school ("maturité fédérale") certificate or equivalent degree. For the other degrees, a specialized education program of one year, the Special Mathematics Course (CMS[xxxviii]), enables Swiss applicants to acquire the required admission level. Admission to the master programs requires having obtained the bachelor degree (see admission requirements[xxxix]).

A 2.4 Structure of the studies (cf also chapter C)

The curricula of the bachelor and master programs are structured according to the ordinance cited above:

- **Bachelor**: the students are enrolled in one of 16 sections of the bachelor program[xl]; however the ability to change sections to join a bachelor cycle in an adjacent topic exists for many sections at the end of the first (propaedeutic) year.

  The propaedeutic year of study is a selective year consisting mainly of basic scientific and technical courses. A harmonization effort was undertaken and a series of core courses were implemented in September 2013. This year is successfully completed by passing a selection exam that assesses the learning outcomes of all teachings - equivalent to 60 ECTS credits. This review serves as a filter (since, by law, any holder of a federal Matura is automatically accepted as a student at EPFL) and must be successfully completed before starting the next step. This filter is effective, because the failure rate for this exam fluctuates between 50

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[5] It should be noted that the present EPFL master's degree in nuclear engineering, in collaboration with ETH Zürich and PSI, is not part of the diplomas presented in the application for Cti certification.

and 55%; of course, this rate is by no means an objective of the EPFL education policy. Moreover, an education reform is planned to reinforce the skills in basic sciences obtained by the student to succeed on the selective exams of the first year.

The second and third years of study form the bachelor cycle[xli]. Obtaining the 120 ECTS credits, in addition to the 60 credits for the propaedeutic year that constitute the cycle lead to the bachelor degree. This title is an academic "passport" giving access to the master program in the corresponding branch or an adjacent field (with the corresponding prerequisites), but also a title enabling mobility for another master program (in another EFPFL section or in another university). During their third year of study, students can spend a year of "horizontal" mobility abroad at another university (see the Guidelines on mobility and the conditions for admission[xlii] to the master program).

- **Master:** the master programs[xliii] comprise two successive parts: the **master cycle** requiring the acquisition of 60 or 90 ECTS credits (depending on the program of the section) and the **master project** (or master thesis: 30 ECTS) for a period of 4 to 6 months. Successfully completing these two parts yields the degree of Master of Science as well as the professional designation of engineer or architect for some curricula:

    The programs have developed minors or specializations[xliv] of 30 ECTS credits during the master cycle. The minors enable to broaden the education to transdisciplinary fields, whereas specializations serve to deepen a component of the field of study. The duration of the taught component of the master program, including a minor or specialization, should however not exceed 90 credits (see Directive[xlv] on master programs and minors at EPFL). The master programs as well as the minors and specializations offered are described in detail in the part of the self assessment document dedicated to each of the education sections (a list of them and their contents can be found here[xlvi]). Throughout the curriculum, the students follow a program in humanities and social sciences (SHS[xlvii]), for which the main objective is to connect the scientific approach to the problems of society such as the environment, management and economy, ethics, religion, philosophy, etc. This transversal program represents a minimum of 14 ECTS within the study program. In the first year, a common course has been introduced in 2014 under the title "Global Issues". The students must also perform, for all degrees in professional engineering, a 2 to 6 month industry internship[xlviii], mainly in a company (example of an internship[xlix] for the programs of the STI School)

A 2.5 Duration and evaluation of the studies (see also chapter C)

The duration and evaluation of the studies are governed by the Ordinance[l] on the bachelor and master programs at EPFL and the Ordinance[li] on the evaluation of Bachelor and Master studies.

For each cycle, the branches are gathered into blocks (or groups). In a group, each branch must be successfully completed in order for the corresponding credits to be gained. In a block, obtaining the average grade can enable acquiring all credits constituting the block. This block system enables to impose compulsory subjects, but avoids that a branch becomes eliminatory. The Master thesis begins only after successfully completing the master cycle. It ends with a report and an oral defense before the Msc. thesis advisor and an external expert.

To prevent abuse, the duration of a study cycle is limited to twice its normal length, which enables students who wish to pursue their studies at a reduced pace to undertake other activities (such as part times job). Cohort studies show that about 60% of those who graduate from the master program do so in the minimal required time.

All student activities credited to the course plan are reviewed and recorded. The professors are responsible for the smooth running of educational activities. For each course, the exam type is given in the syllabus. EPFL has issued an Ordinance on study evaluation at EPFL[lii]. It informs teachers about the preparation, organization and running of examinations. This Directive aims in particular to limit cheating and plagiarism[liii]; it is also recommended for teachers to inform students about these two issues.

Syllabus (see also chapter C)

Each bachelor and master program - including minors and specializations - offered at EPFL is fully described in its syllabus available online on the web pages of each section (see for example for the qualifying year of Microengineering[liv]). In it, the courses are presented in terms of targeted competencies, headings of the treated content, prerequisites, teaching material, teaching activities and exam type. The syllabus and Web pages for students[lv] ensure the transparency of all the academic approaches and provide access to academic or social points of contact and the academic management tool IS-Academia[lvi]. More details are given about this in the part of the self-assessment document dedicated to the sections (and chapter C).

EPFL's Massive Open Online Courses (MOOCs[6])

The digital revolution is on its way since many years. It has now reached everyone's life without pressure, just because it connects not only individuals between them, but also with the global world. The transmission of knowledge will undoubtedly and obligatorily benefit from this vector. The digital world is certainly the major invention capable to strongly impact the culture and knowledge of humankind after that of writing and printing. Universities are not foreign to this move and have immediately participated to the creation of the Web of sciences for the broadest possible diffusion of scientific discoveries and knowledge. Universities must now further engage in such direction, but this time for education. We believe that the successful university of tomorrow will be not only innovative and open to the world, but also committed to diffuse its knowledge there where it will have the larger impact on society, starting with its students. EPFL has undertaken itself to develop Massive Open Online Courses (MOOCs) since they offer a relevant way to efficiently proceed in such direction.

This move for universities will be, however, both an opportunity and a challenge. There is no doubt for those who have been involved in the generation of open online courses, that it represents a unique chance to rethink the development of new paradigms in education, and force the teachers to replace students at the center of their reflections. Important questions immediately arise such as, how to transmit knowledge in that way - how to challenge the curiosity of students or their adaptability to this new media - how to foster their capacity of self motivation permitting them to actively interact with a digitalized teacher, and, above all, to learn. Therefore, although we all agree that online courses have to be somehow still considered as experimental by both teachers and students, we must admit that things are going fast, and early experiments have already convinced us that the digital will undoubtedly become a tool for student success.

The general vision and strategy of EPFL on MOOCs can be summarized as follows both in terms of main target populations and new paradigms in education:

A) *They will soon impose themselves as a relevant pedagogical complement to regular courses presently delivered on our campus once, as already supported by ongoing experimental classes, teachers will have designed the right way and/or mix (flipped classes) to be adopted for their successful usage in this context.*

B) *They offer a unique pedagogical tool to reach and disseminate knowledge in developing countries*

C) *MOOCs appear undoubtedly as a true opportunity for continuous education*

EPFL has therefore been involved in this movement since its outset through fruitful partnerships with *Coursera* and *edX*, the two main MOOC platforms. Two years later, about 600'000 students have registered to one of the 17 MOOCs produced by EPFL. We will see below what these numbers actually mean. EPFL has set up an editorial process by which MOOCs are first selected by an editorial board, then are produced with the help of a professional team, and finally are evaluated and scrutinized under the 'learning analytics' framework. We developed these points below.

a) *Two audiences.* To report the MOOC activities from the point of view of accreditation, it necessary to dissociate two audiences: on the one hand, on-campus students take a MOOC within the context of an EPFL courses; on the other hand, worldwide students take a MOOC outside any curriculum. We respectively refer them as internal and external participants. EPFL MOOCs vary by the balance between internal and external participants. The MOOCs that reached several dozens of thousands students are mostly taken by external students. These are *high-visibility*

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[6] MOOCs are online courses offered for free to any interested person worldwide courses offered for free to any interested person worldwide. A course is driven by a professor who releases a series of pre-recorded video lectures and assignments week by week. A teaching team answers the questions in the discussion forums.

MOOCs taught by world-renowned professors, for example the course "functional programming in SCALA" which is taught by the inventor of the SCALA language. Top universities compete to offer courses in domains where they want to establish or maintain an academic leadership. These courses are nonetheless used with our on-campus students. At the opposite, some MOOCs target early bachelor courses, such as the introductory physics course on mechanics. These MOOCs are primarily designed for EPFL students but nonetheless made available worldwide. Since they are in French, their audience is usually one order of magnitude lower than English speaking high-visibility MOOCs.

b) *Flipped classes*. The integration of MOOCs within EPFL courses (for internal students) follows various formats that have to be adapted to the specificity of each course, namely the size of the class, the theory/exercise balance, etc. In some first year classes, the courses in given in its traditional lecture format and the MOOC is used as a lectures rehearsal, as a modern textbook. In other classes, students are asked to watch the MOOC videos before the classes and then come to EPFL for more interactive session, such as solving more complex problems with the teacher. First insights indicate that students who watch videos before coming to class are better prepared for the exercises but that the management of the students' workload requires fine tuning. This pedagogical reorganization of the class that increases interactions with the teacher is actually difficult to achieve but this is the way MOOCs offer an added pedagogical value.

c) *Students reactions.* Despite our promises, students fear that EPFL will use MOOCs to reduce the contact with their teachers. In general, students who have followed a MOOC are more positive after having done it than before. The teaching evaluations made by students are hence rather positive, except in two cases: students judge more the quality of contents than the quality of format. Moreover, a strict policy that preserves the privacy of EPFL students has been implemented, upon the request of the students association.

d) *Credits.* The ECTS credits are only given to EPFL internal students who complete on-campus the examination requirements associated to the course. The external students who complete a course on-line receive a certificate from the MOOC platform that is explicitly declared as non-equivalent to EPFL credits. This may be revised in a couple of years, as online proctored exams may soon become more reliable than on-campus exams.

e) *Editorial process.* After the 17 existing MOOCs, about 30 more MOOCs are in the editorial process. First, MOOCs proposal are submitted to an editorial committee, whose members check if the "program manager"(directeurs de section) and the dean are in favor. Then, the MOOC enters into a production process that includes points of quality control, between the production team and the teacher, sometime with the participation of students. When the MOOC is conducted, the same instruments for quality assessment are used as for any EPFL course. These controls are enhanced with learning analytics, namely the use of computational methods to analyzes learning traces. In order to consolidate the competence and know-how in MOOCs-related matters and to develop MOOCs technologies and practices, EPFL opened the EPFL [Center for Digital Education](#)[lvii] on April 1st 2013. The center is located in the Rolex Learning Center. The center aims at fostering the adoption of MOOCs both within EPFL and by partners of EPFL.

f) *What numbers mean*. The number of registrations is an indicator of the worldwide visibility that MOOCs provide to EPFL, who took the lead in Europe. They must however be decomposed into 3 populations: a) Between one quarter and one third of the registrations do not participate or only for one week: they reveal their interest for the topic, but realized the course may be too demanding, or does not match what they are looking for; b) Another third of participants are visitors: they use the MOOC resources in the same way they use Wikipedia or YouTube, without the intention to complete the course. They are not "drop outs" but actually rather satisfied of finding what they are looking for; c) Finally, the last third of registrations are those intending to fulfill all requirements in order to get the certificate. Among them, a quarter to a third will actually obtain the certificate, which about 10% of the initial registrations. This ratio concerns the external audience. For internal students, the drop-out rate is the course drop-out rate of EPFL classes, high in the first year and then close to zero.

g) *Conclusions*. MOOCs are not considered at EPFL as the only way to deliver future courses to its students but rather as an important ingredient in the innovations that EPFL has to bring to enrich its new educational approaches. Nonetheless, the impetus of MOOCs has moved education

excellence back at the center of campus discussions. Simply stated, teaching a MOOC became a high stake event, similar to high visible publications

EPFL is planning to progressively and experimentally generalize the use of MOOCs in introductory classes to improve the quality of teaching for a growing number of students. Simultaneously, the school aims to reach out to a larger audience, *i.e.* in collaboration with French-speaking African partners, to address the needs of the developing world.

Continuing education

EPFL's continuing education, a contribution to the Life Long Learning, is the sub-objective 6 of the 1st objective (Teaching) included in the strategic goals of the Performance Mandate of the Federal Council to the ETH-Domain for the period 2013-2016. This activity is managed in collaboration with UNIL under the "Foundation Formation Continue UNIL-EPFL". Within it, EPFL offers a variety of courses, of which most lead to a Master of Advanced Studies (MAS), a Diploma of Advanced Studies (DAS) or a Certificate of Advanced Studies (CAS). However, there is an increasing emphasis on short courses targeting knowledge transfer rather than titles. The main objective of the programs — typically involving both EPFL and external teachers — is updating professionals in engineering, science and architecture on the recent evolution of specialized areas. For detailed information and courses provided, please refer to the web site[lviii] of the foundation.

EPFL's continuing education has rapidly expanded since the foundation started: the number of courses has gone from 13 in 2010 to 24 in 2013, and the overhead income has increased steadily. The ambition is now to accelerate the expansion with an increased commitment of the School, Colleges, their deans and the centers. The use of online courses (like MOOCs) seems promising; they can be particularly adapted for continuing education if a suitable financial model is developed (see also the annual report 2012 of the foundation, Annex A 2-1).

A 3 Organization and Management

A 3.1 Stakeholder Participation

The stakeholders participate at several levels:
a) In the ETH Board[lix], which in addition to representatives of private economy comprises members of academia and a representative of the School Assembly of the two ETH (list of the members of ETH-Board[lx]).
b) In the Senior management of EPFL, which has its own advisory board (a sounding board for the EPFL presidency).
c) By the EPFL Senior management being attentive to students; biannual meetings are held between:
   a. EPFL Senior management and the board of AGEPOLY[lxi] (EPFL students association).
   b. EPFL Senior management and student representatives[lxii].
d) By the VPAA being close to students; the EPFL Director of Educational affairs collects suggestions and grievances through sessions held monthly with the AGEPOLY. The collaborator of educational affairs[lxiii] in charge of student associations meets also regularly their head and committees.
e) Some Schools have their own advisory board, such as I&C[lxiv]. Moreover, a few centers (e.g. CIB[lxv]) or institutes also have their own board.
f) In the Program Directions (in French: sections):
   a. They have evidence as well as key elements of the employability of alumni having just graduated from EPFL (annual employability survey[lxvi] performed by the Career Center).
   b. During each School evaluation, they carry out a survey of the alumni who graduated from their programs.
   c. The voice of the students is heard through class representatives and student representatives of the teaching commission (in French: Commission de section).
   d. The voice of the world of employment is heard by consulting the advisory committee (in French: comité aviseur).
   e. By consulting the feedbacks of the employer in the internship report of students.
g) By satisfaction surveys of EPFL students, PhD students at EPFL and EPFL collaborators (see F 1.3).

h) By contacts between EPFL and the high schools in the French-speaking cantons, the cantonal departments of education, as well as prospective students of the institute of technology through the Study Programs Promotion Service[lxvii], included in the EPFL Education Affairs.

The involvement of stakeholders in the quality management of EPFL is also addressed in Chapter F and in the specific reports of the sections.

A.3.2 Governance

Traditionally, EPFL is led by a Presidency, which takes into account numerous consultations. The management of EPFL, whose broad competencies are defined in the legal documents listed under A 1.1 includes:

- The *Presidency[lxviii] for EPFL*, (Professor Patrick Aebischer), which has a General Secretariat[lxix], a Head for External Affairs, and a General Counsel[lxx]: the latter is in charge of legal affairs, risk management and controlling, fundraising and equal opportunities. A unit of culture and art at EPFL[lxxi] is included in the General Secretariat; thanks to its program, this unit participates indirectly to the acquisition of transversal skill of EPFL students.

- *The Vice Presidency for Academic Affairs* (VPAA[lxxii]; Professor Philippe Gillet), specifically in charge of Education and Research; it also includes International Relations, Cooperation and Development, as well as the **Unit for Quality Assurance and Accreditation**.

- *The Vice-Presidency for Planning and Logistics* (VPPL[lxxiii]; Dr. André Schneider) with a mission of providing infrastructure and services tailored to the needs of an institution of the highest international level. It includes: human resources, finance, planning, procurement, real estate and infrastructure, security, prevention and health, sustainable development[lxxiv] of the campus, the SwissTech Convention Center[lxxv] (EPFLs convention center), management and operation of the site.

- *The Vice-Presidency for Innovation and Technology Transfer* (VPIV[lxxvi]); Dr. Adrienne Corboud Fumagalli), aiming to stimulate innovation by filing for licenses and patents, creating start-ups, through collaboration with SMEs and the establishment of partnerships with specialization companies (please refer also to B 2.2).

- *The Vice-Presidency for Information Systems* (VPSI[lxxvii]; professor Karl Aberer), dedicated to the coordination of computer services of high quality, preventive management of information security and the provision of financially and environmentally sustainable IT infrastructures.

The governance of EPFL has a body for participation, the EPFL Assembly (AE[lxxviii]). This assembly is consulted before decisions of general interest by the EPFL management or by the ETH Board. It consists of 16 members elected to each of the four bodies of the institution: students, teachers, members of the administrative and technical body and scientific collaborators.

A 3.3 Organization

Organizational chart

The organization of EPFL is described in the ad-hoc regulatory texts listed under A1.1. The detailed organizational structure of EPFL can be seen as a flowchart in Annex A1.1-1. The organization as a list with the names of the unit managers, but also the employees, can be consulted here[lxxix] (see the EPFL organizational chart, figure A3.3-1)

Organizational structure

It is structured as follows:

- ❖ The EPFL Senior management[7] including the **Presidency and the Vice-Presidencies** (cf. A2)

- ❖ **The Vice Presidency for Academic Affairs**[lxxx] managing in a participatory manner:

  - **Five Schools**: School of Engineering[lxxxi], School of Architecture, Civil and Environmental Engineering (ENAC[lxxxii]), School of Computer and Communication Sciences (IC[lxxxiii]), School of Basic Sciences (FSB[lxxxiv]), School of Life Sciences (SV[lxxxv]); to which must be added the two Colleges of Management (CDM[lxxxvi]) and Humanities (CDH[lxxxvii]). The organizational

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[7] The management has an EPFL ethics commission http://ethique.epfl.ch/, an advisory body whose statutes can be found at: http://ethique.epfl.ch/files/content/sites/ethique/files/shared/Statuts.pdf

regulations of each School and College are listed^{lxxxviii}. These bodies have the following characteristics:

- Each School or college is headed respectively by a **Dean or a Director** who has significant autonomy in personal, financial but also organizational management (e.g., the Dean's office of the School of Life sciences^{lxxxix}).

- **The School also has its own management committee**, which is its executive body. The Director of the bachelor and master programs is often included in the management committee of the School (or college), with the directors of the institutes (see for instance the School of Basic Sciences^{xc}).

- **The other key organism of the School is the School Council** (e.g., for the School of Life Sciences^{xci}), whose competences are described in the Directive on School Councils^{xcii} of March 28, 2005, posted on March 31, 2013.

- **Schools and Colleges include institutes** that are generally disciplinary (bringing together Chairs and laboratories), general services (for STI^{xciii}), as well as technical centers and platforms (e.g., for STI^{xciv}).

- **The Schools also have ad-hoc committees** such as bachelor/master teaching commissions, academic commissions[8] (review of curricula and courses for the bachelor/master programs), doctoral and research program commissions, promotion commission, recruitment commission but also security and IT commission, without forgetting the advisory committees. Some Schools also have advisory boards such as that of the I&C School^{xcv}), that can also function as an advisory committee for the bachelor and master education.

- **"Transversal" dean's offices:** Bachelor/Master teachings, Doctoral School, Research[9], that coordinate educational programs, as well as teaching and research units, international relations (all reporting to VPAA) and a Dean for International Relations.

- **A Director of the service Development and Cooperation**, in charge of North South collaborations.

- **Educational Affairs,** academic central services under the supervision of a Director reporting to the VPAA Deputy General Secretary, in charge of the implementation of the strategy defined by the Dean of bachelor/master, the Dean of doctoral school et and the Dean of research.

- **EPFL Research Commission** (EPFL RC; mission and organization^{xcvi}).

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[8] Objectives and missions of the Academic Commission:
- Ensure that courses introduced in the study plan of the program meet the objectives of the intended training.
- Establish an annual report for the BaMa dean's office containing the findings obtained from the study of the quality of the performed assessment tests, the analysis of exam protocols, the evaluation criteria used in the assessment, the scale of rating of the exams, and assessment of the quality of course materials.
- Develop a set of recommendations to improve any weaknesses found in the structure or teaching methods of the curriculum.

[9] In charge of the Human Research Ethics Committee http://ethique.epfl.ch/ .

Figure A1.1-1: EPFL organizational chart

Organisation Direction EPFL
Novembre 2013

ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE

Présidence

Secrétariat Général
Coordination Direction EPFL
Coordination organes académiques CH
Media et communication
Affaires culturelles

General Counsel
Affaires juridiques
Contrôle de gestion, risques et controlling
Fundraising
Egalité

Affaires extérieures et politiques
Relations politiques
Relations européennes

VP Systèmes d'information
Coordination SI
Service informatique
Centre formation digitale

VP Planification & Logistique

Secr. Général adjoint Planification & Logistique
Budget et planification
Service financier
Achats de biens et services
Système de contrôle interne
Support opérationnel

Délégué DSPS
Sécurité
Prévention
Santé

Délégué DII
Management
Constructions
Exploitation
Intendance

Délégué RH
Campus durable
Partenariats public privé
Quartier Nord
Restauration et commerces

VP Affaires Académiques
Affaires professorales
Accréditation et assurance qualité

Secr. Général adjoint Affaires Académiques

Accréditation, et Qualité,

Directeur Coopération

Doyen Relations Internationales

Délégué RI

Doyen Recherche

Délégué recherche
Research Office

Doyen Bachelor/Master
Sections
CMS

Doyen Ecole doctorale
Programmes doctoraux

Délégué formation
Service académique
Service affaires estudiantines
Centre d'appui à l'enseignement
Promotion des études
Centre de carrière
Information scientifique & bibliothèques
Organisation et gestion informatique de la formation
Service des sports UNIL/EPFL

VP Innovation & Valorisation

Doyen formation continue
Fondation UNIL-EPFL pour la formation continue

Office transfert technologies
Partenariats industriels
Entrepreneurship
Alliance

Faculté SB
Sciences de base
Sec$ons(d'enseignement(

Faculté STI
Sciences & techniques de l'ingénieur
Sec$ons(d'enseignement(

Faculté ENAC
Environnement architecture construction
Sec$ons(d'enseignement(

Faculté SV
Sciences de la vie
Sec$on(d'enseignement(

Faculté IC
Informatique et communications
Sec$ons(d'enseignement(

CdM
Collège du management
Sec$on(d'enseignement(

CdH
Collège des humanités
Sec$on(d'enseignement(

EPFL-ME
EPFL Middle East
Sec$on(d'enseignement(

PRES-SG / 22.11.2013

Leading the Technological University

Executive sessions: Executive sessions at EPFL, held once a week, include the President, Vice-Presidents and the Secretary General, both Deputy General Secretaries (VPPL and VPAA), EPFL Head of communication and EPFL's General Counsel. Formal decisions like budget allocations and faculty recruitments, education programs are typically discussed and approved during these senior management meetings. Several reporting and strategic reports support these decisions. At regular intervals, the "transversal" deans (see above) and the Delegate to the VPAA for QMS are invited to present cases, but also to discuss specific point with members of the EPFL Senior management.

Interfacing with School Deans: Sessions for sounding out, discussing strategy and key developments of the EPFL are held twice a month between the EPFL Senior management and the School Deans as well as the College Directors. Bilateral discussions on more operational issues (such as infrastructure and "heavy" equipment, budget, space planning) are also conducted monthly by the VPAA separately with each School Dean in the presence of the VPPL and of the General Counsel.

VPAA Management: Within the VPAA, a meeting comprising the Heads of the various central services and the "transversal" deans is held monthly to present projects, discuss pending cases and exchange information (SdA). Numerous bilateral meetings are also held between the VPAA, and respectively the VPAA Deputy Secretary General, the "transversal" Deans, the Delegate to the VPAA for QMS and those responsible for central services of the VPAA.

Management of current affairs and general coordination: EPFL current activities are reviewed and followed up on a weekly basis in a more informal ad-hoc meeting, including the Secretary General and the Deputy Secretaries General.

In Summary, the organizational structure put in place thus allows for efficient management, both prospective and responsive, as well as a participatory management pursuing with flexibility not only the many missions assigned by the ETH Act, but also able to react quickly to unexpected challenges and opportunities.

A 3.4 Management[10]

The management of the EPFL teaching programs is subject to a set of [regulatory texts][xcvii]. In addition, each program has its own rules, its study plan, as well as its own [website][xcviii].

The bodies in charge of the management of the bachelor and master programs are (consult also the organizational chart figure A 1.1-1):

- The **Dean of the bachelor and master programs** ([positioning, mission and projects][xcix]), with the support of the Conference of Directors of Programs (CDS), is in charge of the overall coordination of the bachelor/master programs and runs its operational aspects. He also develops projects for educational reforms with the help of the CDS and implements them after validation of the EPFL Management in the presence of the School Deans. Moreover, he annually presents the curricula for validation by the EPFL Senior management.

- **The conference of the Directors of Programs** [xcixb] (in French Conférence des directeurs de section, acronym CDS; see the ad-hoc regulations, Annex A3.4-1) is chaired by the VPAA, the Dean of the bachelor and master programs as the official substitute, who plays a key role in the preparation and facilitation of the sessions. The role of the CDS is specified in its rules:
  "The CDS develops proposals for improvements in education, intended for the EPFL management. It decides on the issues and strategies for teaching at EPFL and takes position in consultation procedures, including those relating to curricula, knowledge evaluation, evaluation of teaching, internships and student exchanges. It offers all necessary measures to ensure the coordination of the teaching of the sections."

  But it is the EPFL management that officially adopts the new curricula and regulations that are submitted.

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[10] Subchapter dedicated exclusively to the management of bachelor and master programs. For the doctoral programs, please consult F 4.

The CDS has an executive committee, chaired by the Dean of Bachelor and Master that:
- o establishes, for the Vice President for Academic Affairs, the proposed agenda of the meetings of the CDS.
- o has been put in charge by the Vice President for Academic Affairs or by the CDS of developing and formalizing proposals for improvements or reflections on the bachelor/master education.
- o presents its proposals or ideas to the CDS.

The executive committee is composed of a Director of Program per School or College, of a Deputy Director of Program, of a Lecturer appointed by the EPFL association of scientists and lecturers (ACIDE[c]), of a student appointed by AGEPOLY, of the adjunct of the Dean of Bachelor and master, of the head of the EPFL Registar's Office[ci] and his deputy. The composition of the CDS and the list of participants for the year 2013-2014 can be seen in Annex A3.4-1.

- **Each bachelor/master program is run by a Program Director** supported by a deputy (an adjunct) to manage current affairs. The Program director is supported by a system of peer evaluation of teaching:
  - o *The evaluations by students* correspond to the student's satisfaction for different learning activities. Another aspect is the peer review of the teaching, assuring the coherence of the study plan as well as its correspondence to the needs of the future employers. Three committees help the sections directors in these reviews:
  - o *The teaching committee*, including all involved teachers, discusses the challenges and opportunities encountered in the education offer. It looks at the synergies between courses and proposes curriculum evolution.
  - o *The advisory committee* reflects the needs of employers. It helps to define the main directions of evolution and the requirements of industry.
  - o *The academic committee* is responsible for verifying the quality of courses and examinations and for ensuring that the learning objectives are achieved. It contains an external expert usually from ETH Zurich, together with well-established professors of the program.

- **The Educational Affairs[cii], led by a Director**, (activity report 2012[ciii]), includes units of administrative support to the professors (see teachings[civ]), students (portal[cv]), prospective students (portal[cvi]) and PhD students (portal[cvii]). The Educational Affairs has established a student desk[cviii], with its virtual counterpart that responds to any request.

- **The Registrar's Office[cix]**, integrated in academic services, is the administrative department responsible for the management and conservation of student records for bachelor, master, doctorate and continuing training programs. It handles admissions, registration according to school rules, develops course schedules and examinations and continuously informs students of their rights and academic duties. It is responsible for administrative monitoring of students, recording their performances and granting bachelor and master degrees. A list of the office's services is given here[cx].

- To perform its management tasks, the Registrar's Office has a powerful computer tool, tailored to the EPFL, but now used by many Swiss Institutes of Higher Education, **IS-Academia[cxi]**, whose broad features and very extensive management capabilities, are described here[cxii] and that has a public and secure public access[cxiii].[11]

- The IT management of IS-Academia is performed by **OGIF** (Organization and IT management of the education[cxiv]) of which one of the subunits sets the indicators of education (published twice a year in a booklet distributed to the EPFL Senior Management, the deans and the programs directors) and uses e-functions of research and statistical analysis available for IS-Academia (statistic example: Annex A3.4-1bis).

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[11] Which include the management of records of lectures and formalized notes of their learning outcomes (with a specific online help for this topic).

A 4 Promotion of the educational programs

A 4.1 Communication Dedicated to Prospective Students

To develop synergy, coherence and a greater visibility of the different actions and promotion media for the bachelor, master and doctoral programs, the Study Programs Promotion Service (SPE[cxv], 5 coworkers) was created in 2012, thus unifying past scattered actions. The missions of the service[12] involve:

- Contributing to develop a strategy to promote education at EPFL consistent, comprehensive and tailored to each level of education (Bachelor, Master, Doctorate).

- Promoting and enhancing EPFL studies on international, national and internal levels.

- Working closely with all concerned stakeholders, including the Schools and College collaborators dedicated to the promotion of b/m (or doctoral) programs, an conduct promotional activities to meet the expectations of our audience, based on a consistent and readable promotional policy and targeted events.

- Promoting and coordinating connections and the transition between the Swiss high schools and the education given at EPFL.

Several actions and tools are implemented by the SPE to achieve these objectives:

- **The creation and management of communication media dedicated to promote the EPFL curricula (brochures, multimedia, ...):** 13 bachelor brochures (French, English, German), 22 master brochures (English) and 18 brochures for the doctoral programs (English) and a general information brochure (French, English, German) are produced according to a common visual identity, and show the range of courses offered by EPFL (see Annex A4.1-1, for examples of the covers and Annexes A4.1-2 to A4.1-10 for examples of the brochures). They also serve as a springboard for information on our web portal[cxvi] for "prospective students". These brochures distributed at various promotional events are also distributed to EPFL partners (high schools, guidance offices, partner universities, embassies, Swissnex ...). The information contained in the brochures and on the portal provides all relevant information for prospective students.

- **Films and video testimonials** are also produced by the service and complement the contents of the brochures, highlighting pathways for students, alumni or researchers. These videos are available on our promotion portals or via the YouTube EPFL Students channel[cxvii]. The SPE also feeds the Facebook page[cxviii] and defines its editorial policy.

- **Establishment and management of web portals:**
  - The web portals for the Bachelor[cxix], Master[cxx] and PhD[cxxi] programs are intended for any future student wishing to learn more about EPFL studies in terms of their structure, detailed curricula, exchange and mobility opportunities on all practical aspects of integrating the school and campus life.
  - The portal for high schools[cxxii] on the other hand, is addressed to our Swiss secondary school partners (teachers and managers, but also career counselors), with the provision of teaching materials, the announcement of events dedicated to the promotion of science, seminars and discussion and reflection around the transition high school-EPFL, also through a quarterly newsletter.

    The number of visits to the portals is closely monitored; it contributes to their optimization (Annexes A 4.1-11, A 4.1-12, A 4.1-13).

- **Creation and management of "promotion steering committees" by School (or College).** The objective of this approach is to get the bachelor/master and PhD programs to contribute to defining and implementing the specific promotion objectives (awareness to promote young scientists, actions for a targeted recruitment...) and ongoing monitoring of various promotional activities.

- **Management of the high school group**, an entity that aims to forge strong links between EPFL and the Swiss high schools ("Gymnases"), to ensure proper coordination of the

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[12] The service defines its strategy thanks to the support of a steering committee, composed of the Dean of Bachelor and Master, the Dean of Doctoral programs, the Director of Educational Affairs, and the VPAA adjunct General Secretary.

respective educational programs and facilitate the transition of prospective students (basic knowledge required, strength and work methodology...)

- **Presence** at national and international levels (during 1 year; list of events, see Annex A.4.1-14):
  - o Participation in various Bachelor promotional/information events in Switzerland, France, Liechtenstein and Luxembourg: **30 forums.**
  - o Arranging and conducting on site visits for a targeted audience (class and delegation visits for international students):**10 visits**.
  - o Coordination of the participation of EPFL in multiple study abroad fairs/institute of technology forums (sending documentation, coordination with partner universities, Swissnex, Swiss embassies, selection and briefing of our student ambassadors,): **30 events**.
  - o Managing and organizing a "Welcome Day" for welcoming new PhD students (2/year)
  - o On site Information Days of Swiss (French-speaking) and French high school students (2500 registered).
  - o Information Day dedicated to German- and Italian-speaking Swiss high school students (300 registered).
  - o Organization of an information day for the specialized masters programs, such as the masters in computational engineering, financial engineering and technology management (information day for EPFL students, 200 registered).

A 4.2 Institutional Communication

Over the last ten years, EPFL's reputation has continued to grow, both at a national and international level. The local media are particularly interested in news about the Technological University, and references to EPFL appear often in major global publications. This increasing renown is of course essentially due to the excellence of the research and training undertaken on the campus. However, it is also due to the communication strategy deployed by the School during the past years, which promotes also the attractivity of the technological university to prospective students, on a national and an international level. Whether targeted toward the EPFL community or the public, the information written and published by EPFL's Mediacom[cxxiii] service is intended to reinforce the core values of the institutional – innovation, dynamism and excellence.

Various communication channels, *examples of which can be seen on the Mediacom web site[cxxiv]*, support this objective:

- The EPFL website[cxxv], the key support of EPFL information and communication; each category of the internal (and external) EPFL stakeholders has its own internet portal, as can been seen on the banner of the homepage[cxxvi].
- "Flash[cxxvii]" – an internal magazine - is published for the EPFL community every three weeks. It is available free of charge on subscription or from distribution boxes on the campus. It provides a summary of scientific news items written for non-scientists by the Mediacom journalists, and contains many pages dedicated to internal issues. These include academic or cultural events, appointments, profiles, content from students' or staff's associations, and practical information items.
- Targeted e-mails are sent to staff members on an as-needed basis. The Internal Communications Manager, appointed in 2013, ensures that the right information reaches the right people at the right time (see the Annex A4.2-1 *Guidelines for Internal Communications – June 2013)*.

As for the external public, **which also includes future students** and their families (as well as EPFL collaborators), it's naturally through the media that it remains informed about the activities of EPFL:

- The Mediacom team relies on a broad range of media contacts, including trusted journalists, who process and publish information emanating from the School efficiently and quickly. Whether in the form of press releases[cxxviii], videos[cxxix] (more than 3,700,000 views), a media library[cxxx], information posted on specialized sites such as EurekAlert[cxxxi], press conferences, invitations or simply articles published on EPFL's homepage[cxxxii], scientific, event-based and cultural news from EPFL is followed closely by the media, who can rely on our qualified team of scientific journalists[cxxxiii] to guide them in their work, provide further explanation or to direct them towards a specialist in their area of interest. A calendar[cxxxiv] enables everyone – internal or external – to keep up with forthcoming events on campus.

- EPFL is also present on social networks, especially Facebook (25,000 subscribers) and Twitter (10,000 subscribers), publishing research news, a weekly "science question" (Science Q&A), as well as photos from the campus or event-related information.
- The Mediacom Events[cxxxv] team organizes around 800 events each year; for example, visits of federal counselors, well-known personalities, or other universities.
- The Equal Opportunity Office[cxxxvi] organizes promotional activities, focused events and information for girls[cxxxvii] (7-13 years old, respectively for boys and girls[cxxxviii]) aimed to promote the studies, career and profession of scientists and engineers (see also F 2.4).

Mediacom has also close contacts with the School and College collaborators in charge of the communication dedicated to these organisms; it is also responsible for monitoring media articles about EPFL. Every day, it compiles a press review listing references to the School in the general or specialized media. All those belonging to the EPFL community can access the news clippings and audio/video extracts by browsing the dedicated site[cxxxix] or by subscribing to the daily newsletter.

The strategy of bringing together both the internal and external communications operations within the same team (see Annex A4.2-2 for the description of the strategy and the analysis of indicators), under the responsibility of the EPFL management, enables the Federal Institute to effectively monitor the messages going out to the internal and external audiences, and therefore its image. The gathered data, surveys and rankings show that this vision is bearing fruit.[13]

A 5 Human and Physical Resources

A 5.1 Human Resources

Legal basis

EPFL management of Human resources is based on several legal texts:

- **Federal Act on Employees of the Confederation (LPers) of March 24, 2000[cxl]**

- **Framework Ordinance concerning the Federal Act on Employees of the Confederation of December 20, 2000[cxli].**

- **Ordinance on Employees of the EPF Domain (OPers-EPF) of March 15, 2001[cxlii]**

- **Ordinance on the faculty corps of the ETH Domain[cxliii].**

- **EPFL Regulation on tenure-track assistant professors[cxliv] (PATT).**

- **EPFL Regulation on appointing associate professors to full professors[cxlv].**

As well as various other sources, such as Regulation of HR Competences, including the working time regulation, available here[cxlvi] (Polylex EPFL website).

Goals

As part of its performance mandate, EPFL must in the field of human resources satisfy a system of plural objectives (see Annex A 5.1-1) determined by the Federal State, the ETH Board and its own development plan. While the Federal State puts a particular emphasis on the flexibility of working conditions, reconciling work and family life and a salary system focused on performance, the ETH Domain aims to promote attractive employment and also to ensure diversity (languages, age groups, cultures, gender and social classes)[14] and equal opportunities. Meanwhile, EPFL favors the development of competences and performances in an international environment, promotes the intermediary staff through mobility, renders remuneration flexible[15] and dedicates special attention to the training of its staff as well as to cooperation with the social partners. An audit is planned at the end of 2014, to review the EPFL HR (HR: Human Resources) strategy.

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[13] See the EPFL Annual Report 2013 online at http://information.epfl.ch .

[14] Taken from the strategy of the "Office Fédéral du personnel", OFPER. Federal Personnel Office; weblink: intranet.infopers.admin.ch

[15] The Atmos II survey shows a satisfaction improvement of EPFL collaborators from 3.7 to 4.3 out of 6 between the old and the new salary system, with EPFL's concept of flexibility having been approved by the CEPF.

Some statistics[16]

Student numbers at EPFL have increased dramatically since 2004 (2004: 6681; 2013: 10029[17]), an exceptional growth. If we take into account the temporary personnel (B/M student assistants, "external" lecturers, visiting professors), the staff under EPFL management was 8,264 people on Dec 31, 2013. The payroll reached 567 million CHF, remaining proportional to the number of employees. Since 2006, EPFL has successfully integrated various external academic structures, including the Swiss Institute for Experimental Cancer Research (ISREC) and the Institute of Microtechnology in Neuchâtel (IMT-NE). Due to increased competition in the academic field, the principle of mobility[18] has increased the number of fixed-term contracts from 55.5 % of the workforce in 2002 to 65.5 % at the end of 2013. Aligning HR objectives (see Annex A5.1-2) with the objectives and challenges of EPFL enable to move towards the success of innovation, technology transfer and job creation. Since 2006, EPFL has also continued its strong internationalization, from 46.5 % to 58.5 % of non-Swiss persons at the end of 2013. For its internationality, EPFL has also further improved its training program[cxlvii] of EPFL collaborators, with over 35% of its staff courses given in English. 55 % of the courses offered cover subjects facilitating integration, also at the administrative level (*see* Annex A5.1-3). [19]

Participation since 2010 in the *Global Report Initiative (GRI)[cxlviii]* has also strengthened control elements related to diversity, education and promotion of women's careers. In this respect, the percentage of women in the school was 32.9 % on Dec 31, 2013, the proportion of professors and doctoral assistants went from respectively 9% to 12 % and from 25.5 % to 29 % between 2006 and 2013. The proportion of post-doctoral fellows was 23 % on Dec 31, 2013. Regarding the proportion of female managers (equal to or higher than the functional level 10), it has improved from 14.3 % in 2007 to 18.8 % in 2013, which is still insufficient compared to a target of 25 %. Scientific collaborators (doctoral assistants not included) also increased between 2002 and 2012, going from 14.2 % to 22.9 %. Finally, the proportion of women working 100% increased significantly, from 36% to 69%, during the same period, indicating a significant cultural change related to the increasing demands of the world of research.

Management and Reporting

Large administrative projects, such as the implementation of the new salary system (NSS) in 2007, the transition to a defined contribution plan in 2008, a system of flat rate salaries for doctoral assistants and post-docs in 2008 and 2010, the computerization of all personnel records in 2012 and, as of 2013, an absence management system meeting the requirements of the Confederation but also of European projects, have enabled the development of modern management with an HR performance satisfying the multiple expectations of EPFL employees from more than 120 countries. These expectations[20] and changes in the quality of services provided by the EPFL central administration have been monitored with the two satisfaction surveys Atmos I and Atmos II conducted in 2004 and 2012, respectively. Moreover, the overall satisfaction concerning the work situation at EPFL in 2012 amounted to 4.7 out of 6, i.e., 90% of people satisfied (Atmos II survey, see Annex A5.1-5, p. 31; consult also F1.3). When it comes to the average of averages of the various indicators of satisfaction, it shows a significant increase from 4.08 out of 6 in 2004 to 4.52 in 2012 (Atmos II survey, see Annex A5.1-5, p. 144; consult also F1.3).

Furthermore, the development of an annual social report since 2009 (see Annex A5.1-6), a quarterly HR reporting since 2010 (see Annex A5.1-7), a gender report (see Annex A5.1-8) allow a precise monitoring of the various improvement actions undertaken on the basis of satisfaction surveys and multiple HR audits conducted by the Swiss Federal Audit Office, the Inspectorate of the ETH Domain and the European Commission for European projects.

In recent years, in addition to the new Internal Control System (ICS), a culture of risk management has been developed (see Annex A 5.1-9), thus contributing to different analyses to improve the

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[16] Data provided by the EPFL Personal Service.

[17] Data for all EPFL students, from the « Tableau de bord statistiques de la formation », novembre 2013, figure C, p.10.

[18] In this context, fixed-term contracts are a stimulus for an academic career, and also a guarantee of employment for a defined period.

[19] These objectives promote the emergence of talent and mobility, and from this, we hope, a greater efficiency, in itself a source of knowledge and wealth, etc.

[20] Such as the quality of vocational training (job search), the flexibility of the working time for families, the existence of integration programs, etc.

quality of the HR services, especially regarding the replacement plans for staff and School institutes.

EPFL Faculty

The EPFL teaching staff include professors (full, associate, tenure-track assistant, assistant[21]), adjunct professors (in French; Professeurs titulaires), teaching Senior scientists and assistants, EPFL Lecturers, "external" Lecturers, excluding PhD students and assistant scientists involved in teaching and practical work in laboratories; the number of these positions can be found in the Annex of the self-assessment document "Données Certifiées". With these resources and a number of professors close to three hundred seventy, EPFL is able to provide a quality education at the forefront of research, also using lecturers from the private and public economy, whether due to a temporary course load or by specific interventions in the courses (conferences, for example; see also specific reports for each section). Finally, putting the faculty positions up for competitive promotions or for renewal is controlled by the school. The positions are appointed by the ETH Board after presentation of the application (see Chapter F).

A 5.2 Physical Resources and Facilities

(For detailed information, see Annex A5.2-1)

EPFL takes special care of its **campus infrastructure**. The campus is vast and quite new, encompassing 240,000 square meters of floor space of laboratories, offices and classrooms. Classrooms (173 rooms, 17'900 sqm) are geographically distributed close to the various Schools, Colleges and Institutes. Laboratories are specifically equipped for training purposes (175 practical work rooms, 17'700 sqm), and students have access to multiple computer labs. Quality infrastructure for education and training is reflected in the excellent responses from student exit surveys (master and doctoral students), i.e., the evaluation surveys of graduates regarding their training, along with those of visiting professors and recent arrivals. EPFL is a living campus, with the recent completion of ample student housing, shops, and a conference center. Construction activities, operation, maintenance and stewardship are all ISO 9001:2008-certified.

The EPFL Library[cxlix] is the largest scientific and technical library open to the public in Western Switzerland. Located in a building with remarkable architecture (the Rolex Learning Center[cl]), it is a place for work, study and collaboration for EPFL's community, open 17 hours a day, 7 days a week. Working closely with the other academic libraries (ETHZ, Universities), the Rolex Learning Center offers a rich collection of print and electronic resources.

EPFL Conference Center, open in 2014
Swisstech convention Center (2014)

The EPFL Rolex Learning
Center and Library, open in 2011

EPFL provides also a large offer of food services and restaurants[cli] with diversified menus. For students dormitories and flats, please refer to C VII.

EPFL also extended its campus to **others sites**, which include regional and international institute:

- in Ras Al Khaimah (UAE): EPFL Middle East[clii] specializing in energy and sustainability (2004);
- in Neuchâtel (CH; 2007): Institute of Microtechnology — Microcity[cliii];
- in Sion (CH; 2012): EPFL Valais[cliv] academic cluster on energy;
- in Geneva (CH; 2013): Biotech Campus[clv] dedicated to neuroscience and neuro-engineering;
- in Fribourg (CH; 2013): Smart Living Lab[clvi], dedicated to the habitat of the future.

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[21] Including SNSF professors; cf. http://www.snf.ch/en/funding/careers/snsf-professorships/Pages/default.aspx

Please refer to the item *1 The Higher Education Institution* of this self-assessment document for further information on the above campus extensions.

Finally, EPFL attaches paramount importance to **information system** resources and **information technology**, driven by a Vice presidency which is dedicated to managing a highly efficient IT infrastructure. Wired and wireless networks, collaborative services, email, web servers, directories, storage and backup – plus computation clusters and high performance computers (HPC) – are available to all users. Various information systems facilitate the management of research (Infoscience[clvii]) and administration (SAP). Particular attention is given to education (Poseidon[clviii] workstations available to students, acquiring a computer at a discounted price). An efficient help desk and a centralized management of purchases (including software licenses) ensure an effective use of resources.

A 5.3 Finances
(For detailed information, see Annex A5.3-1).
The Swiss government allocates an annual budget to the ETH domain[clix], and the ETH Board[clx] divides it between institutions, taking into account the history and performance of each institution (for more details, section "Points of Reference[clxi]"). EPFL's 2014 **base budget** amounts to 600.55 million CHF, which allows it to finance its long-term activities. For political reasons, EPFL **tuition fees** are very modest (less than 700 CHF per semester), representing only about 6 million CHF annually.

Each laboratory is encouraged to seek **external funding** by filing applications with different organizations to support research: the Swiss National Science Foundation (SNSF[clxii]), European research programs, the Commission for the Promotion of Innovation (Cti[clxiii] - projects in partnership with private companies). Laboratories also obtain funds by accepting the mandates of public authorities or private companies. In 2012, an additional 270 million CHF were raised to fund scientific research.

EPFL is also active in attracting **sponsorship**. More than 220 million CHF were raised between 2007 and 2013 for Chairs, projects or buildings. Currently, partial or entire costs for more than thirty Chairs (~10% of the total) are covered by sponsorship (see for instance the sponsored chairs[clxiv] related to sustainable development).

The institution also diversifies its expansion resources by opening **regional institutes** (off-site campus; cf. A 5.2), partially funded by the participating cantons (more than 280 MCHF since 2010), and carries out projects outside its core business (Swiss tech Convention Center, student housing[clxv], neighborhood innovation, etc.) through **public-private partnerships** (PPP), of which almost 500 MCHF have been raised since 2006.

In 2012, EPFL's **total expenditures** (excluding cantonal financing and PPP) amounted to 803.4 million CHF: 69% for personnel costs (113 kCHF per employee - FTE), 21% for operations and 9% for investments (see attachment). According to the EPFL analytical accounts[22], ~30% of resources are devoted to actual teaching (around CHF 26,000 per student), with the rest being used mainly for research (1.8 million CHF per laboratory).

Additional financial information can be found at the web pages:

http://vppl.epfl.ch/files/content/sites/vpplnew/files/shared/Stat%202012%20(new)/130201%20Finance.pdf

http://vppl.epfl.ch/files/content/sites/vpplnew/files/shared/Stat%202012/EPFL%20en%20chiffres%202012.pdf

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[22] Data provided by the EPFL Vice-presidency of planning and logistics.

REFERENCE URLs QUOTED IN THIS CHAPTER

i www.epfl.ch
ii http://information.epfl.ch/history
iii http://www.cepf.ch/en/node/595
iv https://www.ethz.ch/en.html
v http://www.psi.ch/psi-home
vi http://www.empa.ch/plugin/template/empa/3/*/---
/l=2/changeLang=true/lartid=/orga=/type=/theme=/bestellbar=/new_abt=/uacc=
vii http://www.slf.ch/index_EN
viii http://www.eawag.ch/index_EN
ix http://www.cepf.ch/en/eth-domain/competence-centers
x http://www.ethrat.ch/en/node/557
xi http://polylex.epfl.ch/
xii http://www.admin.ch/opc/en/classified-compilation/19910256/index.html
xiii http://www.admin.ch/opc/fr/classified-compilation/20032108/index.html
xiv http://www.admin.ch/opc/fr/classified-compilation/20031283/index.html#a10
xv http://polylex.epfl.ch/files/content/sites/polylex/files/recueil_pdf/1.1.1_o_organisation_EPFL_fr.pdf
xvi http://polylex.epfl.ch/files/content/sites/polylex/files/recueil_pdf/1.1.3_instr_centers_programs_fr.pdf
xvii http://polylex.epfl.ch/files/content/sites/polylex/files/recueil_pdf/1.2.1_dir_conseil_faculté_fr.pdf
xviii http://www.admin.ch/opc/fr/federal-gazette/2012/2857.pdf
xix http://www.sbfi.admin.ch/org/index.html?lang=en
xx http://www.ethrat.ch/en/eth-board/governance-eth-domain/eri-message-performance-mandate
xxi http://www.ethrat.ch/sites/default/files/Strategic_Planning_2012_2016.pdf
xxii http://information.epfl.ch/national-collaborations
xxiii http://www.ethrat.ch/en/node/605
xxiv http://jahia-prod.epfl.ch/ethz/en
xxv http://www.crus.ch/information-programs/bologne-enseignement.html?L=1
xxvi http://www.admin.ch/opc/en/classified-compilation/19910256/index.html
xxvii http://www.admin.ch/opc/fr/federal-gazette/2012/2857.pdf
xxviii http://www.ethrat.ch/en
xxix http://www.ethrat.ch/en/node/633
xxx http://www.epfl.ae/
xxxi http://sti.epfl.ch/page-101134-en.html
xxxii http://actu.epfl.ch/news/valais-a-health-valley-and-the-driving-force-of--5/
xxxiii http://actu.epfl.ch/news/green-light-for-campus-biotech/
xxxiv http://actu.epfl.ch/news/fribourg-and-epfl-join-forces-to-develop-smart-bui/
xxxv http://master.epfl.ch/en
xxxvi http://polylex.epfl.ch/bachelor-master-cms
xxxvii http://bachelor.epfl.ch/admission-1st-year
xxxviii http://cms.epfl.ch/
xxxix http://master.epfl.ch/entryrequirements
xl http://bachelor.epfl.ch/cms/site/bachelor2/lang/en/programs
xli http://bachelor.epfl.ch/studies
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xliii http://master.epfl.ch/programs
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xlv http://polylex.epfl.ch/bachelor-master-cms
xlvi http://master.epfl.ch/cms/site/master/lang/en/minors
xlvii http://cdh.epfl.ch/humanities-and-social-sciences
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liv http://sti.epfl.ch/page-1681-en.html
lv http://studying.epfl.ch/en
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lvii http://moocs.epfl.ch/information
lviii http://www.formation-continue-unil-epfl.ch/en/
lix http://www.ethrat.ch/en
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lxi http://agepoly.epfl.ch/agepoly
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lxiii http://formation.epfl.ch/
lxiv http://ic.epfl.ch/advisory-board_en
lxv http://cib.epfl.ch/PublicAdvisory.php

lxvi http://carriere.epfl.ch/telechargements
lxvii http://formation.epfl.ch/programs_promotion
lxviii http://direction.epfl.ch/page-30794-en.html
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lxx http://direction.epfl.ch/page-30796-en.html
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lxxii http://vpaa.epfl.ch/page-18828-en.html
lxxiii http://direction.epfl.ch/page-35143-en.html
lxxiv http://developpement-durable.epfl.ch/sustainability
lxxv http://tstcc.ch/en/index.php
lxxvi http://vpiv.epfl.ch/en
lxxvii http://vpsi.epfl.ch/en
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xciv http://sti.epfl.ch/centers
xcv http://ic.epfl.ch/advisory-board_en
xcvi http://commission-recherche.epfl.ch/en
xcvii http://polylex.epfl.ch/formation
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xcix http://decanat-bama.epfl.ch/page-58217-en.html
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cxxviii http://medias.epfl.ch/press-releases
cxxix http://www.youtube.com/epflnews
cxxx http://mediatheque.epfl.ch

cxxxi http://www.eurekalert.org

cxxxii www.epfl.ch

cxxxiii http://medias.epfl.ch/team

cxxxiv http://memento.epfl.ch

cxxxv http://events.epfl.ch/page-75730-en.html

cxxxvi http://egalite.epfl.ch/page-33010-en.html

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cxl http://www.admin.ch/opc/fr/classified-compilation/20000738/index.html

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cxlvii http://sfp.epfl.ch/home

cxlviii http://developpement-durable.epfl.ch/

cxlix http://library.epfl.ch/en/

cl http://rolexlearningcenter.epfl.ch/

cli http://restauration.epfl.ch/

clii http://www.epfl.ae/

cliii http://sti.epfl.ch/page-101134-en.html

cliv http://actu.epfl.ch/news/valais-a-health-valley-and-the-driving-force-of--5/

clv http://actu.epfl.ch/news/green-light-for-campus-biotech/

clvi http://actu.epfl.ch/news/fribourg-and-epfl-join-forces-to-develop-smart-bui/

clvii http://infoscience.epfl.ch/?ln=en

clviii http://poseidon.epfl.ch/english/home/

clix http://www.cepf.ch/en/eth-domain/overview

clx http://www.cepf.ch/en/eth-board/overview

clxi http://www.cepf.ch/sites/default/files/Rapport_sur_le_budget_2014_CEPF.pdf

clxii http://www.snf.ch/en/Pages/default.aspx

clxiii http://www.kti.admin.ch/index.html?lang=en

clxiv http://developpement-durable.epfl.ch/chairs

clxv http://logement.epfl.ch/housing

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B EXTERNAL LINKS AND PARTNERSHIPS

B 1 Links with the Economy

EPFL is attentive to the labor market and the economy; for decades, it has created collaborations with businesses and the world of employment, especially in the context of:

- **Research projects** undertaken with funding from the Commission for Technology and Innovation, but also for instance bilateral contracts of a company with an EPFL lab (see B2.1).

- **Sponsored chairs**.

- **Start-ups, spin-offs, licenses and patents** as well as **companies** operating in the quarter of innovation (see B2.2).

- **Ph.D. thesis**, which results lead to an innovation (licenses, etc., see above).

- **Master thesis** (see the report of the sections).

- **Student internships** (see the report of the sections).

- **Teachings provided by external stakeholders**, either as occasional lectures or seminars, or as complete courses ("external" lecturers; see the report of the sections).

B 2 Research and Innovation Links

B 2.1 Research Links

EPFL is a Technological (or Technical) University with a remarkable success in research during the past years. Professors, "Maîtres d'enseignement et de recherche" (Senior Scientists) and scientific collaborators contribute actively to the EPFL research output. Research at EPFL is simultaneously a top-down and bottom-up process. The main actors and principle drivers of the quality of the research in any competitive research institution are the PIs (Principal Investigators); at EPFL these are mainly the professors. The role of EPFL Senior Management, in addition to that of the EPFL Dean of research, is therefore to define promising research avenues, in particular in interdisciplinary domains in which it is often complex to launch new research directions, but where their developments lead to fruitful scientific results and provide a major source of innovation. One example of this strategy, as part of a new multi-School effort, is in the field of energy that EPFL just launched in Valais[i].

The top down research process also consists in organizing the best possible infrastructures and implementing adequate administrative support for our professors and their staff; this support is provided by the EPFL Research Office[ii]. This task also includes the elaboration of guidelines and directives enabling to set the proper organizational principles in all domains[iii]. Furthermore, EPFL is also active in ethics and deontology; it has determined clear directives on plagiarism[iv], both for students and professors. In addition, the EPFL has developed an instance of whistleblowing[v].

EPFL Research Competitiveness
In this light, EPFL research evolves in a bottom-up manner and the professors have complete freedom to explore the different parts of their research field. A large part of their research funding comes from external funding bodies, in particular SNSF, the Swiss National Science Foundation[vi] (information on the EPFL projects financed by the SNSF, see SNSF statistics 2013[vii], p.5), and EC, the European Commission. Also, other international funding bodies such as NIH, the National Institutes of Health, in the United States are important financial resources for EPFL research.
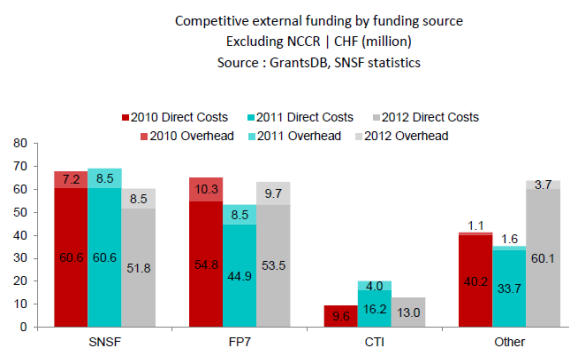
Figure B2.1-1: Competitive external funding by finding source

The amount of competitive funding (cf. Fig. B 2.1-1 and Figure B 2.1-2) that the EPFL professors are able to receive is one of the evidences demonstrating the quality of their research, documented in an annual report ("Research Indicators and Statistics) prepared by the EPFL Dean of Research, presently distributed exclusively to the EPFL Senior Management. EPFL research competitiveness is also ascertained during the School and College evaluations.
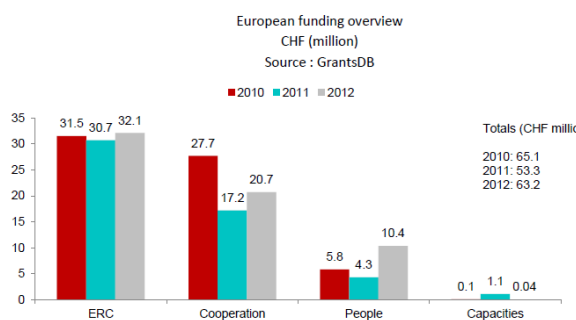
Data provided by the VPAA Research Office
Figure B2.1-2: European funding overview[23]

EPFL and Innovation, links with the economy

EPFL aims to efficiently link research output and innovation, for instance:

- The European commission launched an ERC sub-program scheme "*proof of concept[viii]*" with the goal of "bridging the gap between research and a marketable innovation". EPFL was one of the most successful institutes in this program, which provides evidence of the close connection of fundamental science and innovation at EPFL.

- Tech-transfer activities and interaction with industries, both locally and internationally, are also based on the same principles: a strong central support, and a very large freedom in the choice of possible partners and potential organization of the partnerships. In particular, EPFL has numerous incentives and strong support for the launch of start-up companies.

- Regarding tech-transfer activities and interaction with industries:

  1. At the international level, in the last European Framework program FP7, EPFL had 152 collaboration projects with industry. The number of unique industry partners since 2007 adds up to 569.

  2. At the national level, EPFL's Cti grants are significant (a contract values of 9.6 million CHF in 2010, to 20.1 million CHF in 2011 and 12 million CHF in 2012).

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[23] Benchmark with others European academic institutions available on demand.

These activities are also based on principles similar to those of research: a strong central support, and a very large freedom in the choice of possible partners and potential organizations of the partnerships.

Impact of EPFL Research and Innovation on Education
When promoting new faculty members, EPFL makes sure that the future professors are not only key players in their own field, but also willing to contribute significantly to teaching at EPFL, a key issue documented in the promotion file of PATT (Professor Assistant Tenure Track). Most of the teaching is therefore provided by outstanding scientists and top researchers and, thereby, instill a research-oriented state of mind in students, especially at the master level. Consequently, the curriculum is regularly updated in accordance with new and emerging issues and technologies in the relevant branch of engineering and the students have access to suitable equipment and research facilities. Finally, EPFL is also convinced that the "Innovation mind" needs to be educated and fostered during the studies. This culture of innovation and of a research-oriented state of mind is present not only in courses and seminars, in semester projects realized directly in our research labs, but, **most importantly, in the Master thesis, carried out in EPFL research labs** (when not performed in the private economy).

B 2.2 Innovation and Technology Transfer

EPFL capitalizes on its research through an open innovation process and encourages its scientists and students to interact with leading companies. The institution has entrusted interactions with the business community to the Vice Presidency for Innovation and Technology Transfer (VPIV[ix]). The VPIV organization offers a set of tools to scientists and students to facilitate interactions with companies. These tools contribute to the transfer of knowledge and technology and boost the innovation capacity. They are used and encouraged by the various VPIV service units. (See Figure B 2.2-1, Annex B 2.2-1 for the VPIV organizational chart and Annex B 2.2-2 for the VPIV activity report 2012).
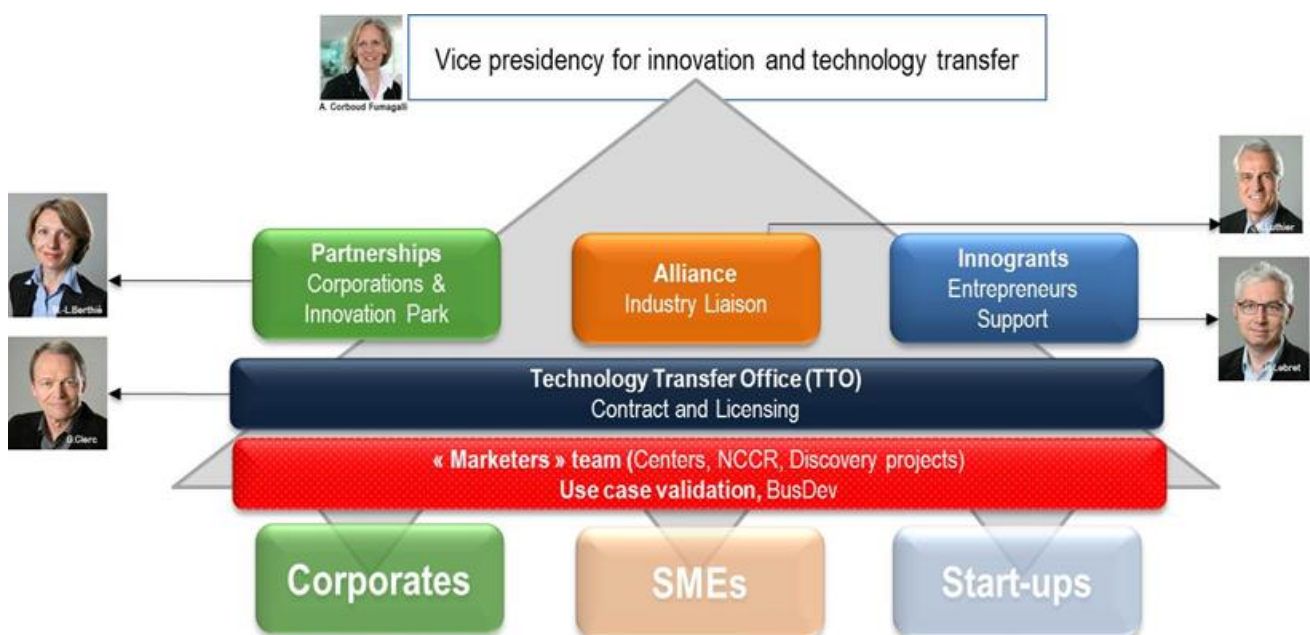
Figure B 2.2-1 VPIV organizational chart

Encouraging Entrepreneurship
As part of its innovation policy, VPIV supports entrepreneurship. Firstly, through seed funding in the form of *Innogrants*[x]. Since this tool was initiated in February 2005, 63 Innogrants (6 million CHF) have been granted and 37 companies launched. Secondly, the culture of innovation needs support, provided mainly through events and conferences aimed at a targeted audience. VPIV contributes to this major issue by co-organizing *Venture Ideas @EPFL* (conferences in partnership with *Venturelab* (sample presentation[xi]) and *Startup Weekends*[xii] for the students.

Start-up Environment
Project implementers, future entrepreneurs and start-ups stemming from EPFL may benefit from various types of infrastructure within the [EPFL Innovation Park](#)[xiii] such as:

- *[La Forge](#)[xiv]*, a co-working space, gives aspiring entrepreneurs a place of work, exchange and inspiration to perfect their start-up project.
- *[Le Garage](#)[xv]* - provides premises offering young companies office space for a maximum of 2 years.
- The more mature start-ups and those collaborating with an EPFL institute or another Swiss University of Applied Sciences have the opportunity to use modular space with flexible lease conditions and take advantage of various benefits[24]. These premises and related offers are managed by the [Foundation of the EPFL Innovation Park](#)[xvi].

There are currently over 110 [start-ups](#)[xvii] on campus. Events are set up around innovation, such as e.g. Cti Entrepreneurship courses; [Pizzas & Start-up](#)[xviii]; theme breakfasts; workshops; etc.

Collaboration with SMEs
EPFL promotes industrial collaborative projects, particularly with SMEs, through its liaison program *[Alliance](#)[xix]* which also involves the other Universities of Applied Sciences in French-speaking Switzerland. The regional authorities provide financial support so as to accelerate technological innovation in local companies. Over the past 8 years, more than a thousand companies have been advised, which has given rise to 425 technology projects. The Alliance Association brings together more than one hundred companies which jointly co-finance this program. The Board, chaired by an industry representative, ensures that the program suitably responds to members' needs.

Collaboration with Large Companies and Partnerships
EPFL offers companies various forms of [partnerships](#)[xx]. These may range from miscellaneous funding ([endowed Chairs](#)[xxi], Public Private Partnership infrastructure, course curricula, promotion of science, co-funding a competence center, etc.), to a partnership with a transdisciplinary center, specific research or service contracts, or even installation of a [company](#)[xxii]'s R&D teams on the EPFL campus, on the "Corporate" premises of the EPFL Innovation Park[25]

These industry groups interact with the campus in various forms such as research collaborations, hiring engineers, proposing internships, funding and participating in conferences, funding excellence fellowships, teaching, etc. Above all, they come to the EPFL campus to boost their innovation capacity and recruit promising talent. Concerning partnerships with industry through transdisciplinary centers, the latter bring together several laboratories with complementary skills to collaborate on emerging themes. The following areas are covered by [6 centers](#)[xxiii] under the VPIV supervision: energy, transport, design, digital media, social media and cloud computing.

Technology Transfer
The Technology Transfer Office ([TTO](#)[xxiv]) is in charge of assessing new inventions, managing intellectual property generated by EPFL labs, approving research contracts with industrial partners and supporting the creation of start-ups. As part of the TTO, the [ENABLE](#)[xxv] program finances projects in the short term to accelerate the transfer of inventions by EPFL scientists to the industry. The purpose of the program is prototyping, demonstration of specific applications, evaluation of pre-industrial feasibility and identification of market opportunities.

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[24] Such as access to conference rooms, computer network, coaching services for business and network development, access to certain EPFL infrastructure.
[25] There are others collaborations as well, such as the development and valorization of our program IS-Academia with a private company (this software is used by several academic institutions).

B 3 European and International Positioning

In the latest ranking issued by Times Higher Education[26], EPFL is recognized as the most international campus in the world. The table below gives an overview of where EPFL faculty, students and staff come from in 2012.

Faculty[27]	311 Professors (PO, PA, PATT), 62% non-Swiss (mainly from the EU)
Students	43% international students at Bs+Ms level (3,235/7,608) including 2,704 from the EU (35%)
Staff[28]	5103 staff and researchers (with Ph.D. students), including 2097 international collaborators.

EPFL is a truly bilingual technological university, offering an experience in English and French for students originating from 130 or so different countries. Over the coming years, EPFL will continue to expand its offer aimed at giving students a global experience based on top quality research and teaching:

- *mandatory introductory courses on global issues[29] ;*
- *area and cultural studies[xxvi] and the corresponding minor in area and cultural studies[xxvii];*
- *internships and stays abroad;*
- *Strategic partnerships aimed at broadening the scope of research perspectives and international exchanges (facilitating students internships abroad) will be further developed (see B.3.3 for details);*
- *on site and extended EPF campus in the western part of Switzerland and Valais/Wallis;*
- *online;*
- *off site (abroad).*

This offer encompasses the development of digital education / MOOCs

B 3.1 Strategy

EPFL's main strategy is to become a truly **global** university by its 50th anniversary in 2020. This means to be recognized at this time as one among the best technological universities in the world: the current promising 2013 rankings place EPFL at no. 13 (Leiden Ranking) and no. 19 (QS World University Rankings). In addition, EPFL aims to contribute towards the emergence of a new Swiss university system.

The strategy to achieve this goal is summarized in the first chapters of the EPFL development plan 2012-2016 which outlines the goals for the EPFL management by 2020 (cf. chapter A). The initiatives described in this document represent EPFL's response to the complexity of scientific and technological developments, globalization, and the emergence of new academic actors at an international level. The document entails meeting four prerequisites related to the EPFL international positioning in the period 2012-2016:

- *to become a reference research university in the field of innovative teaching;*
- *to position the institution in specific and cross-disciplinary research areas;*
- *to attract the best students and scientists from all over the world;*
- *to strengthen our international visibility and presence.*

This strategy will be reviewed in the development plan 2017-2020 due to be released in 2016.

B 3.2 Organization and International Development

Since 2011, the members of the EPFL SENIOR management have established a monthly coordination meeting for international affairs. It brings together also School and College deans (including the Dean of International Affairs) as well as EPFL officers dealing with international matters. The

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[26] See the table on the web page : http://www.timeshighereducation.co.uk/world-university-rankings/2013-14/subject-ranking/subject/engineering-and-IT/institution/ecole-polytechnique-federale-de-lausanne
[27] Data from the *Bilan 2002-2012 des ressources humaines EPFL*, p.8 and p.11.
[28] Data from the *Bilan 2002-2012 des ressources humaines EPFL*, p.11
[29] For the existing course, see http://cdh.epfl.ch/page-104435-en.html

budgets are directly allocated to the most strategically relevant international projects at the management level.

B 3.3 European and International partnerships

EPFL aims to achieve a global presence onsite (within the on-campus international community), online (MOOCs), offsite campus, and by positioning this EPFL global campus as a key player in the fields of science, innovation and urbanism (art-tech-campus).

On site

In terms of research, EPFL intends to pursue its development, strengthen its critical mass and become a full-fledged research university. One of the current moves to achieve this is the evolution of the current EPFL campus to an extended multi-site campus with antennae throughout Western Switzerland. All within an hour of the main campus, these regional institutes will enable EPFL to achieve a critical mass and strengthen competitively at an international level; they will also offer dedicated scientific platforms for international cooperation (see chapter 1 for further information).

EPFL research activities such as NCCR marvel (materials), NCCR robotics, EPFL plasma physics[xxviii] (and its relation to ITER[xxix] digital education[xxx], digital humanities[xxxi] contribute also to the international positioning of EPFL. This also includes strengthening EPFL's participation in the European research area, with so far results in the following areas:

- EPFL Coordination of the EC Human Brain Project[xxxii] with laboratories located in Europe, the US, Japan;
- 92 ERC grants;
- Strong participation in the FP 7 program[xxxiii] (59,8 million CHF received in 2013 without Human Brain project (83,9 millions with HBP), 280 million CHF and 430 faculty members participating in FP7 between 2007 and 2013);
- Space technologies (with the Swiss Space Center[xxxiv]).

Online - MOOCs

With the aim of becoming a reference research university in the field of innovative teaching, EPFL was the first European university to embrace MOOCs (cf. A 2). EPFL has also launched a special initiative for the creation of MOOCs with Africa. EPFL participate to OCEAN[xxxv] – The MOOCs portal based on the Coursera Platform brings together the best French-speaking universities in the world offering MOOCs (EPFL, ENS Paris, ENS Lyon, Polytechnique Paris, UCLouvain la Neuve, Polytechnique Montréal); further general information on Moocs, cf chapter A.

Offsite

the development of:

- a continuous presence in the Middle East: EPFL Middle East with the launching of the first EPFL Master on sustainable energy in 2009, the first start-up created there in 2014 and several collaborations[xxxvi] with KAUST;
- of additional facilities abroad: currently the innovative Venice for Digital Humanities[xxxvii], an EU Teaming program[xxxviii] between EPFL and Croatia, a joint lab on essential technologies[xxxix] in Yaoundé and, in a near future, hopefully a Yersin Institute of Bioengineering in Ho-Chi-Minh City;
- the participation to three international strategic networks:

  o Eurotech[xl]: EPFL, DTU (Copenhagen), TUM (Munich) and TU/e (Eindhoven);
  o RESCIF[xli] – Réseau d'excellence des sciences de l'ingénieur de la Francophonie (EPFL, partner universities in Louvain, Paris, Lyon, Grenoble, Montréal, Rabat, Dakar, Ouagadougou, Yaoundé, Beyrouth, Ho-Chi-Minh-City);
  o The global university leaders Forum (GULF[xlii]) within the World Economic Forum (WEF).

The international development is supported both by the Head of External Affairs to the EPFL President (on a strategic level) and by the EPFL international Office[xliii], which also fosters European academic networks such as Eurotech[xliv] (with an Eurotech Office in Bruxelles), CESAER and CLUSTER[xlv]. Furthermore, the EPFL International Office is connected with the net of Swissnex[xlvi],

which provides international academic and technical intelligences (see fig. B 3.3-1 for an overview of EPFL international academic partners and plays a key role in the settlement of agreements for student exchanges.

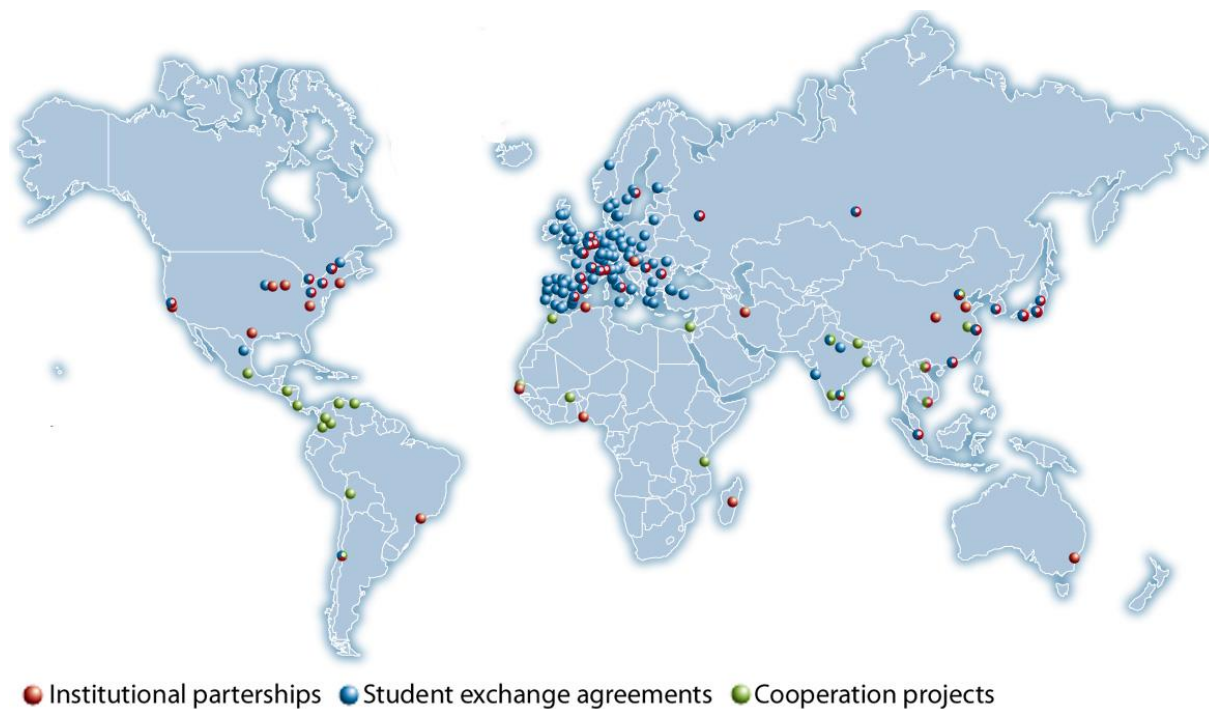● Institutional parterships   ● Student exchange agreements   ● Cooperation projects

Fig. B 3.3-1 Map of EPFL academic partners

Selected research partnerships, now developed on a global scale, with the Harvard Medical School, as well as with selected universities in the US (MIT, Stanford, Caltech, Carnegie Mellon), UK (Oxford, Cambridge, Imperial), Israel (Hebrew University of Jerusalem, Weizmann, Ben Gurion University, Technion), KAUST in Saoudi Arabia, Russia (Bauman, Skoltech, MIPT), Asia (Keio and Osaka in Japan, KAIST in Korea, CAS and Beihang in China / HKUST in Hong Kong, VNU-HCM in Vietnam, NUS, NTU, A-Star, NRF in Singapore) facilitate student mobility and will in the coming years lead to extended student and faculty exchanges.

B 3.4 Joint and Double Degree Programs / Mobility
Joint and double degree programs
EPFL proposes joint and double degrees[xlvii] but still has a restrictive policy. The university partners are presently: ECP Paris, Polytechnique Paris, EC Lille, Supélec Paris (electrical engineering), ISAE (ex-SUPAERO) Toulouse (aeronautical engineering), ENS Lyon, TUM München (automotive industry), Politecnico di Milano (computational engineering), Ecole Polytechnique de Montréal (all EPFL master degrees, except architecture, Physics and Nuclear Engineering). EPFL is currently focusing on enlarging strategic partnerships.

Students mobility
Erasmus and others exchanges inside Europe with the best institutions such as TUM, KTH, DTU, etc. are promoted by the EPFL international Office[xlviii], encouraged and supported by the EPFL Mobility Office[xlix]. Currently:

EPFL to EU = **181 Students**, with 443,000 CHF of Fellowships awarded in 2013-2014;

EU to EPFL = **422 students**.

More information on the mobility possibilities of EPFL students at the URL: http://ri.epfl.ch/studentsmobility and Annex B 3.4-1. The list of the university partners[l] can also be consulted. However, a controversial anti-immigration initiative won the backing of the Swiss

electorate on February 9 2014; UE decided a retaliatory measure: to stop Erasmus exchange programs. This decision will most probably have a moderate effect on future students exchanges at EPFL, since the exchange program will be maintained and financed directly by the Swiss Federal State.

B 3.5 EPFL Cooperation and Development

The scientific cooperation toward development is an integral part of the internationalization strategy of EPFL, through the Center "Cooperation & Development - CODEV"[li]. It is based on a number of projects implemented during the past four decades by researchers from all disciplines and from all Schools. CODEV is part of the networks AUF[30], RESCIF[31] (implemented by EPFL), EADI[32], KFPE[33] among the most important.

Based on partnerships, CODEV[lii] aims to promote scientific cooperation and the development of appropriate technologies for southern countries. CODEV strengthens research institutions in these areas by scientific exchanges within the framework of research projects and joint educational programs (list of CODEV's post-training programs[liii]). It seeks to orient technological innovation for its direct impact on sustainable development of companies in southern countries. In parallel, CODEV conducts awareness actions for researchers and students from EPFL regarding development issues and scientific cooperation and advice for setting up projects in the field. Research funding is an integral part of the activities of CODEV. In 2013, CODEV had approximately fifty partners (see the annual report[liv]), including academic institutions, town governments, foundations, international organizations, cantons, municipalities and cities.

CODEV wants to amplify and make the above area better known in and outside the school, and diversifying public and private funding sources for the benefit of the key actions of the center: EssentialTech; UNESCO Chair "Technologies for Development"[lv]; within RESCIF, support two joint laboratories, CURES[lvi][34] at ENSPY[35] at Yaoundé, and CARE[lvii][36], in Ho Chi Minh City. Through social networks, the biennial conference of the UNESCO Chair[lviii] and through an active collaboration policy with EPFL units, CODEV reaffirms the relevance of the projects and increases their visibility.

For this purpose, the VPAA and CODEV have implemented a comprehensive fundraising strategy. CODEV coordinates with the student association IdM[lix] (Ingénieurs du Monde) [37] to better integrate our students in the projects, and will tend to increase the number of research and educational projects in international partnerships. The dialogue with partner federal agencies will be emphasized, especially with SEFRI[lx][lxi] and DDC[lxii][lxiii].

B 4 Links at a National Level

EPFL has close collaborations[lxiv] with the institutions of the ETH domain, particularly through competence centers[lxv] or through certain professors (such as Professor Janet Hering, School ENAC, who is also Head of the EAWAG institute) and PhD students of EPFL working in research institutes in the domain. EPFL, PSI and ETHZ collaborate also for the master in nuclear engineering[lxvi]. The exchange of students in the domain is enhanced by a program[lxvii] currently funded by the ETH-Board for 3 years. The EPFL is involved in inter-university coordination led by the Rectors' Conference of Swiss Universities (CRUS). Among its major projects, CRUS[lxviii] is responsible for the national coordination and monitoring of education in the Swiss Universities.

The deans in charge of education from both EPFL and ETH have meetings to review and exchange on common topics. The last one was held in Zurich, during the "EPFL journées scientifiques et

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[30] Agence Universitaire de la Francophonie, http://www.francophonie.org/Agence-universitaire-de-la-10.html

[31] Réseau d'Excellence des Sciences de l'Ingénieur de la Francophonie, http://www.rescif.net/

[32] European Association of Development Research and Training Institutes, http://www.eadi.org/

[33] Commission for Research Partnerships with Developing Countries, http://www.kfpe.ch/

[34] Center Universitaire de Recherche sur l'Energie pour la Santé http://www.energie-cures.org/

[35] Ecole Nationale Supérieure Polytechnique de Yaoundé http://www.polytechcm.org/index.php

[36] Center Asiatique de Recherche sur l'Eau http://www.rescif.net/fr/content/care-center-asiatique-de-recherche-sur-leau

[37] Association Ingénieurs du Monde http://idm.epfl.ch/

pédagogiques" of September 4-5 2013. The next meeting is planned in Lausanne the 12th September 2014.

In the framework of art. 15 of the Law for the Encouragement of Research and Innovation[lxix], EPFL has formed alliances, giving it a certain academic responsibility, with:
- CSEM[lxx], Swiss Center for Electronics and Microtechnology, which has two members of EPFL's management in their board[lxxi] and for which the ties with EPFL are also materialized through joint projects[lxxii].
- IDIAP[lxxiii], Dalle Molle Institute of artificial and perceptive intelligence, which has in its foundation board[lxxiv] two members of EPFL's management, and which has an EPFL lab located on the site of the institute in Martigny[lxxv].
- IRO[lxxvi] (Research Institute in Ophtalomology).
- Swiss TPH[lxxvii] (Swiss Tropical and Public Health Institute).
- Swiss Vaccine Research Institute[lxxviii].

B 5 Links at a Local Level

The strongest EPFL academic link at a local level is certainly the close connections with the University of Lausanne (UNIL) and Geneva, and in particular with the UNIL School of medicine and the Center Hospitalier Universitaire Vaudois (CHUV; university hospital of the canton of Vaud). This link is strong, since historically, before the federalization of the institution, EPFL, with the name of EPUL, was part of the University of Lausanne.

Given the small size of the country, it is not always easy to distinguish the links of EPFL on a national and regional level. However, we can mention many initiatives for both research and education:
- Participation in the "Center Intégré de Génomique UNIL[lxxix]", but also in the center of competence in bioinformatics VITAL-IT[lxxx] a strategic partnership with UNIL, UNIGE, UNIBE, as well as with the Swiss Institute of bioinformatics[lxxxi].
- The EPFL regional institutes **in the cantons of Neuchâtel, Valais/Wallis, Geneva and Fribourg** (consult chapter 1 for further information).
- The collaboration between ECAL[lxxxii] (University of Art and Design) and EPFL through the creation of EPFL+ECAL lab[lxxxiii], whose mission is to foster innovation at the crossroads between technology, design, and architecture.
- The future participation of EPFL at the new cancer research center AGORA[lxxxiv], which will be operational in 2016.
- The "Programme Passerelle" giving access to the master in medicine to talented life science and technology students from EPFL in collaboration with the medical schools of the Universities of Lausanne (UNIL[lxxxv]) and now also of Geneva (UNIGE[lxxxvi]).
- Teaching in "hard" (Mathematics, Physics, Chemistry) sciences of UNIL students enrolled in particular in the School of medicine and biology[lxxxvii] given by EPFL professors (particularly the qualifying course); the EPFL-UNIL College of sciences[lxxxviii].
- Conversely, the professors of humanities and social sciences from the College of Humanities[lxxxix38] for which the professors from the University of Lausanne are mainly responsible.
- The collaboration between the pedagogical services of the Universities of West Switzerland (RCFE[xc] network).
- The conference of coordination UNIL/EPFL (CHEL), with regular meetings (at least twice a year) of both EPFL/UNIL Senior Management.
- The University Finance Center of Lausanne EPFL-UNIL (CULF[xci] - Center Universitaire Lausannois en Finance).
- A strong interface between EPFL and Departments of Public Education (DIP) and High Schools (Collèges et Gymnases) of western Switzerland is active to foster the best possible

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[38] Leader Prof. Thomas David (UNIL)

coordination and information between the <u>Swiss secondary educational system and our Institute of technology</u>. Moreover, a specific representative of EPFL is assigned to the different cantons, and special days are devoted to the introduction of prospective students to the professional perspectives and curricula contents offered at EPFL.

- In the same line of local action for education, EPFL has recently created with the Higher Pedagogical School of the Canton of Vaud (HEP-Vaud<u>) a new joint Master in Mathematics for the training of high school teachers</u>[xciiia], education offering a new curriculum for teaching mathematics to students aged 15 to 19 years.

To this should be added EPFL's participation to the network <u>Alliance</u>[xciib] between companies and institutes of technology, partnerships offered by the <u>Vice President for Innovation and Technology Transfer</u>[xciii], but also regular contacts that the Senior management of EPFL has with the cantonal authorities of Geneva, Vaud, Valais and Fribourg, as well as with the municipal authorities of large cities in western Switzerland and the towns surrounding the EPFL campus. B 3.1 describes in more detail the attentiveness of external stakeholders that include members of the economy and world of employment.

REFERENCE URLs QUOTED IN THIS CHAPTER

i   http://valais.epfl.ch/Homepage
ii   http://research-office.epfl.ch/
iii   http://polylex.epfl.ch/page-63552-en.html
iv   http://citation.epfl.ch/files/content/sites/citation/files/PDF/1.3.3_dir_plagiat_etudiant_fr.pdf
v   http://research-office.epfl.ch/page-98843-en.html
vi   http://www.snf.ch/en/Pages/default.aspx
vii   http://www.snf.ch/en/theSNSF/profile/facts_figures/statistics/Pages/default.aspx
viii   http://erc.europa.eu/proof-concept
ix   http://vpiv.epfl.ch/en
x   http://vpiv.epfl.ch/innogrants
xi   http://vpiv.epfl.ch/ventureideas
xii   http://memento.epfl.ch/event/startup-weekend-launch-a-startup-in-54h/
xiii   www.epfl-innovationpark.ch
xiv   http://vpiv.epfl.ch/page-101841-en.html
xv   http://vpiv.epfl.ch/garage/engl
xvi   http://vpiv.epfl.ch/innovationparkengl
xvii   http://societes.parc-scientifique.ch/community/companies/?lang=en
xviii   http://vpiv.epfl.ch/pizzas-start-up-en
xix   www.alliance-tt.ch
xx   http://vpiv.epfl.ch/partnerships
xxi   http://partenariats.epfl.ch/page-69579-en.html
xxii   http://societes.parc-scientifique.ch/community/companies/?lang=en
xxiii   http://vpiv.epfl.ch/page-22996-en.html
xxiv   http://tto.epfl.ch/page-22938-en.html
xxv   http://tto.epfl.ch/enable
xxvi   http://cdh.epfl.ch/cacs
xxvii   http://cdh.epfl.ch/macs
xxviii http://crpp.epfl.ch/Welcome
xxix   http://www.iter.org/
xxx   http://moocs.epfl.ch/mooc-factory
xxxi   http://cdh.epfl.ch/digital-en
xxxii   https://www.humanbrainproject.eu/
xxxiii http://ec.europa.eu/research/fp7/index_en.cfm
xxxiv   http://space.epfl.ch/
xxxv   http://www.ocean-flots.org/
xxxvi   http://kvl.kaust.edu.sa/Pages/Links.aspx
xxxvii http://dhlab.epfl.ch/page-91073-en.html
xxxviii http://actu.epfl.ch/news/croatia-sets-its-sights-on-its-promising-young-res/
xxxix   http://cooperation.epfl.ch/essentialtech-en
xl   http://www.eurotech-universities.org/home.html
xli   http://www.rescif.net/en
xlii   http://www.weforum.org/academic-networks
xliii   http://ri.epfl.ch/

xliv http://www.eurotech-universities.org/home.html
xlv http://ri.epfl.ch/academicnetworks
xlvi http://www.swissnex.org/
xlvii http://ri.epfl.ch/page-107429-en.html
xlviii http://ri.epfl.ch/studentsmobility
xlix http://jahia-prod.epfl.ch/contacts-outgoing/en
l http://sae.epfl.ch/partner-universities
li http://cooperation.epfl.ch/HomePage
lii http://cooperation.epfl.ch/activities
liii http://cooperation.epfl.ch/education
liv http://actu.epfl.ch/news/codev-2013-annual-report/
lv http://cooperation.epfl.ch/UnescoChair
lvi http://www.energie-cures.org/en
lvii http://www.rescif.net/en/content/care-center-asiatique-de-recherche-sur-leau-asian-center-water-research
lviii http://cooperation.epfl.ch/Tech4Dev/Conference-Vision
lix http://idm.epfl.ch/site/index.php
lx http://www.sbfi.admin.ch/org/index.html?lang=en
lxi http://www.sbfi.admin.ch/index.html?lang=en
lxii http://www.ddc.admin.ch/en/Home
lxiii Direction du développement et de la coopération, http://www.ddc.admin.ch/
lxiv http://information.epfl.ch/national-collaborations
lxv http://www.ethrat.ch/en/node/605
lxvi http://master.epfl.ch/nuclearengineering
lxvii http://jahia-prod.epfl.ch/ethz/en
lxviii http://www.crus.ch/information-programs/bologne-enseignement.html?L=1
lxix www.admin.ch/opc/fr/classified-compilation/20091419/index.html
lxx http://www.csem.ch
lxxi http://www.csem.ch/site/card.asp?nav=2453&sub=2455&title=Organization
lxxii http://si.epfl.ch/page-34889-en.html
lxxiii http://www.idiap.ch
lxxiv http://www.idiap.ch/linstitut/organisation-idiap/conseil-de-fondation
lxxv http://idiap.epfl.ch/
lxxvi http://www.iro.vsnet.ch/
lxxvii http://www.swisstph.ch/
lxxviii http://www.swissvaccineresearchinstitute.ch/svri_home.htm
lxxix https://applicationspub.unil.ch/interpub/noauth/php/Un/UnUnite.php?UnId=78&LanCode=8
lxxx http://www.vital-it.ch/
lxxxi http://www.isb-sib.ch/
lxxxii http://www.ecal.ch/en/100/homepage
lxxxiii http://www.epfl-ecal-lab.ch/
lxxxiv http://actu.epfl.ch/news/an-iconic-building-to-quicken-the-research-on-ca-2/
lxxxv http://www.unil.ch/ecoledemedecine/page90993.html
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lxxxvii http://www.unil.ch/fbm
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lxxxix http://cdh.epfl.ch/en
xc https://sites.google.com/site/rcfech/home
xci http://www.hec.unil.ch/ibf/about/events/eventhec.2010-04-30.1453264354
xciiia https://www.hepl.ch/cms/accueil/formation/offres-formation-de-la-hep-vaud/mas--diplome-enseignement-second/master-epfl-hep-en-mathematiques.html
xcii http://www.alliance-tt.ch/accueil
xciii http://vpiv.epfl.ch/partnerships

C. PROCESS GOVERNING EDUCATION AND PROGRAM MANAGEMENT AT EPFL

C1. GENERAL INTRODUCTION TO THE COMMON PROCESSES
(This general presentation, which avoids subsequent redundancies, is further broken down for each section)

ECTS credits for the Bachelor's and Master's programs
Although the Bachelor's program has a constant number of ECTS credits for all sections (180 ECTS), EPFL's Master's program can be completed in 90 or 120 ECTS (which is also the case in other Swiss universities). The current trend is clearly moving towards Master's programs with 120 ECTS, at least for the new curricula. One should also note that EPFL enables the student who so wishes to choose 30 credits in a complementary field in the form of minors and specializations. Thus, the number of students with a minor has increased significantly (see C-I, "Indicators April 2013", p. 57-61). These credits are included in the Master's programs comprising 120 ECTS, but are added to a Master's program of 90 ECTS.

Thus far, EPFL has conserved a large majority of disciplinary Master's programs. This has helped maintain a controlled number of different offers and thus to ensure a strong branding of our degrees. The flexibility and multidisciplinarity required for a modern education are introduced primarily by the addition of a minor or specialization.

EPFL White Paper: a founding document for internal EPFL dialog
At the request of the VPAA, the Dean of the Bachelor's-Master's programs and the quality unit have developed a "White Paper" on the context and the educational missions at EPFL (see Annex C-II). It was discussed in an executive session on October 7, 2013, as well as in the academic management group of October 21, 2013, and February 10, 2014. It emphasizes the role of education in a research-intensive university and analyzes the difficulties inherent to enabling the coexistence of academic aspects and a professional training of engineers and architects. This document is intended to serve as a starting point for future discussions between the VPAA and Schools on the reorganization of teaching in our school. It is, among other things, focused on:

- *the final implementation of learning outcomes for all programs;*
- *a more equitable distribution of teaching loads between professors and doctoral students from different Schools;*
- *the introduction of a polytechnic trunk and common exams for first-year engineering students;*
- *the selection of students after their propaedeutic year (in the future, after the first qualifying semester);*
- *a commitment of the professors to first year courses;*
- *the "branding" of our Master's programs in combination with the promotion of minors and specializations;*
- *the conditions of admission to our doctoral programs of the holders of a Bachelor's degree in 4 years.*

C I Design and Updating of the Programs

C I.I Existing Programs (Kaizen[39])

Most of the *current programs* are the result of a long history and are periodically reviewed by various bodies:
- Internally by each section, the **teaching committee** convenes each semester to discuss the challenges and opportunities encountered in the curriculum. Professors, the intermediary

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[39] Japanese: Quality assurance of continuous improvement

staff as well as students are represented. It annually reviews the curriculum and proposes improvements and adaptations to the school's management.

- Since the accreditation in 2006, **advisory committees** have been created by the curriculum to reflect the needs of employers. They regularly give their views on the education offer of the Bachelor's-Master's programs (for specifics, see the report on the sections).
- In 2013, the Dean of the Bachelor's-Master's programs asked the sections to develop an **academic committee** responsible for verifying the accurate coordination of courses and the quality of examinations and other procedures to ensure that the learning objectives are assessed properly and achieved (see the report on the sections).

C I.II New Programs (Hoshin[40])

For the establishment of *new Bachelor's or Master's programs*, the project is first presented and discussed by the management. The Dean of b/m is thus directly involved and is responsible to promote guidelines to this intention (see Annex C I-I). These are transmitted to the people in charge of defining a new offer. The guidelines state, firstly, that any new education should be complementary and not compete with existing programs and, secondly, that it should appropriately cover a given scientific field. They also stress the need to be *"in tune with the requirements of both the public and private labor markets, and open in principle the door to a doctoral program with a view to a subsequent academic career"*, and *"to be an additional and non-competitive option to an existing offer (minors and specializations included)"*. The impact of this directive has not yet been tested, but new programs following this guideline are in development.[41]

Implementation of curricula and regulations (for existing and new programs)
The process of *implementing the curricula and regulations* involves the following steps:

- *Proposals for changing or proposing new courses from a responsible section and School are subject to the [Registrar's Office]^i (SAC) for verification of the compliance of the proposed changes with the ordinances.*
- *The curricula and rules are then presented and discussed at the Conference of the Directors of programs (CDS) for harmonization.*
- *The curricula and regulations are finally approved by the EPFL Senior management.*

C II Program and Learning Outcomes

Following the accreditation in 2006, a pilot project was launched in the mechanical engineering section for the definition and implementation of learning outcomes (LO) and business skills to describe their curriculum. This work was presented at the intermediary audit of 2010. Taking their experience into account, for September 2013, all sections were required to define their courses based on LOs. In the spring 2014, the sections summarized the competencies to be obtained in each course in generic tables. The details can be found in the description of each course.

The Teaching support center ([CAPE]^ii) and quality unit provide valuable assistance to the sections to better specify the LOs of each course and to establish education objectives of the programs according to a frame of reference for each profession. Management applications of the studies on IS-Academia enable each professor to set LOs for their courses and the sections to validate and coordinate this information in the management of their program. The LOs contain both scientific and technical competencies, such as know-how and cross-disciplinary skills. Three different competence levels have been defined for the scientific and technical expertise. They correspond to a simplified Bloom's taxonomy (see also Chapter F).

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[40] Japanese: Quality assurance of innovation.
[41] These were particularly inspired by the approach of the EPFL College of Management for the establishment of the Master in Management of Technology, which included a thorough international benchmarking of equivalent education programs.

C III Program Content

The content of each program is detailed in the course booklet, published on the web by each section. It contains the course details for each program already available on the web (see Annex C III-I). The course details contain the following information:

- *A summary.*
- *The content and keywords.*
- *The prerequisites for the course and important concepts.*
- *The learning outcomes (LOs) and cross-disciplinary skills.*
- *The expected teaching and work methods.*
- *Evaluation methods and weighting.*
- *Supervision, resources.*
- *Credits and workload, and the teaching language.*

The consistency of all lessons is the responsibility of the section in question. The analysis of the curriculum presented during this self-assessment by the sections contains summary tables of the LOs of each course.

C IV Program Delivery

Each course contains a variety of teaching forms and examinations. The first qualifying year is devoted to learning engineering bases. The amount of practical work increases as the studies progress. Students quickly come into contact with the research performed in the laboratories of EPFL. The details of the activities are summarized in the curriculum which indicates course lectures (c), exercises (e) or practical work (p).

The total workload seems to correspond to expectations. During the **Campus II survey**[iii] the students presented an average load of 52h/week. Spread over the 14 weeks of the semester, and adding the preparation for and passing of exams, this correlates well with the expected 900 hours for 30 credits per semester.

The engineering programs all include an industrial internship of at least 8 weeks, either credited separately to the Master's cycle, or together with the Master's Thesis. Optional courses allow flexibility with regard to orientation at the end of the Bachelor's program and especially to the Master's cycle.

The tests and exams can take many forms. We distinguish in particular between the continuous verification throughout the semester and an exam after two weeks of preparation after the course ends. A Master's thesis, lasting 17 to 25 weeks (one semester), is required at the end of the curriculum.

To guide students in their choice of options, orientation, specializations or minors, study advisors are appointed. They help the section with its management and advise students who need it. The career center also gives them valuable advice. During the 1st year of the Bachelor's program, a critical year for the selection, a system of mentors is put in place for courses in general physics and analysis. 3rd and 4th year students supervise groups of 8 to 10 students as they perform exercises. The tutors are themselves taught by the professors and their PhD student assistants. The goals are to improve the working methods of the young newcomers to EPFL and facilitate their integration into the academic world.

From the start of the academic year in September 2013, most of our courses have a propaedeutic year of which 2/3 of the contents are polytechnic courses of a common level. Thus, for the engineering sections, there is already an identical exam for chemistry and linear algebra. This common polytechnic basis includes:

- *Analysis I and II.*
- *Linear Algebra.*
- *Physics I and II.*
- *Introduction to Life Sciences.*
- *Chemistry.*
- *Information, Computation and Communication.*
- *Global Issues.*

The curricula in basic science all have more advanced courses in their respective fields (physics, math and chemistry). The curricula in computer science, communication systems and architecture have a suitable program. The course "Global Issues[iv]" has been introduced for all students in the second semester of the qualifying year. The purpose of this course is to increase the cross-disciplinary skills of our students by raising awareness of the central problems of our society and the opportunities for an engineer to help solve them.

C V International Dimension of the Programs

C V.I Expected Outcomes

International Dimension

EPFL has an extended and active network of international partner universities. Engineering students have the opportunity to spend up to one full year abroad during the last part of the Bachelor's program (see Annex C I "Indicators April 2013", p. 51-55 and Annex C V.I-I "Indicators April 2012", p. 35-45). About 1/3 of our Bachelor's students take advantage of this offer, which is under the supervision of a coordinator for exchanges, who will interview the student and determine whether spending time at a partner university is adequate from an academic point of view. At EPFL, the students must have achieved an average mark of 70% in the first year in order to go abroad and even higher in order to qualify for a spot in a North-American or Asian institution at the bachelor level (cf. C V.III). In the Master's program, the course work has to be done at EPFL. The Master's Thesis is, however, another opportunity for spending time in a partner university or an industrial lab. Last year, about 12% of the students took advantage of this possibility and an additional 8% went to another university in Switzerland, which often also implies a change of language. These exchanges are typically arranged between professors, with relatively little administrative burden.

The student experience at EPFL is in itself an exposure to the international dimension of the engineering professor. Around one half of our Master's students are of non-Swiss origin[42], which means that any of our students will be exposed to a rich cultural mix without ever leaving the campus. Add to this the fact that more than half of the teachers, teaching assistants and lab work supervisors are also non-Swiss and that English is the language of communication in most of our labs.

Most EPFL professors and Senior Scientists have spent part of their academic youth in well-known institutions abroad. This is a result of the smallness of Switzerland and the fact that moving abroad for a doctorate or postgraduate employment is quite mandatory. Our students benefit from the academic networks of our professors, but also from the general international outlook that permeates the teaching at EPFL.

C V.II Cultural background and Language skills

EPFL has more than 120 nationalities, thus creating an international and multicultural campus. Therefore, English is a central language from both an academic and social perspective. French and English are the two teaching languages at EPFL. When it comes to the teaching languages, a C1 language level is recommended to our students (French for the Bachelor's program and English for the Master's cycle). This is a prerequisite in order to take the courses under the best possible conditions. For all new Bachelor's students, EPFL has introduced a nonselective English test (see Annex C-I,"Indicators April 2013", p. 83-85). This test focuses on oral comprehension, as well as understanding and expression of the written language. Students are then informed of their results and encouraged to take free courses at EPFL's Language Center[v] to reach the C1 level prior to enrolling in the Master's program. The results of this test shows that EPFL students will reach at least a B2 level of competences in English thanks to the English exposure during bachelor and master studies.

The number of courses in English increases progressively throughout the studies, allowing students to get used to it and address any shortcomings. The Education Affairs and the sections encourage students to take English courses (emails are sent to them in the beginning of each semester, and

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[42] Although a fair amount of them are French or come from a French-speaking region (Belgium for instance).

more information is regularly presented on the school's Polynex screens). Some sections, such as that of Computer Science, for example, mandates our Language center to develop courses specifically for their students. EPFL's Language center also offers courses for teachers who want to improve their language skills in order to teach the academic content in English or French. EPFL's Language center[vi] offers students and EPFL employees courses for learning English, German, Italian and French. Students have priority for course registration. Teaching methods include: group learning, individual learning with tutoring or independently in the media zone, work in pairs, intensive courses, etc. To meet the requirements for academic language proficiency, the Language center is managed since the fall 2006-2007 by the University of Lausanne (UNIL).

C V.III Outbound Mobility

To enable students to broaden their knowledge and promote interculturalism, EPFL supports and promotes mobility during the last year of the Bachelor's program and/or during the Master's thesis (see Annex C-I "Indicators April 2013", p. 51-55). Students are selected based on their academic results to ensure the success of their exchange period and so as not to prolong the duration of their studies. For this, EPFL proposes a network of partner institutions[vii] offering equivalent education, specific grants and a selection and mobility support service.

The mobility[viii] offer has been harmonized between all sections of the school. In the Bachelor's program, a grade of at least 4.5 is required to be eligible for exchange during the 3rd year. Each section has a mobility advisor who helps candidates prepare their academic career on the outside, who validates the choice of courses before their departure and who validates credits earned upon their return. The monitoring of results (see Annex C-I Indicators April 2013 p. 51) shows that a vast majority of students manage to earn more than 50 credits during such a year abroad. The list of partner schools can be found here[ix]. During the Master's program, mobility is generally performed by carrying out a semester-long Master's thesis at another university.

C V.IV Inbound Mobility

EPFL distinguishes two types of student mobility: those which remain enrolled in their home university and do not receive an EPFL degree (e.g., those participating in the Erasmus program: horizontal mobility) and those who join EPFL to complete a Master's program and receive our degree (vertical mobility).

Horizontal mobility is described on the webpage[x]. A range of services is offered to these students. They receive follow-up by the persons in charge of mobility in each section, are included in the courses according to their needs but follow and take the same exams as the EPFL students. Their results are analyzed in indicator tables (e.g., Annex CV-I Indicators April 2012 p. 35 and seq).

In terms of vertical mobility, the institute of technology receives more than 2000 applications to start our Master's cycles with a Bachelor's degree from outside EPFL. Our admission committee selects approx. 30 %. In the end, 250 to 300 students choose to join EPFL each year to do their Master's program. They come from all over the globe (see Annex CV.IV-1 Indicators November 2013, p. 52-53). The department of Student Affairs (SAE[xi]) offers a range of services to accommodate students, especially those who join us for the Master's program. Certain activities[xii] are specifically organized for them to facilitate their integration.

C VI Industrial and Research Internship

Introduction of the mandatory internship program
An industrial internship[xiii] is now mandatory for 18 Master's programs awarding the title of engineer or architect. It has been progressively implemented from the academic year 2009-2010 and for all Master's programs from 2011-2012. The internship is not mandatory for academic curricula for which the degree does not include a professional designation of engineer (degrees non submitted to Cti accreditation, for instance the Master in Mathematics). In the IC and ENAC Schools, internships were in place for many years, but were optional, with the exception of the architecture section, where a one-year internship was mandatory.

Internship models

The internship models chosen by the Master's programs for the curricula include three variants:

- *Short internships* (min. 8 weeks) usually during the summer. The short internship may be extended to the following semester.

- *Long internships* of 4 to 6 months.

- *Master's thesis in a company*.

Depending on the Master's programs, the internships give 8 ECTS (for 8 weeks), 30 ECTS (for 1 semester) or are simply validated as completed for a Master's thesis performed in a company, worth 30 ECTS without gaining further credits (the sections have considerable autonomy in the matter; check the regulations of each program). Unlike the internship, performing a Master's thesis in a company requires the supervision of the work by a faculty member of the EPFL and the research subject should be defined jointly by the student's external supervisor and the professor in charge.

Internship advertisement portal[xiv]

Companies are invited to post ads using the EPFL's internship portal. Students also apply through this portal by uploading their application to the internship accounts of the companies in question. There are generally enough offers accepted for publication by those in charge of the Master's programs.

There are large differences in the number of ads published on the portal depending on the Master's program in question. The reasons are related to the needs to be covered (number of students who need to find an internship in a given period), but also to existing traditions. For example, ENAC internships have grown in number the past years without using a centralized ad portal. Contrarily, the IC School has for many years used this portal. As an example, the table below gives the number of ads published during a year, weighted by the number of different Master's programs having received them (data from 2012). Thus, an ad sent to 3 different Master's programs accounts for 0.3 ads per program.

Number of ads validated and published[43] by the Master's programs in 2012															
ENAC			IC	SB				STI				SV	CdM		MEast
AR	GC	SIE	IC	CGC	MA	CSE	PH	EL	GM	MT	MX	SV	MTE	IF	MES
72	31	21	631	70	62	52	68	159	75	111	45	107	77	19	9

During the course of 2014, the usability and appearance of the company interface of this portal will be modernized as it is now integrated in the IS-Academia application.

Students are free to find internships through other channels as long as the subject is approved by the person in charge of the Master's program. It should be noted that, to date, no Master's program has encountered any major difficulties with regard to students finding an internship.

Number of interns

The table below shows the number[44] of internships and ***Master's theses in companies*** since the year 2011-2012 when a mandatory internship was included in the curricula of all the Master's programs.

Number of internships per academic year and Master's program ENAC-IC-SB									
	ENAC			IC		SB			
	AR*	GC	SIE	IN	SC	CGC	MA	CSE	PH
11-12	125	53	39	41	28	16	12	3	13
12-13	175	79	44	63	17	24	14	12	16

*: in AR, the number of internships is given in internships equivalent to one year.

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[43]The publication of the ad to students is made after considering the subject and the company and is subject to the internship ad being posted at a time when we are looking for internship topics. The number of ads posted by companies may thus be higher than the figures shown in the table.

[44]The number of internships and Master's theses in companies has been determined manually by the sections. Current developments in IS-Academia will make enable an automatic counting in 2014.

Number of internships per academic year and Master's program STI-SV-CdM-Middle East								
	STI				SV		CdM	MEast
	EL	GM	MT	MX	B	Stv	MTE	IF	MES
11-12	13	12	27	4	30	30	0	n.a	19
12-13	35	25	36	21	42	28	0	n.a	16

Number of Master's thesis per academic year and Master's program ENAC-IC-SB								
	ENAC			IC		SB			
	AR	GC	SIE	IN	SC	CGC	MA	CSE	PH
11-12	n.a	n.a	n.a	51	21	3	0	2	2
12-13	n.a	n.a	n.a	62	42	4	0	4	3

Number of Master's thesis per academic year and Master's program STI-SV-CdM-Middle East								
	STI				SV		CdM	MidEa
	EL	GM	MT	MX	B	Stv	MTE	IF	MES
11-12	11	19	16	4	7	1	9	19	1
12-13	29	24	25	18	5	5	19	28	3

Evaluation of the interns

The internships are evaluated by the supervisor in the company or a committee of the private or public economy (see Annex CVI-I). A form is filled out regarding professional skills with a comprehensive final assessment with 4 levels (Excellent, Good, Adequate, Poor). This report is sent to the person in charge at EPFL who performs a final validation and transmits the grade "passed" or "failed" to the academic service. Master's theses are not evaluated with this form but by the teacher in charge after a defense of the Master's thesis. The global assessment of the interns is computerized for the Schools IC, STI and SB. The results are very positive because, on all computerized forms, two thirds of the students receive the maximum rating (Excellent). The table below summarizes the results for the year 2013.

Overall assessment of interns by their supervisor (2013)		
Excellent 61 %	Good 34 %	Adequate 5%

Impact of internship on employability

In addition to enabling students to acquire practical skills through immersion in a company, internships play a positive role in the employability of our graduates. They appear in the eyes of employers to be more aware of the realities of the working world and to be operational faster. **Our employability surveys show a correlation between having done an internship and a greater ability to find work.** The following table is taken from the survey on graduate employability of graduates from the Master's program in 2011, but similar results were observed during previous years (prior professional experience is defined as an experience of at least 8 weeks, in a company and in the field of study)

Professional experience	Number of applicants	Number of interviews obtained	Number of positions obtained	Time taken to find a job (weeks)
With prior professional experience	10.8	2.7	1.7	8.6
Without prior professional experience	13.4	3.1	1.6	10.3
All (N=206)	**12.2**	**2.9**	**1.6**	**9.5**

The same survey (class of 2011) shows that after graduation, the students rarely become employed in the company where they performed their internship. It is however a fact that this class was not yet under the full obligation to carry out an internship.

The proportion of graduates who join a company in which they had an internship is as follows:

ENAC			IC		SB _Only engineers_			STI				SV	CdM	
AR	GC	SIE	IN	SC	CGC	MA	PH	EL	GM	MT	MX	SV	MTE	IF
15%	10%	14%	12%	13%	5%	5%	0%	9%	10%	5%	4%	4%	16%	18%

(Proportion based on all graduates, regardless of whether they had performed an internship or not)

Not surprisingly, it is in the sections where the internship was already mandatory (AR, IF) that we find the highest proportion of graduates joining the host company after graduation, which is why we can expect a similar situation for the other sections in the coming years.

Introduction to research, possible internships
Research training is provided by many semester projects and practical lab work is performed directly in the institutes and research centers of our school. Details can be found in the part about the sections. Some students benefit from performing their Master's thesis in industry, which is considered as mobility (see Chapter C.V).

Conclusions on internships
- The internship program is currently a success in the sense that students have no major difficulties in finding an internship and that the satisfaction of the companies regarding the quality of their work is high.
- The EPFL portal for internships is a valuable tool that allows companies to distribute their offers. Ongoing projects aim to improve the usability and appearance of this portal. This will be done by enhancing the academic management of the registration of internships from recording of data of the internship to citing it in the degree, and by establishing automatic and reliable indicators and extractions.

C VII Student Life

Organization and Tasks of DAF
The office of educational affairs (DAF) provides benefits and academic activities related to academic management, student life and education support. It offers services in the field of educational affairs, for students and teachers alike at EPFL. Maintaining a close partnership with the students, it ensures their active participation in the running of the school and campus[45]. Moreover, the director of Educational Affairs, responsible for the units of DAF, advises the Vice President for Academic Affairs in all projects related to "student life".

Campus Activities
The Office of Educational Affairs (DAF) provides institutional support (logistical and financial) to student associations, contributing to a vibrant and lively campus. EPFL also has a sports center (in collaboration with the University of Lausanne[xv]). Moreover, the students are encouraged to organize various events and activities. In 2013, 67 student associations and commissions[xvi] recognized by the EPFL proposed numerous activities, whether on a one-time basis (Polbeach, Balelec, Forum, Polynice, Japan Impact, etc.) or regularly (theater, music, cinema, photography, radio entertainment, robot competition, etc.); participation in sporting events (Challenge, EUGA, etc.); organization of activities that promote the integration of new Bachelor's and Master's students (coaching[xvii], Xchange, etc.). Recognized associations benefit from personalized follow-up, financial support (more than 190,000 CHF in 2013), access to premises temporarily or permanently, and other

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[45] The content of the activities of DAF can be found in its annual report available at http://formation.epfl.ch/.

logistics services. The complete list of associations can be found here[xviii]. In addition, EPFL mentions the activity of class delegates and associational activities in the Diploma Supplement by indicating the duties and responsibilities of students involved in key positions of student associations recognized by the EPFL.

Attesting to the dynamism of cultural and leisure activities on the UNIL-EPFL campus, the pamphlet "Côté culture" is published in conjunction with the Cultural Affairs[xix] of the EPFL and the University of Lausanne (see Annex C VII-I). Distributed at the start of the academic year, it is available in all public places.

DAF has also established close contact with the General Association of EPFL students (AGEPoly[xx]). In addition to the monthly contacts with DAF, elected members (the steering committee of AGEPoly) meet at least twice a year with the EPFL management; all projects involving education and student life on campus are subject to a consultation via AGEPoly's "representation" team to achieve a representative number of students from all sections.

Supervision of and Support to Students

The steering committee of AGEPoly organizes a *welcoming week for new students* the week before classes start. Experienced students welcome the new "freshmen" and help them to discover the premises and student culture. Each year, hundreds of students[xxi] participate. During the same week, courses on work methods (time management, note-taking) called "the job of being a student" are offered by the department of Student Affairs (SAE). More than a quarter of the new students[xxii] participate.

During the semester, the office of student affairs SAE[xxiii] advises new Bachelor's students and offers, with the support of specialists, *support courses[xxiv]* that are complementary to the education, as well as a coaching[xxv] program, provided by students in collaboration with AGEPoly. SAE also organizes the reception of international students joining our programs at the Master's level, *i.e.*, exchange students or state scholars, as well as those who have applied for vertical mobility in our school. The purpose of this welcome is to offer them the best possible integration and ensure EPFL's quality approach. Particular focus is put on the effects of a "culture shock" that affects all international students. The **Career Center**, established in 2006, offers a wide range of services to students to prepare them for employment and career[xxvi] entry (cf. D II).

Student Support

New students who need advice, information or just want to talk with a student of a higher year can go see a coach[xxvii] in their section. They are there to facilitate the entry into university life. For international students, other coaches[xxviii] are available to answer their questions and give them support. In addition, each student can turn to the class delegate who is a spokesperson communicating with the various departments of EPFL.

The EPFL Social Committee for students[xxix] can assign a number of grants[xxx] to students whose financial resources are particularly limited. It analyzes the applications by taking into account its attribution rules under the Grant Ordinance (Ordinance 414.154 on grants and loans from the Federal Institutes of Technology[xxxi]), in response to economic or personal hardship. Social grants or study grants are generally issued by the recipients' home cantons.

Furthermore, students in search of an adequate help can on get a free initial psychotherapy consultation[xxxii] on the campus. EPFL also provides students and employees with a confidential support network[xxxiii] to solve problems of a relational hierarchical order within the institution.

Students Dormitories and Housing Office

EPFL does not have any rooms managed directly on the campus and it is the responsibility of each student to find a home for him/herself. However, there are many student halls[xxxiv] managed by external organizations (foundations, estate agents, etc). These student halls are all very close to EPFL or easily accessible by public transport. Currently, about 3'000 rooms are offered in these halls for UNIL and EPFL students.

Parallel to the student halls, there are possibilities of renting rooms with private landlords or in flat-shares with other students and we encourage all our prospective students to pursue these options. The universities have developed this solution through the years to compensate the lack of student housing. A housing database reserved for EPFL and UNIL students gathers thousands of ads[xxxv] each year. Looking for flats or studios through real estate agencies remains complicated for

students because of the very tight housing market in the area, and many guarantees are required such as a Swiss [guarantor](#)[xxxvi].

The mission of the [Housing Office](#)[xxxvii] is to inform and advise students and PhD students of EPFL in their search for housing; expand the supply of housing in Lausanne and its surroundings; ensure the sustainability of housing from private and institutional landlords; retain private and institutional landlords and adapt the conditions of the renting to the needs of the students. The housing office gives advice, answers to various questions about housing in general and ensures a connection of information between students. It manages the database of ads from private landlords together with the housing office of UNIL.

Language Center
The center[xxxviii] at EPFL offers all students and members of the EPFL community a high quality level of teaching that meets the requirements of their studies, exchanges and/or their current or future work:

- *a general development of language and communication skills;*
- *modular courses focused on specific needs;*
- *the preparation for various examinations and certificates;*
- *individual learning by oneself;*
- *teaching of specialized languages for different disciplines.*

The languages taught are French, English, German and Italian (see also item C V.II).

The Student Service Desk
The [student service desk](#)[xxxix], established in 2007, is the main point of contact for all prospective and enrolled students of EPFL. Its mission is to welcome and inform people interested in the education provided at EPFL. In particular, it answers questions related to benefits and academic services from students throughout their studies. Complex queries are redirected to specialist services. The objective is to provide 80% of the answers directly at the student service desk. This objective is achieved every year since 2007.

C VIII Education Qualification Certificate

Legal framework for obtaining the degree
The right to issue **Bachelor's and Master's degrees** has been conferred on EPFL by the Federal Act of 4 October 1991 for institutes of technology (ETH Law, art. 19). The holder of a Master's degree in engineering or architecture is allowed to use the title of **EPF/ETH-certified engineer or EPF/ETH-certified architect** under Annex I of the Ordinance on the Bachelor's and Master's education at EPFL.

The degrees, bearing the seal of EPFL, mention the name of the graduate. They are signed by the President of EPFL, the Vice-President for Academic Affairs and the Section Director. They are accompanied by a *"Diploma supplement"*, established bilingually in French-English, and describe the level, context, content and status of the studies that have been successfully completed. The degrees mention the field of study and for the Master's degree, the professional designation of the holder, as well as a particular orientation where applicable.

Academic and professional recognition
The professional recognition of an EPFL engineering degree differs from the academic recognition of a corresponding Bachelor's and Master's degree.

Academic recognition
This recognition is cardinal for an international business or for academic mobility; Switzerland has signed the Lisbon Convention and numerous bilateral agreements with its first neighbors. The recognition of our institute of technology by the OAQ (Swiss Accreditation office) affiliated with the

ENQA[xl] also validates its programs within the framework of the Bologna process (excluding that of the Cti which reinforces this recognition).

Professional recognition of EPFL engineer degrees

On the national employment market, Switzerland regulates very moderately, as compared to many EU countries, how to exercise the profession of engineer. It relies on the requirements of the employers, the value of the recognition of ETH or HES and the professional associations to exert control. Accordingly, the holder of an ETH degree with the professional designation of engineer can directly access the job market without first having to integrate an engineering council to fully exercise his profession, as is the case in for example USA and Canada.

The international professional recognition of the engineering, scientific and architectural degrees from ETH with regard to the qualified practice of the profession varies from one country to another; not only within the EU but also around the world. For engineers, its importance also varies depending on the engineering education in question: while it is important for civil engineering professions, for instance, it has less weight for a computer engineer for example[46]. It is however facilitated:

> a) by the international excellence of EPFL and the reputation of its education;
>
> b) by the EUR-ACE label whose Master's degrees are Cti-certified;
>
> c) by a commitment within the *Alumni Association*[xli] of EPFL and scientific associations (Association of Engineers and Architects) that can be grouped in an academy (*Swiss academy of technical sciences*[xlii] or *natural sciences*[xliii]).

Role of the REG foundation in Switzerland

Note in this context the particular role of the REG foundation, a semi-state body, which assigns a quality standard to members of its category. In priority, REG[xliv] concerns professions taught by ENAC: architects, civil and environmental engineers, but also to a lesser extent machine construction, electrical engineering and computer science. Obtaining the designation REG A is facilitated for the holders of ETH Master's degrees, and enables the inclusion in the European Federation Eur Ing of FEANI[xlv]. However, this federation is still little used and the project of a European "passport" for the engineer (of the same type as that for health professions) has yet to be completed.

In addition, the REG foundation conducts since long ago in Switzerland a form of recognition of prior learning (or experience) for the engineering education, allowing experienced HES engineers to obtain a level equivalent to that of an ETH engineer (REG A) or an experienced technician to obtain a level equivalent to that of an HES engineer (REG B). This recognition, which increases the professional recognition of its recipient, can also play a role when determining a salary.

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[46]However, some states are very restrictive in the use of the engineering title; in Quebec, for example, it is forbidden for certified ETH engineer to put the title engineer on their business card and this regardless of their specialty; for those breaking this rule, the company that employs them must pay heavy fines to the Council of Engineers of Quebec (OIQ; http://www.oiq.qc.ca/Pages/accueil.aspx).

REFERENCE URLs QUOTED IN THIS CHAPTER

i   http://sac.epfl.ch/page-18668-en.html
ii   http://cape.epfl.ch/page-90874-en.html
iii   http://news.epfl.ch/news/campus-ii-report-may-2012/
iv   http://cdh.epfl.ch/page-104435-en.html
v   http://langues.epfl.ch/page-35885-en.html
vi   http://langues.epfl.ch/page-35885-en.html
vii   http://sae.epfl.ch/welcome
viii   http://sae.epfl.ch/exchange-outgoing
ix   http://sae.epfl.ch/partner-universities
x   http://sae.epfl.ch/exchange-incoming
xi   http://sae.epfl.ch/welcome
xii   http://sae.epfl.ch/internationals-welcome
xiii   http://stages.epfl.ch/page-93564-en.html
xiv   http://stages.epfl.ch/
xv   http://sport.unil.ch/
xvi   http://jahia-prod.epfl.ch/page-16286-en.html
xvii   http://sae.epfl.ch/coaching-en
xviii   http://associations.epfl.ch/page-16300-en.html
xix   http://culture.epfl.ch/
xx   http://agepoly.epfl.ch/
xxi   http://agepoly.epfl.ch/agepoly/animation/si
xxii   http://sae.epfl.ch/metier-etudiant
xxiii   http://sae.epfl.ch/page-27021-en.html
xxiv   http://sae.epfl.ch/page-27021-en.html
xxv   http://coaching.epfl.ch/
xxvi   http://carriere.epfl.ch/page-19351-en.html
xxvii   http://coaching.epfl.ch/
xxviii   http://sae.epfl.ch/coaching-en
xxix   http://commissions.epfl.ch/page-18520-fr.html
xxx   http://sae.epfl.ch/epfl-grants
xxxi   http://polylex.epfl.ch/files/content/sites/polylex/files/recueil_pdf/ENG/2.10.2_dir_attribution_bourses_etudes_en.pdf
xxxii   http://sae.epfl.ch/psy-consultation
xxxiii   http://securite.epfl.ch/mediation-en
xxxiv   http://logement.epfl.ch/student-halls
xxxv   http://logement.epfl.ch/housing
xxxvi   http://logement.epfl.ch/rentalguarantee-swissguarantor
xxxvii   http://logement.epfl.ch/housing
xxxviii   http://langues.epfl.ch/page-35885-en.html
xxxix   http://studying.epfl.ch
xl   http://www.oaq.ch/pub/en/01_00_00_home.php
xli   http://epflalumni.ch/
xlii   http://www.satw.ch/
xliii   http://www.sanw.ch/
xliv   http://www.schweiz-reg.ch/reg_f3.htm
xlv   http://www.feani.org/site/index.php?id=261

C2 DETAILED PRESENTATION OF THE EDUCATIONAL PROGRAMS

See specific documents presented by clusters essentially organized by schools and colleges
according to the program of the OAQ/Cti visit

D RECRUITING STUDENTS

(This general presentation, which avoids subsequent redundancies, is further broken down for each section)

D I Selection and Admission Strategy

There are several possibilities to enroll in EPFL's bachelor's and master's programs. Our selection criteria are published on our website under "Prospective students[i]". In general, the bachelor's degree has French as the teaching language and students are recruited from French-speaking regions. They are particularly Swiss high school students (also from German-speaking Switzerland) that have a Swiss Matura (cantonal certificate recognized by the Swiss government or federal certificate). When it comes to the holders of the *French baccalauréat* and applicants from French-speaking Africa, EPFL selects candidates in these countries that have the level of a Swiss Matura. The results of selected candidates are monitored year after year in our "tables of statistical indicators for the education" (see for example that of November 2013 p. 30-43, Annex CV-IV-1).

D II Student Selection and Admission Organization

To be admitted to the first year of the bachelor's program, a Swiss maturity certificate (Matura; in French: certificat fédéral – ou cantonal - de maturité) or equivalent degree is required. In 2013, EPFL reviewed the equivalence criteria and they are published by country on our website[ii] and on the website of CRUS[iii] (Rectors' Conference of the Swiss Universities). In rare cases, particularly for students from French preparatory programs and competitive entrance examinations, admission to upper years in the bachelor's program is possible upon application[iv] file.

The master's classes are mostly in English and recruitment for the master's cycle is open to the whole world. We receive about 2000 applications each year, preselected upon application file for the corresponding section, and chosen by an admissions committee. The strategy here is to find candidates with a level equivalent to or higher than that of internal candidates. Twenty or so excellence fellowships are offered each year to attract top candidates. Also in this case those selected are monitored in our indicator tables (e.g., that of November 2013, p. 61, or those from April 2012 p. 62-65). There was no significant difference during the Master's studies between internal students and those with an external bachelor's degree.

D III & D IV Sources of Admission and Admission criteria

The Bachelor's Program
Recruitment for the Bachelor's program
(see Annex CV.IV-1, "Indicators November 2013", p. 13-26)

The applicants for the Bachelor's program are mostly French speaking. Our future students come from all regions of Switzerland, France (especially neighboring France) and Luxembourg (figure D III-I). Nevertheless, exchanges with other regions of Switzerland are strongly encouraged since a significant number of high school graduates from non-French speaking parts of Switzerland, but having studied French as a national language, also choose to go to EPFL.

Figure 1.2.2.5   Nouveaux étudiants BA1 par lieu de formation, sans ceux issus du CMS
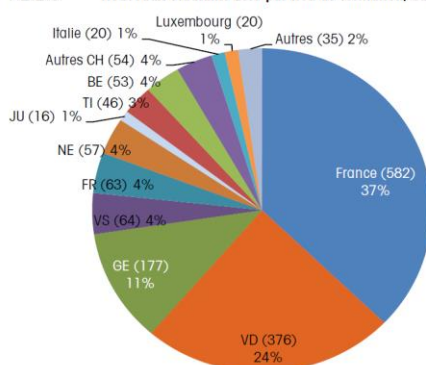
Figure D III-I: New Bachelor students, according to their origin (excerpts from Annex CV.IV-1 "Indicators November 2013")

The Matura gives direct access to the first year of the Bachelor's program without prerequisites. Scientific school-leaving certificates issued by a member of the countries of the European Union are admitted to the first year of the Bachelor's program if they satisfy the condition of a weighted grade point average equal to or exceeding 80% of the maximum score. Non-EU candidates with a weighted grade point average greater than or equal to 80% of the maximum score or holders of a Swiss professional maturity certificate have the opportunity to integrate the special mathematics course (CMS), a gateway year bringing them up to standard and giving access to the first year of EPFL's Bachelor's program.

Admission to the Bachelor's program
There are thus three main scenarios for admission to the Bachelor's level at EPFL:
- *admission to the first year (especially for Matura holders),*
- *admission to upper years (especially for students of French preparatory schools), or*
- *admission to the preparatory math course CMS (especially for holders of a professional maturity certificate).*

For more information, see here[v].

Admission to the propaedeutic year
Swiss certificates
Regarding the Swiss certificates, holders of a cantonal Matura certificate recognized by the federal government, a federal Matura certificate or a diploma from a University of Applied Sciences (HES) are without examination admitted to the first-year program in all sections of EPFL. For all other non-European or Swiss diplomas, admission to the Special Mathematics Course (CMS) is possible. The CMS is a preparatory year and if completed successfully it gives admission to the first-year program at EPFL.

EU or EFTA certificates
Regarding foreign high school graduates, holders of a scientific school-leaving certificate or equivalent degree issued by a member of the European Union (EU) or the European Free Trade Association (EFTA) are admitted to the first year of the Bachelor's program without examination if they meet the requirement of a general grade point average of no less than 80% of the maximum score. Those with a certificate from a country that requires an examination for admission to universities must also prove that they have earned university admittance in that country, for the chosen field of study. Holders of the certificates mentioned above, whose family (mother and/or father or spouse of the applicant) officially reside in Switzerland at the time of application have a facilitated admission.

For special cases (e.g., when the certificate does not indicate a grade point average or such an average cannot be calculated, or if there is no scientific certificate), please refer to the detailed information per country on the website of CRUS[vi] (Rectors' Conference of Swiss Universities).

Case of non-EU and non-EFTA certificates
Candidates with a general school-leaving certificate or equivalent degree issued by a non-EU or non-EFTA country and that does not give access to the first-year program at EPFL may apply for admission to the CMS. For non-French-speaking foreign applicants, a B2 level in French is required and this level must be justified in the application file, including a follow-up of courses in French. Other application files are passed on to the admission committee in order for the prerequisites to be verified.

Admission to the Special Mathematics Course (CMS)
CMS - the Special Mathematics Course is a preparatory year and if completed successfully it gives admission to the first-year program at EPFL (see rules[vii]). Admission to CMS is conditioned by the number of places available. This gateway course is designed for specific audiences:
- For Swiss diplomas, holders of a professional maturity certificate are likely to be admitted to the CMS as long as there are enough available places and the candidates are younger than 25. They must pass this preparatory year to be admitted to EPFL's first-year program. Applicants that are not admitted can always take the admission exam (see below).
- Holders of a Matura cannot be admitted to the CMS as they are eligible for the first year of the Bachelor's program.

- For international high school graduates (or equivalent), holders of a degree awarded by a country in the European Union (EU) or the European Free Trade Association (EFTA) and who do not fulfill the admission conditions for the first-year program mentioned above cannot be admitted to the CMS. Candidates of Swiss nationality residing abroad at the time of graduation may however request to be admitted to the CMS. Admission is determined on the basis of the qualifications of each applicant and is subject to the availability of places. The Admission Committee makes its decision at the end of July. The candidates are personally informed in the beginning of August. Applicants that are not admitted can always take the admission exam.

- Holders of a school-leaving certificate with a scientific profile, or equivalent, issued by a non-EU or non-EFTA country are eligible for the CMS if their average grade point average is at least 80% (i.e., 16/20), if the applicant is younger than 25, and if they have taken mathematics and physics without interruption during the last two years before their high school graduation. Those with a certificate from a country that requires an examination for admission to universities must also prove that they have earned a university spot in that country, for the chosen field of study. For non-French-speaking foreign applicants, a B2 level in French is required. Admission is determined on the basis of the qualifications of each applicant and is subject to availability. The Admission Committee makes its decision at the end of July. The candidates are personally informed in the beginning of August.

- Holders of an international school-leaving certificate are also eligible for the CMS provided that there are enough available places, that they are younger than 25 and have gotten 32 points out of 42 (without bonus) for a "Higher level" in mathematics and in physics or chemistry and in a modern language (a language at level A1 or A2, SL also counts as HL), 3 additional branches in a Standard level from the following disciplines: natural sciences, geography, history, economics, a modern language, applied mathematics. People who are not native French speakers should certify their knowledge of French (good grade as a foreign language in their final exam or certificate equivalent to a B2 level). Admission of Swiss candidates is determined on the basis of the qualifications of each applicant. Applicants that are not admitted can always take the admission exam.

Admission exam
Any candidate who does not fulfill the conditions for admission to the first-year program can take the full or reduced admission exam. Candidates must pass this exam to be admitted to the first-year program according to EPFL's ordinance on admission[viii].
For more information, see here[ix].

Links with high schools (schools for upper secondary education)
EPFL is very involved in issues of the high school-EPFL transition. Matura certificates and their level in terms of required basic skills are a crucial part of admission to EPFL. The Federal Council and the Swiss Conference of Cantonal Ministers of Education (EDK[x]) coordinate the recognition of certificates of maturity with a joint body: the Swiss Maturity Committee: EPFL is present in this committee, as well as in working groups proposing the reform of the Matura. To participate in the development of training for high school science teachers, EPFL, which is again a stakeholder, collaborates with the University of Teacher Education in Vaud (HEP - Haute Ecole Pédagogique du canton de Vaud). In this context, a new joint EPFL-HEP Master's program in Mathematics dedicated to education[xi] has just been created, with the aim of ensuring a high level of education in mathematics as well as pedagogy and didactics. In addition, a new high school portal with a quarterly newsletter has been created, which promotes exchanges with high schools, informs about seminars and scientific events of interest to high school teachers and offers educational material developed at EPFL that can be used at the high school level. For more information, see here[xii].

Admission to upper years
These conditions apply mainly for students from French preparatory schools (e.g., CPGE) and candidates for entrance examinations of ENS Lyon. Applications are processed by an admissions committee that communicates its decision in late July. The candidates are personally informed in the beginning of August. All other candidates who can prove an equivalent academic education in Switzerland or abroad, have the possibility to submit their applications even if admissions during the

Bachelor's program are very unusual. EPFL favors admission to the Master's cycle of candidates holding a Bachelor's degree.

The Master's program
Recruitment to the Master's program
Applicants to the Master's program are essentially international (see Annex CV.IV-1: "Indicators November 2013", p. 45-54 and figure DIII-II). Recruitment is focused on quality rather than quantity, and this quality is required both when it comes to education (renown of the school of origin, reputation of this school according to areas of expertise, institutional partnerships...) and the level of student performance (grades, relative positioning in their class, academic record, projects, internships, publications, letters of reference and motivation...). The goal is to select external candidates who provide a real added value for the dynamics of the school.
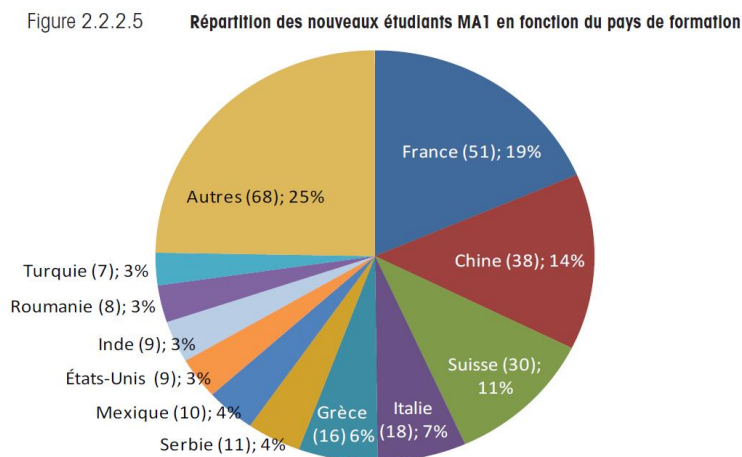
Figure 2.2.2.5   **Répartition des nouveaux étudiants MA1 en fonction du pays de formation**

Figure DIII-II: New Recruited Master students, according to their origin (excerpts from Annex CV.IV-1 "Indicators November 2013")

Excellence fellowships for the Master's program
With the support of partners, EPFL offers a limited (but growing) number of Excellence fellowships for Master's students with academic achievement of the highest level. All students have the possibility to propose a candidate for a fellowships grant when applying for the Master's program. Each grant consists of a sum of CHF 16,000 per academic year (i.e., a maximum of CHF 32,000 for a two-year Master's program) for external candidates, and CHF 10,000 (payable in two installments) with a certificate of Excellence for internal candidates (who have a Bachelor's degree from EPFL). Some of these grants are funded by companies through special partnerships: Debiopharm, Novartis, PWC…

Admission to the Master's program
Any student who holds a Bachelor's degree (or equivalent) in a related field from a recognized university may submit an application for the master's program, but for non-EPFL students, admission is competitive. Only candidates demonstrating excellent academic results and that have excellent references are likely to be accepted.

EPFL students at the end of the Bachelor's program are enrolled automatically in the master's cycle of their field of study and do not need to carry out the application procedure to continue in the same branch of study. If they change their field of study and become interested in, for example, a specialized Master's subject (Management of Technology, Financial Engineering, Energy Management and Sustainable Building, Nuclear Engineering, Computational Science and Engineering), they are required to go through the application procedure just like all other external candidates.

Case of Swiss HES graduates: Graduates of University of Applied Sciences (HES) are admitted to EPFL's Master's programs in Architecture, Civil Engineering, Environmental Science and Engineering, Chemistry, Chemical Engineering, Electrical Engineering, Mechanical Engineering, Microtechnology,

IT and Communication Systems, if they have obtained their degree in the same field. However, they first have to perform a gateway year of 60 ECTS credits. The details of this gateway year should be discussed directly with the section in question.

Registration of exchange students: For international students who have completed an exchange at EPFL before applying for a Master's program, credits earned in the Master's cycle and not used by the school of origin are validated by EPFL up to 30 ECTS credits. For more information, see here[xiii].

Selection of candidates: The selection of candidates for the Master's program is made based on the qualifications of each applicant by an admissions committee, which gets together twice a year (a winter session and a spring session), chaired by the Dean of the Bachelor's-Master's school, managed by the Registrar's office and consisting of representatives of the sections, a representative of the International relations office, and a representative from the study programs promotion. Applications received and centralized at the department of Academic Services are submitted to the sections, which in turn perform a pre-selection of files according to their specific criteria (adequacy of the education, competence clusters from the schools of origin, quality of the qualifications, previous experiences with students from the same schools, expertise and contact networks of the teachers...). This pre-selection by the sections is then reviewed by members of the Master's admissions committee for validation and final acceptance. This last selection takes place on the basis of more institutional recruitment criteria and with a commitment to harmonize requirements.

Doctoral program
Recruitment to the doctoral program
Applicants to the doctoral program are in large part international (see Annex CIV.IV-I "Indicators November 2013", p. 69-77 and figure DIII-III).

The Doctoral School oversees 18 doctoral programs covering all fields studied at EPFL. Each program is responsible for the recruitment of its doctoral students, as well as the organization and supervision of their curricula. The doctoral programs offer advanced courses and stimulate the emergence of a scientific community in a specific field. The first step in selecting doctoral candidates is evaluating their application files; admission is highly competitive. Each doctoral program has a committee that meets 2-3 times a year and that makes recommendations, sets admission criteria and directives for the candidates. Generally, applicants must apply to the program of their choice within the time limits set by it. However, some programs may propose positions in the context of specific research opportunities.

Figure 3.2.3.1 — Répartition par région de formation des étudiants en cours de thèse aujourd'hui

- Afrique/Océanie (11) 0.5%
- Autres Amérique (92) 4%
- Autres Asie (102) 5%
- Suisse (639) 31%
- Autres Europe (390) 19%
- Russie (61) 3%
- Grèce (63) 3%
- Chine (70) 3%
- Iran (110) 5%
- Allemagne (134) 7%
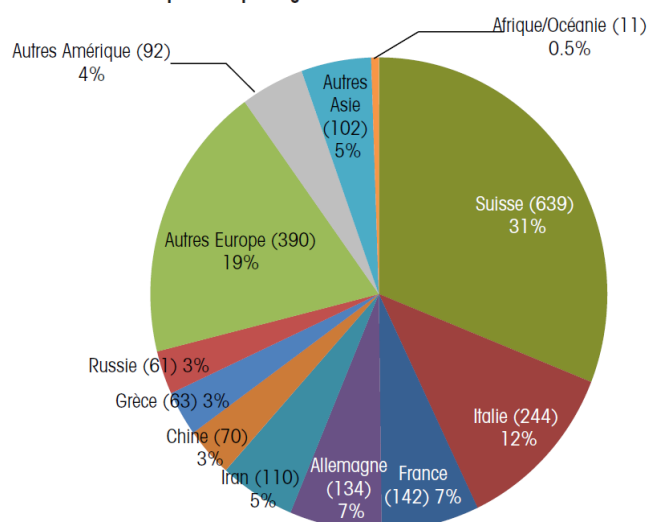- France (142) 7%
- Italie (244) 12%

Figure DIII-III: New Recruited PhD students, according to their origin (excerpts from Annex C V-II "Indicators November 2013")

The vast majority of the [PhD students]xiv admitted to EPFL are employed and paid as "assistants-PhD students". They work on their research, participate in educational tasks and contribute to the smooth functioning of their research unit. They have a double status as a student and an employee. For more information on doctoral programs, please refer to Chapter F.

D V Attention to Diversity

The EPFL campus has a very international population, with over 120 nationalities represented, which makes EPFL, one of the most cosmopolitan campuses worldwide, with 40% of international students in the Bachelor's program (mainly French students), 46% at the Master's level and 66% at the PhD level. International students admitted to EPFL are mainly from Europe (36%), followed by Asia (8%), Africa (3%) and North America (3%). EPFL performs several actions to improve the representation of women on campus. We see an increase in the number of female students at EPFL, which is currently around 27%. Consult also item F 2.4

Detailed statistics are available in the tables of indicators in the field of education. The computer system currently in place (IS-Academia) renders it possible to centralize the management of admissions to the master's program and monitor each submitted application file. Detailed statistics on the geographical and academic origin of applicants, the percentages of admissions and registrations, and the academic performance of admitted students are available.

REFERENCE URLs QUOTED IN THIS CHAPTER

i   http://futuretudiant.epfl.ch/en
ii   http://bachelor.epfl.ch/admission-countries
iii http://www.crus.ch/information-program/recognitan-swiss-enic/zulassung/zulassung-in-der-schweiz/individual-countries.html?L=2
iv   http://bachelor.epfl.ch/upper-years-admission
v   http://bachelor.epfl.ch/admissions
vi   http://www.crus.ch/information-program/recognition-swiss-enic/zulassung/zulassung-in-der-schweiz/foreign-certificates.html?L=2
vii http://polylex.epfl.ch/files/content/sites/polylex/files/recueil_pdf/2.9.1_r_etudes_cms_fr.pdf
viii http://polylex.epfl.ch/page-26075-en.html
ix   http://bachelor.epfl.ch/admission-exam
x   http://www.cdip.ch/dyn/11553.php
xi   http://master.epfl.ch/teaching-maths
xii http://gymnases.epfl.ch/
xiii http://master.epfl.ch/entryrequirements
xiv http://phd.epfl.ch/application

E EMPLOYMENT OF GRADUATES
(This general presentation, which avoids subsequent redundancies, is further broken down for each section)

E I Graduate Employment Surveys

Each year, the [Career Center](#)[i] (CC) at EPFL investigates the employability of its graduates from the Master's (and Doctoral) programs having obtained their degree the previous calendar year. The survey is conducted in August/September, which is a hollow period in the academic calendar, i.e., an average of one year after graduation. This survey covers four main areas:

1. **Measure of parameters that are representative of the ease of finding work:**
   a. Time elapsed between the sending of the first application and the signing of an employment contract.
   b. Number of applications sent.
   c. Number of interviews obtained.
   d. Number of job proposals obtained.

2. **Gathering of factual information about the first job, in particular:**
   a. Starting salary.
   b. Position held.
   c. Number of subordinates, where applicable.
   d. Employer (including size and origin of the company, public or private sector, etc.).
   e. Country where the activity is carried out.

3. **Gathering of subjective information about the first job, in particular:**
   a. Job satisfaction (pay, recognition of the EPFL title, adequacy of the EPFL education, tasks performed, overall satisfaction).
   b. Assessment of the skills learned at EPFL in relation to the needs of the held position.

4. **Gathering of demographic information, in particular**
   a. Sector (master's program, resp. doctoral program).
   b. Age.
   c. Gender.
   d. Nationality / residence permit in Switzerland.
   e. Country of establishment.
   f. Activity after one year (employed, PhD studies, self-employed, job-hunting, not looking).

This survey, which is presented annually in an executive session, provides a comprehensive view of the employability of graduates from EPFL. However, since the response rate is generally between 50 % and 55 % on average, only combined global figures are statistically reliable, for which reason the employability data used by sections in their specific reports include data obtained over several years; their results are discussed by the sections themselves. The last 3 annual surveys with their findings are available [here](#)[ii]. OGIF issued in 2014 a special report concerning the employability of EPFL young alumni (cf. Annex E I-I), thanks to the data provided by the CC; the results are commented in the specific reports of the sections.

EPFL takes also advantage of this survey to gather information about two groups of people who in a strict sense fall outside the case of access to employment, i.e., alumni entrepreneurs and graduates pursuing a doctorate. The sections may conduct their own investigations. Moreover, during School and College evaluations, a questionnaire is sent to the alumni of each section using the email address registered with EPFL's [alumni association](#)[iii].

E II Career Information and Counseling

EPFL's Career Center

The Career Center (CC[iv]) accompanies the EPFL students in their academic orientation and employability by providing a range of services covering different kinds of needs. These services listed on the website of CC recur each year, sometimes with the addition of special events. Below are the details of the services offered in **2013**.

1. Courses and seminars:
    a. Workshop "The application file" organized 9 times in 2013 (5x for PhD students and 4x for Master's students).
    b. Course "Accounting, Finance and Management", also open, for a fee, to participants outside EPFL.
    c. Workshop "Demystifying the Assessment Center", organized 2 times in 2013.Seminar "Successful job interview" organized once in 2013.

    237 students attended a course organized by the Career Center in 2013.

2. Individual services:
    a. Information interviews on EPFL with prospective students and their families ("promotion").
    b. Individual consulting interviews for academic guidance, job hunting, opportunities, career management, work permits, etc. in English and French.
    c. Correcting resumes and cover letters.
    d. Mock job interviews.
    e. Individual psychometric tests with debriefing (Helios/TMS methodology) in order to help with orientation or career transition. In addition, a partnership with **TalenToday**, a platform offering career testing online in French and English, was set up in November 2013. Access is available free to students since the beginning of February 2014.

    693 individual interviews were conducted in 2013 (average duration 1h 30 min; cf. Annex E II-I, CC annual report 2013).

3. Group services:
    a. Sending of targeted jobs by e-mail (51).
    b. Work by the EPFL Alumni group on the network of online contacts on LinkedIn (~1,200 new members in 2013, nearly 8,000 members at the end of 2013).
    c. Information on events related to employment via the website of the CC.
    d. **Industrial Round Tables**, information and contact sessions with representatives of employers having graduated from EPFL.
    5 Round Tables took place in 2013:
    – *Working in Cooperation and Development*.
    – *Engineering careers in the design world*.
    – *Academic or business career?*
    – *R&D in industry*.
    – *New opportunities in IT*.

    The Industrial Round Tables attracted between 50 and 80 students per session

    e. A large *LinkedIn* event was organized by the CC in November in partnership with representatives of the company, to teach students of EPFL how to create and optimize their profile on this social network and use it to get their first job. The EPFL Alumni group on LinkedIn was also presented to them, as were the best ways to use it to network with 8,000 members. Students were able to ask questions and discuss with the lecturers over a drink. The event was a great success with about 250 participants.

4. Company presentations and recruitment days on campus: the Career Center regularly organizes, on behalf of employers, corporate presentations and job interview days, which take place in the interview rooms of CC.

5. Preparing Students for EPFL Forum 2013:

As in previous years, the Career Center is in charge of preparing EPFL students for the Forum:
- CV Seminar (April 29, 2013 - in French and English).
- Week of resume corrections (April 30-May 3, 2013).
- Seminar "Successful Forum" (Sep 26 2013 - in French and English).
- Week of mock job interviews (Oct 8-11, 2013).

The seminars preparing for the Forum drew a total of about 300 students.

Support of the EPFL alumni association

Finally, EPFL's alumni association[v] provides, in part with the support of CC, various support actions to facilitate the employability[vi] of its graduates. It has, in particular, internationally active chapters.[47]

E III Employer Satisfaction

No formal investigation is conducted by the Career Center itself to measure the satisfaction with the quality of the engineers at EPFL (for more information, see the corresponding item in the report about the sections). However, the CC has the opportunity to discuss regularly with employers of EPFL graduates and their feedback is very positive.

In addition, there are two facts that reinforce this impression:
- Each year, between 200 and 300 companies use the (fee-paying) recruitment services[vii] of CC to attract students to them, which provide a sound evidence that the employers are satisfied.
- CC draws the same conclusion from the organization of the EPFL Forum[viii], the annual job fair held on campus, the success of which is undeniable in view of the number of participating companies (the Forum is a student committee and supported by the Career Center).

REFERENCE URLs QUOTED IN THIS CHAPTER

[i] http://carriere.epfl.ch/page-19351-en.html
[ii] http://carriere.epfl.ch/download
[iii] https://www.epflalumni.ch/
[iv] http://carriere.epfl.ch/page-19351-en.html
[v] https://www.epflalumni.ch/
[vi] https://www.epflalumni.ch/career-services-2/
[vii] http://carriere.epfl.ch/employers
[viii] http://forum.epfl.ch/en

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[47] See for instance the recent meeting of EPFL alumni in Portugal, https://www.epflalumni.ch/rencontre-au-portugal-2/, but also the initiative by Swissnex San Francisco (https://www.epflalumni.ch/nos-evenements/swissnex-sf-rencontre-avec-gilles-marchand-directeur-de-la-radio-television-suisse-rts/)

F. QUALITY ASSURANCE

F 1 Quality Assurance Strategy

F 1.1 Definition of the Quality Assurance Strategy and Information of the Public

Cockpit View of EPFL's QA

EPFL's quality assurance strategy follows a waterfall system, from the highest levels of the federal government – at SEFRI, to single employees at the school, which provides it with a strong consistency. The figure below (fig. F 1.1-1) provides a "cockpit view" of the EPFL Quality Management System (QMS).

Organ/ Person	Content/ Level		Reference document	Type of evaluation	Frequency
SEFRI/ Federal Council	**STRATEGIC**		Message FRI 2013-2016	Final eval.	Once every 4 years
CEPF			Performance mandate 13-16 Strategic plan 13-16	Intermediate and final eval.	Once every 2 years
				SEFRI reporting	Once a year
EPFL			EPFL convention of objectives 2013-2016	DIALOG and CEPF Reporting	Once a year
				Satisfaction surveys	Once every 4- 6 years
Schools and Colleges			Selfassesment doc. for audit	School/College eval.	Once every 4 -6 years
			EPFL convention of objectives	Assesment with EPFL Senior Management	Once a year
Institute		**OPERATIONAL**	Autoeval. Doc. for audits Strat. doc. of Schools and Colleges	School and College Eval. Institute Eval.. Discussion with the Dean	4-6 years as the need may occur Minimum once a year
Sections			Programme content; tools of continuous improvement; competences Grid ; education comm. ; academic comm.; advisory committee (pv)	Self assesment by the Programme Director	Once a year Accreditation audit (once every 4-6 yrs)
Teaching staff			Syllabus Teaching Content	Student evaluations	Once per semester
Managers, Collaborators			Personal specifications, List of annual goals	discussion and personal assesment	Once a year

Figure F1.1-1: Cockpit view of the EPFL Quality Management System

Content and Communication of the QMS

EPFL QMS contents, processes and procedures, are accessible to all and are clearly stated on EPFL's website, with many references. They are segmented into two parts:

- [Content on the QMS](#)[i] derived from the common standard advocated by the two agencies OAQ/Cti, including self-assessment documents and audit reports since 2006. Audit results and remedial measures are presented to EPFL's management and the ETH Board during DIALOG. Monitoring of the latter is carried out by the VPAA. The details of the EPFL QMS are exposed in chapters A to F of this self-assessment document.

- Information dealing with internal quality assurance of the ETH domain, mainly the evaluation of [Schools and colleges](#)[ii] (peer review mode). Key processes and procedures for the School and College assessment can be found in four documents listed with other relevant texts on this web page:
  - o EPFL Guideline from 2005: *Evaluations in the ETH Domain*[iii];
  - o Evaluation procedure and process: *Evaluation of EPFL Schools and Colleges: Quality Procedure*[iv], a document from 2011 prepared jointly with ETH Zurich);
  - o EPFL guideline: *Guidelines for the Preparation of the Self-Assessment Documents Provided to the Committee*[v].

o EPFL instruction and check-list: *School and College Evaluations: Planning and Checklist[vi]*.

The preparation steps for the assessments of Schools or Colleges (dealing mainly with their vision, strategy, management, faculty recruitment, research, doctoral programs) are subject to preparation and follow-up meetings with the respective Deans or Directors and the quality manager, particularly to determine the list of experts and the *terms of references*, both approved by the VPAA; *i.e.* the audit is prepared by the steering committee of a school and all stakeholders of the latter participate in the drafting of the self-assessment report. The audit report is first presented to the EPFL management, and then, in a second step, the Dean informs the management on the position of the School, as well as proposes remedial measures to be implemented.

All the aforementioned will be not only presented during the DIALOG sessions (an annual meeting between a delegation of the ETH-Board and the EPFL Senior Management, which reviews the implementation of EPFL strategy and projects), but also discussed in a meeting of the ETH Board. The Dean communicates also the audit results to the employees of the School. Two to three years after the audit, the Dean delivers a midterm review to the EPFL management. A last review of the implementations of the remedial measures is delivered to the expert team of the next School evaluation.

Specific communication actions of EPFL's quality policy in relation to the accreditation audit in 2014 are explained in section 3 of the self-assessment report. Those relating to information from EPFL satisfaction surveys are listed under F 1.3.

F 1.2 Domain
EPFL's quality assurance system covers, in particular, the following key activities and major tasks of EPFL:
   a) **Management and strategy**, reaching its goals, items F 2.1 and F 2.2.
   b) **Education**, divided into QA of teaching and programs, see items F 3.1 and F 3.2.
   c) **Research**, cf. item F 4, including the quality assurance of the PhD program.
   d) **Resource Management**, see items F 2.4, F 3.4, F 5.
   e) **Innovation and Technology Transfer**: this performance is audited, though not always, during School evaluations. However, the Vice-President for Innovation and Technology Transfer conducts an annual reporting (see item B 2.2). This mission will also, for the first time, be submitted to a comprehensive evaluation within the ETH domain as requested by SEFRI in its reporting to the Federal Council on the objectives of the 2012-2016 performance mandate.

Other Accreditations/Certifications
Quality systems are being used in laboratories and EPFL units, such as for example:
* Under ENAC: the *Traffic Facilities Laboratory* (ENAC School) is accredited under ISO 17025 for four test areas: bituminous binders, aggregates, asphalt concrete, "in situ" tests.
* Within the SV School:
   * Animal labs have a SPF[48] certification.
   * A safety management system[vii] is in place.
   * Moreover, ISO certification is pending for central core facilities for culture medium and consumables preparation;
* The real estate and infrastructure sector[viii] integrated in the central services and VPPL has an ISO 9001 certification.
* The EPFL Forum has an ISO 14001 certification[ix] .
* The BALELEC festival[x], already ISO 14001-certified, is preparing the ISO 20121 certification.

When it comes to the education:
* EPFL's Bachelor/Master program in architecture complies with Directive 85/384/EEC since 2009;

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[48] Specific Pathogen Free (SPF); for more explanations, see also the annex F1.2-1

- The Executive MBA in Technology Management (EPFL's continuous training) has the AMBA accreditation[xi];
- The section for financial engineering is preparing an accreditation of its master program by the CFA[xii] agency.

Management Systems strengthening EPFL QMS
Related key EPFL processes and managerial activities reinforce the activity of EPFL QMS, as well as the quality culture of the institution without being formally integrated.

- o **Sustainable development:**
  - EPFL provides a periodic report on sustainable development[xiii], established according to the guidelines of the Global Reporting Initiative[xiv].
  - The technological university also produces an environmental document in the reporting system of the federal government (RUMBA[xv]).
  - In addition, EPFL has signed the ISCN/GULF Sustainable Campus charter[xvi].

- o **Risk management:** risk management was introduced at EPFL by the ETH Board with its legal basis:
  - Council Directive concerning the ETH and risk management[xvii] for the ETH and research institutions[xviii] of July 4, 2006;
  - Ordinance[xix] on the organization of EPFL of March 1, 2004 (from 2012);
  - Guidelines of Organization of Risk Management[xx] at EPFL;
  - Organization of Risk Management and its committee: The CRM consists of four members and is advised by two representatives of the academic field. They bring academic expertise, especially for risk analysis of strategic domains and of Schools and colleges. As of 2013, the head of the quality system actively participates in the analysis of the objectives and risks of the Schools. The CRM coordinates and supervises the activities of seven committees attached to it (see Fig. F1.2-1).
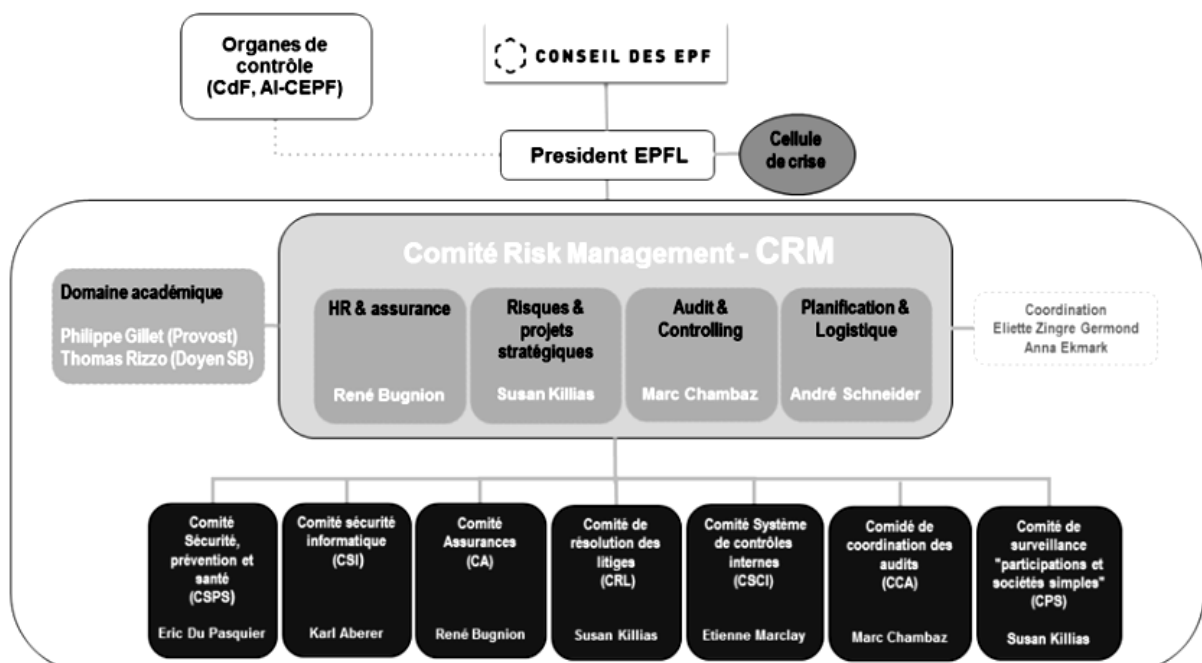

Figure F1.2-1: Organigram of the Risk Management in the ETH-Domain and in EPFL

- The mission of the CRM is to:
  - implement the risk management policy at EPFL in accordance with the Directive of the ETH Board on risk management;
  - develop an organization and procedures to ensure legal compliance;
  - ensure the identification of risks and the implementation of measures to reduce them to an acceptable level;
  - ensure that the people involved with risks manage them, communicate them to the CRM and regularly perform critical verifications.
  - oversee the insurance program and adapt it to the needs;
  - encourage individual actions and initiatives to improve the management of risks and opportunities at EPFL;
  - report to the President and the EPFL management on an annual basis and regularly on the status and the progress of cases related to risk management.
- The extent of the EPFL's risk management includes the campus of Lausanne, Neuchâtel, Geneva and soon that of Sion (Valais) and Fribourg as well as all stakeholders (public and private partners, bodies of research funding, sponsors, donors, ordinary partnerships, foundations, associations, media).

- **Financial supervision of EPFL - Controlling[xxi]**: in addition to the work carried out by EPFL's own financial controlling unit, supervision is done by the following bodies:
  - The Federal Audit Office (CdF).
  - CEPF's Internal Audit Office (AI CEPF).
  - The auditors of the European Commission (EC) and those of the European Court of Auditors who review research projects funded by the European Community.
  - For the first time, the Cantonal Finance Control Unit announced in late 2012 the revision of the construction of a project financed by EPFL, UNIL and sponsors on the premises of the EPFL/UNIL Sports Center.

  Their activities are not restricted to merely financial control but also include process control.

  Annex F1.2-2 provides information on the monitoring of activities and Risk Management, of which an ad hoc committee carries out the coordination. *Annex F1.2-3* provides examples of actions of financial supervisors and risk management that have had an impact on EPFL's quality assurance.

- The **EPFL information system (IS)** is an essential asset which contributes to its objectives. A special attention is given to IS security. IS security team consists of 3 collaborators. Its aim is to ensure the business continuity and to protect EPFL reputation. **EPFL IS security is inspired by ISO/IEC 27000 series and the Information System Security Policy[xxii] is its cornerstone**. Risk analysis, audit recommendations follow-up, intrusion tests and incident management are some tools used in this context. On the June 2014, EPFL management approved a new directive concerning use of IT resources. An information classification directive and an IT general controls inventory are being developed.

- **Safety Prevention and Health Domain:** Since July 2011, the Security Service of EPFL then known as SHE (Safety, Health and Environment) has become the DSPS (Safety Prevention and Health Domain). These three main pillars summarize the different actions to be taken and implemented to ensure the safety of the staff and infrastructures on the site of the EPFL. The mission of the Safety, Prevention and Health Domain on the EPFL campus is to ensure the following services:
  a) **Safety**: Safety and security tips and analyzes, management of all EPFL emergencies, policy contingency and events (security tips and concept), firefighters and rescue workers.

b) **Prevention**: Compulsory Basic Safety Training for all new hired EPFL staff (FOBS), specific training for security correspondents (COSECs), specific training for the use of certain equipment, identification of chemical, biological and physical hazards in the units and rooms of the school (cadaster of the hazards), audits and checks, incident and accident handling, prevention campaigns (Help Network), actions and follow-up of the construction projects.

c) **Health** : Ensure medical monitoring of employees, advice on health and hygiene in the workplace (MSST), training of Samaritans and Samaritans teams, monitoring of occupational exposure, taking into account the occupational diseases, the presence of a Health Point with nurses of the Policlinic Medical University (PMU) allowing the EPFL population to have access to an active medical center for a first anamnesis, care and prevention.

The website of the DSPS service refers to the Schools' pages and sites dealing with their own actions in these three areas.

F 1.3 Stakeholder Involvement

The involvement of stakeholders, especially external ones, has already been mentioned in item A 3.1 and that of students in programs particularly in F 3.1. Other information is also in the portion of the report devoted to sections. The specific attentiveness to students by the education sphere is listed in Annex F1.3-1. We deal here with periodic satisfaction surveys (approximately every six years) of internal stakeholders performed globally at EPFL:

- *The Campus II[xxiii] 2012 Survey* of bachelor and master students at EPFL. The results are globally very positive and show a significant improvement in student satisfaction; indeed, the respondents appreciate the quality of the delivered education and also to be part of EPFL. The ratio of unsatisfied respondents is below 3% in all sections. Their satisfaction is significantly higher than in 2004: despite some weak points detected and described in the management summary of the survey, the education is globally very well perceived at EPFL. The remedial measures and a first follow-up are included in Annex F1.3-2.
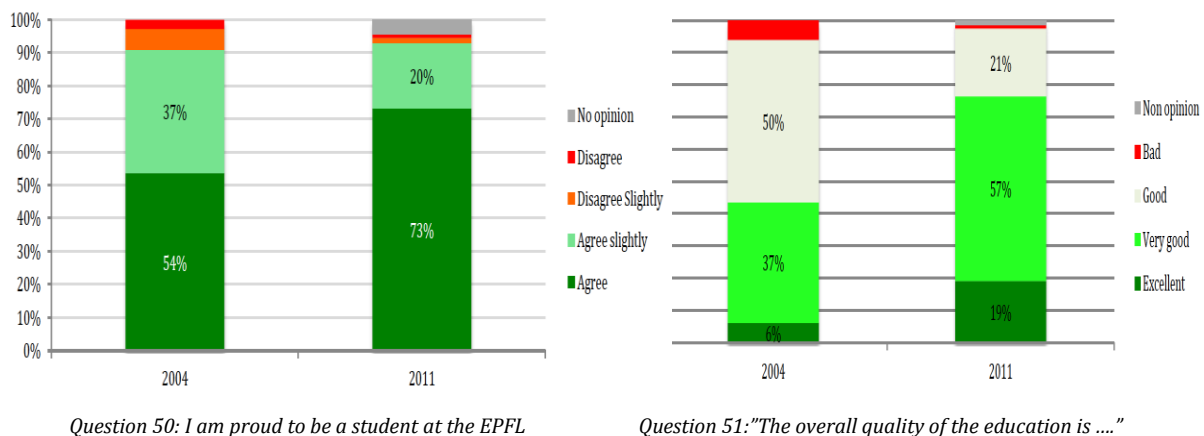

Question 50: I am proud to be a student at the EPFL   *Question 51:"The overall quality of the education is …."*

Fig. F1.3-1 Overall Satisfaction Progression of Students 2011 versus 2004

- *The Doctoral II[xxiv] 2012 Survey* of the PhD students at EPFL. Again, the results are globally positive: overall, the 2012 survey reveals an encouraging level of satisfaction of the doctoral students, while still showing significant room for improvement for instance in supervision, variety of doctoral courses and recruitment procedures. 85% of Ph.D. students are satisfied with the conditions under which they are conducting their thesis research (as compared to 90% in 2005, a comparable result). 90% identified that the advice from their thesis advisor was useful or very useful. The remedial measures following the investigation and a first follow-up are presented in item F 4.1.

- *The ATMOS II Survey[xxv]* addressed EPFL employees (excluding PhD students; Annex F1.3-3). The survey covered 10 topics. Overall, just as the identification with the institution and its strategies can be classified as strong, the involvement and satisfaction of the employees

and coworkers, especially professors, were very good. The average increase of +0.5 points compared to the index of the first survey in 2004 (Atmos I; 4.0 out of 6) is noteworthy with improvements in almost all areas. This positive result, however, should not draw attention from more unfavorable results, where improvements are desired. The results of ATMOS II have been compared with those of a similar survey conducted by our sister institution, ETH Zürich. Very similar patterns of satisfaction were found for the 10 topics (including evolution of professional activity, career and mobility). The adopted remedial measures are found in Annex F1.3-4.
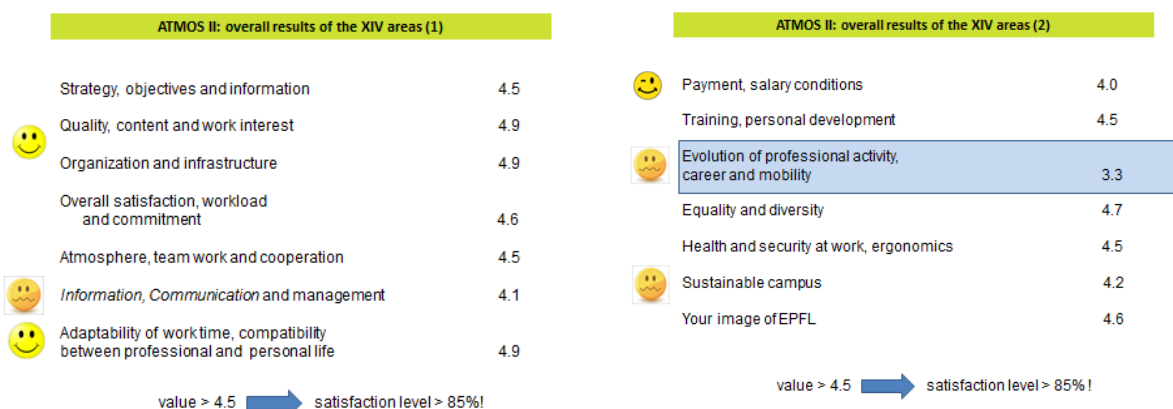

Figure F1.3-2 Overall scores for ATMOS II

Regarding the process aspects, all questionnaires, investigation reports, and remedial measures were validated by the EPFL management and presented to the CEPF during the DIALOG session. For Campus II, the monitoring of remedial measures is performed by the Dean of the bachelor and master programs, for Doctoral II by the Dean of the PhD program, and for ATMOS II by an ad-hoc committee composed of the Secretary-General, two Deputy Secretaries General, the HR manager of EPFL and the Quality Officer of EPFL. A first review meeting was held on January 9, 2014. For this latest survey, however, several remedial measures profoundly affect the habits at EPFL; their implementation is gradual and their effect will be seen in the medium and long term. Some actions have, however, been immediate, such as the appointment of a person in charge of the internal communication at EPFL.

Investigations and management decisions concerning remedial measures have been the subject of an internal communication, particularly at CDS, at a meeting with Deans, at the committee of doctoral program directors, at the school's Education Assembly, at the School Assembly, and also in internal meetings of the VPAA. The VPAA Newsletter, Flash, also published articles about them.

The comprehensive surveys above, placed directly under the supervision of and coordinated by the EPFL's Quality Unit are not by far the only ones to be conducted within the institution. Other EPFL units also conduct surveys independently and regularly, for example:

- the Career Center[xxvi] for the insertion of new alumni (see chapter E);
- the Educational Affairs[xxvii] for the annual satisfaction survey regarding service to students, which enables to adjust and improve the services (report 2013[xxviii]);
- AGEPOLY – here as part of a survey in 2013 on new teaching methods and EPFL's education reform (presentation of the main results, Annex F1.3-5), in order to convey the concerns of the students to management;
- Other satisfaction surveys by certain services that fall within the VPPL are also conducted periodically on EPFL collaborators such as EPFL's travel agent[xxix] and the unit in charge of coordination of catering[xxx].

F 2 Governance

F 2.1 Consistency with Global Strategy and F 2.2 Strategic decision making

Quality appears in missions of the VPAA[xxxi] and its visibility is quite unusual in universities: a Quality Delegate, with the title of professor and former program director, has been appointed by EPFL's management in September 2013. He reports directly to the Vice President of Academic Affairs. The monitoring of quality cases, in particular when it comes to education, is subject to discussion and regular meetings between these two actors.

The figure in F1.1 displaying the QA of EPFL in the mode *cockpit view* shows that EPFL's QA is integrated into the strategic approach of the domain and EPFL, and is in harmony with the latter. Thus, many quality activities, such as the design and results of satisfaction surveys, committee briefings and debriefings, as well as audit, accreditation and evaluation reports of School activities, are subject to reporting and debate followed by the decision of a remedial action program at the strategic level. Those involved in this process are the Senior Management of EPFL and the ETH Board, especially, for the latter, at its meetings, and in the context of the annual DIALOG day. It is on this occasion that the goals of the convention of objectives are reviewed by the delegates of the ETH Board and the Senior management of EPFL. The monitoring of this condition is also the subject of two additional reporting sessions:

- In the annual budget request that EPFL addresses to the ETH Board (see Annex F 2.1-1 and F 2.1-2).
- The elements of reporting provided by EPFL are attached to the annual monitoring report of the goals of the performance mandate written by the ETH Board to the attention of the political authorities of the Confederation (see Annex F 2.1-3).

The QA related to the recruitment of staff and faculty members is specifically treated in section F 5 of this report.

F 2.3 SWOC[49] analysis and Strategy for Improvement

Continuous Improvement within EPFL

The self-evaluation report provides much evidence of continuous improvement within the ETH domain and, in particular, within EPFL:

a) *For education*, an indicative and in-depth assessment of the delivered teachings provides useful information for the professors and the sections in order to correct any non-conformity into expected competences (education, coordination between courses or sequences in the program)[50]. A substantial offer of course seminars, tools and personalized assistance provided by CAPE facilitates the achievement of this goal and can provide optimal support to any professor wishing to improve the quality of his teaching (cf. F 3.4).

b) *For the programs*, the information provided by the academic boards and advisory committees of the sections, global surveys (*i.e.* Campus I/II, Doctorants /II and ATMOS I/II, as well as remedial measures ensuing from them, and those conducted on new graduates or on alumni), School evaluations, the use of a new computerized grid for program management (included in IS Academia) according to expected competences based on learning outcomes (recently developed by the EPFL Quality Unit), are gathering elements for the implementation of continuous improvement of various Bachelor/Master courses and programs. Hence, on the same line, EPFL will also take into account the recommendations of the OAQ/Cti accreditation audit in November 2014.

c) *For research*, its constant monitoring done by annual reportings of the School deans and that developed centrally by the dean of research, and the results of periodic School audits and remedial action programs resulting from them, constitute valuable instruments for its continuous improvement. These measures also guide *the strategies of the Schools and their daily management*, and have an impact on *the process of recruiting faculty professors*

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[49] Strengths, Weaknesses, Opportunities, Challenges
[50] The evaluation system is currently being reviewed by a subcommittee of the CDS following a decision taken in March 2014.

performed at the highest level. An example of School evaluation and related documents will be provided to the experts in an ad-hoc workbook during the audit.

d) *For EPFL's strategy*, which in the EPFL convention of objectives is delineated into achievable goals for the planning period; the monitoring and any possible adjustments are described in the item A 1. Imperfectly achieved goals, if they do not become obsolete, may be reworked during the drafting of the next period's convention of objectives. Note also the contribution of the ATMOS II survey to improve the daily functioning of the technological university.

e) *For the ETH Domain*, the objectives contained in the performance mandate, besides the annual reporting of the ETH-Board to the Federal Council, are subject to intermediary and final evaluations, and the final report is submitted to the SEFRI, as well as to the two parliamentary committees dealing with higher education and research. This final report is also taken into account when establishing the performance mandate for the next planning period.

Global SWOC Analysis

The SWOC analysis below focuses on quality assurance aspects. The assessment of the overall strengths and weaknesses of the institute of technology is given elsewhere in the self-assessment document (item 7) taking into account the risk analysis done in 2014 by the school. Moreover, the sections have also developed their own analysis (see their specific contributions).

Strengths

- A comprehensive quality assurance system that covers all the missions of the school and the various hierarchical levels of the ETH Domain, supported by other management systems, in particular by a structured risk management, financial controlling, Iso 9001 certification in VPPL units and security management system (informatics and communication).

- An improved level of satisfaction of the students with respect to the quality of education and to their pride in belonging to the EPFL according to the CAMPUS II survey.

- An effective management of Academic Affairs in line with the quality assurance that provides services to students and professors, as well as high-quality administrative monitoring.

- A comprehensive academic on-line management system, IS-Academia, the backbone of the academic quality assurance of our institute of technology, allowing full monitoring of all curricula, students, and judicious reporting.

- A teaching expertise and support service for the professors (CAPE) enabling to improve course delivery, and to support the implementation of learning outcomes.

- A proven management of education, driven by an ad-hoc Dean centrally coordinated by the Conference of the Directors of programs.

- A grid of skills and a computer tool (learning outcomes and chart flow of courses) facilitating program management.

- A well-segmented stakeholder participation, with follow-up.

Weaknesses

- Due to the dramatic increase of student registrations observed over the last few years, our infrastructures are starting to face some space limitations and flexibility, particularly at the bachelor level.

- An uneven dotation of management resources between sections, which does not always allow some of them to implement to their satisfaction the recommendations and control measures required by the EPFL Senior management, or to take into account the views of all internal and external stakeholders.

- Variable support for education and thereby for the teaching sections from the School deans.

- A low participation of faculty in CAPE pedagogical seminars.

- The introduction of learning outcomes, which, although well initiated, still remains in its implementation phase with the desired educational developments and necessary alignment

of their evaluation procedure (full implementation and specific outcome assessments at exams).

Opportunities

- New laboratories (Discovery Learning Labs), and also "the extensions of our Campus through Regional Institutes" should permit us to respectively to develop new trends and potential for creativity in the pedagogical approaches, and to extend the offer of semester projects and master thesis in new domains of engineering.

- New study regulations during the first year of bachelor permitting that student could be already selected at the end of the first semester through an intermediary exam. Students, who would fail this intermediate exam, would be asked to follow a specific remedial course organized by the CMS to compensate their gap of knowledge and acquire the required skills. This would be assessed by a final exam at a spring exam session. Only if this test could be successfully passed, students would be allowed to apply again and repeat their first year of bachelor. At the same time this measure would improve the teaching conditions for those continuing during the second semester and thereby their chances of acquiring the level of learning outcomes required for passing the propaedeutic exam.

- A reform of the education that both strengthens the skills acquired at the bachelor program and better specifies the teaching objectives in the master programs with the definition of core course modules conferring competence profiles that are specific to each engineering specialty.

- Development of competences grids describing each curriculum and allowing quality control of the educational offers as well as a more effective management of programs.

- New Curriculum planned in Digital Sciences.

Challenges

- The recent registration of a large number of students in the bachelor programs represents a true challenge: if access to our more advanced courses was not better controlled (required level and related assessment mode), this could lead to a decrease in quality of the delivered education (too many students, overcrowded classes, proportional decrease in training lab space, insufficient assistantships, etc.).

- The current plan is to experimentally introduce MOOCs as a strengthening support (development of so-called "flipped courses") for the polytechnic courses of the propaedeutic year. Such introduction of MOOCs in the study plans will need, not only, a specific evolution in the pedagogy of course delivery, but also, in the way learning outcomes are assessed (organization of tests with identity certification respecting our internal study regulations).

- "Discovery Learning Labs" (a new concept of "wet" labs for b/m students) are planned not only to adapt our teaching lab capacity in face of the increased student's number, but also to develop new practical activities during the bachelor and master studies. The main goal behind this initiative is to foster interdisciplinary projects with specific slots in study plans requiring a smooth coordination between sections.

- The development of EPFL regional extensions will lead to the delocalization of a significant part of the teaching staff (including lecturers and PhD students). Some risks may arise thereby from an increasing complexity for the organization of teaching (for example: frequent travels for both teachers and PhD-students), or a reduced offer of common services in the off-campus centers (seminars, libraries, etc.).

- The mobility of students had to be re-considered after the vote of the 9th of February 2014 regarding freedom of circulation within the EU. The reintegration of Swiss universities in an Erasmus-equivalent program is a critical point to maintain international exposure and training for our students.

Action plan

Important objectives arising from the previous analysis:

- The full implementation of learning outcomes implies the establishment of a strong and motivating academic governance. In this way, it will be possible to communicate a vision and to coherently fix objectives in order to create the necessary team spirit within internal stakeholders of our education system. Such a spirit is required to implement study reforms and to overcome the passive resistance to change of some stakeholders.

- To develop of a strong alliance between the VPAA and the school deans to obtain their adhesion to its objectives concerning a strengthened quality of education and thereby to encourage the latter to support sections (budget and human resources) for an optimal implementation of the education reform.

- To foster an integrated culture of quality for education within EPFL promoted in a team spirit by the Dean Ba/Ma, the DAF and the Quality office in accordance with the new LEHE (Loi fédérale d'Encouragement des Hautes Ecoles) to be implemented in January 2015. To this end, incentives should also be found to promote the acquisition of a good command in French for all faculty members originating from different backgrounds.

- The teaching sections should be encouraged to interact more with their Academic committees and to further develop the dialogue with external stakeholders. Sections should validate the gathered information obtained by these contacts by comparing it with the results obtained by the follow up of graduate employability performed by the career center and the EPFL Alumni association.

- Due to the absence of an entrance exam wanted by Swiss laws, some students are in difficulties during the propaedeutic year. To help those students, a filtering exam is planned at the end of the first semester to reorient them towards a specific remedial course. The new regulation is in discussion and the organization of such course should be carefully planned to give insufficiently prepared students true chances to fill their gap of knowledge.

- We plan to reinforce the quality of the common polytechnic courses in the propaedeutic year and to use, to this end, new pedagogical tools. The introduction of MOOCs and "flipped courses" in this selection year is considered as an opportunity to promote, on the one hand, common course contents and exams, and, on the other hand, new pedagogical approaches. Such MOOCs, also intended to be broadcasted worldwide, will be valuable not only for developing countries, but may also serve locally for the preparation to the entrance at EPFL

- We plan to implement rules and accompanying facilitation measures to ensure the participation to our educational programs of teachers and PhD assistants working in the recently developed "EPFL regional centers". These centers offer extraordinary possibilities in terms of infrastructures, collaborations and integration of students in research projects linked to industry. Such rules are already in place for the "Microengineering center" between the "Institut de Microtechnique" (IMT) in Neuchâtel, and the section of Microengineering. They will be extended to all other centers, Sion, Geneva, and Fribourg.

- The work in laboratories and research groups is a traditional strength of the EPFL education system. The recent increase in student's number will therefore require new facilities. The development of the so-called "Discovery Learning Labs" will be central not only to relieve that gap at the bachelor level, but also to complement the lab space offer for new interdisciplinary and creative projects at the master level.

F 2.3 Equal Opportunities

EPFL promotes women's careers: for example, a specific clause in the regulations of tenure-track assistant professors concerning maternity leave (Art. 19 of the regulation[xxxii]). But EPFL also has an ad-hoc unit: the EPFL Equal Opportunities Office[xxxiii] is a unit depending on the General Counsel with missions framed by Federal Laws. It develops measures and actions for:

- the next generation of scientists in the French-speaking part of Switzerland, promoting STEM[xxxiv] subjects among youngsters especially for girls, to encourage them to choose scientific engineering fields;

- female students and scientists at EPFL, to encourage their career development and advancement and to enable access of women to executive positions, through Gender Mainstreaming;

- men and women, when it comes to work environment and conditions at the EPFL, to make it easier to reconcile family life and professional activities. Thus, EPFL has, in partnership with the University of Lausanne, four day care centers[xxxv].

Detailed information about the office, including legal framework, mission, strategy, indicators, and focus for 2014, is included in Annex F2.3-1. See also the web site[xxxvi] of the office for further information as well as the web site of the Wish foundation[xxxvii].

F 3. Teaching

Globally, the Program director is supported by a quality system that includes:

- The **evaluations by students** correspond to the student's satisfaction for different learning activities. Another aspect is the peer review of the teaching, assuring the coherence of the study plan as well as its correspondence to the needs of the future employers. Three committees help the sections directors in these reviews:

- The **teaching committee**, including all involved teachers, discusses the challenges and opportunities encountered in the education offer. It looks at the synergies between courses and proposes curriculum evolution.

- The **advisory committee** reflects the needs of employers. It helps to define the main directions of evolution and the requirements of industry.

- The **academic committee** is responsible for verifying the quality of courses and examinations, in particular for ensuring that the learning objectives are achieved. It contains an external expert usually from ETH Zurich, together with well-established professors of the section.

F 3.1 Systematic Evaluation of Academic Performances

Annual reviews of the curriculum by the advisory committees, academic committees, assessments of new alumni provided by the career center, as well as pluri-annual meetings (minimum twice per year) of section commissions have been addressed in the subchapter F 2.1 dedicated to stakeholders (and in the part of the report devoted to the sections); the subject of the next subchapter is the review of the daily management of the programs and learning outcomes. However, the basis of systematic evaluation of the bachelor/master education, implying the different internal stakeholders of our school is certainly that of teaching evaluation. This aspect is discussed in the present section.

Teaching Evaluations at EPFL

Overview
As part of the focus on continuous improvement of the teachings and the programs, professors and sections are encouraged to evaluate and develop their courses every semester. In doing so they are informed by feedback from the students. This comes in a number of forms:

- **Student evaluation of teaching**: Quick feedback (~ smoke detector) through an indicative evaluation: all courses have a short student evaluation of the teaching during week 9/10 of the semester.

- **More detailed feedback through**:
  - an in-depth evaluation, carried out by the section.
  - a complementary evaluation, carried out by the Teaching Support Center and accompanied by personalized feedback and support.

Mechanisms for student feedback to professors are described in more detail below, however, it is important to note that student feedback is not the only form of evidence that teachers can use to evaluate their own courses. Other evidence includes:

- A review of what students have learned (as evidenced in exam performances, for example)

- The professor's own experiences in teaching the course

- Feedback from colleagues or from a Teaching Advisor (e.g. following a class observation)

Student evaluations of the teaching are intended <u>to be read in context and in conjunction with other forms of evidence</u>.

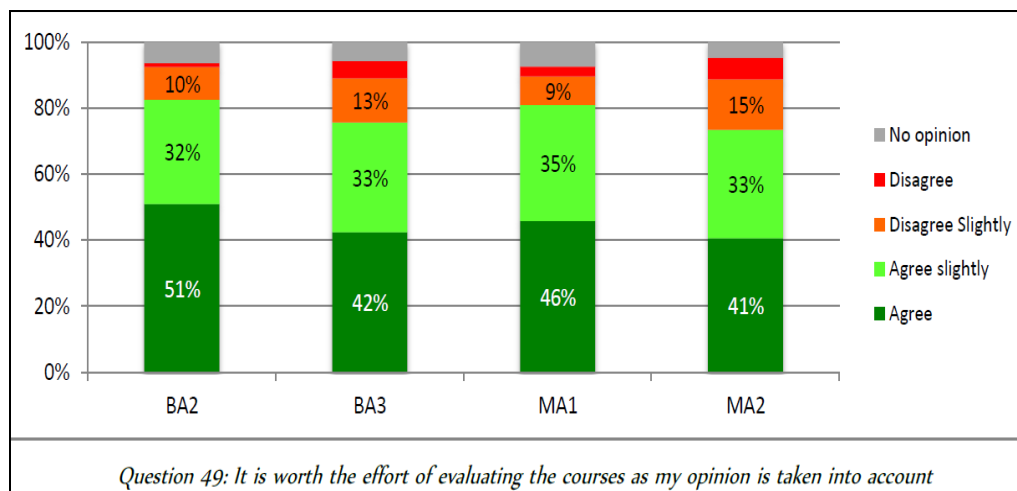**Student Evaluations of the Teaching: Indicative evaluation**

All Bachelor and Masters courses are subject to a student evaluation of the teaching in week 9/10 of each semester (doctoral courses are also automatically evaluated, but, due to the differences in their format, another type of mechanism is used). In order to maximize the response rate in indicative evaluations, a single statement is given: "Globally, I think that this teaching is: Excellent (6); Good (5); Satisfactory (4); Unsatisfactory (3); Poor (2); Extremely Poor (1)". Students are also provided with an opportunity to leave comments. The response rate for the indicative evaluation is typically between 50% and 60%. About half of all student respondents also leave comments. The indicative evaluation is regarded as useful by a majority of professors (73%), as can be seen from Figure F3.1-1.
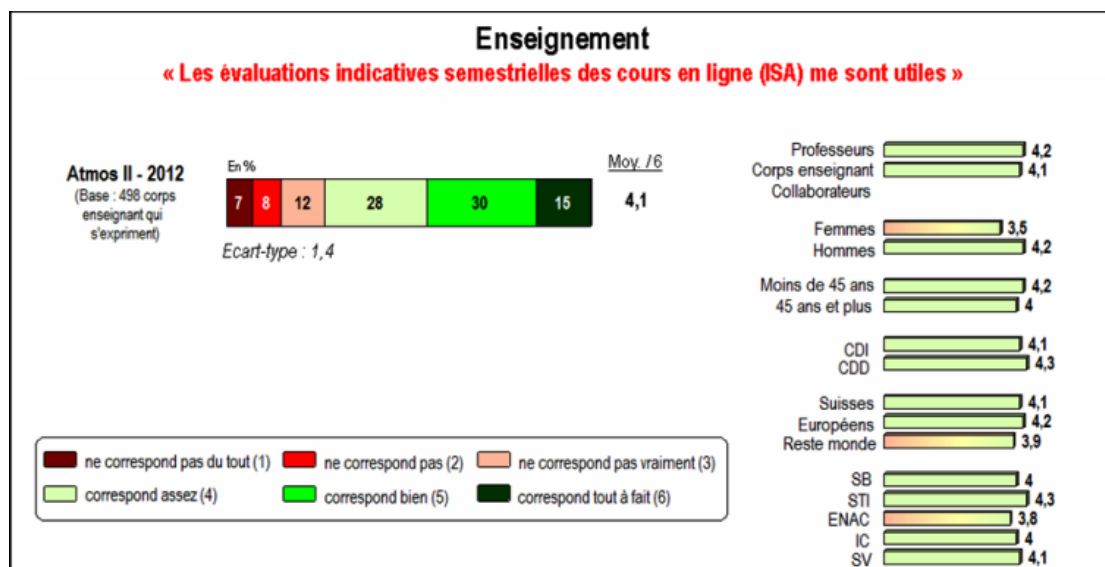
Note: Based on 498 responses from professors in the ATMOS II Survey, Summer 2012

Figure F3.1-1: Professor responses to the statement "the on-line indicative evaluation each semester is useful to me", for all EPFL professors and for particular professor cohorts.

It is also regarded as useful by students, who feel their input is taken seriously, as can be seen from Figure F3.1-2 (below).

Question 49: It is worth the effort of evaluating the courses as my opinion is taken into account

Note: Based on 2,584 responses to Campus II Survey, October 2011

Figure F3.1-2: Student responses to the statement "it is worth the effort of evaluating the courses as my opinion is taken into account. »

Each semester, about 90% of all courses receive a mean average evaluation from students of 4 or higher. Courses with a lower mean indicative evaluation are regarded as having an "insufficient" evaluation score, and are subject to further scrutiny. The fact that the indicative evaluation is based on a single question means that its reliability is open to question. Therefore, it is important that it is not seen as a final assessment of a professor's performance or of a course; having an "insufficient" evaluation score does not mean that there is a problem with a course *per se*, rather <u>it means that the course merits closer inspection by the Director of the program</u>.

Student Evaluations of Teaching: In-depth Student Evaluation
While the indicative evaluation provides regular feedback from a reasonably large proportion of students, more detailed feedback from students is also valuable. This is provided through in-depth evaluations involving a multi-dimensional student evaluation questionnaire of the teachings, administered by the section. In-depth evaluations of the teaching are provided under three circumstances:

- an in-depth student evaluation of teaching is required **for all courses, at least once every five years** (following a policy introduced in 2012);

- an in-depth student evaluation of teaching is required **for all new professors of a course;**

- when **a course has an "insufficient" indicative student evaluation** score, the section director is responsible for carrying out an in-depth student evaluation of teaching. The results of these in-depth evaluations are discussed between the professor and the section director, with a view to identify whether an issue exists and, if so, how it can be addressed.

Student Evaluation of Teaching: Complementary Student Evaluation
A third format for student feedback is the complementary evaluation. **Any teacher can request a complementary student evaluation of teaching**, administered by CAPE. This can be carried out in place of an in-depth student evaluation of teaching (subject to the agreement of the section).
Complementary evaluations enable the teacher to approve the questionnaire in advance, and to get feedback on issues that are of particular interest. The questionnaire is often administered during the exam, thereby ensuring an effective 100% response rate. A teaching advisor prepares a written report, integrating both quantitative and qualitative data, and meets with the professor to discuss feedback and analysis. This report is confidential to the teacher in question. In the case of complementary evaluations carried out in lieu of an in-depth evaluation, a summary of the report is provided to the section director by the professor, who, in turn, reports to the Dean of the Bachelor and Master programs.

CAPE: The Teaching Support Center

The evaluation of the teaching alone allows only a partial continuous improvement thereof, if it is not accompanied by the supporting activity of a teaching unit. This is the role of CAPE.

Mission

The Teaching Support Center / Center d'appui à l'enseignement (CAPE[xxxviii]) is the unit within the VPAA[51]. The mission of the Center is to work with professors, sections and schools to support quality improvements of the teaching. The Center does this through[52]:

- One-to-one support, coaching, and advice to professors (further details here[xxxix]).
- Personalized complementary student evaluations of teaching to professors (further details here[xl]).
- Training workshops on higher education pedagogy (further details here[xli]).
- Managing the automated indicative evaluation system.
- Supporting development projects (such as the introduction of the new Course Description Interface, introducing Classroom Response Systems — clickers[xlii], first year tutorials[xliii], etc.).

Summary of CAPE's activity in numbers 2013

- one-to-one work with professors (incl. personalized complementary student evaluations) 279 engagements with 227 professors;
- 15 teaching workshops attended by 87 EPFL professors and 60 professors from partner universities;
- 14 presentation skills workshops for doctoral students, attended by 110 PhD students;
- support for writing of new course descriptions including learning outcomes;
- 651 indicative course evaluations during the fall semester, with 54% student response rate
- clickers[xliv] (Classroom Response Systems) integrated into classes involving 1,500 students.

F 3.2 Implementation of Learning Outcomes (see C.2)

In 2013, EPFL direction has decided to implement learning outcomes for the description and shaping of its programs, namely as "statements of what an engineer knows, understands and is able to do on completion of a learning process", in particular at the end of his engineer curriculum. Learning outcomes are now to be defined by teachers and sections at EPFL in terms of knowledge, skills and competence. However, as mentioned in their critical review on the implementation of learning outcomes in European higher education (see D. Proli et al. ref[xlv]): "*in the absence of thorough techniques and methodologies able to ensure cohesiveness and consistency of the whole learning cycle, the substance of the learning outcomes approach is often dispelled in favour of a mechanical rewording of courses and certifications, thereby scattering its potential benefits*".

Since we are in the implementation phase, the following strategy was followed at EPFL in order to favour this challenging implementation and change of culture:

a) the creation of a task force under the guidance of the Dean BaMA, the Teaching Support Center (CAPE) and the QA office to provide the general basic information and motivation to initiate the sought cultural change among the program directors and the teaching community of our school.

b) two different tools were generated:

1) an electronic interface to facilitate the new culture of course description (F.3.2.1);

2) the introduction of a computer-generated grid indicating the intended competency profile obtained for a given program as a function of the cumulated course learning outcomes present in that curriculum (F.3.2.2).

Both tools are capable and expected to evolve according to the needs and feedbacks from program directors and our teaching community at EPFL.

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[51] The Center was inaugurated in 2013, taking over this responsibility from the CRAFT lab, which had previously had this role since 2003. It is housed within the Educational Affairs Division (DAF) of the VPAA.
[52] The Center represents a team of five (4.1 full time equivalents) (biographies can be accessed via hyperlinks): Roland Tormey (100% - Coordinator), Siara Isaac (100%), Ingrid Le Duc (60%), Jean-Louis Ricci (80%, until May 2014, position will become 100% upon replacement), Nadine Stainier (70%).

Support for Professors in Writing Learning Outcomes

In 2013, EPFL adopted a new model Course Description Form requiring professors to describe their course content in terms of Learning Outcomes. An electronic interface was developed to enable professors to directly enter their Course Descriptions into IS-Academia, the EPFL academic database. To maximize the value of the approach of learning outcomes in EPFL, the system was designed with four goals in mind:

- to encourage professors to use "observable" verbs in describing the goals of student learning in their courses

- to encourage professors to consider describing student learning in terms of mid-range cognitive functions (analyzing and applying), and higher cognitive functions (creating, synthesizing and critiquing) in addition to using verbs typically associated with lower-range cognitive functions (remembering and understanding).

- to encourage professors to consider whether their course teaches professional or cross-disciplinary learning outcomes (often linked to more affective, or interpersonal domains), in addition to subject-specific (cognitive and psychomotor) learning outcomes.

- to ensure that professors have the liberty to describe the learning outcomes of their own courses in a format and language that seems most appropriate to them.

To this end, the system includes:

- pre-defined ("observable") learning outcome verbs, categorized in terms of lower-range, mid-range and higher-range cognitive functions (see the scrollable box with verbs on the upper right side of the image in figure F3.2-1).

- pre-defined cross-disciplinary / professional learning outcomes (see the scrollable box with cross-disciplinary skills on the lower right side of the image in figure F3.2-1).

- although encouraged to use these pre-defined elements, the system also leaves professors free to write subject-specific and cross-disciplinary learning outcomes in whatever form they feel most appropriate.

Figure F3.2-1: Screen grab of the course description interface, showing suggested verbs and cross-disciplinary skills.

Course Descriptions were completed by teachers during the summer 2013 and were validated by the relevant section.

To encourage professors to use the new on-line Course Description interface, the following supports were put in place:

- A website and demonstration video with information on [learning outcomes](#)[xlvi] and on the course description interface was made available in English and French.
- a personalized support service was put in place to aid professors in completing their Course Description.
- monthly updates on progress in completion of Course Descriptions was provided to Section Directors during the course of the project.

In addition, a focus on using learning outcomes to provide guidance and on curriculum alignment underpins a number of the courses that are offered by the Teaching Support Center (such as course design, effective assessment and effective exercises).

The number of learning outcomes in course descriptions was effectively zero in Spring 2013. By November 2013, 11,957 English and French-language learning outcomes had been written for 1,192 courses (81% of all Bachelor and Masters courses). There were also 2,644 cross-disciplinary learning outcomes identified for 710 courses (48% of all courses). Since there are some courses in the database that are not taught every year, the effective completion rate of learning outcomes is actually higher than 81% (see table F3.2-2).

Table F3.2-2: Increase in the completion of learning outcomes in EPFL courses in 2013

	July 2013	August 2013	September 2013	November 2013
% of courses with learning outcomes included	31%	50%	75%	81%
Number of learning outcomes in French	2960	4743	5649	5933
Number of learning outcomes in English	2761	4718	5630	6024
Number of cross-disciplinary learning outcomes	1179	2106	2453	2644

Note: Based on data from the IS Academia academic database. The data represents the total number of learning outcomes for the 1,466 Bachelor and Master courses offered.

Generation of a computerized grid for the management of programs according to the intended learning outcomes

Sharing again the views of [D.Proli *et al.*](#)[xlvii] in their analysis of the difficulties encountered for the implementation of learning outcomes, we also believe at EPFL that this change in mentalities implies not only a re-thinking of learning paths, but also a real organizational effort to overcoming the well known "silos" and related specific resistance that exist around departments and Schools. In order to permitting the introduction of more flexible collaboration patterns, easy and quick alignment of the different programs, and their regular updating, we have thought to propose a new computerized grid system for the establishment of the intended competency profile of our programs. The motivation for the generation of such tool was to provide program directors with a meaningful tool capable of increasing both their efficiency and efficacy for the transition from well-established procedures to the newly formulated outcomes in the management of their programs. Moreover, by implementing such system on all our campus, this could function as favourable impulse for the adoption of the desired culture by bringing its different users to progress as a community in this (r)evolution.

This tool (figure F3.2-3) will in fact be an evolution of the grids used until now for the presentation of our [study plans to the registrar office](#)[xlviii] and to the direction of the school. Such grids recapitulate all the courses offered per year and per academic program. All courses and their expected learning outcomes are now expressed according to the 11 subclass of intended

competency profiles to establish the professional referential presented during this OAQ/Cti review.

In the part concerning the *"Acquisition of Scientific and Technical Knowledge and Mastery of their implementation"*, learning outcomes are also expressed according to the condensed version of the Bloom's taxonomy proposed by the CAPE for the teachers' course descriptions. Moreover, by asking the program directors to attribute specific colours to the disciplines taught during the courses, a flow chart between courses becomes immediately apparent. The use of colours permits at the same time to highlight the specificities or/and subspecialties within a program. Program directors have accepted to exercise it for the first time to present their programs for this OAQ/Cti review. A grid description with the formulation of the expected learning outcomes accompanies each grid.

Callouts:
- Colour codes of courses indicating **Disciplines**
- **Block of courses** with its total of ECTS
- **Learning Outcomes** expressed according to Bloom's taxonomy

Master in LST
Orientation
MOLECULAR MEDICINE AND SYSTEMS BIOLOGY

Intended competency profile for the program in Life Sciences & Technology

Discipline colour legend:
- BASIC SCIENCES
- MOLECULAR MEDICINE
- SYSTEMS BIOLOGY
- MULTIDISCIPLINARY APPROACHES OF…
- ENGINEERING AND TECHNOLOGICAL T…
- EXPERIENCE IN INDUSTRY
- HUMANITIES AND TRANSVERSAL SKILLS
- OPTIONS IN OTHER SECTIONS *(max 10 ECTS approved by personal mentor)*

Left vertical label: ORIENTATION — Molecular Medicine and Systems Biology — at least 19 ECTS

Competency profile column groups:
- **Scientific and technical knowledge and mastery of their implementation** — A, B, C, D
  - A: Knowledge and understanding of a wide range of fundamental sciences
  - B: Scientific and technical knowledge
  - C: Mastery of Engineering Methods and Tools
  - D: Mastery of Experimental Approaches and Tools for Research and Innovation
- **Adaptability to the specific requirements of entreprises and society** — E, F, G, H
  - E: Entrepreneurship and economic issues, quality, competitiveness and productivity, business intelligence
  - F: Ability to take into account issues related to deontology, ethics, and health and safety at workplace
  - G: Ability to take into account environmental issues, in particular application of principles of sustainable development
  - H: Ability to take into account social issues and needs
- **Organizational, personal and cultural dimension** — I, J, K
  - I: Ability to integrate into professional life, to fit into, shape and develop an organization
  - J: Ability to work in an international context
  - K: Ability to self-assess, to manage one's own competences in the context of lifelong learning, and to make career choices

Sem	Code	Title	ECTS	Teach	Pedag	Type	A1	A2	A3	B1	B2	B3	C1	C2	C3	D1	D2	D3	E	F	G	H	I	J	K
7 or 9	ChE-421	Advanced Principles and Application of Systems Biology	3	PO/CC	C · P	Engineer	x	x	x	x			x	x		x	x							x	x
8	BIO-315	Biomolecular Structure and Mechanics	4	PA	C · P	Engineer	x	x	x	x			x	x		x	x							x	x
8	BIO-471	Cancer Biology I	5	PO/PA	C · E	LST	x	x	x	x						x	x						x	x	x
8	BIO-472	Cancer Biology II	5	PO/PA	C · E	LST	x	x	x	x						x	x			x			x	x	x
8	COM-502	Dynamical System Theory for engineers	4	PO	C · E	Engineer	x	x	x	x			x	x		x	x						x	x	x
8	BIO-479	Immunology (Advanced Topics)	5	PA	C · E	LST	x	x	x	x						x	x			x			x	x	x
8	BIO-477	Infection Biology	5	PA	C · E	LST	x	x	x							x	x			x			x	x	x
8	BIO-491	New tools and research strategies in person. medicine	4	CC/PA	C · E	LST	x	x	x	x						x	x			x			x	x	x
8	ChE-411	Principles and Applications of Systems Biology	3	PO	C · E	Engineer	x	x	x	x						x	x			x			x	x	x
8	BIO-447	Stem Cell Biology and Technology	3	PO/PA	C · E · P	LST	x	x	x	x						x	x			x			x	x	x

Figure F3.2-3: Program Competences Grid in relation with Learning Outcomes

In summary, this grid and its description aim to provide program directors with:

a) a tool favouring the implementation of the new sought culture;

b) a readout system easily updateable for the analysis and adaptation of their programs;

c) a coloured flow chart and the progressive specialization and specification of their curriculum to analyse its consistency to building-up the intended competency profiles according to professional standards;

d) the possibility to consider each individual course within the perspective of a whole program with the relevant information indicating, *who is teaching*, *the pedagogy*, the *number of ECTS credits*; this could also be easily implemented with *students' feedback on the courses*, *student numbers*, *adequacy and quality of the associated infrastructures*, etc.;

e) a relevant tool to communicate and exchange with the internal (teaching commission, faculty and students, and with other program directors) and external stakeholders (industry, partner institutions, alumni) in the continuous improvement of their program;

f) an efficient way to transmit to their successors the management of their programs.

F 3.3 Methods used for Assessing Learning Outcomes and the Performance of Students

Propaedeutic Year

The first year has been reviewed and harmonized. Joint exams are introduced in the courses of linear algebra, chemistry and "Information, Computation and Communication" (ICC). They will take the place of other technology courses. A propaedeutic board of program directors is in place and discusses the course contents and related examinations. To insure a fair assessment of student learning outcomes at the end of the 1st year, QCM are being introduced. A presentation and a poster, which enables to judge the cross-disciplinary skills demonstrated by students, assess the learning outcomes of the newly developed courses "Global issues".

Bachelor and Master Cycles

In the bachelor and master cycles, the students' skills are tested in diverse ways. To the traditional written exams are gradually added oral exams, presentations and project reports, practical laboratory work, group work... The courses and projects in Humanities and Social Sciences (SHS) enable to test all the cross-disciplinary skills throughout the curriculum.

Each semester, the teaching commissions, including the academic commission (see F3 and also the specific comments in the documents of the sections under C), discuss and evaluate the courses, their quality and any problems encountered during examinations. Each exam is subject to a protocol written by the teacher and transmitted to the sections. An electronic reading of these protocols, examination statements and their answers is being implemented. Recently, academic commissions were also established to verify the contents of peer reviews.

Industrial internships are assessed by a supervisor in the company and approved by a supervisor at EPFL. The Master thesis tests the overall skills of students reaching the end of their training in engineering and architecture. An external expert participates in this evaluation.

All student performances are recorded by the Registrar's Office through the IS-Academia software.

F 3.4 Resources and Infrastructures

Several actions are conducted to evaluate and make available the resources expected to properly supervise students and provide adequate structure to our teaching:

- The Dean of the Bachelor and Master programs has prospectively analyzed the impact induced by an increase in the number of students with an estimate of the resources required for the management of 10,000 Bachelor and Master students (see Annex F3.4-1, document from the academic management meeting of April 22, 2013). This work has enabled to obtain a projection of the number of professors, PhD students and tutors required and release the installments - in time - of a dozen people who are mainly devoted to teaching courses for first-year students.

- New buildings (ME building) include rooms for practical work designed to allow the experiments included in engineering study plans. Moreover, a project is under discussion with the University of Lausanne for the construction of a building dedicated to practices in chemistry and molecular science (Wet lab).

- The Polydôme building has been converted into a 180-seat auditorium.

- EPFL has requested funding to convert the old chemistry library into an auditorium with 250 seats.

These elements are derived from an analysis conducted by the education domain ("domaine de la formation") regarding classroom needs (attached document sent to the Vice-president of Planning and Logistics, Annex F3.4-2). The renovation program of the auditoriums and existing classrooms will enable a densification of work places and will bring about 1,100 additional seats in 40 classrooms and 17 auditoriums.

Other actions are underway:

- Given the increase in intermediary examinations and tests, performed completely or partly in the form of multiple-choice questions, the education domain has created a new position to help in the design and analysis of these events.

- A dozen or so EPFL online courses ([MOOCs](#)^{xlix}) are newly created each year. Today these online courses essentially complement the lectures and, where possible, may replace them in the future. The school has set up an infrastructure for the management and creation of these courses and financial assistance to professors who create them.

The reassessment process of the needs to properly support our missions is constant. It is performed by the deans of schools and by the units of the education domain who have added this mission to their specification of objectives.

F 4 Research Quality Assurance

F 4.1 Quality Assurance Processes for Research Activities

Quality of research is of paramount importance in a research university; furthermore, it translates directly into the quality of education. EPF Quality assurance of research is performed both internally and externally; it is inspired by the model published by the [British Research Information Network](#)^l. The EPFL external quality assurance is positioned at different levels:

a) **For EPFL articles in peer reviewed journals**: by the assessment of the editorial committee, which accepts, declines or preconizes content modification before publication. EPFL researchers publish mostly in the best peer-reviewed publications.

b) **For research projects**: international, European, national funding agencies (such as CTI and FNRS) select research projects on a competitive basis, fund them and eventually evaluate their output. The high level of EPFL research projects funded by external agencies (for instance, the high number of [ERC grants](#)^{li}, points at the excellent international performance of the institution.

c) **For EPFL as a whole,** for instance by different [international rankings](#)[53], which provide a "global picture" of the overall EPFL performance, for instance:

  1. in the Academic Ranking of World Universities in Engineering/Technology and Computer Sciences – 2013, EPFL is ranked 15;

  2. The Times of Higher Education 2013-2014 announced the publication of a list of the 25 most international universities in the world, and EPFL came in first place.

Please consult also B 2. However, assessing the quality of research performed at any university is a challenging task. Indeed, merely counting simple outputs does not lead to a proper evaluation of the real quality of the research that is carried out. Also, immediate publication of mainstream results does not mean much for a research institution that is aiming at long-term advances in science and technology.

The main step in this process is to aim at a level of excellence when it comes to hiring full, associated and assistant professors. At all levels, there is a strong interaction between the different EPFL stakeholders. In particular, the EPFL Senior Management and the School Deans assess not only the quality of the candidates' research, but also respect a wide range of different competences and skills of EPFL faculty members. This assessment is particularly carefully carried out at the level of the tenure process where two complete evaluations are performed independently: one at the level of the School, and one at the level of EPFL, before submitting the proposal to the ETH-Board. The promotion file is very complete and includes the number of publications, and citations. It also includes written evaluations by colleagues, and most importantly, by external experts who have been carefully selected. The file also contains, for example, the most important publications, as well as research and teaching plans. Furthermore, in a last step, the

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[53] These ranking can be described as a kind of benchmarking. http://sti.epfl.ch/page-73094-en.html

appointment of a professor is reviewed and validated by the ETH-Board. The tenure process has been discussed recently in great detail at all levels of the school, by involving all stakeholders: it has for instance been largely improved through the work of a group of assistant professors.

Importantly enough, major issues beyond the quality of research are ethical issues and human relations within the research groups and between the research groups and the students. *These are issues that considerably influence the long-lasting quality of the research of the EPFL as a whole*. EPFL is constantly aiming at improving such issues through mentoring at different levels, for instance at the level of assistant professors. A mentoring at the level of PhD students is also in place.

Quality Assurance of the EPFL research is fully supported by the services of the EPFL research office[ii];EPFL School and College evaluation process also contributes in a major way (see also F 1.2).

F 4.2 Periodic Evaluation of Research Results

Each year, the Research Office in the central service at EPFL provides a still confidential document, presently addressed exclusively to EPFL Senior Management. The aim is to globally summarize the different possible indicators for the quality of research. This document contains a wide range of tables, in particular numbers concerning publications (citations, highly cited papers, journals in which EPFL researchers publish, etc.) and also, numbers about external funding. It is certainly not the aim of this document to compare individual researchers, or even the different schools with one another. Rather, its objective is to obtain an accurate picture of the evolution of the research quality at EPFL.

An example of a graph contained in this report is given in the figure here. It shows the evolution of the different sources of European funding over the last three years (figure F5.2-1).

Fig 2.30: European funding overview
CHF (million)
Source: GrantsDB
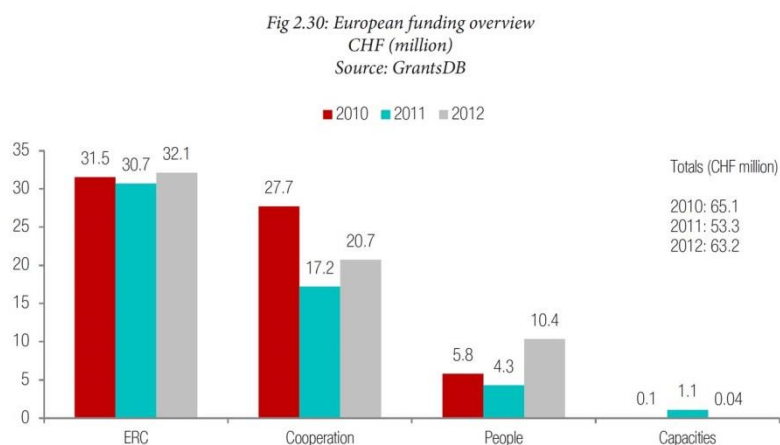
The changes of the different numbers over the years provide a very important tool to assess the quality of research, and to possibly react in case a wrong evolution should be detected.

School and College evaluations, on a 6-year basis (see F 1.2), are also part of the periodic evaluation of the research. An audit committee appointed by the ETH Board also regularly evaluates the overall performance of the ETH domain.

F 4.3 EPFL Doctoral Programs and Quality Assurance

The EPFL doctoral programs, which currently count 2058 doctoral students, exist since 2003. During the last 10 years, the number of students has doubled. However, the increase has slowed down during the last couple of years. Structures and regulations are now well in place, and at the moment the focus is on building a strong community feeling within the disciplines, while at the same time opening possibilities for interdisciplinary research. The former is especially important since the number of EPFL off-site campus is increasing, allowing for close collaboration with local SME's, but leading to additional challenges related to exchanges between students at different locations, study plan requirements, and teaching tasks (courses and teaching generally take place on the EPFL's main campus).

Organizational Structure

The doctoral school[liii] consists of 18 doctoral programs, which are each managed by a program committee presided by a program director. The program committee has up to 12 members who, except for the student representative, are mostly professors or senior scientists. The Vice-President for Academic Affairs (VPAA) appoints the committee members and program director at the proposal of the laboratories or Chairs in the program. A Dean, who reports to the VPAA, heads the doctoral school. The doctoral programs are not necessarily linked to only one EPFL School. Several programs are truly interdisciplinary, and have students and professors from different Schools who are involved in interdisciplinary research projects.

Legal framework

The Federal Ordinance and EPFL Directive govern the doctoral studies in all doctoral programs. However, to allow flexibility, each doctoral program has individual program regulations. Here details are provided on the program's study plan, the candidacy exam at the end of the first year, annual reports, mentoring, and other issues (The EPFL ordinance and Directive[liv]).

Study Plan

PhD students need to follow courses which - depending on the doctoral program to which the students belongs - represent between 12 and 30 ECTS (list of available doctoral courses[lv]). Out of these, at least 4 ECTS need to be obtained during the first year. In addition to this scientific and technical knowledge, transferable skills are very important. A broad range of courses for transferable skills is available for EPFL students. Transferable skills are also acquired due to the teaching obligations for doctoral students. These obligations should amount to a maximum of 20% of their time. The teaching tasks are varied, but generally consist in assisting a professor with his course (helping students with exercises, small experiments, full supervision of students projects, etc.) but can also involve, for example, assisting with the preparation of an MOOCs (Massive Open Online Courses)[54].

Quality Assurance of the Doctoral Program

The quality of the EPFL doctorate is verified at different levels and points in time. The first step is the hiring process. This is followed by a candidacy exam after one year, annual evaluations, and finally an oral thesis exam and public defense after 4 years. To develop the strategy of the doctoral program - with the aim of maintaining and, where needed, improving it - surveys are conducted regularly.

Recruitment

A fair and competitive recruitment process, in combination with the candidacy exam after the first year, ensures the excellence of the doctoral students. Generally, candidates should apply to the doctoral program of their choice, by its fixed deadlines. However, programs sometimes also publish specific offers. A first selection phase consists of the evaluation of the application file. Admission being extremely competitive, it is crucial to prepare it very carefully. The application is directly submitted to the chosen doctoral program. A committee evaluates and takes a decision on the application, taking into account the research interests and potential thesis directors indicated. If the applicant is admitted, he will have up to one year to enroll. If he is hired by an EPFL lab, his contract will be organized during this time. Some time will also be needed to sort out any visa and residence permit requirements. The application file is entirely completed online, via the online application form.

To a fair extent, the recruitment takes now place in the form of hiring days. Here, all the candidates, whose application files are selected, come to EPFL and meet several potential thesis supervisors. All students are therefore evaluated together with their peers by different professors. The hiring days furthermore enhance a program's community spirit and improve the students' integration. Details on the EPFL recruitment process, aimed at prospective students, can be found from the website of the doctoral program[lvi].

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[54] Please consult the data from the Doctorat II survey on the types of teaching tasks in which doctoral students are engaged.

Candidacy Exam
At the end of the first year, the student is submitted to a candidacy exam. The main aim of this exam is to ensure that in addition to the ability to perform academic studies, the student is able to work in a laboratory in collaboration with a team of researchers and technicians. During the exam, the students present and defend a research plan, as well as obtained results/on-going studies, in front of an academic committee. The candidate should fulfill several requirements to be formally accepted to the program after this first year, namely; succeed the candidacy exam, have the agreement of a thesis advisor to supervise the thesis work, have a research plan that is approved by the thesis advisor, and have obtained the required ECTS credits for the first year.

Oral Thesis Exam and Public Thesis Defense
In addition to the normal supervision of the Ph.D. student by his advisor, the doctoral candidate has to submit annual reports on the progress to their thesis advisor, who in turn provides written feedback. Three years after the candidacy exam, the thesis should be ready. The student should present and defend their thesis at the oral thesis exam in front of the thesis jury. The jury consists of the director of the doctoral program, presiding the jury, the thesis advisor, one EPFL expert and two external experts. Some weeks after the jury has accepted the thesis, the student has a public thesis defense where the thesis is presented to a larger audience. An overview of the different stages of the doctoral studies is displayed in Figure 4.3-1.
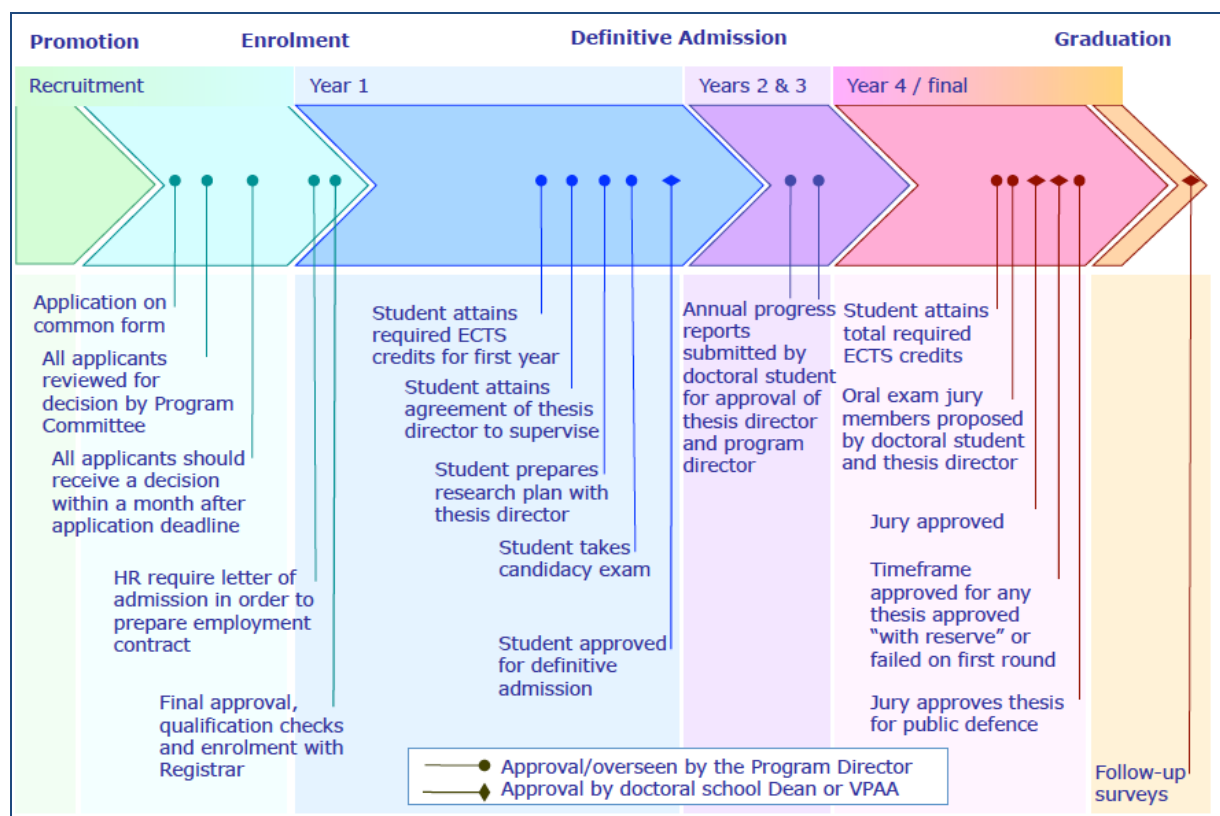
Figure F4.3-1. Main Process and time schedule of the EPFL doctoral studies

Periodic and End-of-Thesis Surveys
In addition to annual/biannual analyses of the end-of-thesis questionnaires, two large surveys - aimed at all doctoral students of EPFL (Doctoral Surveys I and II, cf. F 1-3) - have been conducted in 2003 and 2012. The response rate for these surveys was large; the 2012 survey had 1'217 respondents. In addition to these periodic surveys, there is an end-of-thesis survey, which is completed by all students just after finishing their thesis, thus involving about 350 students per year.

These surveys provide very detailed information on different aspects of the EPFL doctorate. The questions concern the global satisfaction, choosing and arriving at EPFL, training, workload,

supervision, and career possibilities. This information enabled to improve the doctoral studies where needed. The analysis of the 2012 survey results is available [here](lvii). The current strategy of the doctoral school - which is based on the outcome of the 2012 survey results and the end-of-thesis surveys - is presented in Annex F4.3-1.

F 5 Teaching

F 5.1 Qualification of EPFL Employees in Teaching and Research
EPFL has the following mechanisms at its disposal:

a) All employees, whether scientific or not, as well as all faculty members are appointed on the basis of a specification in a competitive mode: the position is advertised and communicated in the media and on the school's [website](lviii).

b) All EPFL employees have an annual qualification review in which their performance and competences, but also any needs of [training](lix) to improve or gain skills are discussed. This is also an opportunity to propose training related to these needs[55].

c) All EPFL employees have the opportunity to enroll in continuing education seminars offered by the school, in connection with acquiring generic skills, also at the [language center](lx).

d) Scientists and faculty members participate in seminars, colloquiums, conferences, symposia, or make short stays in foreign laboratories to update their knowledge and skills in their areas of research. Faculty and staff also have the opportunity to go on sabbaticals. For doctoral students, see subchapter (F 4.3).

e) The promotion of scientific staff is fixed in the [directive](lxi) on academic titles granted to scientists at EPFL. Any promotion of an EPFL employee, including that of tenure-track assistant professors, takes into account an educational file including the list of given courses and their evaluation by students: the file is accompanied by a letter from the Section Director giving his opinion on the candidate's contribution to the education. The modes of assessment promotion and promotion of tenure-track assistant professors, are included in the [*Regulations*](lxii) *concerning tenure-track assistant professors*; those of associate professors are included in the [*Regulations*](lxiii) *of appointing associate professor to full professor*. For the recruitment of full or associate professors, the procedure is given in Annex F5.1-1.

f) The faculty can benefit from the support such as pedagogical courses and seminars organized by CAPE, but also of a CAPE local service, of a CAPE personalized assistance on request, especially in case of a subcritical assessment of teaching. Ad-hoc courses are also organized for doctoral students; a training day is set up for students participating in [coaching](lxiv).

F 5.2 Periodic Evaluation of the Teaching Staff
The quality assurance processes include the periodic evaluation of the teaching staff.
The evaluation of professors through their teachings was raised in F 3.1; when it comes to the teaching portfolio, the information can be found in F 5.1.

F 5.3 Career Planning
The HEI promotes the career planning of young academics.
Career and promotion opportunities have been addressed in sub-chapter 5.1. At the academic level, the principle of mobility and starting with fixed-term contracts prevails, especially for young

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[55] This area has improved significantly between 2004 and 2012 since according to the Atmos surveys the percentage of people having had an annual review in the past twenty-four months has gone from 47 % to 77 % of the respondents. For the same period, the use of management by objectives has increased from 39 % to 69 % of people recognizing setting goals annually with their supervisors. However, the average of the review in the Schools is 71 % compared to 85% on the central administrative services.

researchers conducting post-doctoral fellowships. For permanent scientific employees as well as administrative and technical staff, internal mobility remains a problem. This is shown in the satisfaction survey Atmos II with an insufficient score of 3.3 out of 6 for prospects of promotion, mobility and dynamic and challenging careers. Too often, the position of MER no longer corresponds to a true evolution and the creation of teaching pools for senior scientists remains delicate. For now, planning tables are being set up in the steering committees of the Schools and institutes to become more proactive especially for positions of scientists and engineers in charge of the management of large installations; when it comes to IT jobs, a position of staff manager in the HR service, in charge of skills assessments and career development, has been opened. In any event, the policy of granting permanent positions still remains restrictive.

F 6 Internal and External Communication

F 6.1 Internal Communication of the Quality Assurance Process

The quality assurance process is communicated:
   a) in the explicit missions[lxv] of the Vice-presidency for Academic Affairs
   b) for the overall processes, at the following web pages:
      a. Accreditations and quality assurance[lxvi] of the bachelor and master programs.
      b. Evaluation of Schools and Colleges[lxvii].
   c) The EPFL surveys of internal stakeholders (Campus II, Doctorants II, Atmos II) are available on the EPFL website (see also F 1.3). Their results were published in the monthly EPFL journal "Flash" and presented in many seminariums such as for the EPFL Senior Management, Dean VPAA meetings, School Assembly, Assemblée des enseignants, Commission of the Directors of the Program, meetings of EPFL's department heads, etc.)

Results associated to b) and c) are also presented to the ETH Board. Communication of quality assurance processes in relation with the present accreditation can also be found in item 3 of the self assessment report.

F 6.2 Reporting on the Processes and Results of Quality Assurance

The HEI ensures transparent reporting on the processes and results of quality assurance measures to the groups concerned within the HEI. The evidences are found mostly in the various sections of chapter F, as well as in others items of the self-assessment document (such as C 1.1, C 4.3).

F 6.3 Information about the Study Programs

Complete information about the bachelor and master programs can be found on EPFL's website, for instance:
   • For prospective[lxviii] EPFL students.
   • For EPFL students[lxix].

EPFL students also have their own portal[lxx]. Please consult also item A 4 of this document

REFERENCE URLs QUOTED IN THIS CHAPTER

i http://vpaa.epfl.ch/page-85996-en.html
ii http://vpaa.epfl.ch/page-85997-en.html
iii http://vpaa.epfl.ch/files/content/sites/vpaa/files/EVAL-ETHR_Juni05.pdf
iv http://vpaa.epfl.ch/files/content/sites/vpaa/files/EAVL-schools_Quality%20procedure.pdf
v http://vpaa.epfl.ch/files/content/sites/vpaa/files/EVAL-Guidelines%20prep%20self%20assessmt.pdf
vi http://vpaa.epfl.ch/files/content/sites/vpaa/files/EVAL-Steps%20of%20prep%20planning%20and%20checklist.pdf
vii http://sv-safety.epfl.ch/files/content/sites/sv-safety/files/SAF_Rules_Vademecum_[F]-1.pdf
viii http://dii-e.epfl.ch/qualite.html
ix http://forum.epfl.ch/en/companies/epfl
x http://actu.epfl.ch/news/balelec-se-lance-le-defi-de-la-certification-durab/
xi http://mot.epfl.ch/
xii http://www.cfainstitute.org/community/university/Pages/recognition_program_for_universities.aspx
xiii http://developpement-durable.epfl.ch/files/content/sites/developpementdurable/files/7_publications/EPFL_sustainability_report_2010_2011_web.pdf
xiv https://www.globalreporting.org/reporting/g4/Pages/default.aspx
xv http://developpement-durable.epfl.ch/files/content/sites/developpementdurable/files/7_publications/Umweltbericht_2011_F.pdf
xvi http://developpement-durable.epfl.ch/files/content/sites/developpementdurable/files/7_publications/iscn_gulf_charter.pdf
xvii http://cg.epfl.ch/page-30131-fr.html
xviii http://polylex.epfl.ch/files/content/sites/polylex/files/recueil_pdf/1.4.2_dir_gestion_riques_EPF_fr.pdf
xix http://polylex.epfl.ch/files/content/sites/polylex/files/recueil_pdf/1.1.1_o_organisation_EPFL_fr.pdf
xx http://cg.epfl.ch/files/content/sites/polylex/files/recueil_pdf/1.4.3_r_organisation_risk_management_fr.pdf
xxi http://cg.epfl.ch/page-18405-fr.html
xxii http://polylex.epfl.ch/page-109644-fr.html
xxiii http://news.epfl.ch/news/campus-ii-report-may-2012/
xxiv http://phd.epfl.ch/enquete_doctorat
xxv http://rh.epfl.ch/page-32097-fr.html
xxvi http://carriere.epfl.ch/telechargements
xxvii http://formation.epfl.ch/page-16395-en.html
xxviii http://formation.epfl.ch/files/content/sites/formation/files/shared/Enqu%C3%AAte%20Satisfaction%20Services%202013.pdf
xxix http://voyages.epfl.ch/cwt
xxx http://restauration.epfl.ch/
xxxi http://vpaa.epfl.ch/page-57690-en.html
xxxii http://rh.epfl.ch/page-32097-fr.html
http://polylex.epfl.ch/files/content/sites/polylex/files/recueil_pdf/ENG/4.2.1_r_professeur_tenure_track_en.pdf
xxxiii http://egalite.epfl.ch/page-18047-en.html
xxxiv Science, Technology, Engineering, and Mathematics.
xxxv http://information.epfl.ch/garderies
xxxvi http://egalite.epfl.ch/page-18047-en.html
xxxvii http://www.epflwishfoundation.org/
xxxviii http://cape.epfl.ch/page-90874-en.html
xxxix http://cape.epfl.ch/page-91631-en.html
xl http://cape.epfl.ch/page-91630-en.html
xli http://cape.epfl.ch/page-92561-en.html
xlii http://clickers.epfl.ch/home
xliii http://craft.epfl.ch/page-44087-en.html
xliv http://clickers.epfl.ch/home
xlv http://empleo.ugr.es/unilo/documentos/UNILO_ANALYSIS_OF_LOs_IMPLEMENTATION_with_annex.pdf
xlvi http://teaching.epfl.ch/page-16706-en.html
xlvii http://empleo.ugr.es/unilo/documentos/UNILO_ANALYSIS_OF_LOs_IMPLEMENTATION_with_annex.pdf
xlviii http://sac.epfl.ch/study_plans
xlix http://moocs.epfl.ch/
l http://www.rin.ac.uk/our-work/communicating-and-disseminating-research/quality-assurance-and-assessment-scholarly-researc
li http://actu.epfl.ch/search/erc-grants/
lii http://research-office.epfl.ch/en
liii http://phd.epfl.ch/home
liv http://phd.epfl.ch/Regulations
lv http://phd.epfl.ch/doctoral_courses
lvi http://phd.epfl.ch/prospective
lvii http://phd.epfl.ch/management
lviii http://emploi.epfl.ch/page-31605-fr.html
lix http://sfp.epfl.ch/
lx http://langues.epfl.ch/
lxi http://polylex.epfl.ch/files/content/sites/polylex/files/recueil_pdf/4.4.3_dir_titres_academiques_fr.pdf
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lxiv http://sae.epfl.ch/coaching-en
lxv http://vpaa.epfl.ch/page-57690-en.html
lxvi http://vpaa.epfl.ch/page-85996-en.html
lxvii http://vpaa.epfl.ch/page-85997-en.html
lxviii http://futuretudiant.epfl.ch/en
lxix http://sac.epfl.ch/study_plans
lxx http://studying.epfl.ch/en

6. Implementation of the recommendations from the last OAQ and Cti evaluations

The recommendations that arose from the 2006 audit have been implemented, discussed in detail during the intermediary audit reporting in 2010, and approved on this occasion by the Audit Committee.

Follow up audit 2010

The recommendations for the 2010 audit primarily concerned:

- Improvement of the management of the education, including:
  - *Strengthening of EPFL pedagogical service CRAFT*: the team has been expanded (it now comprises 5 people, each dedicated to a faculty or college), its position has also been clarified; the service has changed acronyms and has become [CAPE][i]; since 2013, it is positioned as a unit for service, advice and educational support integrated in the education management. Its synergies with the activities of the sections are currently under development.
  - *The development of teaching skills of the section managements, including to better recognize their management work in their specifications, such as in Life Sciences*. Substantial work has been performed regarding the implementation of learning outcomes:
    - the establishment *learning outcomes* for all courses
    - the *constitution of a skills matrix* in direct consistency with the intended competency profiles
    - the *improving assessment of specific learning outcomes* during exams already enable to strengthen the pedagogical approach, as well as the quality assurance and curriculum management.
    - Finally, in addition to the *Advisory Committees*, the sections now have an *Academic Committee* that annually reviews the content of the curriculum, but also pays more attention to the implementation of exams.
  - *The development of definitions of professional skills that are consistent with the contents of the program and its teaching*: much work has been done, but still needs to be refined in the definition of professional competency profiles, listed in the established grids for each bachelor/master program.

The above actions are described in more detail in Chapters 5C and 5F.

Follow up audit 2013

The following recommendations of the audit for the master degree in technology management in 2013 (see notice no. 2013/10-02 on the renewal of the State's approval of a master degree in professional engineering issued by the École Polytechnique Fédérale de Lausanne (EPFL)) were focused on:

- Defining more precisely the specified qualifications based on industrial needs.
- Maintaining and affirming the need for a long industry internship (25 weeks).
- Carefully following the proportion of graduates actually exercising the engineering profession.
- Requiring a minimum level in French (B1) of the graduates.

Although the above recommendations were directed specifically to the MTE section for its master degree in Management of Technology and are stated in their specific report, it is clear that the requirement of a minimum level in French B1 of the graduates is addressed to all EPFL alumni, especially the international master students at EPFL, who have not gone through an EPFL bachelor program. This is the price of the advanced internationalization of the EPFL (and ETHZ) campus.

Command of French for International Master students

Mastering the French language is a specification of Cti, which contrasts with the laws and regulations governing EPFL. For the institute of technology (and its sister school ETH Zurich), the professional designation of engineer is not related to the mastery of a Swiss national language.

But, despite this situation, the situation is not critical at all for the 20% of Master students concerned, **since most of them, eager to cope with a French speaking environment, participate actively to the elective French courses provided by the EPFL language center**; indeed, an average of 100 EPFL Master students joins each semester the French courses of the EPFL Language Center[56] (figure 6-1) — on a total of about 400 EPFL Master students not having a good level of French at the beginning of their EPFL cursus. Last but not least, EPFL international students get also a fair command of French in their extracurricular life.
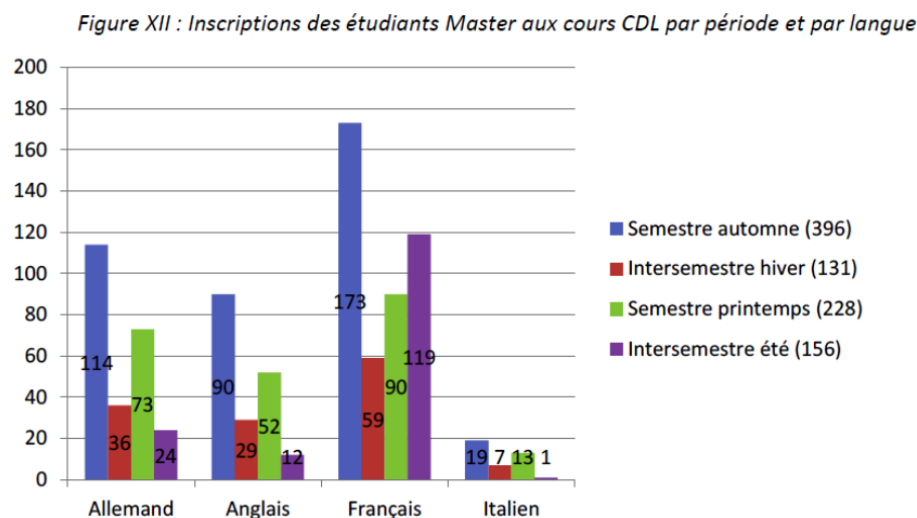
Figure 6-1: Participation of EPFL Master students to language courses (2012-2013

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[i] http://cape.epfl.ch/page-90874-en.html

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[56] *ANNEXE STATISTIQUE AU RAPPORT D'ACTIVITE, CENTER DE LANGUES EPFL , UNIL, période du 10.09.2012 au 15.09.2013*, réf. CDL 2012-13 Annexe Stat OGIF.doc / 9 janv. 14, p. 11/40, document at the disposal of the experts during the audit of November 2014.

o **Strengths and Weaknesses Profile**

In complement to the previous global SWOC analysis presented above under F2.3, here are the more salient points to mention for the whole institution :

Strengths

- A cutting-edge and research–oriented institute of technology that conduct major impact projects and participate to international and national network to provide answers to the challenging problems facing humanity.

- A European recognition and a rare multicultural dimension favoring the hiring of new professors at the highest level without discrimination of their cultural origin, conferring to our institution a broad and global culture.

- A committed initiative on education with MOOCs by which EPFL is pioneering the field.

- A great capacity for multidisciplinary research and trainings as illustrated by the creation of new teaching specialties (minors) and research centers at the interface between various Schools and Institutes, endowed with robust skills in sciences and engineering, and modern technology platforms.

- The generation of clear incentives for innovation and technology transfer favoring the creation of start-ups or the development of strong partnerships with industry.

- A recently extended anchorage to the local economy for Tech Transfer and Education by the creation, on the one hand, of multiple antennae of our school in synergy with the universities and universities of applied sciences present in the different cantons of western Switzerland (Fribourg, Geneva, Neuchâtel, and Valais), and, in the other hand, by creating strong interactions with the medical schools of the Lemanic Area ("Arc lémanique") for biomedical sciences and translational research in life sciences.

Weaknesses

- A great level of uncertainty for the maintenance of the Institution positioning at the European level (funding through its participation to flagship projects and ERC grants, attractiveness for the hiring at the highest level, participation to the Horizon 2020 Research and Erasmus programs) consecutive to decisions of the EC inherent to the Swiss vote, on February 9th 2014, to limit the free circulation of individuals.

- Need to adapt of the present infrastructures and organization of the governance of the institution (top down with few bottom up) in face of its recent growth (increase in complexity of the school, regional extension, Campus Biotech), and new challenges, in particular concerning the educational framework conditions (faculty to student ratio at the bachelor, teaching lab space limitation) due to the recent and unpredictable increase in student number registering at EPFL.

- Difficulty to foster the emergence of a brand culture within the institution due the multicultural origin of the new faculty confronted to a still local mentality, in particular as far as its administration (HR) and the operational management of educational processes are concerned.

Information :
Active links to websites are underlined and in blue or under the form of hyperlinks at the end of each chapter
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