Undergraduate Technological Degree

STATISTICS AND BUSINESS INTELLIGENCE

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1. Courses Objectives

The Statistics and Business Intelligence DUT fosters skills necessary for the computerized management of data, their statistical analysis, and business intelligence:

- Graduates are skilled in data management: they are able to design, create, update, and administrate a data base.
- They master the statistician's process steps: data collection, quality control, organization and storing, extraction and relevant information presentation, statistical analysis and results presentation.
- They possess specific business intelligence skills: they can participate to the implementation and the operating of business intelligence system. They can design performance indicators, create dashboards and do reporting. They can also participate to data mining operations from data warehouses and data marts.

Graduates integrate the world of work in a variety of companies and organizations. They must be skilled on a technical level, but they should also be able to incorporate a variety of professional environments and know how to communicate.

The curriculum was designed to make sure students would not only acquire the necessary knowledge and work process but also the ability to work autonomously, through theoretical and practical teaching, and through projects.

A teaching supervision during the course of the DUT enables them to progressively elaborate their personal and professional project. Modules enable them to select either the immediate professional integration path, either towards studying further that can lead to a level 2 degree (licence) or a level 1 degree (master), and to eventually select a specific professional industry. Supplementary modules for the immediate integration in the world of work path are listed and described in this document, and so are supplementary modules for further studies are detailed in a "degree supplement" handed to the degree.

Key qualities of a graduate:

The DUT leads to working in a variety of positions in the data analysis industry and enables students to adapt to most industries thanks to its multidisciplinary approach. Here are three essential qualities of the Statistics and Business Intelligence graduates:

- Training in statistics, data base and programming gives graduates skills in data management and statistical analysis appreciated in small and middle-sized enterprises, in large companies, administrations or research centers.
- Management knowledge and company management, business intelligence operational skill combined to an advanced level in statistics training give graduates qualities to be a key operative.
- Graduates' communication skills, in both French and in English, as well as their general culture namely in economics and company management, give them tools to efficiently participate to corporate internal relationships, to international and national cooperation actions, to customers relationships, to relationships with contractors. They also enable them to report on results regarding missions entrusted to them, missions related to data base, business intelligence or statistical studies.

2. Activities and Skills Tables

a. Graduates Industries and Jobs

Statistics and Business Intelligence graduates work in the fields of data statistical analysis, IT management of these data and business intelligence.

They can find positions in all types of industries, in companies as well as in the administration or associations. Here are some of the most significant industries:

- Trade: marketing and customer relationships management (market survey companies, mass retail, banks and insurance, telecommunications, IT contractors, etc.)
- Health: clinical trials, epidemiology studies, disease surveillance, medical information analysis, health

economy (pharmaceutical industry, biomedical research, hospitals, public health organizations, etc.)
- Industry: quality control, reliability, research and development studies (aeronautics, car industry, food industry, energy, etc.)
- Public or semi-public services: socio-economic studies, land management, land settlement, resources management, environment (regional government, regional authority, health, economics, and tourism observatory, etc.)

Jobs offered by these companies correspond to four job profiles:
1. **CES** "Statistical Studies Associate"
2. **DS** "Statistical Developer"
3. **DM** "Data Manager"
4. **CEDD** "Business Intelligence Associate – Business Intelligence Developer"

Companies often offer positions that combine several activities, for instance "Statistical studies associate/Data manager".

1. Statistical Studies Associate

The statistical studies associate is hired by a decision-maker, a company department or a client to carry out statistical studies that are essential to make decisions. These statistical studies are based on data that can already be available in data bases or that will need to be collected in compliance with a protocol to be determined.

In case of a survey (socio-economic, marketing, poll, etc.), the Statistics and Business Intelligence graduates participates to its design, since the design of the questionnaire to the qualification and recording of data and including the administration of the questionnaires. In the industry, food, health sectors the Statistics and Business Intelligence participates to studies generally based on experimental protocols in compliance with official regulations and statistic standards.

Then, often in collaboration with a senior statistician, the statistical studies associate participates to the design of models, selects the most appropriate statistical processes and performs the analysis with specific software applications. They interpret statistical analysis results using proper charts and graphs.

Finally, the restitution of results to the study purchasing service is carried out by the Statistics and Business Intelligence graduates in written reports and oral presentations that need strong writing skills.

2. Statistical Developer

Graduates are in charge of application programming and statistical interfaces within the market statistics software applications field. In compliance with a bill of specifications, they are in charge of the design, the development, the fine-tuning and the testing as well as the creation of documentation aimed at end users. They are in charge of updating the created application, of training and supporting users as well as incident management.

Statistical developers, thanks to market software applications know-how, are to be the company's point person for the use of software applications.

3. Data Manager

Data managers are in charge of the computerized management of data. Statistics and Business Intelligence graduates enter the collected data in a database designed specifically, check the consistency of the data and conditions them to eventually lead to a quality statistical analysis.

Statistics and Business Intelligence graduates:
- Design or assist in the design of data collecting material (observation notebooks, e-questionnaires, etc.) and of a database
- Organize the information entry in the database
- Incorporate heterogeneous data and extracted from different sources
- Check and validate data entered in the database (consistency control programming, correction management, quality control, database closing)
- Make sure the database is exhaustive, traceable, and that it is archived in compliance with good practices and regulations, and with confidentiality and safety demands.

Statistics and Business Intelligence graduates are skilled in participating to the design and operating of databases in all industries (clients' database, clinical trials, products, images, administrative, etc.).
Data are often dematerialized and data management operations widely globalized. These tasks require a good command of the English language, knowledge of foreign cultures and project management skills.

4. Business Intelligence Associate- Developer

Business Intelligence associates-developers participate to the implementation and operating of corporate business intelligence systems. Indeed, information technologies and systems generate large data flows, the problem is not only to acquire and manage data (operational systems), but also to make use of them to help the decision-making process (business intelligence).
Statistics and Business Intelligence graduates work for:
- The design, the fueling and the management of data warehouses and data marts from company operational database
- The design and the calculation of performance indicators and scorecards, the design of dashboards and the automation of their production, the edition of reporting (Business Intelligence tools)
- The extraction of information from large data systems via appropriate statistical processes (data mining techniques)

It should be noted that the "decision" profile of this mission relies on a double IT and statistical skill and on management knowledge and company management.

b. Activities and Skills Table

In a nutshell, the four basic activities of Statistics and Business Intelligence graduates are:
- To contribute to design studies and surveys and to perform statistical analysis
- To develop statistic analysis and/or reporting programs/applications
- To design, make, and manage database
- To participate to the design of business intelligence solutions

Each of the positions described here above comprises these activities to a certain extent. For instance, the first two activities will be essential components of a statistical studies associate job, but the other activities will also be part of the job, but to a lesser extent. They also resort to other common types of activities:
- Needs analysis and background audit
- Presentation of work, in ways in relation with the activity, for which written and oral skills in both French and English are necessary and to common core skills:
    - CC-1 To adapt to a field of study
    - CC-2 To grasp the study field
    - CC-3 To lead a project
    - CC-4 To understand the structure, the working, and the strategic stakes in an organization
    - CC-5 To understand the challenges of corporate information analysis
    - CC-6 To understand the company's economic environment
    - CC-7 To observe and thoroughly analyze a situation
    - CC-8 To self train
    - CC-9 To ensure technology monitoring in one's domain of expertise
    - CC-10 To comply with regulations in the collection, the operating and the broadcasting of data and results
    - CC-11 To adapt to an international environment (English and general culture)
    - CC-12 To use office software applications
    - CC-13 Understand mathematics tools for probabilities and statistics

Note: "contribute" in this context means "being able to work in an autonomous manner over simple issues or participate to more complex ones as part of a team".

ACTIVITIES	SKILLS (BEING ABLE TO)
Statistical studies: contribute to the design of studies and surveys and to the creation of statistical analysis FA1-1 Participate to the creation of a survey, to collecting experimental data or to the search for pre-existing data. Qualify, organize, and store data FA1-2 Data description: one-dimension, multi-dimension and graphical representation statistics FA1-3 Statistical model: selection of the model, sensitivity, performance, and implementation FA1-4 Statistical inference and forecast: estimate and hypothesis tests FA1-5 Communication of results via the creation of study reports, summaries and oral presentations and via visuals	• Contribute to the drafting of the survey protocol, of the poll layout or of the design of experiments • Contribute to the design of the questionnaire or of the observation notebook • Use software applications enabling the calculation of the size of samples • Contribute to the selection of statistical and data mining processes and to implement them • Use business statistical software applications • Check and validate statistical analysis results and interpret them: do the critical analysis of models and used processes • Present an analysis report in the relevant language: French/English
Develop programs/statistical analysis and reporting software applications FA2-1 Drafting of general and/or detailed specifications for an application from a bill of specifications FA2-2 Programming of all or part of an applicable solution from detailed specifications and design of a technical document FA2-3 Technical implementation (or roll-out) of an application and users training and support (training, user guide, technical support) FA2-4 Programming of tables, listings, and graphs of the statistical analysis	• Design the bill of specifications (functional and technical specifications, quality insurance plan) of a request (study, survey, application, etc.) • Use several programming languages • Draft and validate users acceptance tests and performance tests • Use several business statistical analysis software applications and use several development tools • Apply used software applications programming good practices • Draft technical documents (user guide, etc.)
Design, create, and manage a database FA3-1 Design an appropriate structure for a database FA3-2 Creation, consolidation (incorporation of external data) and testing of the database FA3-3 Interrogating of the database FA3-4 Validation of the database (validation plan, quality control, correction management) FA3-5 Creation of the documentation needed for the use and fueling of the database (user guide, data entry instructions)	• Use data management and operation software applications (statistical software applications, SGBD) • Draft the bill of specifications – both functional and technical, the quality insurance plan • Draft and validate users acceptance tests and performance tests • Develop automatic monitoring programs for the database to validate the consistency and the completeness of data • Draft technical documentation (data management plan, validation plan, user's guide, transfer protocol, etc.) • Use the English language, namely in an international context (offshoring)
Contribute to the design of business intelligence solutions FA4-1 Implementation of a conceptual model of data and creation of a relationship and/or associated multi-	• Identify information sources (internal, external, online, etc.) and their characteristics (nature, volumetry, reliability, etc.)

dimensional database FA4-2 Incorporation, consolidation, and recording of data issued from a variety of sources towards a data warehouse FA4-3 Design, automation, and maintenance of reporting, dashboards, scorecards FA4-4 Design and creation of statistical analysis FA4-5 Design and production of relevant indicators and visuals	• Draft the bill of specifications – both functional and technical, the quality insurance plan • Use several programming languages • Design operational, business intelligence and/or multidimensional databases • Operate a database using query languages • Use a data integration tools (ETL) • Identify the appropriate statistical processes and datamining tools and implement them • Design and create a dashboard

c. Associated ROME files

Posts with a Statistics and Business Intelligence DUT:

ROME CODES:

CODE ROME	TYPES OF JOBS
H1101	• Customer assistance and technical support
H1210	• R&D technical intervention
M1403	• Socio-economic studies and forecasting
M1805	• IT studies and development
C1105	• Insurance actuarial studies

Posts with a Statistics and Business Intelligence DUT and professional experience:

ROME CODES:

CODE ROME	TYPES OF JOBS
H1206	• Industrial R&D management and engineering
H1502	• Industrial quality management and engineering
M1803	• IT systems management

Note: This list is not exhaustive for several reasons:
- Some posts are not listed in the ROME files, such as statistical developer or data manager
- Some activity fields are only listed for Masters or Doctorate holders when they offer posts for Statistics and Business Intelligence DUT holders such as research in Earth sciences, biology, astronomy (K4202)
- Statistics and business intelligence are useful tools in almost all working fields, it would be impossible to list all possible posts in an exhaustive manner

3. General Organization of the Program

a. Program Description

Targeted audience

The Statistics and Business Intelligence DUT aims at high school graduates interested in statistics and IT. They will also have an interest in applied mathematics, essential to statistics, as well as in economics and management, French and English expression and communication. High school graduates with majors in Literature with a minor in mathematics, Sciences, Economics and social sciences, as well as Management techniques with a minor in IT systems management and Industrial and Sustainable Development techniques with a minor in digital and IT systems, and finally Laboratory techniques are especially targeted.

Semesters, Modules, Paths

Students attend lectures (CM) with the entire class, but also supervised work (TD – in groups of 28 students) and practical work (TP – groups of 14 students).
The 1,620 hours of teaching are spread over four semesters and divided into teaching units (UE), whose number/semester vary depending on the semester. Teaching units are divided into modules. To each module is assigned a coefficient which corresponds to a number of credits (in compliance with the ECTS system).
In each teaching unit, the number of hours and credits associated to each module ensure a balanced program, especially regarding Semester 1 which plays a crucial part in the adaptation of students to higher education.
The DUT spans over a minimum of 60 weeks. It is recommended to add 2 to 3 weeks in order to extend Semester 1.
The DUT training program comprises a major, ensuring the acquisition of a core skill, as well as supplementary modules. These supplementary modules aim at creating an exhaustive study pathway whether students want to join the world of work or study further after obtaining their DUT. Supplementary modules are fully part of the DUT.

Supplementary modules listed in this document are related to an immediate integration into the world of work and can be identified with the letter C next to their number. The "Welcome" teaching unit of Semester 1 includes a "Mathematics and Economics" module whose content is adapted to the student's profile. In this teaching unit, the teaching of descriptive statistics courses also takes into account the profile of the student.
If students decide to study further, the program offers supplementary modules to foster a more in-depth understanding of technologies and sciences. Supplementary modules are offered as part of the adaptation of the students study pathway, depending on their personal and professional project (PPP). These modules have the same coefficient and number of hours than supplementary modules related to an immediate integration into the world of work.

Subjects, teaching units
- Statistics

Descriptive, inferential, decision-making or data mining statistics processes so the graduates can implement them in an autonomous manner, and are able to adapt to the company's specific processes. The main statistics application fields are also presented.
- IT

This subject includes knowledge related to statistics-specific and general programming, to the design and use of database. At first covered separately, this knowledge is then mobilized together in order to build a decision-making chain, from the integration of data until the restitution of information.
- Economics

The economics curriculum, covered from an international point of view, takes into account the different backgrounds of students. The goal is to get the student acquainted with an economical reasoning, and enable them to understand economical information and be able to have a critical analysis during debates on this matter.
- Management

The curriculum offers a stepping stone into management and decision-making based on the use of professional software applications, case studies and via the use of management tools in statistics and IT analysis of data. It also includes corporate understanding and some of its strategic aspects (decision-making process, performance assessment, and marketing).
- Mathematics

The curriculum is covered during the first two semesters. It takes into account the different backgrounds of students, namely during the Welcome teaching unit where analysis basics are consolidated. Some elements of the curriculum are selected for their immediate usefulness in statistics and probability.

- Expression – Communication

The expression and communication curriculum is two-fold. First, the consolidations of written and oral skills, taking into account the evolution of technological tools and more generally, the society's evolution. Second, the curriculum develops a professional "know how to communicate" of which a part is dedicated to the DUT, namely the presentation of results of statistical studies.

- English Language

The English Language curriculum includes general, professional and scientific English. The curriculum is cross subject in a professional context (scientific articles, document research, software applications user guides, role plays, presentations, international cooperation, etc.).

- Law

The curriculum has a professional objective, enabling graduates to understand the legal framework in which they will work as part of a company (labor law) or as data operatives (data law).

Teaching Units Names per Semester
Semester 1 (450h)
- TU11: Welcome
- TU12: Statistics and Mathematical tools
- TU13: IT introduction and to business intelligence
- TU14: Economical environment and communication

Semester 2 (460h)
- TU21: Introduction to inferential statistics
- TU22: IT and Business intelligence basics
- TU23: Economics, management, and communication
- TU24: Project

Semester 3 (450h)
- TU31: Statistics
- TU32: Business Intelligence solutions
- TU33: Economical and professional environment
- TU34: Professional application

Semester 4 (260h)
- Business Intelligence statistics and IT
- Professional environment and application fields
- Project and internship

Associations between teaching units and subjects

Subject	Associated modules number
Statistics	M1102, M1201, M1202, M1203, M2101, M2102, M2103, M2203, M2204*, M3101, M3102, M3103, M3401C*, M3402C, M3403*, M4101*, M4102C, M4204C
IT	M1301, M1302, M1303*, M2201, M2202, M2203, M3201C, M3202, M3401C*, M3403*, M4101*, M4103C
Economics	M1101A, M1401*, M2301*, M3301, M4201C*
Management	M1303*, M1401*, M2204*, M2301*, M3203, M4201C*
Mathematics	M1101A, M1204, M2104
Expression and Communication	M1402, M2302, M3302, M4202
English Language	M1403, M2303, M3303, M4203
Law	M42O1*

a. Program summary charts per semester

SEMESTER 1

TEACHING UNIT (TU)	MODULE REFERENCE (M)	MODULE NAME	COEF. /M	TOTAL COEF. /TU	LECTURE VOLUME	SUPERVISED WORK	PRACTICAL WORK VOLUME	TOTAL HOURS STUDENT /TU
TU 11	**M 1101A**	Mathematics or Economics	2	5	10	15	5	**80**
	M 1102	Descriptive Statistics	2		10	15	5	
	M 1103	Personal and Professional Project 1	1			20		
TU 12	**M 1201**	Descriptive Statistics 2	2	10	10	15	5	**145**
	M 1202	Probabilities and simulations 1	3		10	20	10	
	M 1203	Statistical studies and surveys	2		5	10	15	
	M 1204	Probabilities and statistics mathematics	3		20	15	10	
TU 13	**M 1301**	Programmation basics	3	9	15	15	15	**130**
	M 1302	Data operation	3		10	15	15	
	M 1303	Steering tools 1	3		15	15	15	
TU 14	**M 1401**	General economics and company understanding	2	6	15	20		**95**
	M 1402	Communication basics	2			15	15	
	M 1403	Technical English language introduction	2			15	15	
TOTAL HOURS SEMESTER 1			**30**		**120**	**205**	**125**	**450**

SEMESTER 2

TEACHING UNIT (TU)	MODULE REFERENCE (M)	MODULE NAME	COEF. /M	TOTAL COEF. /TU	LECTURE VOLUME	SUPERVISED WORK	PRACTICAL WORK VOLUME	TOTAL HOURS STUDENT /TU
TU 21	M 2101	Inferential statistics introduction	2.5	10	15	20	10	180
	M 2102	Curves adaptation and chronological series	2		10	10	10	
	M 2103	Probabilities and simulations 2	2.5		15	20	10	
	M 2104	Mathematics for data analysis	3		20	30	10	
TU 22	M 2201	Software and Internet development	2.5	7	15	15	15	135
	M 2202	Data structuration	1.5		10	15	5	
	M 2203	Statistics programming 1	1.5			20	10	
	M 2204	Steering tools 2	1.5		10	10	10	
TU 23	M 2301	General economics & company management	2	7	20	25		125
	M 2302	Communication, IT, and argumentation	2			15	15	
	M 2303	Technical English development	2			15	15	
	M 2304	Professional and Personal Project 2	1			20		
TU 24C	M 2401	Project management	2	6	5	15		20
	M 2402	Project 1 (120h)	4					
TOTAL HOURS SEMESTER 2				30	120	230	110	460

SEMESTER 3

TEACHING UNIT (TU)	MODULE REFERENCE (M)	MODULE NAME	COEF. /M	TOTAL COEF. /TU	LECTURE VOLUME	SUPERVISED WORK	PRACTICAL WORK VOLUME	TOTAL HOURS STUDENT /TU
TU 31	M 3101	Data analysis	2	9	15	20	10	130
	M 3102	Estimate and tests of hypothesis	3		15	15	10	

TEACHING UNIT (TU)	MODULE REFERENCE (M)	MODULE NAME	COEF. /M	TOTAL COEF. /TU	LECTURE VOLUME	SUPERVISED WORK	PRACTICAL WORK VOLUME	TOTAL HOURS STUDENT /TU
	M 3103	Linear model	3		15	15	15	
TU 32	M 3201	Business Intelligence system	3	7	5	20	20	105
	M 3202	Business intelligence application development	2		5	15	10	
	M 3203	Business intelligence management techniques	2		10	15	5	
TU 33	M 3301	Economics	1.5	6	10	20		125
	M 3302	Professional communication	1.5			15	15	
	M 3303	Professional English and International cooperation	2			25	20	
	M 3304	Personal and Professional Project 3	1			20		
TU 34	M 3401C	Statistical cases study and business intelligence	2.5	8		15	15	90
	M 3402C	Application fields 1	1,5		5	10	15	
	M 3403	Statistical programming	2		5	10	15	
	M 3404	Project 2 (90h)	2					
TOTAL HOURS SEMESTER 3			30	85	215	150		450

SEMESTER 4

TEACHING UNIT (TU)	MODULE REFERENCE (M)	MODULE NAME	COEF. /M	TOTAL COEF. /TU	LECTURE VOLUME	SUPERVISED WORK	PRACTICAL WORK VOLUME	TOTAL HOURS STUDENT /TU
TU 41	M 4101	Data mining	3	7	10	25	10	110
	M 4102C	Polls	2		10	20	5	
	M 4103C	Advanced data bases	2		5	15	10	

TU	Code	Subject	Credits						Total
TU 42	**M 4201C**	Economics, management and law	3	**9**	15	25			**150**
	M 4202	Corporate communication	1.5			15	15		
	M 4203	Scientific English	2.5			25	20		
	M 4204	Application fields 2	2		5	15	15		
TU 43	**M 4301**	Project 3 (90h)	2	**14**	10	10			
	M 4302	Internship – application	6						
	M 4303	Internship – restitution	6						
TOTAL HOURS SEMESTER 4			**30**		**45**	**140**	**75**		**260**
TOTAL HOURS TRAINING			**120**		**370**	**790**	**460**		**1,620**

The 150 hours of English Language teaching are divided into 80 hours of supervised work and 70 hours of practical work.
The 120 hours of Expression – Communication are divided into 60 hours of supervised work and 60 hours of practical work.

10% of the hours of the supervised training curriculum (article 15 from August 3rd 2005) is dedicated to "Learning differently", in each subject of the curriculum. It aims at fostering the autonomy of student via self-teaching:
- Searching for information sources (literature, online sites, public data, etc.)
- Self training websites (e.g. online IUT) use, namely those specialized in statistics and IT (browsing English websites will be strongly encouraged)
- Autonomous learning of extra-curricular techniques, e.g. adapt to a corporate environment during the placement
- Use of available resources to learning foreign languages (multimedia system)
- Organization of cross projects supervised by professors from different fields.

b. Supervised projects and placements

Supervised projects

Supervised projects enable students to apply acquired knowledge within practical productions. Through these supervised projects, students learn how to manage projects and are able to use their acquired knowledge and know-how. These activities which represent a total of 300 hours are a great opportunity for students to develop professional abilities:
- Using the know-how and knowledge in a professional environment (document research, offering solutions, production of products or services in part or entirely, etc.)
- Experimenting with cross-subjects
- Learning and implementing project management methods: drafting bills of specifications, group work, time and deadline management, written and oral communication, etc.)
- Development of students' relationship skills: autonomy, development of qualities related to team work (initiative, ability to communicate, etc.)

Placements

The placement, that lasts at least 10 weeks and takes place during the 4th semester, hones the professional

skills covered by the DUT curriculum. This placement enables students to carry out a mission in compliance with the technical, technological, and relationship skills expected from the graduates.

The whole placement process, from finding the company to the oral exam to show for the work done during the placement, is carried out in compliance with a quality process that clearly defines who does what and how in terms of supervising the student during the placement.

Looking for the placement is essential as it prepares and teaches students how to look for a job.

The mission is defined by both the company and the department in order to ensure its feasibility and interest for the three parties to the contract.

During the placement, the student is supervised by both a professor from the department and a tutor within the company.

The work done by the students, the report drafted and the oral presentation delivered enable the evaluation of the placement. This evaluation is based on an evaluation grid that enables the assessment of students' individual qualities.

Placements abroad are strongly encouraged and if need be, the length of the placement can be increased.

c.   Personal and professional project

The Personal and professional project (PPP) must enable students to have a clearer understanding of the different jobs in their industry and of the personal abilities they will need. The following concepts must be developed: trade and skill, beyond the mere notions of salary and degrees. The PPP should enable students to come up with immediate and future professional desires that reflect their personal aspirations and abilities so they can design a training pathway consistent with the considered career paths. It also enables students to familiarize with guidance tools that will be useful throughout the course of their lives.

Students should be the main actor of this process: the PPP fosters among students their ability to commit. All members of the teaching staff can participate, whatever their specialty, in order to supply students with guidance, methods, tools to teach them how to find solutions on their own to orientation, professional integration, continuous education issues and to implement the selected solutions.

Students' projects must be grounded in experience, which they will have understood, analyzed and compared to other people's experience.

The teaching staff may resort to any professional integration or career guidance tools or methods.

The PPP can also rely on an e-Portfolio students design in the course of the DUT. More generally, the use of ICT, the Internet and social networks is strongly encouraged.

d.   Educational orientations – education through technologies

The curriculum set two goals to achieve: make sure students are operational when they integrate the world of work and supply them with the knowledge and know-how that will enable them to adapt to both changes in the chosen trade   and to the studies or training paths they may choose to follow at some point in the course of their career. Students should work with the most recent working methods, technologies and software applications as they are the ones used in the world of work. In order for education through technologies to be efficient, the *commission pédagogique nationale"* recommends:

- To teach how to understand and acquire statistical concepts as well as to use statistical techniques via the use of IT tools: to experiment through IT simulations and analyze actual data with specialized professional software applications
- To develop formal – in compliance with standard definitions - project processes, especially regarding supervised projects (e.g.: ISO 10006 – a project is a unique process that consists in a pool of coordinated and managed activities with start and end dates, undertaken in order to achieve a goal in compliance with specific demands such as deadlines, costs, and resources)
- To supply students with equipment that enable them to use a great number of tools and software applications (programming languages and environments, operation systems and networks, management systems and database, professional software applications, specialized terminals, etc.), with an access to the most commonly used software applications in the world of work – considering how difficult it can be to forecast which software applications or tools are concerned,

it is up to the teaching staff to assess the needs in this case.
- To make sure industry experts are included in the teaching staff – academically, courses taught by professionals from the industry should amount to 15% of the curriculum, namely in the technical and professional subjects.

In regards to the context created by the high school curriculum reform, the inclusions of both general and technical high school graduates as well as the adaptation to companies' needs regarding business intelligence lead to:
- Design the first semester as a period of adaptation to higher education and to the curriculum: creation of a "Welcome" teaching unit, a lower number of hours per week during this first semester than during the following ones
- Adapt the subjects' content (namely in math, statistics, and probabilities
- Tackle Business Intelligence in each teaching unit, each semester

e. Current economic issues

Competitive Intelligence

"Competitive intelligence can be defined as the action of gathering, analyzing, distributing intelligence useful to economic actors" (Intelligence économique et stratégie des entreprise, Commissariat Général du Plan, La Documentation française, février 1994)

Some of the skills acquired in this DUT show how the curriculum complies with the definition of competitive intelligence:
- CC-4 Understanding how companies are structured, work and the strategic challenges they face
- CC-5 Understanding the issues related to information management within companies
- CC-6 Be acquainted with corporate environment
- CC-9 Being in charge of the technological monitoring in one's work field
- CC-10 Make sure the collection, the operation, the broadcasting of data and results comply with legal regulations
- CC-11 Adapt to an international environment (English language and general culture course)

Finding the relevant piece of information, business intelligence, is a core notion of both the general economics course and corporate organization course.

A survey of the literature is also an important element tackled in the Expression-Communication course.

Data management and treatment via business intelligence systems and database that can be both sizeable and heterogeneous, as well as the analysis of this data via statistics tools and data mining tools are core teachings of the curriculum.

Finally, the curriculum also includes protection of data on an IT level as well as legally.

Entrepreneurship

Teachings related to business creation are already part of the curriculum and will increase in the future.

A large part of the management and economics courses supplies students with basic knowledge regarding business creation and management:
- Management courses include: steering tools, general, financial, analytical, projected accounting, etc.
- Economics courses include: understanding and management of corporations, interpreting the current economic situation, etc.

Furthermore, the PPP also tackles business creation.

Standardization

Competitiveness also means compliance with mostly international standards, rules, as well as good practices. These usually depend on the industry (e.g. ISO standards related to industrial statistics). Even if it is not prescriptive, compliance with ethics remains essential. Especially in the context of digital data, whether related to a corporation or an individual.

In statistics, the Statement on Professional Ethics adopted by the International Statistical Institute in 2010 must be taken into account.

In IT, the issues related to standardization device are tackled via the description and use of the industry's standards (languages, design and analysis methods, database, systems, networks, etc.) and courses should include notions related to general IT and IT systems security.

In economics, international standards represent highly financial stakes and trigger a fierce competition between nations to set forth their champion companies standards. Courses in economics and more specifically international economics tackle these aspects.

Sustainable development

The current development of digital tools in both a personal and professional aspects of our lives puts forth the question of how to conciliate technological innovations and the consumption of dwindling natural resources. Digital solutions enabled the access to news content in real time, a slump in paper consumption or even to reduce our travels. They also have a substantial impact on the environment whether regarding manufacturing equipment, using it and recycling it.

Its impact is all the more substantial as this equipment usually has a short lifecycle and their obsolescence is mainly due to software applications that constantly need more power and storage capacity. Statistics and business intelligence tackle data flow rationalization methods and techniques that can lead to a decrease in the volume of stored data in data centers. Sustainable development is now a global challenge and therefore, it is crucial to take into account methods and techniques to reduce software applications' carbon footprint when designing and maintaining them.

Project management

Project management is part of a specific 20h module during the 2nd semester. It is implemented within Semester 2 (120h), Semester 3 (90h) and Semester 4 (90h) projects in order to foster autonomy and students capacity to work as team player while working using all the subjects covered by the curriculum.

Health and Work Safety

We take into account health and safety at all levels: students, employees, and the production of employees.

- Students during their first year at the IUT have the possibility to meet with someone from the preventive medicine center, health interlocutor and advisor for students during the entire training period. Furthermore, students are informed regarding repetitive strain injuries.
- IT is a key tool within companies. Thus, it has an impact on working conditions and employees' health. The module regarding understanding companies covers hygiene and safety structures within companies and the project management modules and activities cover corporate safety rules compliance.
- Finally, the production of graduates must take into account ergonomics for the production's final users. In order to do so, standards must be complied with. For instance, modules concerning web sites cover accessibility for the disabled.