

2022 EDITION

ICT: **JOBS WITH A FUTURE!**

INFORMATION AND
COMMUNICATION
TECHNOLOGIES

2022 EDITION



ICT: **JOBS WITH A FUTURE!**

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de l'Enfance et de la Jeunesse



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INTRODUCTION

THE APPROPRIATE ICT SKILLS FOR A SUCCESSFUL DIGITAL TRANSFORMATION

Training a new generation of ICT professionals

This survey has been conducted jointly by FEDIL - The Voice of Luxembourg's Industry and ABBL - Luxembourg Bankers' Association every two years since 2002. Over the past twenty years, the digital transformation of the Luxembourg economy has taken off and has become a major challenge for both businesses and policy makers.

Digital transformation affects everyone. Whilst every area of our society makes use of information and communication technologies to varying degrees, the most advanced digital technologies play a key role for the whole economy. The Covid-19 health crisis of the last two years has undoubtedly accelerated this trend. Whilst the use of digital technologies has been a matter of survival for many companies, allowing them to maintain their activities at a distance, many companies have understood the importance of adopting a digitalisation strategy. Others have accelerated their approach, considering digital transformation an indispensable factor in increasing their performance and responding to major climate, energy and environmental challenges.

To succeed in this digital transformation, it is not enough to have the most innovative technologies and the most efficient infrastructures. We need men and women who master these new technologies and put their multidisciplinary skills at the service of digital projects and the local economy. Awakening and training young people in digital technologies and professions is essential to ensure that they have the necessary resources and cutting-edge know-how.

To effectively target training required in the numerous professions linked to information and communication technologies (ICT), both FEDIL and ABBL have invested in identifying the needs of their members with a view to relaying them to the government bodies responsible for the education of our young people.

Everyone can agree that it is essential to continue to arouse the interest of young people in these digital professions, because the future will undoubtedly be digital. In addition to filling the need for profiles that are already scarce on the job market, the availability of such specialists will be a competitive advantage for Luxembourg when it comes to attracting innovative companies in the ICT world, ranging from start-ups to Big Techs choosing Luxembourg as a European or even international hub for their activities.

This survey, conducted by FEDIL and ABBL, does not pretend to provide an exhaustive and detailed analysis of ICT career and training opportunities in the industrial and financial sectors. It aims to provide young people with reliable information to enable them to make an informed choice for their studies and to give an overview of possible functions with a short-term projection of market prospects, available training and company needs, while referring them to additional sources of information to deepen and refine their research.

Given the current health situation, it is particularly difficult for companies to make firm predictions about their recruitment needs, but it is clear from our survey results that companies need employees with the right ICT skills, and will continue to do so in the future.

YVES MAAS
CHIEF EXECUTIVE OFFICER - ABBL


RENÉ WINKIN
DIRECTOR OF FEDIL

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(*) Results of a survey of industrial and financial companies in the Grand Duchy of Luxembourg





1. **THE METHODOLOGY OF THE SURVEY**

1.1. OBJECTIVES

The objective of the survey is twofold:

- 1) to guide young people and their parents towards a vocational orientation corresponding to the needs of the market in their field of study
- 2) to provide information to the public authorities and training professionals to ensure that the needs of companies are matched with the training to be provided

In addition, the partners in the study want to gain a better understanding of companies' needs in terms of qualifications, to be able to develop the continuing training market in a targeted manner and to increase the use of ICT in initial training.

1.2. THE APPROACH

To determine these needs, we asked industrial and financial companies about their expectations for recruitment in the ICT field over the next two years. This may involve recruitment following departures (retirement in particular), but also the creation of new jobs, synonymous with an expected or planned expansion.

A list of qualifications, defined in collaboration with experts from the various sectors and validated by the human resources departments of large companies, was submitted to the selected sample.

The exercise carried out has its limitations. The results are indeed hiring forecasts and not definitive promises of hiring. These forecasts may not be realised, just as new needs may arise.

FEDIL and ABBL each defined their own sample and sent out the questionnaires electronically.

1.3. THE CHOICE OF COMPANIES AND SECTORS

The survey was conducted by FEDIL and ABBL among their respective members. The following sectors are therefore covered by this study:

- Manufacturing
- Construction
- Financial services
- Business services

This list includes companies that are directly involved in the ICT field and can be classified as follows:

Production:

- Manufacture of office machinery and computer equipment
- Manufacture of insulated wire and cable
- Manufacture of electronic components
- Manufacture of transmitting and receiving apparatus
- Manufacture of sound and video reception, recording and reproduction apparatus
- Manufacture of measuring and checking instruments
- Manufacture of industrial process control equipment

Services:

- Wholesale of electrical household appliances and radio and television equipment
- Wholesale of office machinery and computers
- Telecommunications
- Rental of office machinery and computer equipment
- Computer systems consultancy
- Software development
- Data processing
- Database activities

1.4.

THE RANGE OF OCCUPATIONS

The choice of occupations is based on the nomenclature of ICT roles. This repository of IT and telecommunications jobs and professions is a recurrent publication drawn up by the *Club informatique des grandes entreprises françaises (Cigref)*¹.

Various other sources, as well as input from company experts, have made it possible to adapt the initial list according to the development of professional profiles.

1.5.

PARTICIPATION RATE AND COVERAGE OF THE SURVEY

97 companies participated in the 2022 survey. This corresponds to an average response rate of 15.7%, as 618 questionnaires were sent out. The sum of the respective numbers represents a total of 27,534 employees. The following results indicate the needs expressed by these companies.

As the survey was limited to the members of the participating organisations, which are not necessarily statistically representative of the branches concerned, any extrapolation to the whole economy is obviously excluded. Furthermore, sectors that are heavy users of IT (public administration, education, health care, etc.) are not included in the survey population.

.....
1) <https://www.cigref.fr/nomenclature-des-profils-metiers-du-si-du-cigref-version-intermediaire-2021>



2.

SCOPE OF THE SECTOR AND EXISTING FUNCTIONS

2.1.

THE ICT SECTOR

The sector continues to experience strong growth rates and a significant increase in employment. In the third quarter of 2021, the ICT sector employed 20,157 people (source: STATEC, national accounts). This is one of the highest figures in the OECD countries. In addition, there are ICT professionals employed in many other sectors such as trade, finance, and industry.

But which occupations are more precisely grouped under the acronym ICT?

The professions that belong to this sector are those that ensure the integrity of the electronic communication chain from one end to the other. In other words, they are the means (e.g. network infrastructures) used by professionals to convey content (e.g. multimedia), develop software or offer services (e.g. hotline, maintenance) to other professionals or to citizens.

The ICT sector has been booming for several years: the emergence of technologies such as the Internet of Things (IoT), Big Data, Distributed Ledger Technology (blockchain), High Performance Computing (HPC), Artificial Intelligence (AI), 5G, coupled with new consumption patterns (cloud computing) and the proliferation of mobile devices and services to individuals, has strongly influenced the functioning of the modern economy and the daily life of companies and individuals.

Two other issues of key importance for the economy of the future - the data economy - are cyber security and data protection. Both issues are necessary for the implementation and operation of increasingly complex solutions in which users, both companies and individuals, must be able to trust for the smooth running of their business.

Finally, the continuous evolution of ICT has been accelerated not only by the emergence and availability of new disruptive technologies, but also by the design of new business models, notably propagated by start-ups, which have a direct impact on the occupations and skills required in the future. In this context, the General Data Protection Regulation (GDPR) which entered into force on 25 May 2018 has created a whole new set of occupations and necessary qualifications.

We have listed the ICT occupations under the following nine headings:

1. Software analysis, development and maintenance

This heading covers occupations ranging from the design of software to its implementation, including the analysis and modification stages to adapt it to a changing environment.

2. Analysis, development and administration of computer systems

This category of professionals is responsible for organising IT resources (hardware, software, personnel, data and procedures) to gather, classify, process and disseminate information in a given environment. It is a highly strategic function in any company.

3. Hardware analysis, development and maintenance

Hardware professionals design hardware to meet the specific needs of those who define information systems or ensure their proper functioning to maintain the integrity of the overall system.

4. Customer Service

Professionals in this category have commercial skills and master the high technicality of the products in order to help and assist their clients.

5. Coordination

This category includes cross-functional professions such as project managers who coordinate analysis, development, maintenance and customer service activities.

6. Consulting and solutions development

This category includes professionals who have a holistic approach to ICT systems and solutions. Their in-depth knowledge of market needs enables them to bridge supply and demand, but also to provide system auditing services for companies.

7. Telecommunications

Telecommunications professionals are responsible for setting up the computer network that forms the basis for the exchange of ICT information. Their role is crucial in view of the importance of the ICT sector in the economy as a whole.

8. Digital marketing

This heading covers the professions that have emerged with the Internet, enabling companies and public sector players to ensure and secure their presence on the Internet to best meet the needs of consumers. The new technologies and the emergence of new business models underline the absolute necessity of continuous training for professionals in this sector.

9. High performance computing (HPC)

This category of professionals is at the crossroads of numerical methods, software development and data analysis. Their business knowledge also enables them to optimise information processing chains in order to assimilate an increasing amount of data in record time. In a world where data is becoming more and more important, these activities significantly increase the competitiveness of companies.

Technology, services and innovation are concepts that are at the heart of all discussions. Our clients' working environment has had to evolve and adapt to a new way of doing business and communicating. My role as Account Manager is exciting and motivating because it is a constant challenge, a questioning, which calls on my ability to adapt. My objective is to be the trusted partner of my clients and to accompany them throughout their journey with solutions adapted to their needs, both ethical and eco-responsible. ▶▶

CATHERINE WEILER

ACCOUNT MANAGER, LARGE SEGMENT,
PROXIMUS LUXEMBOURG

2.2.

SOURCES OF INFORMATION ON ICT FUNCTIONS

Various sources of information are available to find out more about the functions that exist in the ICT field.

The HELLOFUTURE campaign

This campaign encompasses several channels for presenting and exchanging information about jobs in the various sectors of Luxembourg industry. All levels of study are concerned, from DAP, technician and secondary school leaving certificate (BAC) to BTS, bachelor, master or doctorate.

Pupils and students are offered innovative and interactive tools to help them in their orientation towards a promising professional future, the industrial world of tomorrow. In order to help them choose a career path towards industry and technology, HelloFuture offers various tools and activities, namely a website of FEDIL member companies offering internships, roadshows in high schools and a media campaign.

The website www.hellofuture.lu is an educational tool in itself: it includes video testimonials, brochures/brochures, all sectors, the history and future of Luxembourg industry and much more information to learn everything about industry and technology.

Dossiers Études et Métiers of the Ministry of Higher Education and Research

The Higher Education Information Service of the Ministry of Higher Education and Research regularly updates the brochures that comprehensively illustrate the different professions in the ICT field, namely:



STUDIES AND PROFESSIONS
TECHNOLOGY AND INDUSTRY
www.cedies.public.lu/fr/publications/



STUDIES AND PROFESSIONS
ICT - INFORMATION AND COMMUNICATION TECHNOLOGIES
www.cedies.public.lu/fr/publications/agriculture-sciences-industrie/tic.html

The internet portal for educational and vocational guidance

The www.maison-orientation.public.lu portal provides simple, quick and user-friendly access to numerous existing sources of information on studies, the world of work, changing career paths and support measures. Its main objective is to support the choice of orientation throughout life.

The winwin.lu website

The Chamber of Commerce's "winwin.lu" apprenticeship promotion campaign aims to inform and raise awareness among the public and stakeholders of the advantages of initial vocational training and to improve the public's perception of this training path. The portal www.winwin.lu, which is available in French and German, functions as a gateway to the world of apprenticeship and offers two navigation areas developed for the apprenticeship applicant and the training company respectively. Numerous apprenticeship occupations in the industrial sector are presented here. Interested parties can watch videos, download brochures or find out about the employer's modules in the training programme. The training company can manage its apprentices as well as the employer's assessments via the tutor platform integrated into the winwin.lu website.



3. **THE RESULTS OF THE SURVEY**

3.1.

HIRING FORECASTS

The 2022 edition of the survey shows significant hiring potential over the next two years. 687 hires are planned by the 97 companies that participated in the survey. Even though the total number of new hires planned for the next two years is lower than in the previous survey, the ratio of new hires forecast for the 2022 survey is higher than in 2020 (687 new hires forecast for 97 companies, or a ratio of 7.1, compared to 979 new hires forecast for 168 companies, or a ratio of 5.8).

Our survey is primarily a barometer of ICT employment. This employment has continued to grow steadily. In projected hiring, job creation continues to outnumber replacements. Nevertheless, it must be noted that the rate of job creations this year is the lowest since the survey was launched in 2002 (53%) compared to 47% of replacements.

◀ **Open job positions are often meant for replacements. Banks are doing quite well despite the pandemic, however, they are still under budgetary constraints. There is a certain caution in terms of investments. For the creation of a new job position, a specific business case is required.** ▶

ERIC MANSUY

CHIEF OPERATING OFFICER, GROUP HEAD OF INFORMATION TECHNOLOGY - QUINTET PRIVATE BANK EUROPE

The function groups in which recruitment is planned are as follows:



	2020	2022
1. Software analysis, development and maintenance	314	224
2. Analysis, development and administration of computer systems	231	199
3. Analysis, development and maintenance of computer hardware	39	35
4. Customer service	137	60
5. Coordination	108	76
6. Consulting and solution development	114	44
7. Telecommunications	28	18
8. Digital marketing	8	14
9. High Performance Computing	/	17

The main positions sought for the next two years are as follows:

FONCTIONS	
Programmer (Software developer (general), Web developer, API developer, Cloud application developer, Back-end developer, Integrator)	81
Systems Administrator	36
Business Analyst	33
Network Administrator	30
System Engineer	29
Project Manager, Product Manager	26
System Analyst	23
Helpdesk Support Technician	23
Software Architect, Software Engineer	22
Customer Support Technician	22

Six of the most sought-after functions in the previous edition are still in demand according to the 2022 survey. These are Programmer, System Administrator, Network Administrator, IT Project Manager, User Support Worker and Software Architect. Four new jobs have made their way into the top 10 most sought-after jobs for the next two years. These include business analyst, systems engineer, systems analyst and customer support.

It is worth noting that since the launch of the survey in 2002, the most sought-after job that remains at the top of this ranking is that of programmer. This is indeed a real need for companies, as developments particularly in software customisation, mean that programmers are increasingly in demand.

 **A developer is a technician in charge of the realisation of systems or applications. He or she is involved in the needs analysis and design phases of a project. The role of the developer is to translate the business needs into code that the machine can understand and execute. Therefore, the best programmers are generally graduates with a 5-year degree and the ability to understand a need without having a detailed description of it. In addition, they must have an abstraction capacity that allows them to model a need in an optimal and generic way (object-oriented programming paradigm). There are very few resources in Luxembourg that are really able to master object-oriented programming.** 

LAURENT DERKUM

DIRECTOR OF HUMAN RESOURCES AND COMMUNICATION, BANK RAIFFEISEN

3.2.

JOB CREATION STILL EXCEEDS REPLACEMENTS

2020

Creations

69%



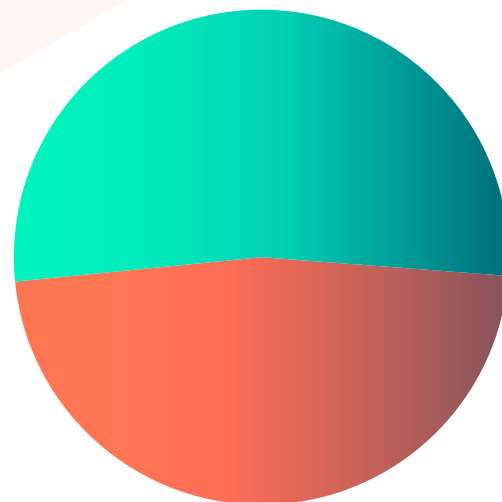
Replacements

31%

2022

Creations

53%



Replacements

47%

« In the ICT sector certain profiles are in high demand not only in Luxembourg but also in the rest of the world (full-stack Java/Angular developers, DEVOPS engineers and experienced system administrators). From our point of view, the statistical results show that the war for talent has started in the ICT industry and that it is a global war that is not limited to Luxembourg. The increase in replacements may be linked to the departure of these profiles to the state or to other companies (not necessarily banks). »

LAURENT DERKUM

DIRECTOR OF HUMAN RESOURCES AND COMMUNICATION,
BANK RAIFFEISEN.

3.3.

INCREASINGLY HIGH TRAINING REQUIREMENTS

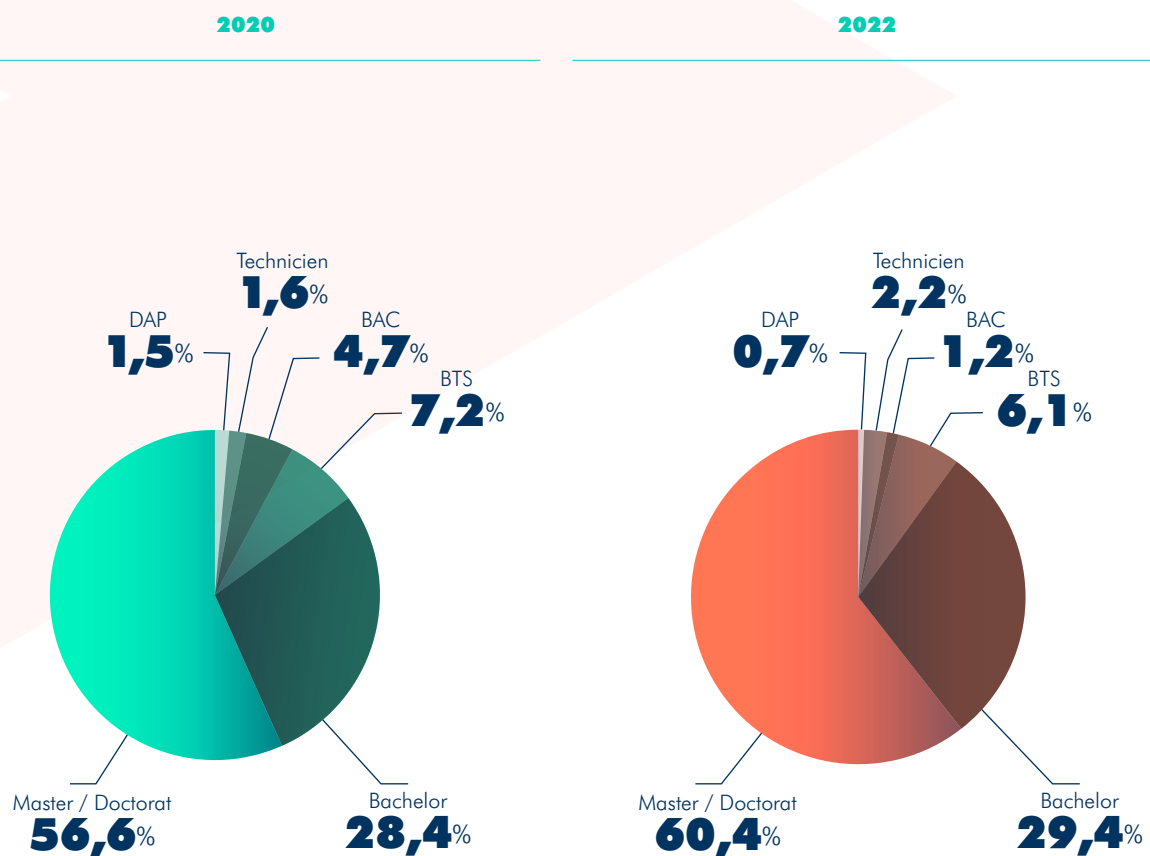
Companies are demanding increasingly high levels of training for most occupations: "BAC +2" is a minimum requirement in 95.9% of cases.

Forecasts of hiring for a level below BTS are 4.1% in 2022 compared to 7.8% in 2020. University level candidates are the most sought after, with 89.8% of forecasts. Among the latter, there is considerable demand for the most advanced university graduates, with 60.4% of hiring forecasts for

Master's/Doctorate levels of study and only 29.4% for Bachelor's level. This confirms the findings of 2020, when Master's/Doctoral graduates (56.6%) were already more in demand than Bachelor's degree holders (28.4%).

N.B. : The qualification levels are defined below.

Educational levels in demand:



3.4.

CONCLUSION: COMPANIES ARE LOOKING FOR HIGHLY QUALIFIED PROFILES

- Level of training: although our survey is not completely exhaustive, it is clear that qualification requirements are high for most functions.
- New jobs (53.1%) remain higher than replacements, as has been the case since the survey was launched in 2002, but they are the lowest in the last two decades.

3.5.

RESULTS OVER THE LAST FEW YEARS

SURVEY	PARTICIPANTS	EMPLOYEES REPRESENTED	HIRING FORECAST	JOB CREATION	REPLACEMENTS
2022	97	27.534	687	53%	47%
2020	168	56.030	979	69%	31%
2018	118	46.958	698	69%	31%
2016	148	38.579	532	65%	35%
2014	183	51.324	605	61%	39%
2012	187	42.265	417	72%	28%
2010	137	35.088	188	59%	41%
2008	255	47.427	565	68%	32%
2006	330	59.706	655	63%	37%
2004	265	41.023	312	57%	43%
2002	328	42.031	1.036	77%	23%

Per participating company, hiring expectations have increased from 5.8 in 2020 to 7.1 in 2022. The participation rate (15.7%) has decreased significantly compared to the previous survey (29.8% in 2020). This could be explained by the fact that the current Covid-19 health crisis is having an impact on companies, making it difficult for them to make projections on hiring forecasts for the next two years. The health crisis has affected companies on several levels, also in terms of recruitment policy.

3.6.

INCREASING OUTSOURCING OF CERTAIN SERVICES

Outsourcing is a service contract that consists of entrusting an external service provider with an entire function or department of the company for a long period of time (more than one year). The service provider then takes full responsibility for the management of the function or service with a performance commitment (FAIRWELL, 1999).

For many years, Luxembourg companies have made extensive use of outsourcing, thus contributing to the development of the services sector. It should be noted that outsourcing is a highly important instrument, allowing companies to remain competitive by using advanced ICT technologies while controlling the associated costs.

IT activities and R&D (Research & Development) in particular are experiencing a real explosion among outsourced activities.

We have tried to measure this outsourcing of IT tasks in our respondent companies.

The results are clear: the use of outsourcing, at least partially, varies between 9% and 65%, depending on the task.

The use of outsourcing obviously has an impact on the jobs and qualifications of the companies that take on and provide such services. In the financial sector, outsourced services of the "BPO" type can be expected. (Business Process Outsourcing).

Outsourcing of IT tasks (%)

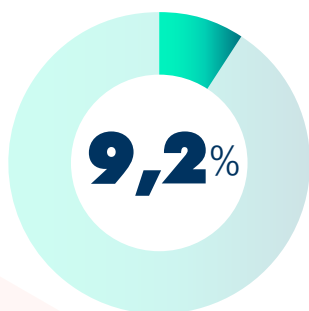
(Number of companies answering the outsourcing question: 82)

	NEVER	SELDOM	AROUND 50%	OFTEN	ALWAYS	N/A	NO RESPONSE
IT SYSTEM MANAGEMENT	15,1	22,6	16,3	24,6	17,9	1,9	1,6
TECHNICAL MAINTENANCE OF COMPUTER EQUIPMENT	18,5	15,1	12,2	12,3	12,9	5,8	23,3
DATABASE MANAGEMENT	16,8	14,0	14,3	6,2	16,4	11,5	20,8
WEB SITE DEVELOPMENT	12,6	7,5	9,2	18,5	17,1	21,2	13,9
WEB SITE MAINTENANCE	6,7	20,4	17,3	10,8	11,4	17,3	16,0
SPECIFIC SOFTWARE DEVELOPMENT	16,0	8,6	11,2	16,9	13,6	11,5	22,2
DATA BACK-UP/ STORAGE	13,4	8,6	15,3	9,2	7,1	17,3	29,0
OTHER	0,8	3,2	4,1	1,5	3,6	13,5	73,3

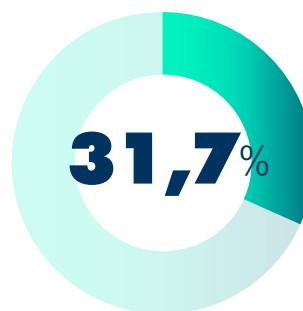
Partial outsourcing of IT tasks

(sum percentage about 50%, very often, always)

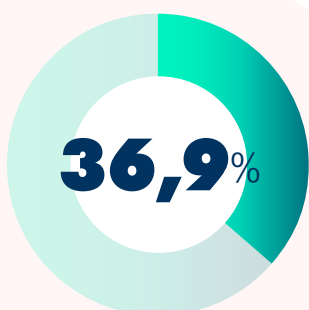
OTHER



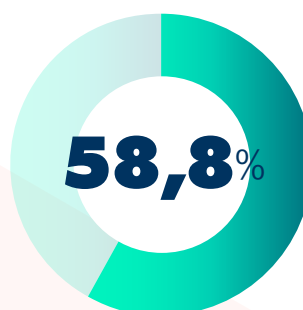
BACKUP



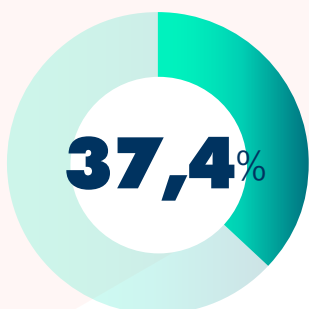
DATABASE MANAGEMENT



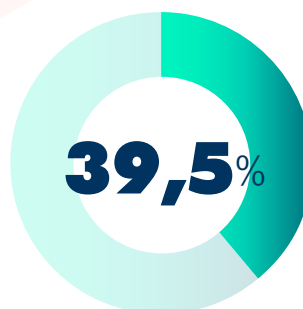
IT SYSTEM MANAGEMENT



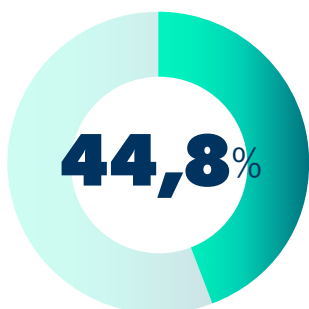
TECHNICAL MAINTENANCE OF
COMPUTER EQUIPMENT



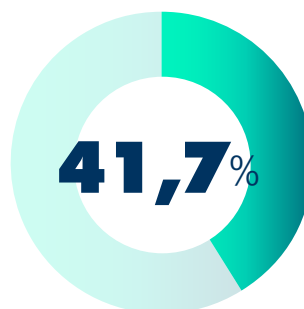
WEBSITE MAINTENANCE



WEBSITE DEVELOPMENT



SPECIFIC SOFTWARE DEVELOPMENT





4. **DEFINITIONS OF QUALIFICATIONS**

4.1.

SECONDARY EDUCATION COURSES

Vocational training at DAP level

The vocational aptitude diploma (DAP) can be done under an apprenticeship contract or a traineeship agreement. In principle, the training lasts three years. An intermediate integrated project for concurrent classes and a final integrated project allows a set of skills to be assessed at the end of the training. These projects simulate concrete professional actions typical of a person starting his/her professional life.

After passing the DAP, the student can continue his or her education in a technician training course in the same specialty under the technician training scheme or do a master's certificate. By passing preparatory modules, he/she can consider higher technical studies in the specialty corresponding to his diploma (university or BTS).

Vocational training at technician level

The technician's diploma differs from the vocational aptitude diploma in that it has a more in-depth and diversified skills profile and a broader general culture. Technician training prepares the student primarily for working life. However, the technician's diploma gives access to higher education provided that the student passes the preparatory modules for higher technical studies.

Training at BAC level

The BAC is the usual abbreviation used for both the classical secondary school leaving certificate and the general secondary school leaving certificate.

4.2.

HIGHER EDUCATION COURSES OF THE SHORT TYPE

The brevet de technicien supérieur (BTS) is awarded at the end of a two-year short higher education course (120 ECTS, European Credit Transfer System).

4.3.

UNIVERSITY COURSES

- Bachelor (180 to 240 ECTS)
- Master (60 to 120 ECTS)
- Doctorate (3-4 years)

◀ **COVID-19 has enabled a great acceleration in our industry around the need for technology, both internally and for our customers. Through technology, we have a unique opportunity to simplify our processes, standardise the way we work and give our staff the ability to focus on value-added tasks. The customer experience remains at the centre of our strategy.** ▶

PATRICIA MARTIN

HEAD OF HR FANUC EUROPE CORPORATION

The background features a large, bold, orange chevron pointing to the right, set against a dark blue background. A wavy, dotted pattern in a lighter blue color flows across the lower half of the image.

5.

INITIAL TRAINING IN THE FIELD OF ICT

5.1.

THE DAP FOR QUALIFIED COMPUTER SCIENTISTS

Following the reform of vocational training, a computer training course was launched from the beginning of the 2011 academic year at DAP level. This training enables students to be trained to carry out practical IT tasks such as installing, configuring and maintaining software and hardware.

It lasts for three years and is part of the concurrent regime, i.e. the practical training takes place in the company and is supplemented by 16 hours of theoretical training per week, which is taken in a secondary school. Thus, the apprentice is present in the company for three days a week during the three years of training.

Admission requirements

The student must have passed at least a 5th G class with an overall basic level of the lower cycle of General Secondary Education and have concluded an apprenticeship contract with an employer-trainer.

Institutions offering these courses

Lycée des Arts et Métiers - Luxembourg
www.artsetmetiers.lu

Lycée Guillaume Kroll - Esch-sur-Alzette
www.lgk.lu

Skills acquired at the end of the course

The activities of the qualified computer scientist consist mainly of work requiring specific computer knowledge. Thus, the elements of competence cover both the assembly and maintenance of computers and the sale of equipment and the follow-up of potential customers. The holder of the DAP as a qualified computer scientist can apply for jobs in all sectors of activity using ICT. In addition, he/she has access to a 2nd level of the computer technician training, if he/she wishes to continue his/her studies. Students interested in the DAP for qualified computer technicians should contact the career guidance service of the Employment Development Agency (ADEM-OP), in particular to obtain the contact details of training companies.

Information

For more information, please consult the “professions” tab of the Chamber of Commerce website www.winwin.lu

5.2.

THE COMPUTER TECHNICIAN

The training of the computer technician lasts four years. The field of activity of the computer technician covers all areas where computer equipment is used. The tasks are very diverse depending on the job. The fact that they are trained in the installation, commissioning and maintenance of office computers makes them indispensable in almost all areas of professional life. The technician will also be able to create dynamic web pages and deal with local network problems. Finally, the training offers access to higher education in computer science by passing additional modules.

Admission requirements

The student must have passed at least one class of 5th G with a basic level and a strong level in mathematics.

Institutions offering these courses

Lycée des Arts et Métiers - Luxembourg
www.artsetmetiers.lu

Lycée Guillaume Kroll – Esch-sur-Alzette
www.lgk.lu

Lycée privé Emile Metz
www.lpem.lu

Lycée du Nord – Wiltz
www.lnw.lu

Skills acquired at the end of the course

The activities of the computer technician consist mainly of work requiring specific computer knowledge performed with a certain degree of autonomy. Thus, the elements of competence include networking of computers and servers, configuration of computers for access to a network, the development and maintenance of websites, the configuration of workstations or problem management.

5.3.

THE SMART TECHNOLOGIES TECHNICIAN

The training of the Smart Technologies technician lasts four years. The technician carries out projects in a wide range of fields such as robotics, automation, renewable energies, electricity and communication networks. This course places great emphasis on practice and independent work. It is aimed at creative young people with a passion for technology. The Smart Technologies Technician Diploma will give access to working life or to higher education through preparatory modules.

Admission requirements

The student must have passed at least a 5th grade G with a basic level and a strong level in mathematics.

Institutions offering these courses

The programme is common to all students during the first two years of training. In the 3rd and 4th year of training, the student chooses a specialisation specific to the high school. The last two years of training take place under an apprenticeship contract for the specialisations offered by the Lycée Guillaume Kroll and the Lënster Lycée. The specialisations offered by the Lycée des Arts et Métiers, the Lycée technique d'Ettelbruck and the Lycée Privé Emile Metz will take place full-time at the school during the 4 years of training.

Electro-Technologies

Lycée des Arts et Métiers – Luxembourg
www.artsetmetiers.lu

Renewable energies

Lycée technique d'Ettelbruck – Ettelbruck
www.ltett.lu

Robotics and Automation

Lycée Guillaume Kroll – Esch-sur-Alzette
www.lgk.lu

Smart Energy

Lënster Lycée International School – Junglinster
www.llj.lu

E-controls

Lycée Privé Emile Metz – Luxembourg
www.lpem.lu

Skills acquired at the end of the course

- Plan, implement and document projects;
- Communicating between different devices and computer systems;
- Operating and maintaining complex electrical installations;
- Recognising and repairing faults in technical installations;
- Advising customers.

5.4.

THE GENERAL SECONDARY SCHOOL DIPLOMA, GENERAL TECHNICAL DIVISION, COMPUTER SECTION (GIN)

The creation of the computer science section in the upper classes of the general technical division complements the range of computer science courses already offered in vocational training leading to the technician's diploma or the vocational aptitude diploma. In this way, general secondary education will be able to meet the diversified demand of private sector companies.

Admission requirements

Pupils who have successfully completed the 3rd year of general secondary education in the engineering section (3GIG) or the 3rd year of general secondary education in the mathematics-computer science section (3CB), the natural sciences-mathematics section (3CC) or the computer science and communication section (3CI) may enrol in the 2nd year of general secondary education in the computer science section (2GIN).

Institutions offering these courses

Lycée des Arts et Métiers – Luxembourg
www.artsetmetiers.lu

Lycée Guillaume Kroll – Esch-sur-Alzette
www.lgk.lu

Lycée Privé Emile Metz – Luxembourg
www.lpem.lu

Skills acquired at the end of the course

The computer science section prepares students for higher education and university studies, mainly in fields related to computer science and mathematics, but also in engineering and exact sciences.

Many of the students who graduate from the General Technical Division and go on to post-secondary studies do so in the field of computer science. The skills that the future students master after the GIN training correspond to the knowledge required to enter higher education in the field of computer science and to develop in the career of the computer scientist in companies and administrations.

5.5.

THE CLASSICAL SECONDARY SCHOOL LEAVING CERTIFICATE, SECTION I - COMPUTER AND COMMUNICATION SCIENCES

In the context of the “Future Hub” label, which promotes innovative high schools in the field of new technologies, Section I - Computer and Communication Sciences is aimed at students in traditional secondary education who have a taste for computers, communication and new technologies.

Admission requirements

Pupils who have successfully completed the 4th year of secondary education (4C).

Institutions offering these courses

Lycée des Arts et Métiers – Luxembourg
www.artsetmetiers.lu

Lycée Guillaume Kroll – Esch-sur-Alzette
www.lgk.lu

Lycée Edward Steichen – Clervaux
www.lesc.lu

Lycée classique d'Echternach – Echternach
www.lce.lu

Skills acquired at the end of the course

The programme of section I focuses on programming, management of very large databases (big data), applications of financial technology (FinTech), development of video games (gaming), with an innovative pedagogy, in particular by carrying out creative projects linked to science and new technologies.

Section I aims to create digital leaders, capable of mastering the creation and application of new technologies and opens access to higher education, particularly in the fields of computer science and communication.

5.6.

HIGHER TECHNICIAN CERTIFICATES IN THE FIELD OF ICT

The short higher education courses (two years, BAC+2) are the result of close cooperation between the world of education and a number of specialised companies that are members of FEDIL, whose ambition has been to develop highly qualified training corresponding to the real needs of the employment market. In both cases, the training programmes, initially limited to twelve students for each of the courses, are based on strong interactions with companies through internships and courses given by professionals.

The dynamics of the sector are also reflected in the training, as several new BTS in this field have been accredited in recent years. This applies in particular to the BTS “Cloud Computing”, offered since the 2018-2019 school year by the Lycée Guillaume Kroll, the BTS “Connected Buildings & Cities” offered by the Lycée des Arts et Métiers, and the BTS “Internet of Things” and “Game Programming and Game Design” offered since the 2018-2019 school year by the same lycée.

Two new BTS in this field have started in 2021-2022: the BTS Cybersecurity (Lycée Guillaume Kroll) and the BTS Digital Content (Lycée Nic-Biever Dudelange).

5.6.1.

ADVANCED TECHNICIAN'S CERTIFICATE IN COMPUTER SCIENCE (BTSi)

This training has been provided since the beginning of the 2010-2011 school year by the Lycée des Arts et Métiers.

Admission requirements

In general, you can enrol if you have a diploma from the end of classical secondary school or general secondary school or any diploma recognised as equivalent. It is recommended to have certain basic skills to follow the studies: basic knowledge of working with computers (current operating systems), logical reasoning ability, languages (German, French, English).

Institutions offering these courses

Lycée des Arts et Métiers – Luxembourg
www.artsetmetiers.lu

Skills acquired at the end of the course

The holder of the BTS in computer science (BTSi) will be able to intervene in several fields of computer science and thus presents a generalist training profile, as recommended by the companies that participated in the preparation of the training. Given the multidisciplinary and multilingual nature of the training, the holder of a BTSi will have dealt with the following areas of IT: networking and telecommunications, programming, operating systems, web technologies, databases and professional communication in English, German and French.

5.6.2.

ADVANCED TECHNICIAN'S CERTIFICATE “COMMUNICATION TECHNOLOGIES” (BREVET DE TECHNICIEN SUPÉRIEUR)

This training, initially entitled “Telecommunications networks”, has been provided since the start of the 2011-2012 school year by the Lycée Guillaume Kroll (formerly the Lycée technique d'Esch-sur-Sur). Lycée technique d'Esch-sur-Alzette (LTE)).

Admission requirements

Completion of classical/secondary general education, general interest in communication technologies.

Institutions offering these courses

Lycée Guillaume Kroll – Esch-sur-Alzette
www.lgk.lu

Skills acquired at the end of the course

The BTS “Communication technologies” course is based on practical training of the BAC+2 type in the field of telecommunication networks (data transmission by wire, wireless, optical fibre). It is a qualification in the field of implementation, optimisation and maintenance of telecommunication networks.

5.6.3.

HIGHER TECHNICAL DIPLOMA “CLOUD COMPUTING”

Cooperation with expert companies ensures highly specialised training in virtualisation, infrastructure and cloud services, security, communication and project management.

Admission requirements

High school diploma (classical, general or technical) or an equivalent foreign diploma. No technical prerequisites are assumed. A competitive examination consisting of a test of comprehension of a technical text and an interview is organised to establish a ranking. A maximum of 14 students will be accepted per year.

Institutions offering these courses

Lycée Guillaume Kroll – Esch-sur-Alzette
www.lgk.lu

Skills acquired at the end of the course

At the end of this training, the holder of the BTS “Cloud Computing” will be highly qualified in operating systems, data networks, virtualization and the use and marketing of the various services offered in the Cloud. Communication and project management are two other important pillars of the training, without neglecting IT security aspects.

5.6.4.

HIGHER TECHNICIAN’S CERTIFICATE “GAME PROGRAMMING AND GAME DESIGN”

This is a practice-oriented course in the fields of digital game design and development which offers a solid foundation in programming by applying the appropriate mathematical and physical rules.

Admission requirements

Completion of classical or general secondary education, technician’s diploma, or any diploma recognised as equivalent. A competitive examination consisting of a programming and mathematics test and an interview is organised to establish a ranking.

Institutions offering these courses

Lycée des Arts et Métiers – Luxembourg
www.artsetmetiers.lu

Skills acquired at the end of the course

The holder of the BTS “Game Programming and Game Design” will be able to create games using “game design” and “level design” techniques based, among other things, on historical developments. They will also be able to create large-scale computer applications using advanced programming methodologies, as well as define, plan and implement the various transmedia aspects of a game. Finally, he will be able to use 2D and 3D mathematics to solve graphic problems.

5.6.5.

HIGHER TECHNICIAN’S CERTIFICATE “CONNECTED BUILDINGS & CITIES”

The course teaches the basics and applications of Building IoT, Smart Cities, Smart Grid, E-Mobility and Industrial IoT, as well as project management in automation.

Admission requirements

High school diploma or general secondary school diploma, technician diploma, or any diploma recognised as equivalent. Access based on a portfolio and an entrance exam if the number of candidates is greater than 12.

Institutions offering these courses

Lycée des Arts et Métiers – Luxembourg
www.artsetmetiers.lu

Skills acquired at the end of the course

The holder of the BTS “Connected Buildings & Cities” will have in-depth skills in the fields of data acquisition and processing, automation and regulation, networks as well as in the technical, energy and economic management of buildings (Facility Management). In addition to the technical aspects, the holder of this BTS will also have advanced skills in project management and professional communication (in English, German and French).

5.6.6.

HIGHER TECHNICIAN’S CERTIFICATE “INTERNET OF THINGS”

Practice-oriented training in the fields of electrical engineering, computer science, mechanics and plastic arts, with the aim of creating, operating and maintaining connected objects.

Admission requirements

Diploma of completion of classical or general secondary education, technician diploma, or any diploma recognised as equivalent. Access based on a competitive examination.

Institutions offering these courses

Lycée des Arts et Métiers – Luxembourg
www.artsetmetiers.lu

Skills acquired at the end of the course

The holder of the BTS “Internet of Things” will be able to quickly understand the needs of customers, respectively the problem that has been posed. To this end, he/she will be able to communicate effectively with an interlocutor on technical topics in order to identify his/her needs. He will participate in the study of the solution and carry out all or part of the implementation, taking into account the organisational and technical constraints of the situation. Finally, he/she will be able to carry out research and acquire new know-how independently.

5.6.7.

HIGHER TECHNICIAN CERTIFICATE “CYBERSECURITY”

Cybersecurity is not only about technology. It is also a question of governance and communication. That is why the training programme focuses on 5 different areas: security concepts, security governance and management, IT operations, network technologies, soft skills.

Admission requirements

High school diploma or equivalent diploma. Access by competitive examination (14 places), good knowledge of English.

Institutions offering these courses

Lycée Guillaume Kroll – Esch-sur-Alzette
www.lgk.lu

Skills acquired at the end of the course

Advanced technical and practical training, preparing students to implement and manage operational cyber security in a professional context according to the latest developments. Graduates of the BTS Cybersecurity will be able to integrate easily into operational security teams, implement and manage security at system and network level, assist the information security manager as a technical advisor, have the knowledge to manage and analyse incidents and adapt to new security challenges.

5.6.8.

HIGHER TECHNICIAN DIPLOMA “DIGITAL CONTENT”

Since the 2021/2022 school year, the Lycée Nic-Biever has been offering this new BTS course which teaches students to master the techniques and technologies for the production of digital content. This knowledge will allow them to better enter the world of work, where they will be directly operational.

The course covers four main areas of study: media technologies; IT and the Internet; languages, communication and organisation; economics, management and marketing.

Admission requirements

High school diploma or general secondary school diploma, technician diploma, or any diploma recognised as equivalent. Registration is based on a portfolio and an interview (12 places).

Institutions offering these courses

Lycée Nic-Biever – Dudelange
www.lnbd.lu

Skills acquired at the end of the course

With the skills acquired in the various fields, the student will be able to plan, design, produce and install media products of all kinds in the fields of audiovisual, multimedia and interactive media, as well as in the field of print, while deepening his/her oral and written language skills (French, English or German). They will be able to use common office tools (word processing, spreadsheets and other office tools) efficiently and thanks to courses in law, economics and management our graduates will be able to perform versatile functions and diversified tasks in multiple sectors.

5.7. BACHELOR DEGREES

5.7.1.

BACHELOR IN APPLIED INFORMATION TECHNOLOGY (BINFO)

The Bachelor in Applied Information Technology (BINFO) offers an excellent, generalist education in information technology (IT), whose objectives are to give students operational skills that are relevant to potential employers and so allow a quick integration into the professional world. The BINFO provides students with the basic theoretical and applied knowledge in core IT areas but also the practical thinking to apply these technologies in industry. This focus on an applied qualification combines theoretical components of a traditional study in computer science with a focused approach giving students real-world skills and applicable concepts geared toward their chosen career path.

Admission requirements

Luxembourgish secondary school diploma or foreign diploma recognised as equivalent by the Luxembourg Ministry of Education. Languages: level B2 in English and B1 in French.

Selection based on grades especially in mathematics, informatics, and other natural science or technical subjects.

Institutions offering these courses

University of Luxembourg, Campus Belval
Esch-sur-Alzette
www.uni.lu

Skills acquired at the end of the course

The skills acquired during the programme are structured around four pillars:

- acquire advanced skills in programming and designing computer systems,
- having studied at least one specialty of computer science, such as computer networks, industrial computing, management information systems for banking and insurance or the development of distributed services,
- get the ability to express yourself in writing as well as in the spoken word for teamwork and interaction with users,
- understand the functioning of companies and better understand their realities through the internship and the interventions of professionals, for example in the field of law and standards in computer science.

5.7.2.

BACHELOR IN APPLIED INFORMATION TECHNOLOGY – CONTINUING EDUCATION PROGRAMME

This programme is developed in partnership with the Luxembourg Life Long Learning Center <https://www.lllc.lu> of the Chambre des Salariés (CSL)

The Bachelor offers a two-year programme for a continued “professionalisation” in IT.

It is designed to combine professional life and learning with the organisation of evening courses during the week and individual or project-based learning activities.

Admission requirements

- Bac+2 with a minimum of 3 years of professional experience in the IT domain, or a “Diplôme de fin d’études secondaires/Diplôme de technicien” or equivalent with a minimum of 6 years of professional experience in the IT domain.
- Selected candidates must be granted the equivalent of 100 ECTS for their professional experience by the “Commission de validation des acquis professionnels de l’Université”.

Institutions offering these courses

University of Luxembourg, Campus Kirchberg
Luxembourg
www.uni.lu

Skills acquired at the end of the course

At the end of the programme, the student is able to:

- prove knowledge of advanced programming skills for different types of applications;
- explain key technologies important in information technology (IT)
- develop the interest and skills base to continue with an academic study of the Master level;
- communicate in French and English, both written and oral, in a context of teamwork and interaction with people of diverse cultural and technical backgrounds;
- further develop his/her ability to work independently, analyse situations, anticipate problems and propose solutions in a variety of professional contexts.

5.7.3.

BACHELOR IN COMPUTER SCIENCE

The **Bachelor in Computer Science (BICS)** at the University of Luxembourg offers a computer science study programme aimed to bring you the theoretical and practical skills needed to successfully pursue your studies in Master in Computer Science both at the University of Luxembourg or in the best international universities or schools.

Admission requirements

- Luxembourgish secondary school diploma or foreign diploma recognised as equivalent by the Luxembourg Ministry of Education
- Language: B2 certificate in English. No certificate for French or German (B1 level advised)
- Selection based on several criteria (motivation letter, level in mathematics and in sciences, high school degree typed etc.)

Skills acquired at the end of the course

University of Luxembourg, Campus Belval
Esch-sur-Alzette
www.uni.lu

Skills acquired at the end of the course

This training provides the foundation for continued studies in master and PhD if desired. It also represents one of the best steps for students who wish to become teachers.

5.7.4.

BACHELOR OF ENGINEERING - DIGITAL ENGINEERING

The programme addresses the need for highly qualified and versatile engineers in the digital aspects of the classical branches of electrical, mechanical and civil engineering. In addition to basic training in these fields, digital engineering focuses more on information technology topics, e.g. programming, computer-aided design, geospatial technologies and building information modelling. University-level education in these areas underpins the digitisation processes in the various engineering fields and supports applications in manufacturing, energy production and distribution, sustainable cities and 3D reality capture.

Admission requirements

High school diploma (classical or general) or “Technician’s Diploma in the corresponding specialty with preparatory modules” or foreign diploma recognised as equivalent by the Ministry of National Education

- Language skills: B2 in German is required, plus B1 in French and B1 in English
- Letter of motivation

Institutions offering these courses

Université du Luxembourg, Campus Kirchberg
Luxembourg
www.uni.lu

Skills acquired at the end of the course

In addition to basic training in the classic fields of electrical, mechanical and civil engineering, the Bachelor’s degree in digital engineering focuses on subjects related to information technology, such as programming, computer-aided design, geospatial technologies and building data modelling.

5.8. MASTERS DEGREES

5.8.1.

MASTER IN INFORMATION AND COMPUTER SCIENCES – MICS

This **Master programme** is a continuation of the **Bachelor** studies as a first step towards the **PhD**. MICS starts with an orientation meeting where all new students get to know the professors and other students. The first semester is mandatory for all: it is dedicated to the fundamentals of computer science. By the end of the first semester, the student selects courses based on one or more profiles that she/he would like to pursue. Profiles are similar to specialisations with the added benefit that multiple profiles can be realised.

The second and third semester offer specialised courses in the selected field, preparing the candidate for the final Master Thesis.

Admission requirements

- Bachelor degree in computer science or related field
- Language: level B2 in English

Location of the course

University of Luxembourg, Campus Belval
Esch-sur-Alzette
www.uni.lu

Skills acquired at the end of the course

The Master in Information and Computer Sciences (MICS) enables students to acquire deeper knowledge in computer science by understanding its abstract and interdisciplinary foundations, focusing on problem solving and developing lifelong learning skills. Students can specialise in the following areas:

- Artificial Intelligence, Communication Systems, Information Security and
- Reliable Software Systems.

The program particularly equips students with skills for project-oriented, interdisciplinary work within a research or high-level industry-oriented environment as well as laying the groundwork for PhD studies. The multilingual and intercultural environment empowers the students to work both individually and in multinational teams.

5.8.2.

MASTER IN INFORMATION SYSTEM SECURITY MANAGEMENT

The Master in Information System Security Management (MISSM) at the University of Luxembourg is developed in partnership with the Luxembourg Institute of Science and Technology (LIST). This Master aims to train professionals in information security management.

Admission requirements

- Bachelor and 3 years of experience or Master in a related field
- Language: level B2 in English

Location of the course

University of Luxembourg, Campus Belval
Esch-sur-Alzette
www.uni.lu

Skills acquired at the end of the course

Students who successfully complete this Master will be able to :

- Select information, tools, methods and core competencies to maintain a professional level when practicing the art of information security management;
- Deduce and analyse current relevant managerial criteria in information security, in general and tailored for one company;
- Identify relevant sources and interpret the descriptive information in the context of one's company regarding legal, organisational and managerial aspects;
- Define, classify and list the necessary Éléments for the design of security solutions integrating at the same time management and technology. Plan, design and implement these solutions;
- Evaluate, criticise and judge an existing security situation and proposed solutions. Validate, recommend and implement improvements;
- List the specific features of human risk and communication in the field of information security. Analyse and deduce the Éléments of solutions to be implemented.

5.8.3.

INTERDISCIPLINARY SPACE MASTER

The Interdisciplinary Space Master (ISM) of the University of Luxembourg is a building block for a new global space industry. The programme aims to generate a talent pool of highly skilled engineers and innovative entrepreneurs who will be able to create, shape and sustain leading commercial space enterprises and play an important role in the economy of the future.

Admission requirements (20 places)

- Bachelors degree in physics, mathematics, electrical, mechanical or aerospace engineering (academic), computer science, or other natural science or equivalent experience. Candidates with a Bachelor's degree in another domain but with several years of experience in space, aerospace, mechanical, electrical, industrial, or robotics engineering are also encouraged to apply.
- Grades of 85% or higher in their technical courses
- Language: B2 in English

Location of the course

University of Luxembourg, Campus Kirchberg (main)
and Campus Belval
Luxembourg
Esch-sur-Alzette
www.uni.lu

Skills acquired at the end of the course

The Master is an innovative balance of business and technology teaching and learning.

The ISM programme provides solid knowledge in all aspects of the space value chain, along with space engineering expertise. In addition, the course will provide business and management tools enabling students to start their own space companies or contribute in non-technical areas of existing companies. It offers a building block for a new global space industry and aims to generate a talent pool of highly skilled engineers and innovative entrepreneurs who will be able to create, shape and sustain leading commercial space enterprises and play an important role in the economy of the future.

5.8.4.

MASTER IN TECHNOPRENEURSHIP (MTECH)

The Master in Technopreneurship (MTECH) at the University of Luxembourg is developed in partnership with the Institut luxembourgeois de la normalisation, de l'accréditation, de la sécurité et qualité des produits et services (ILNAS) and the Luxembourg Lifelong Learning Center (LLLC) of the Chambre des Salariés (CSL).

This Master is mainly designed for professionals in the Smart ICT driven economy sectors, technopreneurs and anyone fulfilling the conditions for admission.

Admission requirements (15-20 places)

- Bachelor degree and 3 years of experience or Master degree in computer science, applied mathematics, engineering, law, economy, and related fields
- Good level of English (IELTS with at least 5.5 or TOEFL with at least 213 for computer based test, 79 for Internet based test and 550 for paper based test)

Location of the course

University of Luxembourg, Campus Kirchberg
and Campus Belval
Luxembourg
Esch-sur-Alzette
www.uni.lu

Skills acquired at the end of the course

This Master degree aims for the students to transfer smart secure ICT knowledge directly into technical innovation, through the prism of the competitive and innovative tool of technical standardisation, during their internship in collaboration with their company. The Master covers various Smart ICT technologies, such as Cloud Computing, Internet of Things, Big Data, Artificial Intelligence, Blockchains and Distributed Ledger Technologies, while addressing Digital Trust aspects related to these technologies (smart secure ICT).

5.8.5.

MASTER IN SOFTWARE DEVELOPMENT AND VALIDATION (MDVL)

The Master in Software Development and Validation (MDVL) at the University of Luxembourg is offered in partnership with the University of Franche-Comté. Delivered at a distance and entirely online, it offers an innovative high-level training in the field of software testing and validation.

Admission requirements (15 places)

- Bachelor's degree in computer science or lower with professional experience in the field
- Language: B2 level in French

Location of the course

Distance learning.

Skills acquired at the end of the course

This Master's degree aims to train computer science managers capable of understanding the design and development of software with different programming paradigms, and mastering the skills related to their validation, which makes it possible to establish a level of confidence in the elements produced.

5.8.6.

MASTER OF DATA SCIENCE

As of September 2021, the University of Luxembourg will offer a new **Master of Data Science**. Data scientists are trained as both mathematicians and computer scientists and their unique profile at the intersection of the two disciplines are highly sought.

Admission requirements (20 places)

- Bachelor or equivalent with at least 180 ECTS in mathematics, physics, engineering or information technology
- Language: level B2 in English

Location of the course

University of Luxembourg, Campus Belval
Esch-sur-Alzette
www.uni.lu

Skills acquired at the end of the course

Based on a multidisciplinary approach, the Master programme will provide students with the necessary skills to solve complex problems with data in different contexts.

The programme covers data mining, data cleaning and processing, data visualization, statistical modeling, database management, workflow organization. It also addresses machine learning and deep learning techniques and their applications to life sciences, medicine and physics.

5.9.

INFORMATION ON HIGHER EDUCATION ABROAD

The Higher Education Information Service of the Ministry of Higher Education and Research offers services for high school students, future students, and people who wish to return to higher education.

The Higher Education Information Service provides information and advice on Luxembourg and international higher education, publishes brochures on higher educa-

tion in Luxembourg and abroad and on careers, manages a website, and organises the annual Student Fair in autumn. The Service receives the public every day according to the opening hours available on its website at the **Maison de l'orientation**.

For more information, see:

**Service Information études supérieures
Ministère de l'Enseignement supérieur et
de la Recherche**

18-20, montée de la Pétrusse | L-2327 Luxembourg
T. (+352) 247-88 650 | etudes@mesr.etat.lu
www.mesr.gouvernement.lu

Maison de l'orientation

29, rue Aldringen | L-1118 Luxembourg
T. (+352) 80 02 81 81 | info@m-o.lu
www.maison-orientation.public.lu

**Services regroupés à la Maison
de l'orientation :**

Service de coordination de
la Maison de l'orientation (SCMO)
T. (+352) 80 02 81 81 | info@m-o.lu

Agency for the transition to independent living (ATVA)
T. (+352) 247-75162 | info@cc-atva.lu

Psycho-social and School Support Centre (CePAS)
T. (+352) 247-75910 | info@cepas.public.lu
www.cepas.public.lu

Adult education service

T. (+352) 8002-4488 | sfa@men.lu

**Higher Education Information Service (Ministry of Higher
Education and Research)**

T. (+352) 247 56417
Open Monday to Friday from 1 to 5 pm
www.gouvernement.lu

**Vocational guidance service of the Employment
Development Agency (Adem-OP) - Centre Region**

T. (+352) 247-85480 | info.op@adem.public.lu
www.adem.public.lu

Service national de la jeunesse (SNJ)

Antenne locale Luxembourg
antenne.luxembourg@snj.lu | www.hey.snj.lu

Service de la scolarisation des enfants étrangers (SECAM)

T. (+352) 247-76570 | secretariat.secam@men.lu



6. **CONTINUING EDUCATION IN THE FIELD OF ICT**

6.1.

HOUSE OF TRAINING

Established in 2015 at the initiative of the Chamber of Commerce and the ABBL, the House of Training is a key player in the field of continuing professional training in Luxembourg. Its mission is to support companies, their managers and employees in the development of their skills and knowledge in order to prepare them for the challenges of the future.

The House of Training has more than 20,000 individual registrations per year for its “catalogue” and “tailor-made” training courses. It offers a wide range of continuing professional development courses listed in sectors and fields, structured in 4 main categories:

- Management training
- Training for support activities (Internal company organisation, Human Resources, Accounting, Law, Taxation, IT, Marketing & Communication, Health & Safety at work)
- Sector-specific training (Insurance, Banking, Vehicles & Investment Managers, Financial Professionals, Construction, Engineering & Architecture, HoReCa, Real Estate, Industry, Transport & Logistics)
- Self-development training (Personal Development).

ICT is present in all categories of the House of Training’s offer.

In its “IT” area, the House of Training has developed a training offer focused on the professional profile of the IT project manager. The training courses offered in this area cover the following topics:

- Office software and collaborative tools
- Business intelligence & Big Data
- Cybersecurity, Web & Design,
- Programming & Operating Systems
- IT Governance

In the areas of “Entrepreneurship & Business Management” and “Internal Company Organisation”, the House of Training offers certification courses in :

- Digital transformation
- Project management and agility
- Innovation
- E-Commerce

In the field of “Marketing and Communication”, ICT is present in:

- Digital communication
- Digital marketing

Within the field of Banking, a “Digital Finance” theme with a set of specialised courses has been developed by the House of Training in cooperation with the ABBL, including:

- Introduction to Digital Finance
- Artificial Intelligence in Finance - Fundamentals
- Data Analytics in Banking - Fundamentals
- Cloud Computing Officer in Financial Institutions - Fundamentals
- Cybersecurity - Fundamentals
- Cybersecurity - Regulatory Framework
- Cybersecurity - Management
- Cybersecurity - Incident Management
- Crypto-Assets and Tokenisation
- Robotisation in Banking
- Blockchain Technology
- Blockchain for Banking - Regulatory and Legal Aspects
- Instant Payments
- Open Banking and Application Program Interfaces
- Outsourcing Regulation in Finance
- Digital Future of Retail Banking
- Digital Future of Wealth Management and Private Banking

- Digital Future of the Fund Industry
- Digital Future of Corporate Banking

In the field of “Architecture, Engineering & Urbanism”, the House of Training offers numerous training courses in Building Information Modeling (BIM).

With the acquisition of Key Job S.A. in 2020, the Chamber of Commerce of the Grand Duchy of Luxembourg is completing the training offer proposed by the House of Training. Key Job, which is a training organisation specialising in IT courses, offers a range of training courses from traditional office automation courses to multimedia systems, including high-level technical courses. The aim is to offer enhanced support and guidance to Luxembourg SMEs to help them make a success of their digital transition by acquiring the skills needed to transform their activities digitally.

To find out more, visit:



**HOUSE OF
TRAINING**

Continuous professional training
7, rue Alcide de Gasperi | L-1615 Luxembourg
T. (+352) 46 50 16-1 | customer@houseoftraining.lu
www.houseoftraining.lu

6.2.

THE HIGHER INSTITUTE OF ECONOMICS (ISEC)

The Institut Supérieur de l'Économie - (ISEC) is a higher education institution founded by the Chamber of Commerce and the Chamber of Trade. It offers Bachelor's and Master's degree programmes for people working in Luxembourg and the Greater Region who wish to develop within their company and have their specific knowledge recognised by a university degree. Drawing on the know-how and experience of several leading academic partners, ISEC offers quality programmes, adapted to the needs of the Luxembourg economy, which support the development of skills in companies.

In partnership with the FOM - Hochschule fuer Oekonomie & Management, ISEC offers degree programmes oriented towards strategic management and various operational fields such as project management, finance, law, human resources and marketing, as well as international relations:

- Bachelor of Arts Business Administration
- Master of Business Administration (MBA)

In partnership with the University of Lorraine, ISEC offers degree programmes aimed at managers of a company's internal organisation and digital project managers in order to develop the skills needed to assume the responsibilities associated with this profile:

- Master 2 Project Management
- Master 2 Quality Management
- Master MIAGE Speciality: Computer Science and Innovation

To find out more, visit:



7, rue Alcide de Gasperi | L-1615 Luxembourg
T. (+352) 46 50 16-1 | info@isec.lu
www.isec.lu

6.3.

LUXEMBOURG LIFELONG LEARNING CENTER (LLLC)

The Luxembourg Lifelong Learning Center (LLLC), the training centre of the Chamber of Employees, offers a wide range of training courses in a variety of fields.

Since 1971, the LLLC has been striving to meet the needs of employees and now has over 8,000 registrations per year. Different levels and formats of training are offered such as evening classes, seminars, specialised training, industry certifications and university courses.

Particular attention is paid to training in the field of ICT. Most of the ICT training programmes prepare for recognised industry certifications. In particular, the LLLC is accredited as an official examination centre for Pearson Vue and Kryterion, which enables it to organise certification examinations for the main IT manufacturers.

In the field of ICT, the LLLC offers training in the following areas: office software, multimedia, programming languages, web development, computer networks and cybersecurity.

As regards training in computer networks and cybersecurity, the LLLC offers, in collaboration with the Competence Center of the University of Luxembourg, all the training courses offered by the Cisco Networking Academy.

A “Bachelor in Applied Information Technology” is also offered in collaboration with the University of Luxembourg in continuing education (in the evening).

Finally, the ECDL (European Computer Driving Licence) certification as well as training courses preparing for the ECDL are offered exclusively by the LLLC.

To find out more, visit:



**LUXEMBOURG LIFELONG
LEARNING CENTRE**
LA FORMATION CONTINUE DE LA CHAMBRE DES SALARIÉS

2-4, rue Pierre Hentges | L-1726 Luxembourg
T. (+352) 27 494 600 | formation@lllc.lu
www.lllc.lu

6.4.

UNIVERSITY OF LUXEMBOURG COMPETENCE CENTRE (ULCC)

The University of Luxembourg Competence Centre (ULCC) is a professional and university continuing education organisation operating under the supervision of the University of Luxembourg in collaboration with the Ministry of Higher Education and Research. Located on the Belval Campus, the Competence Centre develops and manages training programmes for adults that meet the needs of the labour market and support the major development axes of the Luxembourg economy.

The ULCC offers several short non-degree courses in the field of digitalisation and ICT.

To find out more, visit:



Maison du Savoir (10th floor)
2, avenue de l'Université | L-4365 Esch-Alzette
T. (+352) 26 15 92 17 | info@competence.lu
www.competence.lu

6.5.

DIGITAL LEARNING HUB (DLH)

The Digital Learning Hub, a training centre dedicated to IT, was set up by the Ministry of Education, Children and Youth in order to stem the shortage of qualified people in the IT sector.

The DLH, which will be located in Belval, will bring together 4 training entities, namely:

- The Design Thinking School
- The Blockchain Thing
- Cybersecurity
- Coding School

The DHL will be officially launched at a press conference of the Minister of National Education, Children and Youth scheduled for May 2022.

To find out more, visit:



www.dlh.lu

6.6.

ICT TRAINING COURSES OFFERED BY ADEM TO JOB SEEKERS**Codingjobs**

This intense three-and-a-half month training course organised by ADEM and delivered by Numericall enables candidates to train to become web developers thanks to various training modules covering five main technologies: HTML, CSS, Javascript, PHP and MySQL. The skills they acquire in this programme are in high demand on the job market and therefore enable them to apply for junior developer/integrator positions in a website development agency and in any other company, regardless of its size.

FIT4 DigitalFuture

This training, intended for jobseekers under 30 years of age registered with ADEM, was designed to introduce young people to the world of digital technology. It includes various modules, including the European Computer Driving Licence (ECDL) technical diagnostic test, the creation of a website / Content Management System via Wordpress, the creation of a visual identity for project communication and also includes a section on information security awareness. The course provides a global vision of a digital project through the identification of IT needs, the understanding of the mechanisms of digitisation of a project and the communication of the latter, via an Internet platform. The training is provided by the House of Training. This training is financed by the Employment Fund and the European Social Fund (ESF).

Openclassrooms.com

Jobseekers registered with ADEM have free access to training courses on digital themes (digital marketing, project management, design, web and mobile development, etc.) on the Openclassrooms.com website for a period of three months. The aim is to promote employment in the digital sector and accelerate the integration of jobseekers into the job market. The courses are created in partnership with universities, schools and prestigious companies that are experts in their field. Certificates of achievement are issued by OpenClassrooms. ADEM is at the disposal of employers in order to organise tailor-made training courses according to the needs of the market (Data scientist, Java developer, junior ERP consultant).

To find out more, visit:

Employment Development Agency (ADEM)
Job seekers
T. (+352) 247-88 888 | info@adem.etat.lu
www.adem.lu

6.7.

OTHER CONTINUING EDUCATION OPPORTUNITIES

All other continuing education opportunities offered by accredited training bodies can be consulted through the continuing education portal at the following address www.lifelong-learning.lu.

In addition, the Higher Education Information Service of the Ministry of Higher Education and Research publishes a brochure aimed at a public of employed students which lists the official information sites on the possibilities of higher education by distance learning or evening classes in Luxembourg and neighbouring countries.

The background features a dark blue field with a large, bright orange triangle pointing towards the right. A wavy, dotted pattern in a lighter blue color flows across the lower half of the image.

7.

**EXTRACURRICULAR
ACTIVITIES IN
THE FIELD OF ICT**

LUXEMBOURG TECH SCHOOL

Luxembourg needs people with digital skills! Still, a large number of children and students have never been engaged in any coding activity. This is both a challenge and an opportunity to fill this void and provide new learning possibilities.

Since 2016, the Luxembourg Tech School supports the national strategy by developing the future digital leaders. Luxembourg Tech School implemented a unique project-based methodology that has proven, not only, successful, but also highly motivating and fun for you.

This epic programme is for all 12-19 years old students who are passionate about the digital realm and eager to learn and apply technology in a real business and creative context. At the moment, Luxembourg Tech School offer a 3 year program divided into 3 levels. Each level is divided into up to 3 modules, each centered on one specific domain.

Admission requirements

- Level GO — age: 12-14
- Level 1 — age: 15-19
- Level Up — age: 15-19

Place of training

- Athénée de Luxembourg | www.al.lu
- Lycée Michel-Rodange | www.lmrl.lu
- Lycée Aline Mayrisch | www.laml.lu
- Lycée International School Michel Lucius | www.lml.lu
- International School of Luxembourg | www.islux.lu
- Lycée de Garçons Esch | www.lge.lu
- Lycée Hubert Clément | www.lhce.lu
- Lycée Technique Agricole | www.lta.lu
- Maacher Lycée | www.mlg.lu
- Lycée Josy Barthel Mamer | www.ljbm.lu

Skills and competences acquired at the end of the program

Students who complete these 3 programs will be able to:

- Create digital and animated graphics with code
- Understand the basics of coding
- Discover how to talk to machines and computers
- Get to know simple robots and learn more about Space
- Create & design art for games
- Discover Big Data
- Prototype innovative banking apps
- Program drones & rovers
- Discover Artificial Intelligence (A.I.)
- Work on their own A.I. art project
- ...

To find out more:

Luxembourg Tech School | www.techschool.lu

