

ECTS COMPUTER SCIENCE AND NETWORK PROCESSING FOR INDUSTRY AND TECHNICAL SERVICES

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HIGHER TECHNICIAN DIPLOMA IN COMPUTERIZED MANAGEMENT (BTS / A-level+2)

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I- DEFINITION

A. Designation

Higher technician diploma in computer science and network processing for industry and technical services (BTS IRIS).

B. The functions of a higher technician in computer science and network processing for industry and technical services

The higher technician in computer science and network processing for industry and technical services (TS IRIS) develops and exploits desk-applications and computing systems, organized in networks or not, intended for production processes of capital goods and technical services.

He / she will principally practise the professional activities within a team, either in companies providing industrial data processing services, or in companies using or manufacturing computerized equipment. The concerned jobs are therefore linked to functions of solution development concerning computer science and network processing for industry and technical services, but also to services of installation, processing, maintenance and renovation of installations, centralized and organized in networks.

Historically, the technological fields of TS IRIS (formerly higher technician in industrial data processing : TS II) mainly affected centralized computing systems that enabled the command and the supervision of industrial processes.

The present development of computing systems, embedded or not, and communication systems, considerably widen the application fields of industrial data processing. In particular, the integration in new technology products (industrial or not) and systems of information and communication, materialized by the arrival of new generation equipment. More over, the softwares incorporated in equipment and electronic data interchanges have enabled new services to emerge, in order to manage, operate and maintain the equipment. The TS IRIS is therefore in the center of a technological revolution where communication and technical services become more and more important.

The TS IRIS can carry out his / her profession within very different fields :

- production of capital goods, industrial or not,
- processing industry,
- health sector,
- carrying / transport business,
- technical management of buildings,
- technical services,
- etc.

The important and permanent technological progress, the necessary adaptation to interlocutors working within these different fields, but also organizational changes (cooperative work) linked to the development of technical services, have contributed to a recomposition of the profession. The duties of a TS IRIS are various and progressive.

The main groups of job that are concerned can affect for example :

- development of computing systems, for hardware aswell as for software, the increasing demand for software which can be re-used favours the implementation of « object-oriented » languages,
- running of computing network systems,
- maintenance, remote or not, technical assistance to users,
- commercial activities

This very scientific and technical training allows the students to take part in different activities linked to the life cycle of a computing system, to adapt to technological permanent evolutions and to join new organizations of technical services to clients and users more easily, in total or partial autonomy

For example, in order to assure a proper equivalence between client's expectations and desk-applications, the TS IRIS can, within a project team, apply new methods of rapid development during the application design. These new methods are based upon breadboarding and the integration of components which can be re-used. Likewise, he / she works out and maintains desk-applications that will be integrated in global data processing solutions, he / she conducts the production, trains the users and sometimes assures a technical assistance. A constant dialogue with the users and all involved interlocutors is therefore necessary.

The BTS's multidisciplinary training brings, (apart from the technical skills that are required in the handling of industrial data processing, network applications and linked technical services), bases that facilitate the student's professional integration, in particular the ability to :

- · **satisfy the client's need**, because the project's success depends directly on this satisfaction ,
- · **respect time-limits and costs**, which requires a good integration in the project team,
- · **satisfy quality criteria**, when it comes to hardware and software solutions but also when it comes to processed documents (design, operation, maintenance, etc.),
- · **communicate** with different company departments (management, technical services, etc.), with the clients and the end-users, **especially in English** (European openings, translation of technical documents, use of Internet network, etc.).

A lot of general abilities and competences are likewise developed within this diploma's framework :

- a basic technological culture, necessary for processing most of the common applications, in total or partial autonomy,
- adaptation ability,
- ability to assure a technological watch (up-dating of knowledge, mastery of technological evolutions, etc.),
- ability to communicate verbally and in writing,
- ability to work in team,
- method, exactness and ability to take initiatives.

II. PROFESSIONAL CONTEXT

A. Different company types

The TS IRIS can practise his / her profession within three types of companies :

- providers of industrial data processing services,
- companies using automated and (or) computerized equipment,
- companies producing dedicated solutions, automated and (or) computerized equipment

B. Different categories of systems

The TS IRIS can carry out his / her profession with following systems :

- electronic systems that basically imply development of dedicated, embedded or non-embedded hardware and software,
- command / control systems allowing the command and the tracking of industrial processes,
- dialogue of man / machine interfaces,
- communication operating systems (voice, data, images) allowing the transfer of data into a computer architecture,

C. Aimed jobs

The jobs that are aimed for are linked to development, operation, maintenance and renovation functions of computerized network solutions for the industry and technical services.

For instance : technician in a design office, desk-application developer , integrator of systems and networks, fitter of computing systems, etc.

The higher technician can also practise his /her profession as a team manager, within his / her company or at the client's place.

For instance : technical support manager, maintenance technician, sales engineer, trainer, etc.

**WEEKLY SCHEDULE 1st and 2nd YEAR
HIGHER TECHNICIAN DIPLOMA IN COMPUTER
SCIENCE AND NETWORK PROCESSING FOR
INDUSTRY AND TECHNICAL SERVICES (BTS)**

CODE OF COURSE	COURSE	First year		ECTS credits per year	Second year		ECTS credits per year
		Weekly schedule	Yearly volume (for your information)		Weekly schedule	Yearly volume (for your information)	
		Total (Lectures + class works + practicals)			Total (Lectures + class works + practicals)		
	French	3(2+1+0)	90	6	3(2+1+0)	90	6
	English	2(0+2+0)	60	4	2(0+2+0)	60	4
	Mathematics	4(2+2+0)	120	8	4(2+2+0)	120	8
	Applied physics	4(2+0+2)	120	8	4(2+0+2)	120	8
	Professional communication	1+0+0	30	4	1+0+0	30	4
	Industrial data processing	18(6+0+12)*	540	30	19(5+0+14)*	570	30
	TOTAL	32h	960h	60	33h	990h	60

* Practicals in workshop

COURSE CONTENT

CODE OF COURSE	TITLE	TUITION TYPE	EVALUATION	HOURS OF COURSES PER YEAR	CREDITS PER YEAR (1 st year)	CREDITS PER YEAR (2 nd year)
U1	FRENCH	FORMAL COURSES CLASS WORK AND PRACTICALS	CONTINUOUS TESTS	50	6	6

Tuition language : French

The Erasmus students will be taught French by a teacher specialized in French for foreigners. 25 lessons are provided per semester.

The tuition of French in the BTS IRIS sections refers to the provisions of the 30th of March 1989 act (B.O.E.N. n°21 from 25th of May 1989) which sets the objectives, the content of the training and the skill referential in the field of the higher technician diploma's French language tuition.

CODE OF COURSE	TITLE	TYPE OF TUITION	EVALUATION	HOURS OF COURSES PER YEAR	CREDITS PER YEAR (1 st year)	CREDITS PER YEAR (2nd year)
U1.2	ENGLISH	FORMAL COURSES CLASS WORK AND PRACTICALS	CONTINUOUS TESTS	60	4	4

1. Objectives

The study of a current foreign language contributes to intellectual development and cultural enrichment of the individual. This subject is a part of the higher technician diploma's professional training since the mastery of English language forms an essential skill in the carrying-out of the student's future profession. The training has made as its objective to satisfy the professional and common activity's specific needs of a proper use of English when exercising the profession, and this without neglecting the four fundamental linguistic abilities (understand, talk, read and write the current foreign language). Since English has been adopted as compulsory language, it cannot be selected as current foreign language II (UF 1) for the optional test.

2. Fundamental skills

They will be developed within following fields :

- documentation exploitation, in English, relating to technical and commercial fields (technical instructions, professional documentation, press articles, letters, files that are computerized or not, etc.) ;
- efficient use of dictionnaires and appropriate referential books;
- verbal comprehension of professional information or instructions and verbal mastery of the communication language in professional or private discussions, including telephone calls;
- writing of notes, reports, letters, messages, short summaries.

The students are recommended to keep a tight cooperation with technology teachers and teachers of professional subjects in order to achieve a benefit of both technology and language.

CODE OF COURSE	TITLE	TYPE OF TUITION	EVALUATION	HOURS OF COURSES PER YEAR	CREDITS PER YEAR (1 st year)	CREDITS PER YEAR (2nd year)
U2	MATHEMATICS	FORMAL COURSES CLASS WORK AND PRACTICALS	CONTINUOUS TESTS	120	8	8

The tuition of mathematics in the BTS IRIS sections refers to the provisions of the 8th of June 2001 act (B.O.E.N. H.S. n°6 from 27th of September 2001) which sets the objectives, the content of the training and the skill referential in the field of the higher technician diploma's mathematic tuition. The provisions of this act are specified for this BTS in the following manner :

1. Guiding lines

Specific objectives of the section

The valorization of numeric and graphic aspects, research and implementation of algorithmes by using the section's own computing means form an essential objective in the higher technician's training in computer science and network processing for industry and technical services.

The study of continuous or discrete phenomenons, mathematically described by functions or sequences, and a first approach to geometrical, probability or matrix models, provide mathematic bases that are useful for data processing and physical applications.

Content organization

The tuition of mathematics is conceived according to these objectives, it can be organized around four poles :

- A study of the global and asymptotic behaviour of common sequences and functions, and a development of differential and integral calculus in order to solve numeric problems. The analysis and the spectral synthesis of periodic functions (Fourier sequences) or non-periodic functions (Laplace transformation), detain an important place. Some notions of operational calculus are represented in the educational program. Other problems have not been introduced in this training, in spite of their usefulness! (Fourier transformation) in order to progress with regard to the time-limit and to achieve the determined level. However, the differential equations have been highlighted since they are linked to problems of evolution and command. Likewise, the training strives for a proper mastery of compound numbers and functions with compound values, especially when it comes to the use of appropriate geometrical representations.
- An introduction to matrix calculus.
- An introduction to probability calculus, centred on fundamental law's description that helps to understand the importance of random phenomena in industrial science and techniques.
- An introduction to geometrical modelling which provides an opening to the most contemporary techniques. The geometrical modelling handles problems up to representation of plane forms.

Study organization

The first and second year schedule covers 2 hours of courses + 2 hours of class works.

2. Program

The mathematic program is based on following modules

- *Compound numbers 2.*
- *Numeric sequences 2.*
- *Functions of actual variables.*
- *Differential and integral calculus 3.*
- *Numeric sequences and Fourier sequences.*
- *Spectral analyse : Laplace transformation.*
- *Differential equations, except the TP 3, where linear equations with constant coefficients from first-rate to second-rate require a particular solution without indication when the right-hand member is a polynomial function*
- *Functions with two or three actual variables, except the b paragraph).*
- *Matrix calculus.*
- *Geometrical modelling 2.*
- *Probability calculus 1.*
- *Vectorial calculus, except mixed products.*

CODE OF COURSE	TITLE	TYPE OF TUITION	EVALUATION	HOURS OF COURSES PER YEAR	CREDITS PER YEAR (1 st year)	CREDITS PER YEAR (2 nd year)
U3	APPLIED PHYSICS	FORMAL COURSES CLASS WORK AND PRACTICALS	CONTINUOUS TESTS	120	8	8

Tuition language : French

I. GUIDING LIGNES

Specific objectives of applied physics

The applied physics program of the STS (Higher technician section) computer science and network processing for industry and technical services has been developed in order to satisfy the **real** needs of this program's students. It is linked to the referential over professional activities, established by the members of the profession, and to the program of industrial science and techniques, applied to computer science. The program emphasizes professional implementation.

This scientific physics program combines traditional academic training and industrial and scientific applications. These two approaches are coming from the industrial world's application field of physics and represent the work of technicians and engineers. The teacher must for that reason base the training on professional practice, specific for this educational program, by selecting examples and exercises that are linked to the training's speciality. The teacher of applied physics may therefore handle subjects that are linked to the student's own projects or workplacements : these actions can, when they are not explicitly represented in the examination program, be either a reinforcement of the handling of certain parts of the program, or a strict and moderate popularization.

This STS program of applied physics must provide the future technician with a good comprehension of scientific principles, required in the implementation of components during the construction of computers, peripherals, electronic connections and interfaces as well as in computerized electrical engineering.

The computer is the main tool of a technician specialized in computer science and network processing for industry and technical services. The professional activities of this speciality cover a wide field of systems, not only typical electronic systems but also command and tracking systems for industrial processes where electrical engineering and power electronics is needed. Even if the main competences are centred on the processing and the transmission of signals, mainly in numeric form, a technician of this program might sometimes have to intervene in other fields than those of numeric signals and algorithms : situated between electronics and electrical engineering, the technician must be a well-informed user, capable of communicating with specialists of these related fields.

II. PROGRAM THEMES

Theme I. ACQUISITION OF A PHYSICAL MAGNITUDE

Sensing device.

The role of a transducer. Passive transducer ; active transducer ; numeric output transducer.
Static and dynamic qualities of a sensor.

Theme II. SIGNAL ANALYSE.

II.1. Chronological characteristics of a signal.

Chronological and compound representations of a sinusoidal signal.
Average value of a periodic signal.

II.2. Frequency characteristics of a signal.

Frequency characteristics of a periodic signal.

II.3. Energy characteristics of a signal.

Instantaneous power. Average power transported by a periodic signal.
Effective value of a periodic signal.

Theme III. ANALOG PROCESSING OF SIGNALS.

III.1. Non-linear analog system : application with comparison function.

Simple valuator, hysteresis valuator.

III.2. Linear analog system : application with amplification function.

Amplification, gain and frequency band of a tension amplifier.

III.3. Linear analog system : application with masking function.

Definition of a mask ; application with first and second rate masks.
Function of harmonic mask transfer. Bode representation. Frequency band.

Theme IV. SAMPLING AND CONVERSION OF SIGNAL.

IV.1. Sampling.

Operation principles of sample-and hold.
Spectrum of a sampled signal. Shannon theorem.

IV.2. Analog-numeric conversion and numeric-analog conversion.

Definitions : resolution, quantum, conversion time.
Reconstruction of signal.

Theme V. NUMERIC PROCESSING OF SIGNAL.**V.1. Linear numeric systems : command law response.**

Discrete signal; processing on a sequence of numbers.

Recursive or non-recursive numeric systems.

Implementation of *z-transition*.

V.2. Linear numeric systems : masking application**Theme VI. SIGNAL TRANSMISSION.****VI.1. A signal's propagation.**

Characteristics of an electromagnetic wave (wave length, frequency, attenuation, spread...)

VI.2. Cable transmission of a signal.

Line closed on its characteristic impedance.

VI.3. Transmission of a signal through optical fibres.

Characteristics and implementation of optical fibres.

VI.4. Modulation and demodulation of a signal to transmit.

Modulation and demodulation notions concerning modulated signals : case study of a numeric signal.

Theme VII. LINEAR SYSTEMS.**VII.1. Formalism and identification of an analog system.**

Definitions : transient state ; steady state ; frequency response ; impulse response ;

Linear analog system.

Identification of a system by its frequency response.

VII.2. Tools used in the study of linear analog systems.

Definitions : static transmittance, time constant ; inherent angular frequency ; pseudo-period ; coefficient of depreciation ; response time ; overshoot.

Isochronic transmittance ; isomorphic transmittance. Implementation of Laplace transformation.

VII.3. Analog slave systems.

Transfer functions of a slave system.

Definition : stability and exactness of a system ; stability-exactness dilemma ; phase margin.

Notions of correctness (proportional equalizer and P.I. equalizer).

VII.4. Sampled slave systems.

Principle.

Theme VIII. ELECTRIC ENERGY : DISTRIBUTION AND CONVERSION.**VIII.1. Electric distribution and security.**

General notions of transport and distribution of electric energy ; roles of a transformer.

Security : electrocution danger ; limits of voltage areas ; earthed binding state.

VIII.2. Electromechanical conversion of energy.

General notions of electromechanical conversion. Operating reversibility of a rotating electric machine.

Definitions : power input to an electric machine and effective power

VIII.3. Static conversion of energy.

General notions of power electronics and control of electric machines.

Direct-alternating current conversion and direct-direct current conversion.

Definitions : active power ; *apparent power* ; power factor.

Notions of electromagnetic pollution.

CODE OF COURSE	TITLE	TYPE OF TUITION	EVALUATION	HOURS OF COURSESPER YEAR	CREDITS PER YEAR (1 st year)	CREDITS PER YEAR (2nd year)
U4	STUDY OF A COMPUTERIZED SYSTEM	FORMAL COURSES CLASS WORK AND PRACTICALS	CONTINUOUS TESTS	540	30	30

Tuition language : French

ANALYSE OF SPÉCIFICATION FILE
<i>Available resources</i>
<p>Definition of a software project's requirements. Technical documents linked to the project. All or parts of following documents :</p> <ul style="list-style-type: none"> - partial or complete contract conditions, - technical specification file, - software specification file.
<p>Linked knowledge and know-how:</p> <p style="padding-left: 20px;">Software development : Global analyse. A project's file organization.</p> <p style="padding-left: 20px;">Modelling. List of actors. Implementation case. Sequence, collaboration, class, and state diagrams.</p>
DEFINITION OF A PROTOTYPE'S OR A SYSTEM'S GLOBAL ARCHITECTURE
<i>Available resources</i>
<p>Technical documents linked to the project. Software specification file.</p>
<p>Linked knowledge and know-how:</p> <p style="padding-left: 20px;">Software development: Global analyse. Modelling. List of actors.. Implementation case. Sequence, collaboration, class, and state diagrams.</p> <p style="padding-left: 20px;">Algorithmic.</p>
JUSTIFICATION OF HARDWARE ARCHITECTURE CHOICE FOR A GIVEN APPLICATION
<i>Available resources</i>
<p>Specification file concerning the application. Preliminary design file, hardware architecture diagram (eventually partial). Functional characteristics of a given implementation case. Constructor's technical documentation of hardware modules used in the application. Description of software environment, available drivers. Technical documentation or limited description of other hardware modules (sensors, operative part, actuators, motors , variators, target system) presented in block diagrams. Component or sub-system catalogues.</p>
<p>Linked knowledge and know-how: Hardware architecture of computing systems.</p>

IDENTIFICATION OF A REAL TIME APPLICATION'S TIME RESTRICTIONS IN INDUSTRIAL ENVIRONMENT

Available resources

Client contract conditions with all its restrictions (geographical, chronological, operational, ...).

Technical file linked to the eventual quantity on hand.

Technical documentation handling the subject (written documents or numeric medium).

Linked knowledge and know-how:

Hardware architecture of computing systems:

E/S-couplers.

Hardware environment of computing systems.

Operating systems :

Operating systems and real time systems.

E/S management.

Real time specificities.

Compatibility check between equipment and fixed time-limits

Available resources

Client contract conditions with all its restrictions (geographical, chronological, operational, ...).

Technical file linked to the eventual quantity on hand.

Technical documentation handling the subject (written documents or numeric medium).

Time-limits of an application.

Linked knowledge and know-how:

Hardware architecture of computing systems:

E/S-couplers.

Hardware environment of computing systems.

Operating systems :

Operating systems and real time systems.

E/S management.

Real time specificities.

Validation of a real time application's task organization

Available resources

Specification file concerning the application.

Preliminary design file.

Technical documentations concerning the application.

Command algorithmes (in case of compound algorithmes).

Technical file of computer (power, E/S systems, characteristics of operating systems and available real time kernels).

Technical file of acquisition cards and their drivers.

Technical file of command cards and their drivers.

Computerized tools for analyse and document production.

Linked knowledge and know-how:

Operating systems.

Operating systems and real time systems

To characterize the main restrictions of an information transmission system
Available resources
Client contract conditions with all its restrictions (geographical, chronological, operational, ...). Technical file linked to the eventual quantity on hand. Technical documentation handling the subject (written documents or numeric medium).
Linked knowledge and know-how: Networks and transmission modes : Fundamental notions. Basic principles of level 1 transmission. User applications. Operating systems and real time systems : Real time specificities. Time restrictions of a control/command system. Software development : Data structure and management. Data coding, encoding and compression.
Description of a communication application's tasks
Available resources
Specification file concerning the application. Preliminary design file. Technical documentation concerning the implemented network. Technical documentation concerning a target machine. Documentation concerning the operating system of a target machine. Computerized tools for analyse and document production.
Linked knowledge and know-how: Networks and transmission modes : Fundamental notions. Network programming. Operating systems of networks.
Configuration validation of an industrial local area network or a field bus
Available resources
Industrial local area network (RLI) under functioning. Configuration software of an industrial local area network integrating all network layers and including a data base of network connected modules. Software and equipment network analyse adapted to industrial local area networks. Network specifications. Technical documentation concerning the application.
Linked knowledge and know-how: Networks and transmission modes : Fundamental notions. Network specificities of local, and industrial local areas, aswell as instrumentation. Industrial local area networks. Network equipment. Operating system of network. Network security. Hardware architecture of computing systems : Input/output couplers Hardware environment of computing systems.

Configuration of a hardware module for a given implementation
Available resources
<p>Specification file concerning the application. Detailed design file of the application. Complete hardware architecture diagram. Constructor's technical documentation of the hardware module to configurate Configuration restrictions of the hardware. Simple documentation of other hardware modules (sensors, actuators, motors, variators, target system, operative part) presented in block diagrams and clearly including the characteristics of the electric input or output magnitude.</p>
<p>Linked knowledge and know-how: Hardware architecture of computing systems.</p>
To create application tasks
Available resources
<p>Detailed design file. Complete technical documentation of the operating system or used real time kernel. Documentation of multitask requests aswell as examples. Technical documentation of the hardware target supporting the application. A hardware target with its configured acquisition cards. Development environment.</p>
<p>Linked knowledge and know-how: Operating systems. Software development : Algorithmic. Data structure and management. C++ language Code generation tools. Event programming. Software quality.</p>
To create communication programs between machines
Available resources
<p>Detailed design file. Complete technical documentation of implemented operating systems. Documentation concerning implemented protocols aswell as examples. Technical documentation of hardware targets supporting the application. Library of interface procedures with implemented network. Programming examples of interface between integrated network layers and an application. Hardware targets with their communication cards and configured operating systems.</p>
<p>Linked knowledge and know-how: Networks and transmission modes. Network programming. Operating system of network.</p>

CODE OF COURSE	TITLE	TYPE OF TUITION	EVALUATION	HOURS OF COURSES PER YEAR	CREDITS PER YEAR (1 st year)	CREDITS PER YEAR (2nd year)
U5	PROFESSIONAL COMMUNICATION	FORMAL COURSES CLASS WORK AND PRACTICALS	CONTINUOUS TESTS	30	4	4

Tuition language : French

INFORMATION RESEARCH ADAPTED TO INTERLOCUTOR'S REQUESTS
Available resources
<p>Clear formulation of the information need linked to a study or a computerized system project (technical, scientific and economic data, solutions, ...).</p> <p>Clear definition of the information research objective.</p> <p>information receiver identification.</p> <p>Interlocutor profiles and their recorded expectations.</p> <p>Inventory and description of the main information sources (books, documentations, synthesis reports, interview reports, data-bases, Internet sites, ... (some of these resources are in English) and their access modes.</p> <p>Required computing means.</p> <p>Time-limit restrictions.</p>
<p>Linked knowledge and know-how:</p> <p>Communication :</p> <p>Nature of the main technical information sources (books, magazines, company editions, fairs, data-bases, constructor's documents, Internet sites, AFNOR, INPI, ...).</p> <p>Techniques of information research (summary, index, keyword, Internet search engine).</p> <p>Interview techniques (linked to the general education).</p>
To structure interlocutor adapted information
Available resources
<p>Availability of the information to structure and direct access means</p> <p>Clear definition of the information structuring objective (hardware or software archiving, presentation, ...).</p> <p>Structuring criteria linked to the interlocutor's needs and to the information characteristics.</p> <p>Information receiver identification.</p> <p>Interlocutor profiles and their recorded expectations.</p> <p>Required computing equipment.</p> <p>Software allowing to structure and to archive information.</p> <p>Time-limit restrictions.</p>
<p>Linked knowledge and know-how:</p> <p>Communication :</p> <p>NFX 60-200 norm (Technical documents to deliver to users of durable goods for industrial and professional use - Nomenclature and general principles of writing and presentation).</p> <p>Interview techniques (linked to the general education).</p>

Teamwork
<i>Available resources</i>
Members of the team and their respective professional interests Allotment of tasks and responsibilities Environmental and time-limit restrictions
Linked knowledge and know-how: Communication : Communication techniques (linked to the general education). Project review.
Presentation of information to identified interlocutors
<i>Available resources</i>
Synthesis of personal work or teamwork (information research) including elements adapted to the objective and to the interlocutors (documentations, graphs, images, diagrams,..) some of the documents can be in English. Clear definition of the presentation's objective. Duration and place of the presentation. Identification of interlocutors. Interlocutor profiles and their recorded expectations. Required and installed computing hardware and software
Linked knowledge and know-how: Communication : Presentation techniques (linked to the general education). Basic functionalities of hardware and software tools for presentation and assistance.

ECTS CREDITS PER YEAR

(1st and 2nd YEAR BTS COMPUTER SCIENCE AND NETWORK PROCESSING FOR INDUSTRY AND TECHNICAL SERVICES)

NUMBER OF COURSE	COURSE	NUMBER OF HOURS			NUMBER OF ECTS CREDITS ASSIGNED PER COURSE PER SEMESTER		NUMBER OF ECTS CREDITS ASSIGNED PER COURSE PER YEAR	
		Course/ week	TP and TD (a)/week	Course/ year	Course	TP and TD (a)	Course	TP and TD (a)
U.I.1	FRENCH	2		50	6		6	
U.I.2	ENGLISH	2		60	4		4	
U.2	MATHEMATICS	2	2	120	8		8	
U.3	APPLIED PHYSICS	2	2	120	8		8	
U..4	INDUSTRIAL DATA PROCESSING	6	12	540	30		30	
U.5	PROFESSIONAL COMMUNICATION	1		30	4		4	
TOTAL NUMBER OF ECTS					60		60	

(a) TP : Practicals
TD : Class work