

SECTOR:  
**COMMERCIAL AND SERVICES**

PROGRAM  
**COMPUTER NETWORKING**

**CURRICULAR DESIGN ON COMPETENCY BASED-EDUCATION**

**HIGH-RANKING AUTHORITIES**

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**Program approved by the “Consejo Superior de Educación” in session 37-2011, act 06-37-2011 from October, 31<sup>th</sup>, 2011**

San José – Costa Rica

SECTOR:  
COMMERCIAL AND SERVICES

PROGRAM:  
**COMPUTER NETWORKING**

TENTH GRADE

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April, 2011

Corrections were made in this study program in September 2011, according to session 31-2011, act 05-31-2011 from September 5<sup>th</sup>, 2011

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## ACKNOWLEDGEMENTS

The Ministry of Public Education and the Department of Technical Education deeply appreciate the valuable contributions of many professionals who gave advice on the development of this study program.

In particular, we appreciate the contribution of MSc. Vanessa Gibson, coordinator of *Coordinación de Iniciativas para el Desarrollo* (Initiative Development Coordination) at CINDE for her support in the development of this study program that will be taught by Computer Science teachers.

Special thanks to the Volunteering Program for Retired Professors from Massachusetts Institute of Technology (MIT), mainly to Ms. Seymour and Mr. Cameron Smith for their suggestions and translations.

We also are grateful to Ms. Norma S. Merrett and Mr. Perry Miller for their work and recommendations in proofreading this program, and particularly for encouraging English Technical Advisors to the best we can be as professionals in our jobs.

Finally, special thanks to Costa Rica Multilingüe for its efforts to encourage Costa Ricans to communicate in many languages, and to make the concept of “multilingual” a reality in our country.

This program will increase the potential for success of the Technical and Professional High Schools preparing students for job opportunities after graduation and will expand the possibilities for rewarding careers for the graduates of these schools.

## Presentation of Fundamentals

In these times the access to information and its efficient use is the most important factor in determining the performance on the personal level and its organization. Starting from this point we can implement a strategy-definition process and make realistic and successful decisions according to developmental requirements of our environments.

In this context the use of information technologies takes on strategic importance in many public and private organizations for their impact on the quality of productivity and services and in competitive growth.

Clearly, the effective use of technology has an important effect on our country's productive, economic and social sectors. Thus, we are promoting the introduction of technology in activities related to performance by providing developmental factors and fundamental tools for attaining these goals.

Naturally, in order to develop the full potential offered by these technologies with its resulting momentum, it is necessary to train our population to a high level in accordance with our labor and management marketing requirements.

It should be pointed out the remarkable growth of our nationally installed technology base creates new information-technology workforce requirements. The demand for specialists in maintenance and updating is evident from technical support levels, resulting from growth in coverage and access to these technologies, to management and entrepreneurs.

The Ministry of Public Education, specially the Department of Technical Education, addresses new requirements in its sub-system which offers training to capable medium-level technicians. Starting from the principle that education is the fundamental instrument for developing useful citizens, the program increases the supply of technical specialists and includes information technology in computer networking.

Therefore, in accordance with the educational policy we aim to:

- Strengthen the fundamental values of the Costa Rican society through the integral formation of students.
- Stimulate respect for cultural, social and ethnic diversity.
- Build awareness in future citizens of their commitment to sustainable development in the national economy

- and society, in harmony with the environment.
- Develop a workforce that contributes to Costa Rica's competitiveness internationally.

To respond to these objectives, various information technical programs were developed. All of them have a curricular structure and a study program. These conform to subject areas which are integrated and organized so that they let the student develop knowledge, abilities and skills. This process allows the student to take an active part in building her/his own knowledge.

In addition to the technical programs' specific contents, we include study blocks of:

- Occupational health: This includes basic contents covering work security and hygiene, plus ways to prevent and control work risks and accidents.
- Entrepreneurial management: This promotes development of knowledge, abilities and skills that permit conversion into single or joint management, such that they not only prepare to perform as employees, but also that they can form their own companies.
- Quality culture: This permits the student to build knowledge and skills necessary to continuous quality improvement processes in various performance tasks, such as a mechanism to grow competitiveness. Also customer service elements are included in this program.

This specialty was designed in the format of competency-based education. This program was approved by the “*Consejo Superior de Educación*” in session 05-2009, act 03-05-09 from 29-01-2009. Some subject-areas were translated, taking into account the following percentages to be given in English in each grade:

- In tenth grade, 60% of content in subject areas delivered in a second language.
- In eleventh grade, 80% of content in subject areas delivered in a second language.

In the twelfth and final grade, 100% of content in subject areas delivered in a second language.

## RATIONALE

### COMPUTER NETWORKING

Technology is one of the areas that has experienced exponential growth, leading to constant modifications not only in its structure, but also in its aims. The constant innovation in this field has influenced all elements of our social, economic and cultural lives.

These factors affect the concept that economic players have about the knowledge, abilities and skills that human resources require to develop productive processes, including quality, competitiveness and productivity, which are not only institutional goals, but also intrinsic values.

In particular, the above idea applies to the field of computer science, transforming it into a dynamic one by constantly introducing new work tools. New equipment and devices appear in the market weekly or monthly, with frequent upgrades. This continuous change demands high adaptability of the educational sector.

Responding to these new demands and constant technological changes, this study program includes methodological strategies in design and content, emphasizing fundamental principles, paradigms and conceptual elements rather than tools to develop them. In this way, adaptations and upgrades will emerge in a more efficient and faster way, allowing these specialties to respond to the market.

A new upgraded proposal is presented in Computer Science:

- English for communication: its goal is to develop student knowledge, abilities and skills for the interpretation and understanding of technical language associated with the specialty; this subject-area will be taught in English only.
- Information and Communication Technologies: includes necessary elements to develop knowledge, abilities and skills to prepare the expert user of these technologies. Some aspects are: hardware, software, Internet, databases, specialized systems of information and connectivity with mobile equipment.

- Computer Network: The concepts related to the latest equipment technology are integrated. These are very useful for company management. The theory and practice varieties of equipment for existent network on the market. They incorporate necessary upgrades regarding technologies of network and new devices on the market; in order for students to have knowledge and constant upgrading about network to be certified.



## CROSS CURRICULAR THEMES

The social, economic, cultural, scientific, environmental and technological world today has demanded that the school curriculum not only provide knowledge and information, but also promote the development of values, attitudes, abilities and skills aimed at improving the quality of lives of individuals and societies (Marco de Acción Regional de “Educación para Todos en las Américas”, Santo Domingo, 2000). However, there is in our education system, a real difficulty teaching new subjects and contents related to emerging and relevant issues of society because there is a risk of saturation and fragmentation of the curriculum.

An alternative to these limitations are the cross-curricular themes, which is understood as an "educational approach that takes advantage of the opportunities offered by the curriculum, incorporating in the design, development, assessment and curriculum management some lessons for life, overarching and significant, aimed at improving the quality of individual and social life. They are holistic, axiomatic, interdisciplinary and in context "(Comisión Nacional Ampliada de Transversalidad, 2002).

According to the guidelines issued by the Consejo Superior de Educación (CSE) (SE 339-2003), the only Costa Rican Cross- Curricular axis are those of values. Thus, the systematic approach of Values in the national curriculum aims to promote the socio-emotional and ethical development of students, starting from the humanist position expressed in the “Política Educativa y la Ley Fundamental de Educación”.

Starting from the values and obligations of the State based on legislation in Costa Rica, we have defined the following Cross- Curricular Themes: **Environmental Culture for Sustainable Development, Integral Sexual Education, Health Education, and Education Experience of Human Rights for Democracy and Peace.**

For each cross- curricular theme we have defined a set of skills students develop in the area over the period of educational training. The competencies are understood as: "An integrated set of knowledge, procedures, attitudes and values, which allows satisfactory individual performance in the face of specific situations of personal and social life" (Comisión Nacional Ampliada de Transversalidad, 2002). They should guide the educational process and the very development of Cross -Curricular themes.

From the pedagogical viewpoint Cross- Curricular Themes are defined mainstreaming as: "Those that pass through and permeate both horizontally and vertically, all subjects in the curriculum and are required for their development integrated and coordinated contributions of different disciplines of study and joint educational action "(Beatriz Castellanos, 2002). In this way, they are present in the annual programs; as well as, throughout the entire educational system.

The following is a summary of each cross-curricular theme approach and its respective competencies:

### **Environmental Culture for Sustainable Development**

Environmental education is considered the ideal instrument for the construction of a culture of people and societies, in terms of achieving sustainable human development; through a process that allows them to understand their interdependence with the environment, from a critical and reflective awareness of reality.

Taking into account the knowledge gained, and activities of appreciation and respect, the students will draw from the reality, thus, causing active participation in the detection and resolution of problems at the local level, without ruling out a global vision.

Competencies to develop:

- Apply knowledge gained through critical processes reflective of reality, the resolution of issues (environmental, economic, social, political, and ethical) in creative ways and through attitudes, practices and values that contribute to sustainable development and better quality of life.
- Participate in committed, active and responsible projects aimed at the conservation, restoration and protection of the environment, identifying their main problems and needs, creating and developing alternative solutions to help improve the quality of life and the sustainable development.
- Practice harmonious relationships with one`s self, others and other living beings through responsible attitudes and skills, recognizing the need for interdependence with the environment.

## Integral Sexual Education

From the document "Políticas de la Educación de la Expresión de la Sexualidad Humana" (2001), a mature experience of human sexuality requires a comprehensive education and cannot be reduced to biological reproduction, or placed in a context devoid of values, ethical principles, moral life, love, and family and coexistence.

Human sexual education starts from early childhood and continues throughout life. In the first place, it is the right and the duty of the parents. It is up to the state to take subsidiary action to improve in the field of education and information, as expressed in Código de la Niñez y la Adolescencia (the Code of Childhood and Adolescence).

The education system must ensure experiences and teaching strategies that respond to the potential of the student population in accordance with their stage of development and socio-cultural contexts.

Competencies to develop:

- Interact with men and women equally, supportive and respectful of diversity.
- Make decisions concerning their sexuality from a life plan based on critical understanding of themselves, their socio-cultural reality and ethical and moral values.
- Identify appropriate internal and external resources when faced with signs of harassment, abuse and violence.
- Express your identity with authentic, responsible and comprehensive actions by encouraging personal development in a context of ongoing interaction and expression of feelings, attitudes, thoughts, opinions and rights.
- Promote constructive thought processes within the family, which dignifies the human condition, identifies and proposes solutions according to the socio-cultural context.

## Health Education

Health education is a fundamental right of children and adolescents. Health status is related to school performance and quality of life. So to work in health education in schools, according to the needs of the student population at each stage of development, citizens are being educated about healthy lifestyles, therefore, people who build and seek healthy lifestyles, have quality of life for themselves and for those around them.

The health education should be a social process to organize, and systematically motivate and guide individuals to develop. This will enhance, modify and encourage those that are the most practical and healthy people; as well as, the relationships with others and their environment.

So health education in the school setting is not limited only to convey information, but seeks to develop knowledge, skills and abilities that contribute to the social production of health, by teaching in a learning environment which tends toward a two-way communication and critical participatory students.

Competencies to develop:

- Experience a lifestyle that allows you to critically and reflectively maintain and improve the overall health and quality of one's life and that of others.
- Make decisions that support overall health of one's self and that of those around him/her, by better knowledge of himself/herself and others and the surrounding environment.
- Choose a process of critical self- appraisal, best- suited to deal with all situations which will encourage a safe environment for overall health of self and others.
- Use responsible, critical and participatory services available in the health sector, education and community, to make commitments on behalf of their quality.

## Experience of Human Rights Democracy and Peace

Costa Rica is a consolidated democracy, but in a constant state of review and feedback, making the observance of human rights is inherent in the commitment to build a culture of peace and democracy.

In educational settings use of appropriate management mechanisms will promote genuine participation in the family, community, institutional and national levels. To this end, civil society must be informed and educated regarding the legal framework provided by the country. This will develop effective participation and increase their participation in the electoral actions. This should provide a model democratic system which makes citizenship an attractive and interesting activity involving civic rights and responsibilities.

Competencies to develop:

- Practice daily duties and responsibilities which are deserving of human beings. These are based on a democratic, ethical, tolerant and peaceful environment.
- Emphasize the rights and responsibilities of citizenship.
- Choose alternative personal, family and social life that might promote tolerance, justice and equity between genders according to the contexts in which they operate.
- Participate in inclusive actions for the equity in all cultural contexts.
- Exercise the rights and responsibilities associated with democratic principles for the culture of peace.
- Show tolerance in order to accept and understand the cultural, religious and ethnic possibilities which are conducive and coexistence in a democratic culture of peace.
- Assess the cultural differences of different lifestyles.
- Practical actions, attitudes and behaviors directed to non-violence in schools, through work with groups of parents, family and citizens. Do this through conflict resolution, other peaceful means and expression of affection, tenderness and love.
- Apply strategies for peaceful resolution of conflicts in different contexts.
- Respect individual cultural, ethical, social, and generational differences.

## **Methodological approach of the Cross – Curricular Themes in the Study Programs and Planning**

Cross- Curricular Themes should be evident during the teaching –learning process in the National Education System from the study programs to the planning.

Regarding to curricula display values that promote, specifically, the incorporation of Cross-Curricula Themes. However, the options for convergence are not limited to those mentioned in the program. The students and the teachers can identify other possibilities to develop cross-curricular themes.

In this case, the teacher must be able to identify from students' prior knowledge, the socio-cultural context, the relevant and current society events which program objectives represent opportunities to address cross-curricular themes.

The Cross-Curricular Themes should be displayed in planning ; specifically, in the teaching /learning strategies and Values and Attitudes columns. The application of Cross-curricular themes in the classroom should consider the students` characteristics and environment details to achieve more meaningful learning.

Further than teacher´s planning, the educational institution should take actions to integrate Cross–Curricular Themes into the institutional plan, promoting active participation, critical and reflective thinking of the parents and caregivers, community leaders, and the community education.

In this sense, the school must take the corresponding decisions to ensure consistency between daily institutional practice and the Cross–Curricular Themes becoming a critical challenge for every educational institution.

### **CROSS-CURRICULAR THEMES COMMITTEE**

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## TEACHING GUIDELINES

This study program adds value to the student's lives. Its program structure explains the contents to be developed in each subject area and every study block. This will be helpful to teachers organizing the process of developing the student's knowledge both in or out of the classroom. While teachers may make additions to the content of the programs, they should not eliminate any, so that all Technical Schools may offer equal opportunities to learn.

**Learning results** included in this program are general in nature in order to give teachers the opportunity to add more specific information to their planning which must be consistent with the program. Learning results should reflect behavioral changes, knowledge, values, attitudes, skills and abilities which the student must master in the short term, either daily or weekly.

**Teaching and Learning Strategies** allow teachers to use their creativity and expertise in choosing the most appropriate strategy for the best learning results. Teaching and learning strategies are a point of departure for teachers who may then consider more appropriate ones, remembering that their strategies should facilitate learning by developing student thought process. The application of cognitive strategies, including comparison, classification, organization, interpretation, implementation, testing, analysis, identification, discussion, synthesis, evaluation, problem solving contribute to shape a critical and analytical student.

A checklist is included to determine basic elements that students must master upon completion of each study block.

**Performance Criteria** assess competency which leads to measurable evidence through observation of the student. Achieving these will allow the teacher to monitor and give individual feedback about learner's progress. These criteria which reflect the expected result of each study block, are the basis for theoretical or performance testing.

The beginning of each study block establishes an estimated time for the program. This time allocation is flexible and teachers are free to add or subtract hours, based on their experience and using appropriate teaching procedures without affecting the in-depth study of the material.

**Values and Attitudes** which are specified in each study block can be shared with the students at the beginning of the school day. These might include learning experiences such as case studies, projects to illustrate values by living them.

According to the competency-based educational framework, the teaching-learning process aims at providing knowledge, develop skills and abilities in order to improve students' attitudes and skills. The following teaching and learning steps should be taken into account:

- Identify and assess students' learning needs (diagnostic evaluation)
- Identify learning results and assessment criteria.
- Plan teaching-learning strategies to be developed, based on student profile and content.
- Design and implement appropriate assessment rubrics.
- Evaluate and give feedback on the teaching process (formative and summative evaluation)

A teaching- learning strategy is a means to achieving learning results using a specific methodology. Strategies include material, technical and human resources which together to content promote students' learning.

Strategy, moreover, provides the link between the content to be taught and the learning expected of the student. At the same time, it gives teachers the opportunity to measure the actual learning results. Therefore, it's a priority to define the method before defining the strategy. As strategies are complementary to each other, their results should be consistent with the method used.

Competency- Based Education defines basic concepts related to the educational and must be taught according to this new methodological approach:

- Teaching should be based on creating an educational environment that:

recognizes students' previous knowledge.

is based on cognitive and metacognitive strategies.

accomplishes complete and complex tasks.



- Learning takes place through:

gradually building knowledge.

the relationship between prior knowledge and new information.

meaningful organization of knowledge for the student.

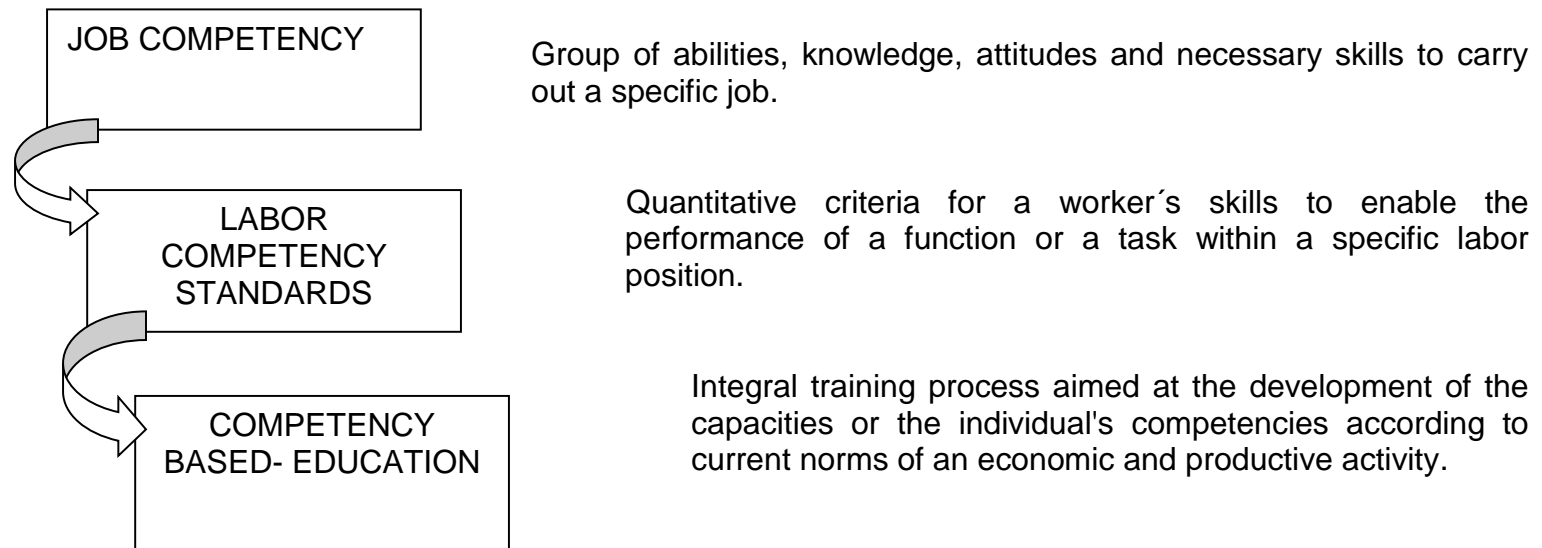
Thus, **General Recommendations** assist in achieving program learning results and purposes:

- The Technical High School which teaches must provide adequate infrastructure, equipment and materials.
- To teach effectively, the teacher must be able and willing to upgrade.
- Both inductive and deductive processes must be developed in the study block, using attractive and dynamic teaching techniques to motivate students to achieve their goals. These techniques, which have been planned and oriented by the teacher, include discussions individual and team work, and searching for information.
- Encourage students to make use of magazines, newsletters and other printed material in order to acquire up-dated information and reading matter.
- Internships are essential in eleventh grade for the fulfillment of the teaching-learning process and must be planned according to the program contents or as a teacher deems necessary in order to establish a relationship with the local area businesses.
- Educational tours are necessary in tenth grade for learning results in the study block. Nevertheless, the teacher is in charge of deciding when to take students out of school.
- It is important for the teacher to be aware of the correspondent use of tools and working habits in the laboratory, workshop and in the classroom.

- Basic technical literature for each subject area of the three grades.
- All subject area teachers must provide necessary tools to solve problems in order to create analytical men and women who will be able to provide solutions and alternatives.
- The time allotted to practice and theory must be evenly distributed in accordance with the learning results to be developed.
- Workshops or labs relevant to the subject areas of each program.
- An up-to-dated computer lab with correspondent software based on the requirements of the labor market.
- Provide manuals, catalogs and technical literature in English to be consulted by students.
- It is essential to make good use of technological devices such as audiovisual equipment, available material on Internet and others.
- This program should stimulate students' creativity through developing specific projects associated with its contents.
- Teacher should ensure equipment and tool-maintenance, and report regularly to the Principal or Technical Coordinator to make the arrangements for technician assistance.

## COMPETENCY BASED EDUCATION <sup>1</sup>

Competency-Based Education is a learning model that promotes the individual's integral and harmonic development and empowers students in all the competencies which the student needs to be successful in a specific activity. In this way, our student's needs are filled and also the requirements of the economic sectors.



A competency refers to the performance of an activity that includes cognitive and psychomotor abilities, or socio-affective, which are necessary to carry out this activity that belongs to a personal, social or professional group.

From the perspective of the Competency- Based Education, academic training aims at the development of personal attributes and applying them in an intelligent way in work tasks, allowing him/her to transfer this competency to different contexts and work situations.

<sup>1</sup> Ávila, Gerardo y López, Xinia. Educación basada en normas de competencia. SINETEC. 2000.

### Comparison between Technical Traditional Education And Competency- Based Education <sup>2</sup>

Technical Traditional Education	Competency- Based Education
The traditional pattern of learning responds to the needs of productive highly specialized processes.	The student adapts easily to different forms of production organization, including those used by the traditional style.
The contents of programs are highly academic. The link to the needs of the productive sector is neither systematic nor structured.	The productive sector establishes the results that the student expects to obtain from training, yielding norm-based system of job competency.
The programs and courses are inflexible.	Programs and courses are structured in subject-areas based on standard-based systems, allowing students to progress gradually and acquire levels of advanced competency.

Source: Morfín, Antonio. La nueva modalidad educativa: Educación basada en normas de competencia.

<sup>2</sup> Ávila, Gerardo y López, Xinia. Educación basada en normas de competencia. SINETEC. 2000.

## ASSESSMENT GUIDELINES

In the educational context in general, and particularly in the educational framework Competency-Based Education, evaluation is a continuous and permanent process and an integral part of the teaching learning process. For that reason, the following aspects can be taken into account:<sup>3</sup>

Performance evaluation is a process requiring evidence and criteria about the level and nature of the achievement of performance requirements established in Learning Results or in Labor Competency Standards. At the same time the criteria determines if a person achieves the competency or not.

In the context of Competency-Based Education evaluation of students follows Learning Results, then evaluation of the competency is focused on the performance. For this purpose, the teacher should collect evidence to determine if the student has accomplished the required knowledge, ability or skills.

From this previous idea, it follows that evaluation is the main aim of Competency-Based Education, which identifies strengths and weaknesses, not only from the students learning process, but also from the same teaching learning process in general, and all aspects that influence it: the teacher, learning atmosphere, strategies, materials, resources, among others.

Competency by itself is not observable, and it has to be inferred starting from performance. Therefore, it is important to define the type of performance that will allow gathering evidence of quantity in enough quality to make reasonable judgements on the individual's performance. The evaluation process deals with observation, gathering and interpreting evidence which later will be compared to the performance criteria of technical norms in a job competency. This comparison is the base that allows inferring whether the student is competent or not.

In this way, Competency-Based Education evaluation uses performance criteria based upon the norm helping to determine the quantity and quality of the required evidence to be able to assess the individual's performance. Thus, the evaluation process comprises the following sequence of activities:

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<sup>3</sup> Ávila, Gerardo y López, Xinia. Educación basada en normas de competencia. SINETEC. 2000.

- Define requirements or evaluation objectives.
- Collect evidence.
- Compare evidence with the requirements.
- Assess based on this comparison.

This leads to a continuous learning process that guides a new development process and evaluation. It is not necessary to collect evidence of students acquired knowledge (learning to know), but rather the actual performance that he/she achieves (learning to do).

The recommended methods of evaluation based on competency standards are the following:

- Observation performance.
- Simulation exercises.
- Designing projects.
- Written or oral tests.
- Performance tests.

Another technique used for assessment is the of "Portfolio of Evidence" used as part of the teaching-learning process.

Competency-Based Education, is a technique or strategy to gather evidence of *knowledge, performance and product* which are shown and confirmed during the learning process. The Portfolio of evidence developed by a student aims at quantifying the progress as a function of acquisition of competencies.

The technique allows the teacher to collect evidence and compare evidence with the requirements and assess them.

**It is the student's responsibility to organize the portfolio, with the teacher 's guidance and orientation. Some guidelines for building the portfolio are in Annex 1 of this document.**

## TEACHERS' PLANNING

### 1. ANNUAL PLAN FOR SUBJECT-AREA

This timeline comprises a distribution of months and weeks for the annual course, which will be used in the development of study blocks of each subject-area and their respective learning results. For its development, the following criteria should be taken into account:

- Emphasize the values and attitudes that will be part of this subject-area during the course.
- Show the amount of hours per study block that make up the subject-area and its logical sequence.
- Provide a list of materials and or equipment to be provided by the institution for the program development.
- "This plan must be delivered to the Principal at the beginning of the school year."

### Scheme for Annual Plan

#### ANNUAL PLAN

Technical High School: \_\_\_\_\_

Program: Computer Networking	Subject-area:	Grade: tenth
Teacher:	Year:	
Values and attitudes:		

Learning Results	FEB.				MARCH				APRIL				MAY				JUNE				JULY				AUG.				SEPT.				OCT.				NOV.				DEC.				HOUR			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4								
Study Block																																																
Material and Equipment required:																																																

## 2. PEDAGOGICAL PRACTICE PLAN FOR THE EDUCATIONAL SUBJECT-AREA.

This plan must be made for each study block. It is used daily and must be delivered to the Principal who evaluates the needs of checking it. This plan should correspond to the annual plan prepared at the beginning of the school year. This is the official format for planning:

### Pedagogical Practice Plan

Technical High School:		
Sector: Commercial And Services	Program: Computer Networking	
Subject Area:	Year:	Grade: Tenth
Study block:	Time:	
Purpose:		

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA	TIME

Learning results of the study program must agree to contents, teaching, learning strategies and performance criteria. The teacher should specify methods, teaching techniques and practices developed in the learning strategies; as well as, identify those tasks that must be developed by each student.

Besides that, values and attitudes must be linked to the learning result. The actions must be indicated in the column of teaching and learning strategies.

Performance criteria are taken from the evidence that is defined in the curriculum in terms of criteria for assessment of competencies and the evidence contained in the standard.

The time is the amount of hours that the teacher considers necessary to develop contents depending on the learning strategies.



## TECHNICAL PROFESSIONAL PROFILE COMPUTER NETWORKING

- Interprets technical information related to the specialty.
- Conveys technical instructions, using standard graphic communication clearly.
- Demonstrates abilities and skills in the tasks of the specialty.
- Leads production process, complying with the instructions of superiors.
- Suggests solutions to problems in the production process.
- Develops and evaluates projects in the field.
- Demonstrates quality in their work.
- Use computer as a tool in the tasks of the specialty.
- Apply standards of Occupational Health.
- Apply systems for preventive and corrective equipment maintenance, and specific machinery and tools for the specialty.
- Demonstrate professional ethics in carrying out duties that are part of the specialty.
- Organize workshops according to the specific technical standards of the specialty.
- Protect the environment by removing pollution arising from industrial production processes.
- Use rational materials, equipment, machinery and tools that are required in the specialty.
- Use appropriate technology in the field, contributing to competitiveness, quality and development of the industrial sector.

## TECHNICAL OCCUPATIONAL PROFILE

The Mid Level Technician of Computer Networking:

- Applies the procedures of drawing different elements of the network using specific software.
- Designs drawings using basic rules for scale management, dimensioned and labeled from the tools of a specific representative.
- Interprets architectural projects and network representations according to their elements.
- Distinguishes basic concepts related to the construction of computers network.
- Installs and configures peripheral equipment and network.
- Installs and configures different types of network cards or wires used in network construction.
- Applies concepts of installation, configuration and expansion of a network.
- Characterizes different operating systems starting from their technical characteristics.
- Explains the method of management processor, the processes and the memory carried out by the operating system.
- Uses the operating system functions for the devices and file management.
- Distinguishes the characteristics of the network-administrator functions and the system used by the operating system.
- Uses entrance, exit and interface functions of some network operating systems.
- Uses accessories and tools for the configuration of some network operating systems.
- Uses some network operating system tools for the administration of users.
- Uses elements of security and auditing of some net operating systems.
- Distinguishes some network operating systems tools for the system management.
- Installs and configures the work environment of some network operating systems.
- Administers bills, groups and impression functions in some network operating systems.
- Assigns security and auditing functions in some network operating systems.
- Executes the processes for improving the performance and optimization of network operating systems.
- Uses native available commands in network operating systems.
- Uses specialized English basic tools for reading and interpreting technical information.
- Applies basic functions of a word processor to write documents.

- Uses tools that present a spreadsheet to write documents.
- Develops databases using available tools.
- Uses Internet applications and services that are offered to search and access information.
- Designs web pages to publish information on the Internet.
- Makes the connection and installation of different mobile devices and computer equipment.
- Applies algorithms and flow diagrams structured as tools for logical resolution of computer problems.
- Uses symbols to construct algorithms and flow diagrams.
- Distinguishes basic concepts related to structured programming.
- Solves problems using program development elements.
- Builds decision blocks and compound conditions for specific cases.
- Uses procedures and functions as part of specific problem solution.
- Recognizes fundamental elements to use specific syntax of a language oriented to structured programming.
- Makes algorithms for the solution of specific problems using available tools.
- Develops simple programs using selection structures, operators, repetition structures and functions.
- Designs programs with a programming language that contains input and output operations.
- Illustrates the importance of security regarding accident prevention.
- Applies basic norms for waste management and disposal.
- Values the importance of signalling: risk zone and access paths.
- Applies safety standards in diverse activities to prevent accidents at work.
- Distinguishes fire hazards; as well as methods to prevent it in workplaces.
- Distinguishes types of chemical agents people are exposed to at work associated with computer science.
- Applies different techniques to prevent workload problems.
- Applies different techniques to prevent electric risks.
- Elaborates boot and recovery disks as security process of equipment maintenance to update it.
- Distinguishes different adapters used in computers.
- Recognizes administrative process components of the work environment associated with the supporting field.
- Identifies basic elements of the accounting process applied in a microenterprise.
- Elaborates a business plan for a small enterprise in the network area.
- Builds basic budgets related to the work of a network technician.
- Elaborates specific projects related to the network area.

- Recognizes health and safety measures to work with computer equipment and manual tools.
- Identifies fundamental elements associated with databases.
- Describes characteristics of different database models and the normalization process.
- Applies elements related to the use of information for construction and maintenance of databases.
- Uses functions and available tools for building or using databases.
- Uses functions and available tools in the work environment.
- Uses functions and available tools in a visual language environment to control the program.
- Develops programs using modular programming elements in a visual language environment.
- Designs user interfaces using different available tools.
- Elaborates different databases and applications for their management and updating.
- Recognizes components of the administrative process in the work environment associated with computer science.
- Elaborates a business plan for a small company in the computer science area.
- Uses different strategies for management and development of computer projects
- Distinguishes the characteristics and application of telematic services.
- Applies basic principles for using data communication and network.
- Distinguishes the concepts associated with data transmission.
- Applies concepts of network design and structured wiring used in LAN network.
- Uses the concepts of IP, NAT and PAT in the structure of network routing.
- Configures the different device used in network.
- Uses the console line to implement a variety of router configuration commands.
- Uses the routing method for networking devices address messages over the network.
- Recognizes basic principles contained in codes and standards related to structured wiring.
- Applies technical standards in the construction and replacement of wiring systems.
- Recognizes concepts and fundamental elements in network commutation.
- Distinguishes the characteristics of network routing for companies.
- Applies basic principles of network traffic filtration for using control access lists.
- Recognizes necessary principles for problem solutions of a networking company.
- Distinguishes characteristics and operation of available technologies for network.
- Installs and configures different components for the expansion or creation of a network.

- Installs and configures types of network cards and wiring used in the construction of network with different technologies.
- Applies techniques and strategies of network administration and maintenance.
- Distinguishes basic concepts associated with computer security.
- Distinguishes security in different contexts and computer environment.
- Recommends different methods and security techniques related to the systems characteristics and available equipment.
- Relates basic quality principles with daily task development of a specialist in computers.
- Applies concepts related to customer service in job performance related to installation and network configuration.
- Applies basic principles of customer service in work development.

## **PROGRAM OBJECTIVES COMPUTER NETWORKING**

- Use specialized English basic tools for reading and interpreting technical information.
- Use software application as a tool that allows the student to perform quality work.
- Use basic programming tools structured for the solution of specific problems.
- Apply basic techniques for preventive and corrective maintenance of desk and portable computers.
- Distinguish basic principles of data communication for designing and implementing network computers.
- Distinguish concepts and fundamental principles of network computers.
- Design and represent computer network according to the customer's specifications depending on the environmental characteristics.
- Apply principles and normative for designing and installing structured wiring systems.
- Apply installation concepts, configuration and expansion of a network.
- Use functions and available tools in network operating systems for its administration.
- Apply basic principles for building and maintenance of simple databases.
- Apply techniques and basic strategies of security and auditing in computer systems.
- Integrate mobile equipment in computer network.

## CURRICULAR STRUCTURE PROGRAM COMPUTER NETWORKING

SUBJECT AREA	X	XI	XII
Information and Communication Technologies	6		
Programación	8		
Computer Maintenance	8		
English for Communication	2	2	2
Computer Network		18	12
Manipulación de la Información		4	
Network Operating Systems			10
<b>TOTAL</b>	<b>24</b>	<b>24</b>	<b>24</b>

NOTE: the lessons of this technical area last 60 minutes.

## CURRICULAR FRAMEWORK COMPUTER NETWORKING

SUBJECT AREA	UNITS IN EACH LEVEL					
	TENTH	HOURS	ELEVENTH	HOURS	TWELFTH	HOURS
Information and Communication Technologies 6 hours	Computer Basis	24 Hrs				
	Software Application	120Hrs				
	Website Design	60 Hrs				
	Specialized Information Systems	18 Hrs				
	Connectivity	<u>18 Hrs</u>				
	Total	240 Hrs				
Programación 8 horas	Herramientas Lógicas	48 Hrs				
	Algoritmos y Diagramas de Flujo	48 Hrs				
	Elementos de Programación	64 Hrs				
	Programación	<u>160 Hrs</u>				
		Total	320 Hrs			
Computer Maintenance 8 hours	Occupational Health	64 Hrs				
	Computer Architecture	80 Hrs				
	Maintenance & computer upgrading	<u>176 Hrs</u>				
	Total	320 Hrs				



SUBJECT-AREA	UNITS IN EACH LEVEL					
	TENTH	HOURS	ELEVENTH	HOURS	TWELFTH	HOURS
Manipulación de la Información 4 horas			Bases de datos Introducción a la Programación en Ambiente Visual Gestión Empresarial Total	40 Hrs  60 Hrs <u>60 Hrs</u> 160 Hrs		
Computer Network 18 hours			Data Communication Principles Local Area Network Design and Network Representation Structured Wiring Physical Network Installation Total	108 Hrs 108 Hrs  126 Hrs 126 Hrs <u>252 Hrs</u> 720 Hrs		
Computer Network 12 hours					Network Devices Network Technologies Computer Security Quality Culture Total	120Hrs  60Hrs 60Hrs <u>60Hrs</u> 300Hrs
Network Operating Systems 10 hours					Operating Systems Network User Network Management Total	70Hrs 90Hrs  <u>90Hrs</u> 250Hrs

SUBJECT-AREA	UNITS IN EACH LEVEL					
	TENTH	HOURS	ELEVENTH	HOURS	TWELFTH	HOURS
English For Communication 2 hours	Building personal interaction at the company.	10 Hrs	Safe work.	10 Hrs	Day to day work.	10 Hrs
	Daily life activities.	10 Hrs	Introduction to business activities.	10 Hrs	Customer service.	10 Hrs
	Working conditions and success at work.	10 Hrs	Complaints and solving problems.	12 Hrs	Stand for excellence.	10 Hrs
	Describing company furniture, equipment and tools.	10 Hrs	Regulations, rules and advice.	12 Hrs	Travel.	10 Hrs
	Talking about plans, personal and educational goals.	10 Hrs	Following instructions from manual and catalogs.	12 Hrs	Building an outstanding future career.	10 Hrs
	Communicating effectively and giving presentations.	10 Hrs	Making telephone arrangements.	12 Hrs		
	Raising economic success.	20 Hrs	Entertaining.	12 Hrs		
		<u>80Hrs</u>		<u>80 Hrs</u>		
	Total		Total		Total	50 Hrs

## CURRICULAR MAP COMPUTER NETWORKING TENTH YEAR

SUBJECT- AREA	STUDY BLOCK	LEARNING RESULTS
Information and Communication Technologies  240 hours	Computer basis 24 hours	<ul style="list-style-type: none"> <li>• Identify concepts, characteristics and elements for developing information and communication technologies. (ICT).</li> <li>• Interpret elements associated with national and international legislation (ICT).</li> <li>• Use basic norms for entering texts.</li> </ul>
	Software Application 120 hours	<ul style="list-style-type: none"> <li>• Apply basic norms of work to use computer equipment.</li> <li>• Solves virus problems in the computer.</li> <li>• Use functions in operating systems for computer hardware and software administration.</li> <li>• Use several tools for environment management in a graphical operating system.</li> <li>• Use tools for resources management.</li> <li>• Apply basic functions of a word processor in the production of documents.</li> <li>• Use spreadsheet tools for document production.</li> <li>• Determine properties and configuration of slide presentations.</li> <li>• Generate slides with basic elements.</li> <li>• Manipulate objects inside the slides file and assign special effects to presentations.</li> </ul>

SUBJECT - AREA	STUDY BLOCK	LEARNING RESULTS
<p>Information and Communication Technologies 240 hours</p>	<p>Website Design 60 hours</p>	<ul style="list-style-type: none"> <li>• Use applications related to the Internet and for searching and accessing information.</li> <li>• Distinguish basic elements related to the design of web pages.</li> <li>• Demonstrate basic norms for web pages design and Internet site construction.</li> <li>• Design web pages for publication of information on the Internet.</li> </ul>
	<p>Specialized Information Systems 18 hours</p>	<ul style="list-style-type: none"> <li>• Identify concepts, characteristics and applications of information systems.</li> <li>• Distinguish job environment elements from specialized information systems.</li> </ul>
	<p>Connectivity 18 hours</p>	<ul style="list-style-type: none"> <li>• Identify characteristics and requirements for the operation of mobile devices.</li> <li>• Recognize options for equipment or mobile devices connectivity.</li> <li>• Carry out connection and installation of mobile devices and computer equipment.</li> </ul>

SUB - AREA	UNIDAD DE ESTUDIO	RESULTADOS DE APRENDIZAJE
Programación 320 horas	Herramientas Lógicas 48 horas	<ul style="list-style-type: none"><li>• Resolver problemas utilizando los diferentes sistemas numéricos.</li><li>• Aplicar la lógica proposicional y la lógica de predicados en la determinación de la validez de una proposición dada.</li><li>• Resolver problemas utilizando el álgebra de Boole.</li><li>• Identificar los principios básicos relacionados con las permutaciones y combinaciones.</li> <li>• Solucionar problemas utilizando algoritmos, matrices y álgebra de matrices.</li><li>• Utilizar las relaciones de recurrencia en el análisis de algoritmos.</li><li>• Aplicar los conceptos de los mapas de Karnaugh en la resolución de problemas.</li></ul>

SUB - AREA	UNIDAD DE ESTUDIO	RESULTADOS DE APRENDIZAJE
Programación 320 horas	Algoritmos y Diagramas de Flujo 48 horas	<ul style="list-style-type: none"> <li>• Aplicar los algoritmos y diagramas de flujo estructurado como herramientas para resolución lógica de problemas computacionales.</li> <li>• Aplicar la simbología para la construcción de algoritmos y diagramas de flujo.</li> <li>• Utilizar la simbología para la construcción de algoritmos y diagramas de flujo.</li> </ul>
	Elementos de Programación 64 horas	<ul style="list-style-type: none"> <li>• Distinguir los conceptos básicos relacionados con la programación estructurada.</li> <li>• Resolver problemas utilizando los elementos que intervienen en el desarrollo de un programa.</li> <li>• Construir bloques de decisión y condiciones compuestas para casos específicos.</li> <li>• Utilizar procedimientos y funciones como parte de la solución de problemas específicos.</li> <li>• Reconocer los elementos fundamentales para el uso de la sintaxis específica de un lenguaje orientado a la programación estructurada.</li> </ul>
	Programación 160 horas	<ul style="list-style-type: none"> <li>• Confeccionar los algoritmos necesarios para la solución de problemas específicos utilizando las herramientas disponibles.</li> <li>• Desarrollar programas sencillos utilizando estructuras de selección, operadores, estructuras de repetición y funciones.</li> <li>• Diseñar programas en un lenguaje de programación que contengan operaciones de manejo de entrada / salida.</li> </ul>

SUBJECT - AREA	STUDY BLOCK	LEARNING RESULTS
Computer Maintenance 320 hours	Occupational Health 64 hours	<ul style="list-style-type: none"> <li>• Describe main concepts and specific aspects of Occupational Health.</li> <li>• Illustrate the importance of security in accident prevention.</li> <li>• Apply basic norms for waste elimination management.</li> <li>• Evaluate the importance of danger area signals and access paths.</li> <li>• Apply security norms in diverse activities to prevent accidents in workplaces.</li> <li>• Distinguish causes and effects of accidents caused by fire; as well as preventive methods in workplaces.</li> <li>• Distinguish types of chemical agents associated with computer science to which the student is exposed in workplaces.</li> <li>• Apply different techniques to prevent work overload effects.</li> <li>• Apply different techniques to prevent electric risks.</li> <li>• Describe regulations of occupational health in the computer science field.</li> </ul>

SUBJECT - AREA	STUDY BLOCK	LEARNING RESULTS
Computer Maintenance 320 hours	Computer Architecture  80 hours	<ul style="list-style-type: none"> <li>• Describe internal components of the computer.</li> <li>• Describe external devices associated with the computer.</li> <li>• Describe different types of software used by the computer.</li> </ul>
	Maintenance & Upgrading Computer 176 hours	<ul style="list-style-type: none"> <li>• Describe health and security measures for working with the computer equipment and manual tools.</li> <li>• Build boot and recovery disks as part of the maintenance security or equipment upgrading processes.</li> <li>• Recognize basic norms to follow the preliminary revision and the inventory.</li> <li>• Distinguish adapters used in computers.</li> <li>• Recognize the installation and/or configuration procedure of different internal computer components.</li> <li>• Recognize the installation and configuration procedure of external computer devices.</li> <li>• Recognize the installation and configuration procedure of operating systems and other software in the computer.</li> <li>• Determine general computer network concepts.</li> </ul>



SUBJECT-AREA	STUDY BLOCK	TARGET	LINGUISTIC ACHIEVEMENT
English for Communication 80 Hours	Building Personal Interaction at the Company. 10 hours	<p><b>Cognitive Target: 1</b></p> <p>Exchanging information about: Personal interaction at the company, ways of interacting, meeting people, ethics, personal skills, cultural aspects</p>	<ul style="list-style-type: none"> <li>• Understanding simple familiar phrases and short statements.</li> <li>• Asking and responding to questions in clearly defined situations.</li> <li>• Reading personal information forms.</li> <li>• Reading a personal letter.</li> <li>• Writing about occupations and writing the name and address on an envelope.</li> </ul>
	Daily Life Activities. 10 hours	<p><b>Cognitive Target: 2</b></p> <p>Interprets and communicates information about: daily activities at home, school and job. Daily routines</p>	<ul style="list-style-type: none"> <li>• Making appointments for personal business.</li> <li>• Describing my personal schedules.</li> <li>• Talking about daily routines at home, at school and at work.</li> <li>• Predicting the content of a story from the title.</li> <li>• Writing about daily routine.</li> </ul>

SUBJECT-AREA	STUDY BLOCK	TARGET	LINGUISTIC ACHIEVEMENT
<p>English for Communication 80 Hours</p>	<p>Working Conditions and Success at Work.  10 hours</p>	<p><b>Cognitive Target: 3</b>  Interprets and communicates information about: someone's job, work tasks, and job positions, responsibilities</p>	<ul style="list-style-type: none"> <li>• Asking and answering about job positions and responding to job interview questions.</li> <li>• Describing someone's job and uncompleted work tasks.</li> <li>• Reading and interpreting a job application. and reading magazine articles.</li> <li>• Writing a paragraph describing a job I would like to have.</li> <li>• Filling out a job application.</li> </ul>
	<p>Describing Company Furniture, Equipment and Tools.  10 hours</p>	<p><b>Cognitive Target: 4</b>  Interprets and communicates information about: company furniture, equipment and tools</p>	<ul style="list-style-type: none"> <li>• Asking for and give information on companies and products, furniture.</li> <li>• Communicating messages with little or no difficulty about equipment and tools.</li> <li>• Reading and interpreting companies' descriptions.</li> <li>• Writing lists of equipment and tools from different companies.</li> </ul>

SUBJECT-AREA	STUDY BLOCK	TARGET	LINGUISTIC ACHIEVEMENT
<p>English for Communication</p> <p>80 Hours</p>	<p>Talking about Plans, Personal and Educational Goals.</p> <p>10 hours</p>	<p><b>Cognitive Target: 5</b> Exchanging information about: leisure activities, holidays and special occasions. Planning educational and personal goals.</p>	<ul style="list-style-type: none"> <li>• Talking about holiday celebrations and leisure activities.</li> <li>• Describing the steps to fill out different types of forms for college enrollement</li> <li>• Reading news and articles about people's plans.</li> <li>• Describing possible weekend activities.</li> </ul>
	<p>Communicating Effectively and Giving Presentations.</p> <p>10 hours</p>	<p><b>Cognitive Target: 6</b> Interprets and communicates information about: daily activities at home, school and job. Daily routines.</p>	<ul style="list-style-type: none"> <li>• Solving problems by phone and making telephone arrangements.</li> <li>• Describing what makes a good communicator.</li> <li>• Evaluating the effects of stress factors and getting advice on presenting.</li> <li>• Describing the facts that affect the success of a presentation.</li> </ul>

SUBJECT-AREA	STUDY BLOCK	TARGET	LINGUISTIC ACHIEVEMENT
<p>English for Communication 80 Hours</p>	<p>Raising Economic Success 20 hours</p>	<p><b>Cognitive Target: 7</b> Using appropriate language for comparing goods, discussing advertisements, describing products and your preferences.</p>	<ul style="list-style-type: none"> <li>• Discussing about advertisements from different communication media.</li> <li>• Comparing goods and services and explaining the reasons why I like a product.</li> <li>• Describing product characteristics by contrasting and comparing different goods or services.</li> <li>• Expanding reading skills by reading job ads from newspapers or magazines and reading formal letters of complaint.</li> <li>• Writing a formal letter of complaint, completing a product comparison chart and writing an advertisement.</li> </ul>

## CURRICULAR MAP COMPUTER NETWORKING ELEVENTH YEAR

SUBJECT-AREA	STUDY BLOCK	TARGET	LINGUISTIC ACHIEVEMENT
<p><b>English for Communication</b></p> <p><b>80 Hours</b></p>	<p>Safe Work</p> <p>10 hours</p>	<p><b>Cognitive Target: 1</b> Exchanging information about: safe and unsafe driving, accidents and job benefits</p>	<ul style="list-style-type: none"> <li>• Giving reasons for being late at work, school or meeting.</li> <li>• Identifying different signs and prevention procedures.</li> <li>• Describing consequences of accidents and prevention procedures at work.</li> <li>• Identifying special clothes and equipment used at work.</li> <li>• Scanning for specific information related to safety at work.</li> <li>• Reading stories about accidents at work and prevention measures.</li> <li>• Describing the advantages of working in a company.</li> </ul>

SUBJECT-AREA	STUDY BLOCK	TARGET	LINGUISTIC ACHIEVEMENT
<p><b>English for Communication</b></p> <p><b>80 Hours</b></p>	<p>Introduction to Business Activities.</p> <p>10 hours</p>	<p><b>Cognitive Target: 2</b> Interprets and communicates information about: Business Activities.</p>	<ul style="list-style-type: none"> <li>• Comparing the increasing profitability of department stores in our country.</li> <li>• Discussing conditions for starting new business in public and private sector companies.</li> <li>• Making predictions about products or services of the future.</li> <li>• Reading about the development of industries.</li> <li>• Providing advice for people who are starting a new business by writing a letter.</li> </ul>

SUBJECT-AREA	STUDY BLOCK	TARGET	LINGUISTIC ACHIEVEMENT
<p><b>English for Communication</b></p> <p><b>80 Hours</b></p>	<p>Regulations, Rules and Advice.</p> <p>12 hours</p>	<p><b>Cognitive Target: 3</b> Interprets and communicates information about: workplace rules and following them.</p>	<ul style="list-style-type: none"> <li>• Discussing situations when foreign business people make a “cultural mistake.”</li> <li>• Talking to a manager about not following rules by structuring a conversation.</li> <li>• Comparing companies’ regulations and giving advice.</li> <li>• Learning about dress code in my country to put it into practice at school or work.</li> <li>• Writing employee dress-code rules to be applied in a company.</li> </ul>

SUBJECT-AREA	STUDY BLOCK	TARGET	LINGUISTIC ACHIEVEMENT
<p><b>English for Communication</b></p> <p><b>80 Hours</b></p>	<p>Complaints and Solving Problems</p> <p>12 hours</p>	<p><b>Cognitive Target: 4</b> Exchanging information about: making complaints, apologizing and solving problems</p>	<ul style="list-style-type: none"> <li>• Learning how to deal with a complaint by voice mail and automated telephone information.</li> <li>• Apologizing when it is required.</li> <li>• Solving problems at the office.</li> <li>• Dealing with problems, client complains and apologizing.</li> <li>• Comprehending the use of items in a first-aid kit.</li> <li>• Writing about solutions to a problem at work or school.</li> </ul>



SUBJECT-AREA

STUDY BLOCK

TARGET

LINGUISTIC  
ACHIEVEMENT

**English for  
Communication**

**80 Hours**

Following Instructions  
from Manuals and  
Catalogs.

12 hours

**Cognitive Target: 5**  
Interprets and communicates  
information about: technical  
vocabulary related to manuals  
and catalogue instructions

- Understanding or using appropriate language for informational purposes.
- Comparing equipment used in a job taken from different catalogues.
- Identifying different equipment and components in catalogues used in a specific field of study.
- Interpreting written instructions from a technical manual in a specific field of study

SUBJECT-AREA	STUDY BLOCK	TARGET	LINGUISTIC ACHIEVEMENT
<p><b>English for Communication</b> <b>80 Hours</b></p>	<p>Making Telephone Arrangements</p> <p>12 hours</p>	<p><b>Cognitive Target: 6</b> Exchanging information about: telephone calls and arrangements.</p>	<p><b>LINGUISTIC ACHIEVEMENT</b></p> <ul style="list-style-type: none"> <li>• Exchanging information in telephone conversations.</li> <li>• Expressing fluently leaving and taking a message.</li> <li>• Making an appointment by telephone.</li> <li>• Comparing the different ways of communication that people use in one culture such as expressions or gestures that people from another culture might not understand.</li> <li>• Writing a paragraph about how culture affects business life.</li> </ul>

SUBJECT-AREA	STUDY BLOCK	TARGET	LINGUISTIC ACHIEVEMENT
<p><b>English for Communication</b> <b>80 Hours</b></p>	<p>Entertaining! 12 hours</p>	<p><b>Cognitive Target: 7</b> Demonstrate ability to work cooperatively with others.</p>	<ul style="list-style-type: none"> <li>• Entertaining guests and promoting leisure activities.</li> <li>• Listening to information about a TV schedule.</li> <li>• Discussing corporate entertaining.</li> <li>• Reading a journal about a trip or magazine descriptions.</li> <li>• Organizing a conference in another country including a variety of aspects.</li> </ul>

SUBJECT - AREA	STUDY BLOCK	LEARNING RESULTS
Computer Network 720 hours	Data Communication Principles 108 hours	<ul style="list-style-type: none"> <li>• Recognize concepts and fundamental elements associated with telephony.</li> <li>• Distinguish telematic services characteristics and applications.</li> <li>• Apply basic principles for data communication and network use.</li> <li>• Recognize concepts associated with data transmission.</li> <li>• Distinguish basic elements of OSI model and TCP/IP used in network building.</li> </ul>
	Local Area network 108 hours	<ul style="list-style-type: none"> <li>• Identify characteristics of local area network.</li> <li>• Apply concepts of network design and structured wiring used in LAN network.</li> <li>• Use concepts of IP, NAT and PAT in network routing structure.</li> <li>• Configure networks devices.</li> <li>• Use line console to apply commands of router configuration.</li> <li>• Use routing method for network device to send messages through the network.</li> <li>• Identify ISP services available in our country and service providers' responsibilities.</li> </ul>

SUBJECT-AREA	STUDY BLOCK	LEARNING RESULTS
Computer Network 720 hours	Design and Network Representation 126 hours	<ul style="list-style-type: none"> <li>• Apply procedures for drawing network elements used by specific software.</li> <li>• Design sketches using basic rules for labelling scale drawings, using a specific software.</li> <li>• Interpret architectural projects and network representation according to their components.</li> </ul>
	Structured Wiring 126 hours	<ul style="list-style-type: none"> <li>• Identify basic concepts associated with structured wiring.</li> <li>• Identify types of wire, characteristics and applications.</li> <li>• Recognize fundamental contents in the codes and norms related to wiring structure.</li> <li>• Apply technical norms in the construction and replacement of wiring systems.</li> </ul>
	Physical Network Installation 252 hours	<ul style="list-style-type: none"> <li>• Distinguish basic concepts related to building a computer network.</li> <li>• Install and configure peripheral equipment in terminals and network.</li> <li>• Install and configure types of network cards or wiring used in network building.</li> <li>• Apply installation concepts, configuration and expansion of a network.</li> <li>• Apply acquired knowledge, skills, and abilities regarding network by doing an internship.</li> </ul>

SUB - AREA	UNIDAD DE ESTUDIO	RESULTADOS DE APRENDIZAJE
Manipulación de la Información 160 horas	Bases de Datos 40 horas	<ul style="list-style-type: none"> <li>• Identificar los elementos fundamentales asociados con las bases de datos.</li> <li>• Describir las características de los diferentes modelos de bases de datos y el proceso de normalización.</li> <li>• Aplicar los elementos relacionados con el manejo de información para la construcción y mantenimiento de bases de datos.</li> <li>• Utilizar las funciones y herramientas disponibles para la creación o manejo de bases de datos.</li> </ul>
	Introducción a la Programación en Ambiente Visual 60 horas	<ul style="list-style-type: none"> <li>• Utilizar las funciones y herramientas disponibles en el entorno de trabajo.</li> <li>• Utilizar las funciones y herramientas disponibles en un lenguaje de ambiente visual para el control del programa.</li> <li>• Desarrollar programas utilizando los elementos de programación modular en un lenguaje de ambiente visual.</li> <li>• Diseñar la interfaz de usuario utilizando las diferentes herramientas disponibles.</li> <li>• Crear diferentes bases de datos y aplicaciones para el manejo o actualización de las mismas.</li> </ul>

SUB - AREA	UNIDAD DE ESTUDIO	RESULTADOS DE APRENDIZAJE
Manipulación de la Información 160 horas	Gestión Empresarial 60 horas	<ul style="list-style-type: none"> <li>• Reconocer los componentes del proceso administrativo en el ámbito de trabajo asociado a la informática.</li> <li>• Elaborar un plan de negocio para una micro empresa en el área de informática.</li> <li>• Utilizar diferentes estrategias para la gestión y desarrollo de proyectos informáticos</li> <li>• Aplicar destrezas, habilidades y conocimientos adquiridos referentes a la redes por medio de una pasantía</li> </ul>

## CURRICULAR MAP COMPUTER NETWORKING TWELFTH YEAR

SUBJECT AREA	STUDY BLOCK	LEARNING RESULTS
Computer Network 300 hours	Network Devices 120 hours	<ul style="list-style-type: none"> <li>• Recognize concepts and basic elements in network switching of a company.</li> <li>• Distinguish characteristics of network routing for companies.</li> <li>• Apply basic principles to filter network traffic by using access control lists.</li> <li>• Analyze principles necessary for the solution of company network problems.</li> </ul>
	Network Technologies 60 hours	<ul style="list-style-type: none"> <li>• Distinguish characteristics and functioning of networking technologies.</li> <li>• Install and configure components for network expansion or creation.</li> <li>• Install and configure different types of network cards and wiring used in building network with technologies.</li> <li>• Apply techniques and strategies for administration and network maintenance.</li> </ul>
	Computer Security 60 hours	<ul style="list-style-type: none"> <li>• Distinguish basic concepts associated with computer security.</li> <li>• Distinguish security in different contexts and computer environment.</li> <li>• Recommend security methods and techniques according to systems and equipment characteristics.</li> </ul>



SUBJECT AREA

STUDY BLOCK

LEARNING RESULTS

Computer  
Network  
300 hours

Quality Culture  
60 hours

- Relate basic quality principles with the development of daily tasks of computer specialist.
- Apply concepts related to customer service performing installation and configuration of network.
- Recognize contributions of teamwork for reaching proposed objectives.

SUBJECT AREA	STUDY BLOCK	LEARNING RESULTS
<p>Network Operating Systems 250 hours</p>	<p>Operating Systems 70 hours</p>	<ul style="list-style-type: none"> <li>• Characterize different operating systems using their technical characteristics.</li> <li>• Explain the administrative method of the processor, the processes, and the memory of its operating system.</li> <li>• Use operating system functions for device and file management.</li> <li>• Distinguish characteristics of the network function manager and the system used by the operating system.</li> <li>• Distinguish the characteristics of currently used main operating systems.</li> </ul>
	<p>Network User 90 hours</p>	<ul style="list-style-type: none"> <li>• Distinguish main characteristics of some network operating systems.</li> <li>• Use entrance functions, exit and interface of some network operating systems.</li> <li>• Use accessories and basic configuration of the network operating system.</li> <li>• Use basic tools of some operating systems for the user's administration.</li> <li>• Use security and auditing elements of network operating systems.</li> </ul>

SUBJECT AREA	STUDY BLOCK	LEARNING RESULTS
<p>Network Operating Systems 250 hours</p>	<p>Network Management 90 hours</p>	<ul style="list-style-type: none"> <li>• Distinguish tools of some network operating systems for system administration.</li> <li>• Install and configure the work environment of some network operating systems.</li> <li>• Administer bills, groups and impression functions in some network operating systems.</li> <li>• Assign security and audit functions in some network operating systems.</li> <li>• Execute processes for the improvement of the performance and optimization of some network operating systems.</li> <li>• Use native available commands in some network operating systems.</li> </ul>

SUBJECT-AREA

STUDY BLOCK

TARGET

LINGUISTIC  
ACHIEVEMENT

**English for  
Communication  
50 Hours**

Day to Day Work  
10 hours

**Cognitive Target: 1**  
Exchanging information about:  
day to day work.

- Asking and giving information about work routines.
- Describing times and conditions of my job and daily routines.
- Expressing likes and dislikes in my daily life.
- Reading an advertisement about a new product
- Writing a plan to improve safety in my home.

SUBJECT-AREA

STUDY BLOCK

TARGET

LINGUISTIC ACHIEVEMENT

**English for Communication  
50 Hours**

Customer Service  
10 hours

**Cognitive Target: 2**  
Interprets and communicates information about: customer service

- Understanding specifications about the elements of effective telephone communications.
- Applying techniques to improve effectiveness as a listener.
- Defining the importance of proper telephone techniques in providing excellent service to customers
- Understanding details from texts, passages and others.
- Stating the importance of attitude and creativity in providing high quality customer service.

SUBJECT-AREA

STUDY BLOCK

TARGET

LINGUISTIC  
ACHIEVEMENT

**English for  
Communication**

**50 Hours**

Stand for Excellence

10 hours

**Cognitive Target: 3**

Exchanging information about:  
The ability to work  
cooperatively with others as a  
member of a team.

- Listening to a conversation between an employer and an employee and between coworkers.
- Expressing encouragement when talking about programs and courses.
- Reading and discussing about job skills.
- Organizing information regarding options between job benefits and personal qualities

SUBJECT-AREA	STUDY BLOCK	TARGET	LINGUISTIC ACHIEVEMENT
<p><b>English for Communication</b> <b>50 Hours</b></p>	<p>Travel 10 hours</p>	<p><b>Cognitive Target: 4</b> Interprets and communicates information about travelling</p>	<ul style="list-style-type: none"> <li>• Listening to statements about a map in order to get to any specific place.</li> <li>• Explaining leisure and entertainment possibilities to a visitor.</li> <li>• Discussing about weather concerns when travelling.</li> <li>• Reading a map from another country to find out cities and places.</li> <li>• Reading about environmental issues to plan a visit to a foreign country.</li> <li>• Revising a business plan to propose an international company.</li> <li>• Developing writing skills: making, accepting or declining an offer.</li> </ul>

SUBJECT-AREA

STUDY BLOCK

TARGET

LINGUISTIC  
ACHIEVEMENT

**English for  
Communication**

**50 Hours**

Building an Outstanding  
Future Career  
10 hours

**Cognitive Target: 5**  
Interprets and communicates  
information about: applying or  
transferring skills learned in  
one job situation to another.

- Listening to a discussion between two managers.
- Discussing community problems and solutions by interviewing classmates.
- Talking about life in a city and contrasting it with life in the country side.
- Comparing and contrast the lives and goals of people regarding working conditions.
- Developing consciousness about my skills, achievements and rewards.
- Organizing ideas to design an improvement plan to change my life.



# **PROGRAM CONTENT**

## **TENTH GRADE**

# **SUBJECT AREA: INFORMATION AND COMMUNICATION TECHNOLOGIES**



## SUBJECT – AREA: INFORMATION AND COMMUNICATION TECHNOLOGIES

### DESCRIPTION

This Subject area has 6 hours per week, and consists of five study units:

- Computer Basis: contextualizes the student in the national and international history of computer science, recognizing the impact that this discipline has had on society. Abilities and skills are also developed for the application of basic norms in the production of different types of documentary material.
- Application software: introduces the most important concepts of operating systems, as well as the knowledge, abilities and skills needed for managing diverse application software (word processor, spreadsheet and graphic design programs).  
**NOTICE: Teacher will use at least two different operating systems, as well as two application tools (word processor, spreadsheet and graphic design programs), so students learn basic concepts more than particular elements.**
- Website Design: consists on the development of abilities and skills in the use of various available services on Internet, to search for and access information. Also contains basic elements related to web-site design and publishing on the Internet.  
**NOTICE: Teacher will use the design software considered to be more appropriate to student interests and the available equipment in Technical Professional High Schools.**
- Specialized Information systems: develops the abilities and basic skills needed for the identification of this type of system, access, installation and use of different available tools.  
**NOTICE: Teacher will develop this study unit using different specialized information systems, according to the contents of the program, the students' interests, and available hardware resources in Technical Professional High Schools and the market.**

- Connectivity: allows the development of knowledge, abilities and skills for an efficient use of different mobile devices.

**NOTICE: Teacher will develop this study unit using different equipment or mobile devices, keeping in mind the available resources in Technical Professional High Schools and the market.**

## GENERAL OBJECTIVES

### SUB. AREA: INFORMATION AND COMMUNICATION TECHNOLOGIES

Develop student's knowledge, abilities and skills to:

- Identify basic concepts related to the evolution of computer science as a work tool.
- Use available applications for the development of their work.
- Use tools and available services on the Internet for the access and manipulation of information.
- Produce different documentary materials using basic norms of typing.
- Design simple web sites for the publication of information on the Internet, based on basic technical norms.
- Create and maintain small databases, as a tool to improve work.
- Use different specialized information systems to access technical information related to the specialty.
- Use services to install and configure options for connectivity among different mobile devices.

This Subject Area has 6 hours per week, it consists on five study blocks:

## DISTRIBUTION OF STUDY BLOCK INFORMATION AND COMMUNICATION TECHNOLOGIES

<b>Study blocks</b>	<b>Name</b>	<b>Time in hours</b>	<b>Weeks per study block</b>
I.	Computer Basis	24	4
II.	Software Application	120	20
III.	Website Design	60	10
IV.	Specialized Information Systems	18	3
V.	Connectivity	18	3
	TOTAL	240	40

## TECHNICAL COMPETENCY STANDARDS OF EDUCATIONAL INSTITUTION

### GENERAL DATA

Title: Computer Basis.  
 Purpose: Relate the evolution of ICT as a tool and the appropriate use of basic norms of entering documental production.  
 Competency level: Basic

### UNITS OF JOB COMPETENCY THAT CONFORM THE STANDARDS

Title	Classification
Clearly relates the origins of computing and computer science.	Specific
Correctly names characteristics of computer generations.	Specific
Properly mentions the importance of ICT development in daily life.	Specific
Effectively defines concepts related to information and communication technology.	Specific
Properly relates ICT with different application fields.	Specific
Efficiently justifies the influence of modern society on ICT.	Specific
Appropriately illustrates changes that have been created by people and ICT.	Specific
Correctly identifies concepts of authorial rights and intellectual property.	Specific
Correctly recognizes legal implications, agreements, laws and regulations.	Specific
Properly interprets elements of the existing legislation.	Specific
Adequately describes steps to patent inventions and creations.	Specific
Correctly recognizes basic norms for entering texts.	Specific
Properly uses correct body position and hands while entering texts.	Specific
Correctly locates text source.	Specific
Correctly writes different types of texts.	Specific

## Competency Elements

References	Title of the element
1 – 1	Relate the evolution of ICT as a tool and the appropriate use of basic norms of entering documental production.

### Performance Criteria:

1. Identifies concepts, characteristics and elements for developing information and communication technologies.
2. Interprets main elements associated with national and international legislation to ICT.
3. Uses basic norms for entering texts.

### Application Field:

Category	Class
Services	Provision of Technical Education Services.

### Performance Evidence:

1. Relates ICT with different application fields.
2. Justifies the influence of modern society on ICT.
3. Recognizes legal implications, agreements, laws and regulations.
4. Interprets elements of the existing legislation.
5. Describes steps to patent inventions and creations.
6. Uses correct body position and hands while entering texts.
7. Locates text source.

### Knowledge Evidence:

1. Relates the origins of computing and computer science.
2. Names characteristics of computer generations.
3. Mentions the importance of ICT development in daily life.
4. Defines concepts related to information and communication technology.
5. Identifies concepts of authorial rights and intellectual property.
6. Recognizes basic norms for entering texts.

Product Evidence:

1. Illustrates changes that have been created by people and ICT.
2. Writes different types of texts.



Sector: Commercial and Services	Program: Computer Networking
Subject Area: Information and Communication Technologies	Grade: Tenth
Study block: Computer Basis	Time: 24 hours
Purpose: Relate the evolution of ICT as a tool and the appropriate use of basic norms of entering documental production.	

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA
1. Identify concepts, characteristics and elements for developing information and communication technologies. (ICT).	<ul style="list-style-type: none"> <li>History of computing and computer science</li> <li>Computers Generations</li> <li>Differences between computing and computer science</li> <li>Development of information and communication technologies</li> <li>Impact of technological advances in daily and company life</li> </ul>	<p><u>Teacher:</u></p> <ul style="list-style-type: none"> <li>Mentions computing and computer science origins.</li> <li>Describes characteristics of computer generations.</li> <li>Enumerates aspects of daily and enterprise life where ICT impact is evident.</li> </ul> <p><u>Student:</u></p> <ul style="list-style-type: none"> <li>Relates the origins of computing and computer science.</li> <li>Names characteristics of computer generations.</li> <li>Mentions the importance of ICT development in daily life.</li> </ul>	<ul style="list-style-type: none"> <li>Awareness to predict events.</li> </ul>	<ul style="list-style-type: none"> <li>Identifies concepts, characteristics and elements for developing information and communication technologies.</li> </ul>

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
	<ul style="list-style-type: none"> <li>• Concepts :               <ul style="list-style-type: none"> <li>• Information</li> <li>• Communication</li> <li>• ICT</li> <li>• Computer science</li> <li>• Computers:                   <ul style="list-style-type: none"> <li>• Hardware</li> <li>• Software:                       <ul style="list-style-type: none"> <li>• of application</li> <li>• systems</li> <li>• programming languages</li> <li>• tutors</li> <li>• systems authors and experts</li> </ul> </li> <li>• Simulators</li> </ul> </li> <li>• Artificial Intelligence</li> <li>• Robotics</li> <li>• Virtual reality</li> <li>• Telematic</li> <li>• Networks</li> </ul> </li> </ul>	<p><u>Teacher:</u></p> <ul style="list-style-type: none"> <li>• Defines concepts related to information and communication technology.</li> <li>• Demonstrates ICT concepts in different application fields.</li> <li>• Interprets the influence of ICT in modern society.</li> <li>• Exemplifies changes caused by the link between people and ICT in society.</li> </ul> <p><u>Student:</u></p> <ul style="list-style-type: none"> <li>• Defines concepts related to information and communication technology.</li> <li>• Relates ICT with different application fields.</li> <li>• Justifies the influence of modern society on ICT.</li> <li>• Illustrates changes that have been created by people and ICT.</li> </ul>		

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
<p>2. Interpret elements associated with national and international legislation (ICT).</p>	<ul style="list-style-type: none"> <li>• Author’s rights and intellectual property</li> <li>• International legislation:               <ul style="list-style-type: none"> <li>• Agreements</li> <li>• Security and integrity of ICT users information</li> </ul> </li> <li>• Legislation in Costa Rica:               <ul style="list-style-type: none"> <li>• Law on the Protection of Intellectual Property Rights</li> </ul> </li> <li>• Patent rights for creations and inventions</li> </ul>	<p><u>Teacher:</u></p> <ul style="list-style-type: none"> <li>• Defines concepts of authorial rights and intellectual property.</li> <li>• Explains national and international legislation about the issue.</li> <li>• Names main aspects of both legislations.</li> <li>• Describes steps to patent inventions and creations.</li> </ul> <p><u>Student:</u></p> <ul style="list-style-type: none"> <li>• Identifies concepts of authorial rights and intellectual property.</li> <li>• Recognizes legal implications, agreements, laws and regulations.</li> <li>• Interprets elements of the existing legislation.</li> <li>• Describes steps to patent inventions and creations.</li> </ul>	<ul style="list-style-type: none"> <li>• Awareness to predict events.</li> </ul>	<ul style="list-style-type: none"> <li>• Interprets main elements associated with national and international legislation to ICT.</li> </ul>

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
<p>3. Use basic norms for entering texts.</p>	<ul style="list-style-type: none"> <li>• Entering:               <ul style="list-style-type: none"> <li>• concept</li> <li>• correct body position</li> <li>• correct hands position</li> <li>• correct fingers position</li> </ul> </li> <li>• Keyboard:               <ul style="list-style-type: none"> <li>• Alphabetical</li> <li>• Numeric</li> <li>• Function keys</li> <li>• Order keys or specific commands</li> </ul> </li> <li>• Text source:               <ul style="list-style-type: none"> <li>• Location regarding entering</li> </ul> </li> </ul>	<p><u>Teacher:</u></p> <ul style="list-style-type: none"> <li>• Describes correct body and hands position while entering texts.</li> <li>• Illustrates the correct position of fingers when using the keyboard.</li> <li>• Exemplifies the correct way to locate the text source.</li> <li>• Applies basic norms for entering texts.</li> </ul> <p><u>Student:</u></p> <ul style="list-style-type: none"> <li>• Recognizes basic norms for entering texts.</li> <li>• Uses correct body position and hands while entering texts.</li> <li>• Locates text source.</li> <li>• Write different types of texts.</li> </ul>	<ul style="list-style-type: none"> <li>• Awareness to anticipate events.</li> </ul>	<ul style="list-style-type: none"> <li>• Uses basic norms for entering texts.</li> </ul>

PRACTICE AND CHECKLIST

PRACTICE DEVELOPMENT

Study Block : Computer Basis

PRACTICE No. 1

Purpose:

Scenario: Classroom

TIME:

MATERIALS	MACHINERY	EQUIPMENT	TOOLS

## Procedures

### Teacher:

- Mentions computing and computer science origins.
- Describes characteristics of computer generations.
- Enumerates aspects of daily and enterprise life where ICT impact is evident.
- Defines concepts related to information and communication technology.
- Demonstrates ICT concepts in different applications fields.
- Interprets the influence of ICT in modern society.
- Exemplifies changes caused by the link between people and ICT in society.
- Defines concepts of authorial rights and intellectual property.
- Explains national and international legislation about the issue.
- Names main aspects of both legislations.
- Describes steps to patent inventions and creations.
- Describes correct body and hands position while entering texts.
- Illustrates the correct position of fingers when using the keyboard.
- Exemplifies the correct way to locate the text source.
- Applies basic norms for entering texts.

RECOMMENDED CHECKLIST	Date:
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Student's name:	
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**Instructions:**  
These criteria will verify student performance by observation. Write an "X" in the column that best describes each student performance.

DEVELOPMENT	YES	NO	NOT APPLICABLE
Clearly relates the origins of computing and computer science.			
Correctly names characteristics of computer generations.			
Properly mentions the importance of ICT development in daily life.			
Effectively defines concepts related to information and communication technology.			
Properly relates ICT with different application fields.			
Efficiently justifies the influence of modern society on ICT.			
Appropriately illustrates changes that have been created by people and ICT.			
Correctly identifies concepts of authorial rights and intellectual property.			
Correctly recognizes legal implications, agreements, laws and regulations.			
Properly interprets elements of the existing legislation.			
Adequately describes steps to patent inventions and creations.			
Correctly recognizes basic norms for entering texts.			
Properly uses correct body position and hands while entering texts.			
Correctly locates text source.			
Correctly writes different types of texts.			

OBSERVATIONS:

### CRITERIA FOR COMPETENCY ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
Identify concepts, characteristics and elements for developing information and communication technologies (ICT)	Identifies concepts, characteristics and elements for developing information and communication technologies (ICT)	Relates the origins of computing and computer science.	Knowledge	Clearly relates the origins of computing and computer science.
		Names characteristics of computer generations.	Knowledge	Correctly names characteristics of computer generations.
		Mentions the importance of ICT development in daily life.	Knowledge	Properly mentions the importance of ICT development in daily life.
		Defines concepts related to information and communication technology.	Knowledge	Effectively defines concepts related to information and communication technology.
		Relates ICT with different application fields.	Performance	Properly relates ICT with different application fields.
		Justifies the influence of modern society on ICT.	Performance	Efficiently justifies the influence of modern society on ICT.
		Illustrates changes that have been created by people and ICT.	Product	Appropriately illustrates changes that have been created by people and ICT.



### CRITERIA FOR COMPETENCY ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
Interpret elements associated with national and international legislation (ICT).	Interprets elements associated with national and international legislation (ICT).	Identifies concepts of authorial rights and intellectual property.	Knowledge	Correctly identifies concepts of authorial rights and intellectual property.
		Recognizes legal implications, agreements, laws and regulations.	Performance	Correctly recognizes legal implications, agreements, laws and regulations.
		Interprets elements of the existing legislation.	Performance	Properly interprets elements of the existing legislation.
		Describes steps to patent inventions and creations.	Performance	Adequately describes steps to patent inventions and creations.
Use basic norms for entering texts.	Uses basic norms for entering texts.	Recognizes basic norms for entering texts.	Knowledge	Correctly recognizes basic norms for entering texts.
		Uses correct body position and hands while entering texts.	Performance	Properly uses correct body position and hands while entering texts.
		Locates text source.	Performance	Correctly locates text source.
		Write different types of texts.	Product	Correctly writes different types of texts.

## TECHNICAL COMPETENCY STANDARDS OF EDUCATIONAL INSTITUTION

### GENERAL DATA

Title: Software Application.  
Purpose: Use tools in software application to develop their work.

Competency Level: Basic

### UNITS OF JOB COMPETENCY THAT CONFORM THE STANDARDS

Title	Classification
Correctly explains norms and precautions that should be followed to use a computer.	Specific
Efficiently recognizes appropriate computer work habits.	Specific
Correctly applies security norms when using a computer.	Specific
Correctly demonstrates work rules and hygiene.	Specific
Efficiently differentiates virus and antivirus types.	Specific
Correctly installs and configures antivirus protections.	Specific
Correctly applies procedures for detection, correction, and protection of programs.	Specific
Successfully identifies the characteristics and functions of DOS.	Specific
Correctly describes the internal and external DOS commands.	Specific
Correctly differentiates DOS commands.	Specific
Correctly uses DOS commands in practice development.	Specific
Correctly defines concepts related to graphics environment operating systems.	Specific
Accurately explains the operation of basic tools of the system.	Specific
Clearly identifies the elements for program administration.	Specific
Efficiently uses functions for managing the environment of the operating system.	Specific
Correctly distinguishes system tools to handle different resources.	Specific
Efficiently describes the procedure to follow in order to use each tool.	Specific
Clearly configures equipment and resources of the computer.	Specific
Clearly identifies functions for the creation, opening, editing and printing of documents.	Specific
Efficiently follows the procedure for managing and inserting charts and graphics.	Specific

Clearly applies management tools for inserting charts and graphics.	Specific
Efficiently elaborates documents applying word processor functions.	Specific
Correctly identifies functions for creation, opening, editing and printing of documents.	Specific
Correctly prepares spreadsheets using tools.	Specific
Efficiently uses mathematical formulas in the development of spreadsheets	Specific
Accurately applies functions and tools in the elaboration of documents.	Specific
Efficiently defines concepts related to the creation of presentations.	Specific
Correctly explains the operation of tools in the administration of slides.	Specific
Clearly identifies the elements presented for the administration of a tool.	Specific
Efficiently uses functions for managing software environment for a slide presentation.	Specific
Correctly defines concepts related to the creation of presentations.	Specific
Correctly explains the operation of the available tools in the administration of slides.	Specific
Correctly identifies the elements presented for the administration of a tool.	Specific
Accurately uses the available functions for managing software environment for a slides' presentation.	Specific
Efficiently distinguishes available tools for efficient object management.	Specific
Correctly describes procedures to manipulate objects inside a file.	Specific
Correctly applies procedures to create special effects in presentations.	Specific
Accurately uses configuration options for drawings and objects effects.	Specific

Competency Elements

References

Title of the element

1 - 2

Use tools in software application to develop their work.

Performance Criteria:

1. Applies basic norms of work to use computer equipment.
2. Solves virus problems in the computer.
3. Uses operating systems functions for computer hardware and software administration.
4. Uses several tools for environment management in a graphical operating system.
5. Uses tools for resources management.
6. Applies basic functions of a word processor in the production of documents.
7. Uses spreadsheet tools for document production.
8. Determines properties and configuration of slide presentations.
9. Generates slides with basic elements.

10. Manipulates objects inside the slides file and assign special effects to presentations.

Application Field:

Category

Class

Services

Provision of Technical Education Services.

Performance Evidence:

1. Explains norms and precautions that should be followed to use a computer.
2. Applies security norms when using a computer.
3. Demonstrates work rules and hygiene.
4. Differentiates virus and antivirus types.
5. Differentiates DOS commands.
6. Explains the operation of basic tools of the system.
7. Describes the procedure to follow in order to use each tool.
8. Follows the procedure for managing and inserting charts and graphics.
9. Uses mathematical formulas in the development of spreadsheets
10. Applies functions and tools in the elaboration of documents.
11. Explains the operation of tools in the administration of slides.
12. Explains the operation of the available tools in the administration of slides.
13. Applies procedures to create special effects in presentations.

Knowledge Evidence:

1. Recognizes appropriate computer work habits.
2. Identifies the characteristics and functions of DOS.
3. Describes the internal and external DOS commands.
4. Defines concepts related to graphics environment operating systems.
5. Identifies the elements for program administration.
6. Distinguishes system tools to handle different resources.
7. Identifies functions for the creation, opening, editing and printing of documents.
8. Identifies functions for creation, opening, editing and printing of documents.
9. Defines concepts related to the creation of presentations.
10. Identifies the elements presented for the administration of a tool.

11. Defines concepts related to the creation of presentations.
12. Identifies the elements presented for the administration of a tool.
13. Distinguishes available tools for efficient object management.
14. Describes procedures to manipulate objects inside a file.

Product Evidence:

1. Installs and configures antivirus protections.
2. Applies procedures for detection, correction, and protection of programs.
3. Uses DOS commands in practice development.
4. Uses functions for managing the environment of the operating system.
5. Configures equipment and resources of the computer.
6. Applies management tools for inserting charts and graphics.
7. Elaborates documents applying word processor functions.
8. Prepares spreadsheets using tools.
9. Uses functions for managing software environment for a slide presentation.
10. Uses the available functions for managing software environment for a slides' presentation.
11. Uses configuration options for drawings and objects effects.

Sector: Commercial and Services	Program: Computer Networking
Subject Area: Information and Communication Technologies	Grade: Tenth
Study block: Software Application	Time: 120 hours
Purpose: Use tools in software application to develop their work.	

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA
1. Apply basic norms of work to use computer equipment.	<ul style="list-style-type: none"> <li>• Basic norms to use the computer</li> <li>• Precautions that are required for the equipment:               <ul style="list-style-type: none"> <li>• Computers</li> <li>• Outline devices</li> <li>• Diskettes</li> <li>• Compact discs</li> <li>• Flash memory, USB</li> </ul> </li> <li>• Work habits in the computers' lab.</li> <li>• Correct body position in front of the computer</li> </ul>	<u>Teacher:</u> <ul style="list-style-type: none"> <li>• Describes basic norms and precautions that should be followed to use a computer.</li> <li>• Describes basic computer work habits.</li> <li>• Illustrates appropriate security norms.</li> <li>• Demonstrates work rules and hygiene.</li> </ul>	<ul style="list-style-type: none"> <li>• Concern about people's fundamental rights.</li> </ul>	<ul style="list-style-type: none"> <li>• Applies basic norms of work to use computer equipment.</li> </ul>

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
		<p><u>Student:</u></p> <ul style="list-style-type: none"> <li>• Explains norms and precautions that should be followed to use a computer.</li> <li>• Recognizes appropriate computer work habits.</li> <li>• Applies security norms when using a computer.</li> <li>• Demonstrates work rules and hygiene.</li> </ul>		

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
<p>2. Solves virus problems in the computer.</p>	<ul style="list-style-type: none"> <li>• Computers Virus:               <ul style="list-style-type: none"> <li>• Concept</li> <li>• Characteristics</li> <li>• Types of virus</li> </ul> </li> <li>• Antivirus:               <ul style="list-style-type: none"> <li>• Concept</li> <li>• Characteristics</li> <li>• Virus detection</li> <li>• Correction and protection of programs</li> </ul> </li> <li>• Prevention:               <ul style="list-style-type: none"> <li>• Firewalls</li> <li>• Prevention software</li> </ul> </li> <li>• Security concepts</li> </ul>	<p><u>Teacher:</u></p> <ul style="list-style-type: none"> <li>• Identifies virus characteristics.</li> <li>• Compares characteristics of anti-virus.</li> <li>• Demonstrates the procedures for detection, correction and protection of programs.</li> </ul> <p><u>Student:</u></p> <ul style="list-style-type: none"> <li>• Differentiates virus and antivirus types.</li> <li>• Installs and configures antivirus protections.</li> <li>• Applies procedures for detection, correction, and protection of programs.</li> </ul>	<ul style="list-style-type: none"> <li>• Concern about people’s fundamental rights.</li> </ul>	<ul style="list-style-type: none"> <li>• Solves virus problems in the computer.</li> </ul>



LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
<p>3. Use functions in operating systems for computer hardware and software administration.</p>	<ul style="list-style-type: none"> <li>• Disk operating system (DOS):               <ul style="list-style-type: none"> <li>• Concept</li> <li>• Characteristics</li> <li>• Utilities</li> <li>• Devices Drivers Configuration</li> </ul> </li> <li>• DOS Internal Commands:               <ul style="list-style-type: none"> <li>• Concept</li> <li>• Characteristics</li> <li>• Uses</li> <li>• Syntax</li> </ul> </li> <li>• DOS External Commands:               <ul style="list-style-type: none"> <li>• Concept</li> <li>• Characteristics</li> <li>• Uses</li> <li>• Syntax</li> </ul> </li> </ul>	<p><u>Teacher:</u></p> <ul style="list-style-type: none"> <li>• Defines DOS concept and characteristics.</li> <li>• Classifies DOS functions.</li> <li>• Describes internal and external commands.</li> <li>• Exemplifies the use of syntax of internal and external commands.</li> </ul> <p><u>Student:</u></p> <ul style="list-style-type: none"> <li>• Identifies the characteristics and functions of DOS.</li> <li>• Describes the internal and external DOS commands.</li> <li>• Differentiates DOS commands.</li> <li>• Uses DOS commands in practice development.</li> </ul>	<ul style="list-style-type: none"> <li>• Concern about people’s fundamental rights.</li> </ul>	<ul style="list-style-type: none"> <li>• Uses operating systems functions for computer hardware and software administration.</li> </ul>

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
<p>4. Use several tools for environment management in a graphical operating system.</p>	<ul style="list-style-type: none"> <li>• Graphic environment and environmental management:               <ul style="list-style-type: none"> <li>• Menus</li> <li>• Dialogue grids</li> <li>• Windows</li> <li>• Options selection</li> </ul> </li> <li>• Initialization and usage:               <ul style="list-style-type: none"> <li>• Units change.</li> <li>• Carpets or sub-directories</li> <li>• Taskbar</li> <li>• Start Function</li> <li>• The use of the mouse (left and right button)</li> </ul> </li> </ul>	<p><u>Teacher:</u></p> <ul style="list-style-type: none"> <li>• Defines concepts related to graphic environment operating systems.</li> <li>• Describes available tools in the operating system.</li> <li>• Demonstrates the operation of the tools described.</li> <li>• Uses functions in the performing of tasks related to environment management.</li> </ul>	<ul style="list-style-type: none"> <li>• Concern about people’s fundamental rights.</li> </ul>	<ul style="list-style-type: none"> <li>• Uses several tools for environment management in a graphical operating system.</li> </ul>

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
	<ul style="list-style-type: none"> <li>• Windows:               <ul style="list-style-type: none"> <li>• Windows elements</li> <li>• Icons</li> <li>• Dialogue box</li> <li>• Personalization</li> </ul> </li> <li>• Menus:               <ul style="list-style-type: none"> <li>• Add and eliminate orders</li> <li>• Shortcuts</li> </ul> </li> <li>• Monitor configuration</li> </ul>	<p><u>Student:</u></p> <ul style="list-style-type: none"> <li>• Defines concepts related to graphics environment operating systems.</li> <li>• Explains the operation of basic tools of the system.</li> <li>• Identifies the elements for program administration.</li> <li>• Uses functions for managing the environment of the operating system.</li> </ul>		

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
<p>5. Use tools for resources management.</p>	<ul style="list-style-type: none"> <li>• Use of accessories:               <ul style="list-style-type: none"> <li>• Fax modem</li> <li>• Printers</li> <li>• Sound</li> <li>• Image</li> <li>• Multimedia</li> <li>• Net devices</li> <li>• Computer peripherals</li> </ul> </li> <li>• Communications:               <ul style="list-style-type: none"> <li>• Phone connections.</li> <li>• Direct cable connection</li> <li>• On-line services</li> </ul> </li> <li>• Configuration:               <ul style="list-style-type: none"> <li>• Internet Tools</li> <li>• Peripheral Equipment</li> <li>• Network connections</li> </ul> </li> </ul>	<p><u>Teacher:</u></p> <ul style="list-style-type: none"> <li>• Describes tools to handle different resources.</li> <li>• Illustrates the procedure when using resources.</li> <li>• Uses configuration options.</li> </ul> <p><u>Student:</u></p> <ul style="list-style-type: none"> <li>• Distinguishes system tools to handle different resources.</li> <li>• Describes the procedures to follow in order to use each tool.</li> <li>• Configures equipment and resources of the computer.</li> </ul>	<ul style="list-style-type: none"> <li>• Concern about people’s fundamental rights.</li> </ul>	<ul style="list-style-type: none"> <li>• Uses tools for resources management.</li> </ul>

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
<p>6. Apply basic functions of a word processor in the production of documents.</p>	<ul style="list-style-type: none"> <li>• Generalities:               <ul style="list-style-type: none"> <li>• Basic keyboard</li> <li>• Functions.</li> <li>• Work windows</li> <li>• Menu and tools' bars</li> <li>• Help</li> </ul> </li> <li>• Working with documents:               <ul style="list-style-type: none"> <li>• Creation</li> <li>• Edition and modification</li> <li>• Save</li> <li>• Printing</li> </ul> </li> <li>• Documents format:               <ul style="list-style-type: none"> <li>• Margins</li> <li>• Tabulations</li> <li>• Paragraphs</li> <li>• Pages</li> </ul> </li> <li>• Blocks Management               <ul style="list-style-type: none"> <li>• Copy</li> <li>• Move</li> <li>• Erase</li> </ul> </li> <li>• Charts and graphics in a document</li> </ul>	<p><u>Teacher:</u></p> <ul style="list-style-type: none"> <li>• Identifies functions for the creation, opening, edition and printing of documents.</li> <li>• Describes the procedure for block management.</li> <li>• Applies tools for managing and inserting charts and graphics.</li> <li>• Applies word processing functions for production of documents.</li> </ul>	<ul style="list-style-type: none"> <li>• Concern about people's fundamental rights.</li> </ul>	<p>Applies basic functions of a word processor in the production of documents.</p>

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
		<p><u>Student:</u></p> <ul style="list-style-type: none"> <li>• Identifies functions for the creation, opening, editing and printing of documents.</li> <li>• Follows the procedure for managing and inserting charts and graphics.</li> <li>• Applies management tools for inserting charts and graphics.</li> <li>• Elaborates documents applying word processor functions.</li> </ul>		

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
<p>7. Use spreadsheet tools for document production.</p>	<ul style="list-style-type: none"> <li>• Characteristics of a spreadsheet:               <ul style="list-style-type: none"> <li>• Generalities</li> <li>• Functions</li> <li>• Working Windows</li> <li>• Menus and toolbars</li> </ul> </li> <li>• Creation of a spreadsheet:               <ul style="list-style-type: none"> <li>• Definition</li> <li>• Parts</li> <li>• Data entry and modification</li> <li>• Working with cells</li> <li>• Formulas</li> </ul> </li> <li>• Recovery and edition:               <ul style="list-style-type: none"> <li>• Ranges</li> <li>• Delete</li> <li>• Move</li> <li>• Copy</li> <li>• Select</li> </ul> </li> <li>• Use of formulas</li> <li>• Formats</li> <li>• Creation of graphics</li> <li>• Printing a spreadsheet</li> </ul>	<p><u>Teacher:</u></p> <ul style="list-style-type: none"> <li>• Identifies functions for creation, opening, editing and printing of documents.</li> <li>• Describes the procedure to create a spreadsheet.</li> <li>• Applies tools for managing and inserting charts and graphics.</li> <li>• Applies functions of the spreadsheet in the elaboration of documents.</li> </ul>	<ul style="list-style-type: none"> <li>• Concern about people’s fundamental rights.</li> </ul>	<ul style="list-style-type: none"> <li>• Uses spreadsheet tools for document production.</li> </ul>

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
		<p><u>Student:</u></p> <ul style="list-style-type: none"> <li>• Identifies functions for creation, opening, editing and printing of documents.</li> <li>• Prepares spreadsheets using tools.</li> <li>• Uses mathematical formulas in the development of spreadsheets.</li> <li>• Applies functions and tools in the elaboration of documents.</li> </ul>		



LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
<p>8. Determine properties and configuration of slide presentations.</p>	<ul style="list-style-type: none"> <li>• General aspects:               <ul style="list-style-type: none"> <li>• Elements of the program</li> <li>• Characteristics</li> <li>• Description</li> <li>• Concepts of the Graphic Presenter:                   <ul style="list-style-type: none"> <li>• Presentation</li> <li>• Slides</li> <li>• Objects</li> </ul> </li> <li>• Forms of visualization and ways to see the presenter</li> <li>• Tools' bar</li> <li>• Menus and sub-menus</li> <li>• Options, program and tools organization</li> <li>• Ways to present or print the presentations</li> </ul> </li> </ul>	<p><u>Teacher:</u></p> <ul style="list-style-type: none"> <li>• Defines concepts related to the presentations of slide.</li> <li>• Describes tools in the use of presentations.</li> <li>• Demonstrates operation of the program in the slide presentation.</li> <li>• Uses functions for the development of tasks related to environment management.</li> </ul>	<ul style="list-style-type: none"> <li>• Concern about people's fundamental rights.</li> </ul>	<ul style="list-style-type: none"> <li>• Determines properties and configuration of slide presentations.</li> </ul>

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
		<p><u>Student:</u></p> <ul style="list-style-type: none"> <li>• Defines concepts related to the creation of presentations.</li> <li>• Explains the operation of tools in the administration of slides.</li> <li>• Identifies the elements presented for the administration of a tool.</li> <li>• Uses functions for managing software environment for a slide presentation.</li> </ul>		

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
9. Generate slides with basic elements.	<ul style="list-style-type: none"> <li>• Create a new presentation</li> <li>• Use of helpers</li> <li>• Elements of the slide</li> <li>• Characteristics and properties</li> <li>• Color combinations</li> <li>• Slide adjustment in the paper</li> <li>• Printing slides</li> <li>• Combination of slide's files for the presentation</li> </ul>	<p><u>Teacher:</u></p> <ul style="list-style-type: none"> <li>• Defines the concepts related to creation of presentations.</li> <li>• Describes tools for the administration of slides.</li> <li>• Demonstrates the operation of power tools.</li> <li>• Uses available functions for the development of tasks related to environment management.</li> </ul>	<ul style="list-style-type: none"> <li>• Concern about people's fundamental rights.</li> </ul>	<ul style="list-style-type: none"> <li>• Generates slides with basic elements.</li> </ul>

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
		<p><u>Student:</u></p> <ul style="list-style-type: none"> <li>• Defines concepts related to the creation of presentations.</li> <li>• Explains the operation of the available tools in the administration of slides.</li> <li>• Identifies the elements presented for the administration of a tool.</li> <li>• Uses the available functions for managing software environment for a slides' presentation.</li> </ul>		

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
<p>10. Manipulate objects inside the slides file and assign special effects to presentations.</p>	<ul style="list-style-type: none"> <li>• Objects:               <ul style="list-style-type: none"> <li>• Characteristics</li> <li>• Properties</li> <li>• Insert objects</li> <li>• Insert other applications</li> <li>• Ways of changing the properties of objects</li> <li>• Transition effects</li> <li>• Hide a slide in power point presentations</li> <li>• Effects for drawings and objects</li> <li>• Elaboration of professional presentations</li> </ul> </li> </ul>	<p><u>Teacher:</u></p> <ul style="list-style-type: none"> <li>• Describes available tools for object management.</li> <li>• Illustrates the procedure to manipulate objects inside a file.</li> <li>• Demonstrates procedures to create special effects in presentations.</li> <li>• Uses configuration options for drawings and object effects.</li> </ul>	<ul style="list-style-type: none"> <li>• Concern about people’s fundamental rights.</li> </ul>	<ul style="list-style-type: none"> <li>• Manipulates objects inside the slides file and assign special effects to presentations.</li> </ul>

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
		<p><u>Student:</u></p> <ul style="list-style-type: none"> <li>• Distinguishes available tools for efficient object management.</li> <li>• Describes procedures to manipulate objects inside a file.</li> <li>• Applies procedures to create special effects in presentations.</li> <li>• Uses configuration options for drawings and objects effects.</li> </ul>		

PRACTICE AND CHECKLIST

PRACTICE DEVELOPMENT

Study Block: Software Application

PRACTICE No. 1

Purpose:

Scenario: Science Computer laboratory

TIME:

MATERIALS	MACHINERY	EQUIPMENT	TOOL

## Procedures

### Teacher:

- Describes basic norms and precautions that should be followed to use a computer.
- Describes basic computer work habits.
- Illustrates appropriate security norms.
- Demonstrates work rules and hygiene.
- Identifies virus characteristics.
- Compares characteristics of anti-virus.
- Demonstrates the procedures for detection, correction and protection of programs.
- Defines DOS concept and characteristics.
- Classifies DOS functions.
- Describes internal and external commands.
- Exemplifies the use of syntax of internal and external commands.
- Defines concepts related to graphic environment operating systems.
- Describes available tools in the operating system.
- Demonstrates the operation of the tools described.
- Uses functions in the performing of tasks related to environment management.
- Describes tools to handle different resources.
- Illustrates the procedure when using resources.
- Uses configuration options.
- Identifies functions for the creation, opening, edition and printing of documents.
- Describes the procedure for block management.
- Applies tools for managing and inserting charts and graphics.
- Applies word processing functions for production of documents.
- Identifies functions for creation, opening, editing and printing of documents.
- Describes the procedure to create a spreadsheet.
- Applies tools for managing and inserting charts and graphics



## Procedures

### Teacher:

- Applies functions of the spreadsheet in the elaboration of documents.
- Defines concepts related to the presentations of slide.
- Describes tools in the use of presentations.
- Demonstrates operation of the program in the slide presentation.
- Uses functions for the development of tasks related to environment management.
- Defines the concepts related to creation of presentations.
- Describes tools for the administration of slides.
- Demonstrates the operation of power tools.
- Uses available functions for the development of tasks related to environment management.
- Describes available tools for object management.
- Illustrates the procedure to manipulate objects inside a file.
- Demonstrates procedures to create special effects in presentations.
- Uses configuration options for drawings and object effects.

SUGGESTED CHECKLIST	Date:
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Student's name:	
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**Instructions:**  
These criteria will verify student performance by observation. Write an "X" in the column that best describes each student performance.

DEVELOPMENT	YES	NO	NOT APPLICABLE
Correctly explains norms and precautions that should be followed to use a computer.			
Efficiently recognizes appropriate computer work habits.			
Correctly applies security norms when using a computer.			
Correctly demonstrates work rules and hygiene.			
Efficiently differentiates virus and antivirus types.			
Correctly installs and configures antivirus protections.			
Correctly applies procedures for detection, correction, and protection of programs.			
Successfully identifies the characteristics and functions of DOS.			
Correctly describes the internal and external DOS commands.			
Correctly differentiates DOS commands.			
Correctly uses DOS commands in practice development.			
Correctly defines concepts related to graphics environment operating systems.			
Accurately explains the operation of basic tools of the system.			
Clearly identifies the elements for program administration.			
Efficiently uses functions for managing the environment of the operating system.			
Correctly distinguishes system tools to handle different resources.			
Efficiently describes the procedure to follow in order to use each tool.			
Clearly configures equipment and resources of the computer.			
Clearly identifies functions for the creation, opening, editing and printing of documents.			
Efficiently follows the procedure for managing and inserting charts and graphics.			

DEVELOPMENT	YES	NO	NOT APPLICABLE
Clearly applies management tools for inserting charts and graphics.			
Efficiently elaborates documents applying word processor functions.			
Correctly identifies functions for creation, opening, editing and printing of documents.			
Correctly prepares spreadsheets using tools.			
Efficiently uses mathematical formulas in the development of spreadsheets			
Accurately applies functions and tools in the elaboration of documents.			
Efficiently defines concepts related to the creation of presentations.			
Correctly explains the operation of tools in the administration of slides.			
Clearly identifies the elements presented for the administration of a tool.			
Efficiently uses functions for managing software environment for a slide presentation.			
Correctly defines concepts related to the creation of presentations.			
Correctly explains the operation of the available tools in the administration of slides.			
Correctly identifies the elements presented for the administration of a tool.			
Accurately uses the available functions for managing software environment for a slides' presentation.			
Efficiently distinguishes available tools for efficient object management.			
Correctly describes procedure to manipulate objects inside a file.			
Correctly applies procedures to create special effects in presentations.			
Accurately uses configuration options for drawings and objects effects.			

OBSERVATIONS:

### CRITERIA FOR COMPETENCY ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
Apply basic norms of work to use computer equipment.	Applies basic norms of work to use computer equipment.	Explains norms and precautions that should be followed to use a computer.	Performance	Correctly explains norms and precautions that should be followed to use a computer.
		Recognizes appropriate computer work habits.	Knowledge	Efficiently recognizes appropriate computer work habits.
		Applies security norms when using a computer.	Performance	Correctly applies security norms when using a computer.
		Demonstrates work rules and hygiene.	Performance	Correctly demonstrates work rules and hygiene.
Solves virus problems in the computer.	Solves virus problems in the computer.	Differentiates virus and antivirus types.	Performance	Efficiently differentiates virus and antivirus types.
		Installs and configures antivirus protections.	Product	Correctly installs and configures antivirus protections.
		Applies procedures for detection, correction, and protection of programs.	Product	Correctly applies procedures for detection, correction, and protection of programs.

### CRITERIA FOR COMPETENCY ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
Use functions in operating systems for computer hardware and software administration.	Uses functions in operating systems for computer hardware and software administration.	Identifies the characteristics and functions of DOS.	Knowledge	Successfully identifies the characteristics and functions of DOS.
		Describes the internal and external DOS commands.	Knowledge	Correctly describes the internal and external DOS commands.
		Differentiates DOS commands.	Performance	Correctly differentiates DOS commands.
		Uses DOS commands in practice development.	Product	Correctly uses DOS commands in practice development.
Use several tools for environment management in a graphical operating system.	Uses several tools for environment management in a graphical operating system.	Defines concepts related to graphics environment operating systems.	Knowledge	Correctly defines concepts related to graphics environment operating systems.
		Explains the operation of basic tools of the system.	Performance	Accurately explains the operation of basic tools of the system.
		Identifies the elements for program administration.	Knowledge	Clearly identifies the elements for program administration.
		Uses functions for managing the environment of the operating system.	Product	Efficiently uses functions for managing the environment of the operating system.

### CRITERIA FOR COMPETENCY ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
Use tools for resources management.	Uses tools for resources management.	Distinguishes system tools to handle different resources.	Knowledge	Correctly distinguishes system tools to handle different resources.
		Describes the procedure to follow in order to use each tool.	Performance	Efficiently describes the procedure to follow in order to use each tool.
		Configures equipment and resources of the computer.	Product	Clearly configures equipment and resources of the computer.
Apply basic functions of a word processor in the production of documents.	Applies basic functions of a word processor in the production of documents.	Identifies functions for the creation, opening, editing and printing of documents.	Knowledge	Clearly identifies functions for the creation, opening, editing and printing of documents.
		Follows the procedure for managing and inserting charts and graphics.	Performance	Efficiently follows the procedure for managing and inserting charts and graphics.
		Applies management tools for inserting charts and graphics.	Product	Clearly applies management tools for inserting charts and graphics.
		Elaborates documents applying word processor functions.	Product	Efficiently elaborates documents applying word processor functions.

### CRITERIA FOR COMPETENCY ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
Use spreadsheet tools for document production.	Uses spreadsheet tools for document production.	Identifies functions for creation, opening, editing and printing of documents.	Knowledge	Correctly identifies functions for creation, opening, editing and printing of documents.
		Prepares spreadsheets using tools.	Product	Correctly prepares spreadsheets using tools.
		Uses mathematical formulas in the development of spreadsheets	Performance	Efficiently uses mathematical formulas in the development of spreadsheets
		Applies functions and tools in the elaboration of documents.	Performance	Accurately applies functions and tools in the elaboration of documents.
Determine properties and configuration of slide presentations.	Determines properties and configuration of slide presentations.	Defines concepts related to the creation of presentations.	Knowledge	Efficiently defines concepts related to the creation of presentations.
		Explains the operation of tools in the administration of slides.	Performance	Correctly explains the operation of tools in the administration of slides.
		Identifies the elements presented for the administration of a tool.	Knowledge	Clearly identifies the elements presented for the administration of a tool.
		Uses functions for managing software environment for a slide presentation.	Product	Efficiently uses functions for managing software environment for a slide presentation.

### CRITERIA FOR COMPETENCY ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
Generate slides with basic elements.	Generates slides with basic elements.	Defines concepts related to the creation of presentations.	Knowledge	Correctly defines concepts related to the creation of presentations.
		Explains the operation of the available tools in the administration of slides.	Performance	Correctly explains the operation of the available tools in the administration of slides.
		Identifies the elements presented for the administration of a tool.	Knowledge	Correctly identifies the elements presented for the administration of a tool.
		Uses the available functions for managing software environment for a slides' presentation.	Product	Accurately uses the available functions for managing software environment for a slides' presentation.
Manipulate objects inside the slides file and assign special effects to presentations.	Manipulates objects inside the slides file and assign special effects to presentations.	Distinguishes available tools for efficient object management.	Knowledge	Efficiently distinguishes available tools for efficient object management.
		Describes procedure to manipulate objects inside a file.	Knowledge	Correctly describes procedure to manipulate objects inside a file.
		Applies procedures to create special effects in presentations.	Performance	Correctly applies procedures to create special effects in presentations.
		Uses configuration options for drawings and objects effects.	Product	Accurately uses configuration options for drawings and objects effects.



## TECHNICAL COMPETENCY STANDARDS OF EDUCATIONAL INSTITUTION

### GENERAL DATA

Title: Website Design  
 Purpose: Design of websites for the publication of information on the Internet based on the technical basic norms.  
 Competition level: Basic

### UNITS OF JOB COMPETENCY THAT CONFORM THE STANDARDS

Title	Classification
Correctly defines basic concepts related to internet.	Specific
Correctly differentiates available services on the internet.	Specific
Correctly recognizes the minimum requirements for internet connection.	Specific
Correctly accesses information through searching tools on the internet.	Specific
Appropriately distinguishes the types of web sites and web pages.	Specific
Correctly compares characteristics of each site on the internet.	Specific
Correctly recognizes previous considerations to design sites on the internet.	Specific
Correctly plans web sites in agreement with the described rules.	Specific
Efficiently identifies considerations for the text management.	Specific
Efficiently recognizes basic norms for the disposition and hierarchy of text in the internet sites.	Specific
Correctly digitalizes images and sounds including them in the designed site.	Specific
Appropriately designs sites starting with text, sound, image and animation.	Specific
Correctly recognizes functions and available tools to design web pages.	Specific
Correctly edit web pages for the management of the presented information.	Specific
Correctly uses tools for the text, images, sound and animations insertion.	Specific
Appropriately designs web pages based on predefined norms.	Specific

## Competency Elements

### References

1 - 3

### Title of the element

Design of websites for the publication of information on the Internet based on the technical basic norms.

### Performance Criteria:

1. Use applications related to the Internet and for searching and accessing information.
2. Distinguishes basic elements related to the design of web pages.
3. Demonstrates basic norms for web pages design and Internet site construction.
4. Designs web pages for publication of information in Internet.

### Application Field:

#### Category

Services

#### Class

Provision of Technical Education Services

### Performance Evidence:

1. Differentiates available services on the Internet.
2. Recognizes the minimum requirements for Internet connection.
3. Accesses information through searching tools on the Internet.
4. Compares characteristics of each site on the Internet.
5. Recognizes basic norms for the disposition and hierarchy of text in the Internet sites.
6. Recognizes functions and available tools to design web pages.

#### Knowledge Evidence:

1. Defines basic concepts related to Internet.
2. Distinguishes the types of web sites and web pages.
3. Recognizes previous considerations to design sites on the Internet.
4. Identifies considerations for the text management.

#### Product Evidence:

1. Plans web sites in agreement with the described rules.
2. Digitalizes images and sounds including them in the designed site.
3. Designs sites starting with text, sound, image and animation.
4. Edit web pages for the management of the presented information.
5. Uses tools for the text, images, sound and animations insertion.
6. Designs web pages based on predefined norms.

Sector: Commercial and of Services	Program: Computer Networking
Subject Area: Information and Communication Technologies	Grade: Tenth
Study block: Website Design	Time: 60 hours
Purpose: Design of websites for the publication of information on the Internet based on the technical basic norms.	

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
1. Use applications related to the Internet and for searching and accessing information.	<ul style="list-style-type: none"> <li>Internet:               <ul style="list-style-type: none"> <li>• Concept</li> <li>• History                   <ul style="list-style-type: none"> <li>• Concepts related to internet</li> <li>• Domains</li> <li>• Hypertext</li> <li>• Protocols</li> <li>• Address</li> </ul> </li> <li>• Internet in Costa Rica</li> </ul> </li> </ul>	<u>Teacher:</u> <ul style="list-style-type: none"> <li>• Defines basic concepts related to Internet (domains, protocols, addresses).</li> <li>• Identifies more outstanding aspects related to the development of Internet in C.R.</li> <li>• Describes available services in Internet.</li> <li>• Demonstrates the use of different available services on the Internet.</li> </ul>	<ul style="list-style-type: none"> <li>• Awareness about the consequences of our actions.</li> </ul>	<ul style="list-style-type: none"> <li>• Uses applications related to the Internet and for searching and accessing information.</li> </ul>

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
	<ul style="list-style-type: none"> <li>• Services of Internet:               <ul style="list-style-type: none"> <li>• Surf or search for information</li> <li>• Electronic mail</li> <li>• Chat</li> <li>• TelNet</li> <li>• File Transfer Protocol (FTP)</li> <li>• World Wide Web (WWW)</li> </ul> </li> <li>• TCP/IP</li> <li>• Requirements for Internet connection:               <ul style="list-style-type: none"> <li>• Connection forms</li> <li>• Suppliers</li> <li>• Access types</li> <li>• Access software</li> <li>• Hardware</li> </ul> </li> </ul>	<p><u>Student:</u></p> <ul style="list-style-type: none"> <li>• Defines basic concepts related to Internet.</li> <li>• Differentiates available services on the Internet.</li> <li>• Recognizes the minimum requirements for Internet connection.</li> <li>• Access information through searching tools on the Internet.</li> </ul>		

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
<p>2. Distinguish basic elements related to the design of web pages.</p>	<ul style="list-style-type: none"> <li>• Types of Web Sites:               <ul style="list-style-type: none"> <li>• Commercial</li> <li>• Informative</li> <li>• Entertainment</li> <li>• Others</li> </ul> </li> <li>• Types of Web Pages:               <ul style="list-style-type: none"> <li>• Registration</li> <li>• Domain</li> <li>• Exit</li> </ul> </li> <li>• Previous considerations:               <ul style="list-style-type: none"> <li>• Users</li> <li>• Accessibility</li> <li>• Functionality</li> <li>• Speed for the access</li> <li>• Size</li> </ul> </li> </ul>	<p><u>Teacher:</u></p> <ul style="list-style-type: none"> <li>• Defines basic concepts related to the design of pages for Internet.</li> <li>• Explains types of web sites and pages presented on the Internet.</li> <li>• Describes basic characteristics of each type of site and pages on the Internet.</li> <li>• Examines different available sites and pages on the Internet.</li> </ul>	<ul style="list-style-type: none"> <li>• Awareness about our strengths and weaknesses.</li> </ul>	<ul style="list-style-type: none"> <li>• Distinguishes basic elements related to the design of web pages.</li> </ul>

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
		<p><u>Student:</u></p> <ul style="list-style-type: none"> <li>• Distinguishes the types of web sites and web pages.</li> <li>• Compares characteristics of each site on the Internet.</li> <li>• Recognizes previous considerations to design sites on the Internet.</li> <li>• Plans web sites in agreement with the described rules.</li> </ul>		

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
<p>3. Demonstrate basic norms for web pages design and Internet site construction.</p>	<ul style="list-style-type: none"> <li>• Text:               <ul style="list-style-type: none"> <li>• Fonts</li> <li>• Text Disposition                   <ul style="list-style-type: none"> <li>• Alignment</li> <li>• Spacing</li> <li>• Separation</li> </ul> </li> <li>• Definition of hierarchy                   <ul style="list-style-type: none"> <li>• Titles</li> <li>• Subtitles</li> <li>• Paragraphs</li> <li>• Cut</li> </ul> </li> <li>• Tables format</li> </ul> </li> <li>• Design of web-sites:               <ul style="list-style-type: none"> <li>• Design</li> <li>• Color</li> <li>• Forms</li> <li>• Images</li> <li>• Animations</li> <li>• Sounds</li> <li>• Design exploration</li> <li>• Surfing the web</li> </ul> </li> <li>• Digitalization of images and sound</li> <li>• Creation and management of animations</li> </ul>	<p><u>Teacher:</u></p> <ul style="list-style-type: none"> <li>• Names basic rules related to text management.</li> <li>• Illustrates hierarchy of text in the site.</li> <li>• Names basic considerations related to the design of web sites.</li> <li>• Demonstrates procedure for the digitalization of images and sound.</li> </ul> <p><u>Student:</u></p> <ul style="list-style-type: none"> <li>• Identifies considerations for the text management.</li> <li>• Recognizes basic norms for the disposition and hierarchy of text in the Internet sites.</li> <li>• Digitalizes images and sounds including them in the designed site.</li> <li>• Designs sites starting with text, sound, image and animation.</li> </ul>	<ul style="list-style-type: none"> <li>• Awareness of our strengths and weaknesses.</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrates basic norms for web pages design and Internet site construction.</li> </ul>



LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
<p>4. Design web pages for publication of information on the Internet.</p>	<ul style="list-style-type: none"> <li>• Design tools:               <ul style="list-style-type: none"> <li>• Functions</li> <li>• Applications</li> <li>• Available tools</li> <li>• Menus</li> <li>• Work window</li> <li>• Edition of pages</li> <li>• Text insertion</li> <li>• Insertion of images, sounds and animations</li> </ul> </li> </ul>	<p><u>Teacher:</u></p> <ul style="list-style-type: none"> <li>• Identifies available functions and tools.</li> <li>• Describes menus and available work window.</li> <li>• Demonstrates the procedure for the insertion of text, images, sound and animations.</li> <li>• Elaborates pages to present information on the Internet.</li> </ul> <p><u>Student:</u></p> <ul style="list-style-type: none"> <li>• Recognizes functions and available tools to design web pages.</li> <li>• Edit web pages for the management of the presented information.</li> <li>• Uses tools for the text, images, sound and animations insertion.</li> <li>• Designs web pages based on predefined norms.</li> </ul>	<ul style="list-style-type: none"> <li>• Awareness about our strengths and weaknesses.</li> </ul>	<ul style="list-style-type: none"> <li>• Designs web pages for publication of information in Internet.</li> </ul>

PRACTICE AND CHECKLIST

PRACTICE DEVELOPMENT

Study Block: Website Design

PRACTICE N°. 1

Purpose:

Scenario: Science Computer laboratory

TIME:

MATERIALS	MACHINERY	EQUIPMENT	TOOL

## Procedures

### Teacher:

- Defines basic concepts related to Internet (domains, protocols, addresses).
- Identifies more outstanding aspects related to the development of Internet in C.R.
- Describes available services in Internet.
- Demonstrates the use of different available services on the Internet.
- Defines basic concepts related to the design of pages for Internet.
- Explains types of web sites and pages presented on the Internet.
- Describes basic characteristics of each type of site and pages on the Internet.
- Examines different available sites and pages on the Internet.
- Names basic rules related to text management.
- Illustrates hierarchy of text in the site.
- Names basic considerations related to the design of web sites.
- Demonstrates procedure for the digitalization of images and sound.
- Identifies available functions and tools.
- Describes menus and available work window.
- Demonstrates the procedure for the insertion of text, images, sound and animations.
- Elaborates pages to present information on the Internet.

SUGGESTED CHECKLIST	Date:
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Student's name:	
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**Instructions:**  
These criteria will verify student performance by observation. Write an "X" in the column that best describes each student performance.

DEVELOPMENT	YES	NO	NOT APPLICABLE
Correctly defines basic concepts related to internet.			
Correctly differentiates available services on the internet.			
Correctly recognizes the minimum requirements for internet connection.			
Correctly access information through searching tools on the internet.			
Appropriately distinguishes the types of web sites and web pages.			
Correctly compares characteristics of each site on the internet.			
Correctly recognizes previous considerations to design sites on the internet.			
Correctly plans web sites in agreement with the described rules.			
Efficiently identifies considerations for the text management.			
Efficiently recognizes basic norms for the disposition and hierarchy of text in the internet sites.			
Correctly digitalizes images and sounds including them in the designed site.			
Appropriately designs sites starting with text, sound, image and animation.			
Correctly recognizes functions and available tools to design web pages.			
Correctly edit web pages for the management of the presented information.			
Correctly uses tools for the text, images, sound and animations insertion.			
Appropriately designs web pages based on predefined norms.			

OBSERVATIONS:

### CRITERIA FOR COMPETENCY ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
Use applications related to the Internet and for searching and accessing information.	Uses applications related to the Internet and for searching and accessing information.	Defines basic concepts related to Internet.	Knowledge	Correctly defines basic concepts related to internet.
		Differentiates available services on the Internet.	Performance	Correctly differentiates available services on the internet.
		Recognizes the minimum requirements for Internet connection.	Performance	Correctly recognizes the minimum requirements for internet connection.
		Accesses information through searching tools on the Internet.	Performance	Correctly accesses information through searching tools on the internet.
Distinguish basic elements related to the design of web pages.	Distinguishes basic elements related to the design of web pages.	Distinguishes the types of web sites and web pages.	Knowledge	Appropriately distinguishes the types of web sites and web pages.
		Compares characteristics of each site on the Internet.	Performance	Correctly compares characteristics of each site on the internet.
		Recognizes previous considerations to design sites on the Internet.	Knowledge	Correctly recognizes previous considerations to design sites on the internet.
		Plans web sites in agreement with the described rules.	Product	Correctly plans web sites in agreement with the described rules.

### CRITERIA FOR COMPETENCY ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
Demonstrate basic norms for web pages design and Internet site construction.	Demonstrates basic norms for web pages design and Internet site construction.	Identifies considerations for the text management.	Knowledge	Efficiently identifies considerations for the text management.
		Recognizes basic norms for the disposition and hierarchy of text in the Internet sites.	Performance	Efficiently recognizes basic norms for the disposition and hierarchy of text in the internet sites.
		Digitalizes images and sounds including them in the designed site.	Product	Correctly digitalizes images and sounds including them in the designed site.
		Designs sites starting with text, sound, image and animation.	Product	Appropriately designs sites starting with text, sound, image and animation.
Design web pages for publication of information in Internet.	Designs web pages for publication of information in Internet.	Recognizes functions and available tools to design web pages.	Performance	Correctly recognizes functions and available tools to design web pages.
		Edit web pages for the management of the presented information.	Product	Correctly edit web pages for the management of the presented information.
		Uses tools for the text, images, sound and animations insertion.	Product	Correctly uses tools for the text, images, sound and animations insertion.
		Designs web pages based on predefined norms.	Product	Appropriately designs web pages based on predefined norms.

## TECHNICAL COMPETENCY STANDARDS OF EDUCATIONAL INSTITUTION

### GENERAL DATA

Title: Specialized Information Systems  
 Purpose: Use specialized different information systems as tool for the development of their work.  
 Competition level: Basic

### UNITS OF JOB COMPETENCY THAT CONFORM THE STANDARDS

Title	Classification
Correctly defines the concepts and characteristics of information systems.	Specific
Clearly describes the concepts, characteristic and use of information systems.	Specific
Appropriately distinguishes the function and characteristics of elements of information systems.	Specific
Correctly recognizes basic operations in specialized information systems.	Specific
Correctly identifies criteria and norms to use basic tools.	Specific
Clearly distinguishes the procedure in order to use certain functions and available tools.	Specific
Appropriately applies procedures for user-accessible registers.	Specific
Correctly applies procedures for the access, editing and use of information.	Specific

### Competency Elements

References	Title of the element
1 - 4	Use specialized different information systems as tool for the development of their work.

### Performance Criteria:

1. Identifies concepts, characteristic and applications of information systems.
2. Distinguishes job environment elements from specialized information systems.

Application Field:

Category  
Services

Class

Provision of Technical Education Services.

Performance Evidence:

1. Distinguishes the function and characteristics of elements of information systems.
2. Distinguishes the procedure in order to use certain functions and available tools.

Knowledge Evidence:

1. Defines the concepts and characteristics of Information Systems.
2. Describes the concepts, characteristic and use of information systems.
3. Identifies criteria and norms to use basic tools.
4. Recognizes basic operations in specialized information systems.

Product Evidence:

1. Applies procedures for user-accessible registers.
2. Applies procedures for the access, editing and use of information.



Sector: Commercial and Services	Program: Computer Networking
Subject Area: Information and Communication Technologies	Grade: Tenth
Study block: Specialized Information Systems	Time: 18 hours
Purpose: Use specialized different information systems as tool for the development of their work.	

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
1. Identify concepts, characteristics and applications of information systems.	<ul style="list-style-type: none"> <li>Information Systems:               <ul style="list-style-type: none"> <li>Concept</li> <li>Characteristic</li> <li>Uses and applications</li> <li>Contributions to daily work</li> </ul> </li> </ul>	<u>Teacher:</u> <ul style="list-style-type: none"> <li>Defines concepts and characteristic of information systems.</li> <li>Explains the procedures to search and access specialized information systems.</li> <li>Demonstrates the function of different elements of the working environment.</li> <li>Exemplifies the procedure to use basic operations in order to obtain information.</li> </ul>	<ul style="list-style-type: none"> <li>Recognizes strengths and weaknesses.</li> </ul>	<ul style="list-style-type: none"> <li>Identifies concepts, characteristic and applications of information systems.</li> </ul>

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
	<ul style="list-style-type: none"> <li>• Elements of the Information Systems:               <ul style="list-style-type: none"> <li>• Menus, bottons, windows, and others</li> <li>• User-accecible registers</li> <li>• Search options</li> <li>• Basic operations to obtain information</li> </ul> </li> </ul>	<p><u>Student:</u></p> <ul style="list-style-type: none"> <li>• Defines the concepts and characteristics of Information Systems.</li> <li>• Describes the concepts, characteristic and use of information systems.</li> <li>• Distinguishes the function and characteristics of elements of information systems.</li> <li>• Recognizes basic operations in specialized information systems.</li> </ul>		

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
<p>2. Distinguish job environment elements from specialized information systems.</p>	<ul style="list-style-type: none"> <li>• Labor applications:               <ul style="list-style-type: none"> <li>• Menus</li> <li>• Functions</li> <li>• Tools</li> <li>• Windows</li> <li>• User-accessible registers</li> <li>• Use of names and access keys</li> <li>• Helping Options</li> <li>• Tools to search information</li> <li>• Procedures to access edit and use information</li> </ul> </li> </ul>	<p><u>Teacher:</u></p> <ul style="list-style-type: none"> <li>• Describes the work environment of the specific tool.</li> <li>• Uses different functions and available tools.</li> <li>• Demonstrates procedures for user-accessible register.</li> <li>• Illustrates procedure for the access, editing and use of information.</li> </ul>	<ul style="list-style-type: none"> <li>• Awareness of strengths and weaknesses.</li> </ul>	<ul style="list-style-type: none"> <li>• Distinguishes job environment elements from specialized information systems.</li> </ul>

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
		<p><u>Student:</u></p> <ul style="list-style-type: none"> <li>• Identifies criteria and norms to use basic tools.</li> <li>• Distinguishes the procedure in order to use certain functions and available tools.</li> <li>• Applies procedures for user-accessible registers.</li> <li>• Applies procedures for the access, editing and use of information.</li> </ul>		

PRACTICE AND CHECKLIST

PRACTICE DEVELOPMENT

Study Block: Specialized Information Systems

PRACTICE N° 1

Purpose:

Scenario: Classroom

TIME:

MATERIALS	MACHINERY	EQUIPMENT	TOOL

## Procedures

### Teacher:

- Defines concepts and characteristic of information systems.
- Explains the procedures to search and access specialized information systems.
- Demonstrates the function of different elements the working environment.
- Exemplifies the procedure to use basic operations in order to obtain information.
- Describes the work environment of the specific tool.
- Uses different functions and available tools.
- Demonstrates procedures for user-accessible register.
- Illustrates procedure for the access, editing and use of information.

SUGGESTED CHECKLIST	Date:
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Student's name:	
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**Instructions:**  
These criteria will verify student performance by observation. Write an "X" in the column that best describes each student performance.

DEVELOPMENT	YES	NO	NOT APPLICABLE
Correctly defines the concepts and characteristics of information systems.			
Clearly describes the concepts, characteristic and use of information systems.			
Appropriately distinguishes the function and characteristics of elements of information systems.			
Correctly recognizes basic operations in specialized information systems.			
Correctly identifies criteria and norms to use basic tools.			
Clearly distinguishes the procedure in order to use certain functions and available tools.			
Appropriately applies procedures for user-accessible registers.			
Correctly applies procedures for the access, editing and use of information.			

OBSERVATIONS:

### CRITERIA FOR COMPETENCY ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
Identify concepts, characteristics and applications of information systems.	Identifies concepts, characteristics and applications of information systems.	Defines the concepts and characteristics of Information Systems.	Knowledge	Correctly defines the concepts and characteristics of information systems.
		Describes the concepts, characteristic and use of information systems.	Knowledge	Clearly describes the concepts, characteristic and use of information systems.
		Distinguishes the function and characteristics of elements of information systems.	Performance	Appropriately distinguishes the function and characteristics of elements of information systems.
		Recognizes basic operations in specialized information systems.	Knowledge	Correctly recognizes basic operations in specialized information systems.



### CRITERIA FOR COMPETENCY ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
Distinguish job environment elements from specialized information systems.	Distinguishes job environment elements from specialized information systems.	Identifies criteria and norms to use basic tools.	Knowledge	Correctly identifies criteria and norms to use basic tools.
		Distinguishes the procedure in order to use certain functions and available tools.	Performance	Clearly distinguishes the procedure in order to use certain functions and available tools.
		Applies procedures for user-accessible registers.	Product	Appropriately applies procedures for user-accessible registers.
		Applies procedures for the access, editing and use of information.	Product	Correctly applies procedures for the access, editing and use of information.

## TECHNICAL COMPETENCY STANDARDS OF EDUCATIONAL INSTITUTION

### GENERAL DATA

Title: Connectivity  
 Purpose: Use connectivity options to maximize the use of functions and available services in mobile different devices as tool for the development of their work.  
 Competition level: Basic

### UNITS OF JOB COMPETENCY THAT CONFORM THE STANDARDS

Title	Classification
Appropriately defines concepts and characteristic of connectivity.	Specific
Correctly identifies available connectivity options in the current market.	Specific
Correctly recognizes uses and applications of connectivity between equipment and devices.	Specific
Correctly distinguishes compatibility requirements between equipment and devices.	Specific
Appropriately identifies types of available technology in the market regarding mobile devices.	Specific
Correctly identifies types of available technology in the market regarding mobile devices.	Specific
Correctly follows the procedure to use functions and available services in each technology.	Specific
Correctly uses different functions and available services for each equipment or mobile device.	Specific
Appropriately identifies equipment requirements, material and necessary software for connectivity.	Specific
Correctly describes rules and norms of security to establish the connection.	Specific
Correctly distinguishes procedures to use different connectivity options.	Specific
Correctly applies procedures to transfer information between equipment and devices.	Specific

### Competency Elements

Reference	Title of the element
1 – 5	Use connectivity options to maximize the use of the functions and available services in mobile different devices as tool for the development of their work.

Performance Criteria:

1. Identifies characteristics and requirements for the operation of different mobile devices.
2. Recognizes options for equipment or mobile devices connectivity.
3. Carries out connection and installation of mobile devices and computer equipment.

Application Field:

Category

Class

Services

Provision of Technical Education Services

Performance Evidence:

1. Characterizes different connectivity options between equipment and devices.
2. Follows the procedure to use functions and available services in each technology.
3. Distinguishes procedures to use different connectivity options.
4. Applies procedures to transfer the information between equipment and devices.

Knowledge Evidence:

1. Defines concepts and characteristic of connectivity.
2. Identifies available connectivity options in the current market.
3. Recognizes uses and applications of connectivity between equipment and devices.
4. Identifies types of available technology in the market regarding mobile devices.
5. Identifies equipment requirements, material and necessary software for the connectivity.
6. Describes rules and norms of security to carry out the connection.

Product Evidence:

1. Uses different functions and available services for each equipment or mobile device.

Sector: Commercial and Services	Program: Computer Networking
Subject Area: Information and Communication Technologies	Grade: Tenth
Study block: Connectivity	Time: 18 hours
Purpose: Use connectivity options to maximize the use of functions and available services in mobile devices as a tool for the development of their work.	

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
1. Identify characteristics and requirements for the operation of mobile devices.	<ul style="list-style-type: none"> <li>Connectivity: <ul style="list-style-type: none"> <li>Concept</li> <li>Characteristic</li> <li>Uses and applications</li> <li>Requirements</li> <li>Compatibility between equipment and devices</li> <li>Contributions to daily work</li> </ul> </li> </ul>	<u>Teacher:</u> <ul style="list-style-type: none"> <li>Defines concepts and characteristic of connectivity.</li> <li>Explains uses and applications of connectivity between equipment and devices.</li> <li>Describes compatibility requirements between equipment and devices.</li> <li>Illustrates contributions from connectivity to daily work.</li> </ul>	<ul style="list-style-type: none"> <li>Awareness of our strengths and weaknesses.</li> </ul>	<ul style="list-style-type: none"> <li>Identifies characteristics and requirements for the operation of different mobile devices.</li> </ul>

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
	<ul style="list-style-type: none"> <li>• Connectivity options between equipment or devices:               <ul style="list-style-type: none"> <li>• Wire</li> <li>• Wireless</li> <li>• Infrared Port</li> <li>• Microwaves</li> <li>• Wi Fi</li> <li>• Bluetooth</li> <li>• Others</li> </ul> </li> </ul>	<p><u>Student:</u></p> <ul style="list-style-type: none"> <li>• Defines concepts and characteristic of connectivity.</li> <li>• Identifies available connectivity options in the current market.</li> <li>• Recognizes uses and applications of connectivity between equipment and devices.</li> <li>• Distinguishes compatibility requirements between equipment and devices.</li> </ul>		

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
<p>2. Recognize options for equipment or mobile devices connectivity.</p>	<ul style="list-style-type: none"> <li>• Mobile devices:               <ul style="list-style-type: none"> <li>• Computers:                   <ul style="list-style-type: none"> <li>• desktop</li> <li>• Laptop</li> </ul> </li> <li>• Digital cameras                   <ul style="list-style-type: none"> <li>• Photographic</li> <li>• Video</li> </ul> </li> <li>• Cellular telephones:                   <ul style="list-style-type: none"> <li>• TDMA</li> <li>• GSM</li> <li>• Dual use technology</li> </ul> </li> <li>• Others</li> <li>• Personal Digital Assistant. PDA</li> <li>• Digital pencil</li> </ul> </li> </ul>	<p><u>Teacher:</u></p> <ul style="list-style-type: none"> <li>• Defines types of available technology in the market regarding mobile devices.</li> <li>• Describes characteristics, functions and services of different mobile devices.</li> <li>• Explains approaches and norms to use connectivity options.</li> <li>• Uses different functions and available services for each equipment or mobile device.</li> </ul>	<ul style="list-style-type: none"> <li>• Awareness of our strengths and weaknesses.</li> </ul>	<ul style="list-style-type: none"> <li>• Recognizes options for equipment or mobile devices connectivity.</li> </ul>

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
	<ul style="list-style-type: none"> <li>• Storage devices:               <ul style="list-style-type: none"> <li>• Universal Serial Bus (USB)</li> <li>• Compact disc readers</li> <li>• DVD readers</li> </ul> </li> <li>• Elements of remote control               <ul style="list-style-type: none"> <li>• Peripheral exit</li> <li>• Others</li> </ul> </li> </ul>	<p><u>Student:</u></p> <ul style="list-style-type: none"> <li>• Identifies types of available technology in the market regarding mobile devices.</li> <li>• Identifies types of available technology in the market regarding mobile devices.</li> <li>• Follows the procedure to use functions and available services in each technology.</li> <li>• Uses different functions and available services for each equipment or mobile device.</li> </ul>		

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
3. Carry out connection and installation of mobile devices and computer equipment.	<ul style="list-style-type: none"> <li>• Connection of mobile devices:               <ul style="list-style-type: none"> <li>• Computers</li> <li>• Digital cameras</li> <li>• Cellphone</li> <li>• Personal Digital Assistant PDA</li> <li>• Digital pencil</li> <li>• Storage devices</li> </ul> </li> <li>• Elements of remote control               <ul style="list-style-type: none"> <li>• Peripheral exit</li> <li>• Others</li> </ul> </li> </ul>	<p><u>Teacher:</u></p> <ul style="list-style-type: none"> <li>• Identifies equipment requirements, material and necessary software for connectivity.</li> <li>• Describes rules and norms of security to establish the connection.</li> <li>• Explains procedures to use connectivity options.</li> <li>• Demonstrates procedures to transfer information between equipment and devices.</li> </ul>	<ul style="list-style-type: none"> <li>• Awareness of our strengths and weaknesses.</li> </ul>	<ul style="list-style-type: none"> <li>• Carries out connection and installation of mobile devices and computer equipment.</li> </ul>



LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
		<p><u>Student:</u></p> <ul style="list-style-type: none"> <li>• Identifies equipment requirements, material and necessary software for connectivity.</li> <li>• Describes rules and norms of security to establish the connection.</li> <li>• Distinguishes procedures to use different connectivity options.</li> <li>• Applies procedures to transfer information between equipment and devices.</li> </ul>		

PRACTICE AND CHECKLIST

PRACTICE DEVELOPMENT

Study Block : Connectivity | PRACTICE N° 1

Purpose:

Scenario: Science Computer Laboratory | TIME:

MATERIALS	MACHINERY	EQUIPMENT	TOOL

## Procedures

### Teacher:

- Defines concepts and characteristic of connectivity.
- Explains uses and applications of connectivity between equipment and devices.
- Describes compatibility requirements between equipment and devices.
- Illustrates contributions from connectivity to daily work.
- Defines types of available technology in the market regarding mobile devices.
- Describes characteristics, functions and services of different mobile devices.
- Explains approaches and norms to use connectivity options.
- Uses different functions and available services for each equipment or mobile device.
- Identifies equipment requirements, material and necessary software for connectivity.
- Describes rules and norms of security to establish the connection.
- Explains procedures to use connectivity options.
- Demonstrates procedures to transfer information between equipment and devices.

SUGGESTED CHECKLIST	Date:
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Student's name:	
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**Instructions:**  
These criteria will verify student performance by observation. Write an "X" in the column that best describes each student performance.

DEVELOPMENT	YES	NO	NOT APPLICABLE
Appropriately defines concepts and characteristic of connectivity.			
Correctly identifies available connectivity options in the current market.			
Correctly recognizes uses and applications of connectivity between equipment and devices.			
Correctly distinguishes compatibility requirements between equipment and devices.			
Appropriately identifies types of available technology in the market regarding mobile devices.			
Correctly identifies types of available technology in the market regarding mobile devices.			
Correctly follows the procedure to use functions and available services in each technology.			
Correctly uses different functions and available services for each equipment or mobile device.			
Appropriately identifies equipment requirements, material and necessary software for connectivity.			
Correctly describes rules and norms of security to establish the connection.			
Correctly distinguishes procedures to use different connectivity options.			
Correctly applies procedures to transfer information between equipment and devices.			

OBSERVATIONS:

### CRITERIA FOR COMPETENCY ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
Identify characteristics and requirements for the operation of mobile devices.	Identifies characteristics and requirements for the operation of mobile devices.	Defines concepts and characteristic of connectivity.	Knowledge	Appropriately defines concepts and characteristic of connectivity.
		Identifies available connectivity options in the current market.	Knowledge	Correctly identifies available connectivity options in the current market.
		Recognizes uses and applications of connectivity between equipment and devices.	Knowledge	Correctly recognizes uses and applications of connectivity between equipment and devices.
		Characterizes different connectivity options between equipment and devices.	Performance	Correctly distinguishes compatibility requirements between equipment and devices.

### CRITERIA FOR COMPETENCY ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
Recognize options for equipment or mobile devices connectivity.	Recognizes options for equipment or mobile devices connectivity.	Identifies types of available technology in the market regarding mobile devices.	Knowledge	Appropriately identifies types of available technology in the market regarding mobile devices.
		Identifies types of available technology in the market regarding mobile devices.	Knowledge	Correctly identifies types of available technology in the market regarding mobile devices.
		Follows the procedure to use functions and available services in each technology.	Performance	Correctly follows the procedure to use functions and available services in each technology.
		Uses different functions and available services for each equipment or mobile device.	Product	Correctly uses different functions and available services for each equipment or mobile device.

### CRITERIA FOR COMPETENCY ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
Carry out connection and installation of mobile devices and computer equipment.	Carries out connection and installation of mobile devices and computer equipment.	Identifies equipment requirements, material and necessary software for the connectivity.	Knowledge	Appropriately identifies equipment requirements, material and necessary software for connectivity.
		Describes rules and norms of security to carry out the connection.	Knowledge	Correctly describes rules and norms of security to establish the connection.
		Distinguishes procedures to use different connectivity options.	Performance	Correctly distinguishes procedures to use different connectivity options.
		Applies procedures to transfer the information between equipment and devices.	Performance	Correctly applies procedures to transfer information between equipment and devices.

## SUB – ÁREA: PROGRAMACIÓN





## SUB – AREA: PROGRAMACIÓN

### DESCRIPCIÓN

La sub-área de PROGRAMACIÓN está integrada por cuatro unidades de estudio con 8 horas por semana, es de características teórico - prácticas, de modo que debe ser desarrollada en una proporción adecuada entre estos componentes. Está integrada por las siguientes unidades de estudio:

- Herramientas Lógicas: introduce al estudiante en la resolución de problemas matemáticos aplicados a la informática, la unidad de algoritmos y diagramas de flujo brinda al estudiante las herramientas básicas para resolución de problemas; que le permitirá al estudiante desarrollar las destrezas en planteamiento y análisis de problemas en una forma ordenada.
- Algoritmos y Diagramas de Flujo: permite desarrollar los conocimientos y destrezas necesarios para la solución de problemas utilizando estas herramientas.
- Elementos de Programación: tiene como finalidad que él o la estudiante conozca y domine el paradigma asociado a la programación estructurada, la lógica matemática para aplicarla a la resolución de problemas utilizando un lenguaje de programación.
- Programación: promueve el desarrollo de habilidades y destrezas para la implementación de programas computacionales sencillos, utilizando la programación estructurada, como herramienta para la solución de problemas específicos.

Es importante tener en cuenta durante el desarrollo de los contenidos propuestos para esta sub – área que el objetivo primordial es desarrollar en los estudiantes los conocimientos, habilidades y destrezas que le permitan:

- Comprender el problema que se le plantea.
- Sintetizar la información relevante.
- Realizar las abstracciones de datos pertinentes para la solución.
- Diseñar una solución eficiente al problema planteado.

De este modo, el aprendizaje de uno o varios lenguajes de programación aunque no se concibe como menos importante, pasa a un segundo plano y debe visualizarse como un medio para alcanzar los objetivos propuestos, y no como un fin en sí mismo. Consecuentemente, la selección del lenguaje que se utilice debe ser atinente a estos objetivos, por lo que se sugiere el uso de Pascal, Delphi, C u otro de características similares.

### **SUB – ÁREA: PROGRAMACIÓN OBJETIVOS GENERALES**

Desarrollar en los y las estudiantes los conocimientos habilidades y destrezas para:

1. Utilizar las diferentes herramientas de la lógica matemática en la solución de problemas.
2. Utilizar los algoritmos y diagramas de flujo en la solución de problemas específicos.
3. Utilizar las herramientas y funciones básicas de la programación estructurada en el planteamiento de soluciones eficientes para problemas específicos.
4. Desarrollar programas de un nivel de complejidad bajo utilizando tanto las estructuras fundamentales como la sintaxis de un lenguaje orientado a la programación estructurada.

### DISTRIBUCIÓN DE LAS UNIDADES DE ESTUDIO PROGRAMACIÓN

Unidades	Nombre	Tiempo Estimado en horas	Tiempo estimado en semanas
I.	Herramientas Lógicas	48	6
II.	Algoritmos y Diagramas de Flujo	48	6
III.	Elementos de Programación	64	8
IV.	Programación	160	20
	TOTAL	320	40

## NORMA TÉCNICA DE INSTITUCIÓN EDUCATIVA

### DATOS GENERALES

Título: Herramientas Lógicas  
 Propósito: Utilizar las diferentes herramientas de la lógica matemática en la solución de problemas.  
 Nivel de competencia: Básica

### UNIDADES DE COMPETENCIA LABORAL QUE CONFORMAN LA NORMA

Título	Clasificación
Reconoce con claridad los diferentes sistemas de numeración.	Específica
Realizar el cambio de base en los diferentes sistemas numéricos eficientemente.	Específica
Realiza las operaciones básicas en los diferentes sistemas numéricos correctamente.	Específica
Soluciona con eficiencia problemas utilizando los diferentes sistemas numéricos.	Específica
Distingue claramente las conectivas básicas utilizadas por la lógica.	Específica
Utiliza con eficiencia las diferentes conectivas en la solución de problemas específicos.	Específica
Resuelve sin margen de error problemas concretos utilizando las Leyes de De Morgan.	Específica
Utiliza adecuadamente las tablas de verdad para resolver problemas de razonamiento.	Específica
Aplica con claridad los principios del razonamiento y las demostraciones en la solución de problemas.	Específica
Identifica sin error los conceptos relacionados con el Álgebra de Boole.	Específica
Describe acertadamente los usos y aplicaciones de los Teoremas y propiedades del Álgebra de Boole, compuertas y los principios de dualidad.	Específica
Reconoce con precisión los usos y aplicaciones del Álgebra de Boole.	Específica
Utiliza correctamente los circuitos combinatorios para la solución de problemas.	Específica
Define claramente los conceptos básicos relacionados con las permutaciones y combinaciones.	Específica
Describe con claridad las características, propiedades y aplicaciones.	Específica
Resuelve problemas utilizando permutaciones y combinaciones sin margen de error.	Específica
Utiliza los principios de permutaciones y combinaciones en el análisis de algoritmos de forma correcta.	Específica
Define adecuadamente los conceptos básicos relacionados con matrices y álgebra de matrices.	Específica

Identifica con claridad las características, propiedades y aplicaciones de los matrices y álgebra de matrices.	Específica
Soluciona problemas utilizando algoritmos, matrices y álgebra de matrices sin margen de error.	Específica
Utiliza de forma correcta los principios para el análisis de la complejidad de los algoritmos.	Específica
Define correctamente los conceptos básicos relacionados con matrices y álgebra de matrices.	Específica
Define adecuadamente los conceptos básicos aplicados a las relaciones de recurrencia.	Específica
Reconoce las características, propiedades y aplicaciones con claridad.	Específica
Soluciona problemas utilizando relaciones de recurrencia sin margen de error.	Específica
Aplica las relaciones de recurrencia en el análisis de algoritmos correctamente.	Específica
Identifica con claridad los conceptos relacionados con los mapas de Karnaugh.	Específica
Reconoce con precisión las aplicaciones de los mapas de Karnaugh.	Específica
Explica adecuadamente el funcionamiento de los mapas de Karnaugh.	Específica
Soluciona problemas específicos utilizando mapas de Karnaugh, sin margen de error.	Específica

Elementos de competencia

Referencia	Título del elemento
2 - 1	Utilizar las diferentes herramientas de la lógica matemática en la solución de problemas.

Criterios de desempeño:

1. Resuelve problemas utilizando los diferentes sistemas numéricos.
2. Aplica la lógica proposicional y la lógica de predicados en la determinación de la validez de una proposición dada.
3. Resuelve ejercicios utilizando el Álgebra de Boole.
4. Identifica los principios de permutaciones y combinaciones en el análisis de algoritmos.
5. Soluciona problemas utilizando algoritmos, matrices y álgebra de matrices.
6. Utiliza las relaciones de recurrencia en el análisis de algoritmos.
7. Aplica los conceptos de los mapas de Karnaugh en la resolución de problemas.

Campo de aplicación:

Categoría

Servicios

Clase

Prestación de servicios de Educación Técnica

Evidencias de desempeño:

1. Realizar el cambio de base en los diferentes sistemas numéricos.
2. Realiza las operaciones básicas en los diferentes sistemas numéricos.
3. Identifica los conceptos relacionados con el Álgebra de Boole.
4. Utiliza las tablas de verdad para resolver problemas de razonamiento.
5. Describe las características, propiedades y aplicaciones.
6. Utiliza los principios para el análisis de la complejidad de los algoritmos.
7. Reconoce las características, propiedades y aplicaciones.
8. Soluciona problemas utilizando relaciones de recurrencia.
9. Explica el funcionamiento de los mapas de Karnaugh.

Evidencias de conocimiento:

1. Reconoce los diferentes sistemas de numeración.
2. Describe los usos y aplicaciones de los Teoremas y propiedades del Álgebra de Boole, compuertas y los principios de dualidad.
3. Define conceptos básicos relacionados con las permutaciones y combinaciones.
4. Define los conceptos básicos relacionados con matrices y álgebra de matrices.
5. Identifica las características, propiedades y aplicaciones de los matrices y álgebra de matrices.
6. Define conceptos básicos aplicados a las relaciones de recurrencia.
7. Identifica los conceptos relacionados con los mapas de Karnaugh.
8. Reconoce las aplicaciones de los mapas de Karnaugh.

### Evidencias de producto:

1. Soluciona problemas utilizando los diferentes sistemas numéricos.
2. Utiliza las diferentes conectivas en la solución de problemas específicos.
3. Resuelve problemas concretos utilizando las Leyes de De Morgan.
4. Aplica los principios del razonamiento y las demostraciones en la solución de problemas.
5. Utiliza los circuitos combinatorios para la solución de problemas.
6. Resuelve ejercicios utilizando el Álgebra de Boole.
7. Resuelve problemas utilizando permutaciones y combinaciones.
8. Utiliza los principios de permutaciones y combinaciones en el análisis de algoritmos.
9. Soluciona problemas utilizando algoritmos, matrices y álgebra de matrices.
10. Aplica las relaciones de recurrencia en el análisis de algoritmos.
11. Soluciona problemas específicos utilizando mapas de Karnaugh.

Modalidad: Comercial y de Servicios	Especialidad: Informática Bilingüe en Redes de Computadoras
Sub-área: Programación	Año: Décimo
Unidad de Estudio: Herramientas Lógicas	Tiempo Estimado: 48 horas
Propósito: Utilizar las diferentes herramientas de la lógica matemática en la solución de problemas.	

RESULTADOS DE APRENDIZAJE	CONTENIDOS	ESTRATEGIAS DE ENSEÑANZA - APRENDIZAJE	VALORES Y ACTITUDES	CRITERIOS DE DESEMPEÑO
1. Resolver problemas utilizando los diferentes sistemas numéricos.	<ul style="list-style-type: none"> <li>• Sistemas numéricos: <ul style="list-style-type: none"> <li>• Binario, octal, hexadecimal</li> <li>• Representación numérica</li> <li>• Cambio de base</li> <li>• Operaciones básicas.</li> </ul> </li> </ul>	<p><u>El o la docente:</u></p> <ul style="list-style-type: none"> <li>• Identifica los diferentes sistemas de numeración.</li> <li>• Describe el procedimiento para realizar el cambio de base.</li> <li>• Explica el procedimiento para realizar las operaciones básicas en los diferentes sistemas numéricos.</li> <li>• Soluciona problemas utilizando los diferentes sistemas numéricos.</li> </ul>	<ul style="list-style-type: none"> <li>• Esfuerzo que se realiza para conseguir algo por uno mismo o con la ayuda de los demás.</li> </ul>	<ul style="list-style-type: none"> <li>• Resuelve problemas utilizando los diferentes sistemas numéricos.</li> </ul>



RESULTADOS DE APRENDIZAJE	CONTENIDOS	ESTRATEGIAS DE ENSEÑANZA - APRENDIZAJE	VALORES Y ACTITUDES	CRITERIOS DE DESEMPEÑO
		<p><u>El o la estudiante:</u></p> <ul style="list-style-type: none"> <li>• Reconoce los diferentes sistemas de numeración.</li> <li>• Realizar el cambio de base en los diferentes sistemas numéricos.</li> <li>• Realiza las operaciones básicas en los diferentes sistemas numéricos.</li> <li>• Soluciona problemas utilizando los diferentes sistemas numéricos.</li> </ul>		

RESULTADOS DE APRENDIZAJE	CONTENIDOS	ESTRATEGIAS DE ENSEÑANZA - APRENDIZAJE	VALORES Y ACTITUDES	CRITERIOS DE DESEMPEÑO
2. Aplicar la lógica proposicional y la lógica de predicados en la determinación de la validez de una proposición dada.	<ul style="list-style-type: none"> <li>• Conectivas básicas de la lógica:               <ul style="list-style-type: none"> <li>• Negación</li> <li>• Disyunción</li> <li>• Conjunción.</li> </ul> </li> <li>• Leyes de De Morgan.</li> <li>• Proposiciones condicionales y equivalencias lógicas.</li> <li>• Razonamientos y demostraciones.</li> <li>• Tablas de verdad.</li> <li>• Tautología, contradicciones y contingencias.</li> </ul>	<p><u>El o la docente:</u></p> <ul style="list-style-type: none"> <li>• Diferencia las conectivas lógicas básicas.</li> <li>• Utiliza las Leyes de De Morgan para resolver problemas específicos.</li> <li>• Determina la diferencia entre las conectivas lógicas básicas.</li> <li>• Identifica en una tabla de verdad, si una expresión dada es tautología, contradicción o contingencia.</li> </ul>	<ul style="list-style-type: none"> <li>• Esfuerzo que se realiza para conseguir algo por uno mismo o con la ayuda de los demás.</li> </ul>	<ul style="list-style-type: none"> <li>• Aplica la lógica proposicional y la lógica de predicados en la determinación de la validez de una proposición dada.</li> </ul>

RESULTADOS DE APRENDIZAJE	CONTENIDOS	ESTRATEGIAS DE ENSEÑANZA - APRENDIZAJE	VALORES Y ACTITUDES	CRITERIOS DE DESEMPEÑO
		<p><u>El o la estudiante:</u></p> <ul style="list-style-type: none"> <li>• Utiliza las diferentes conectivas en la solución de problemas específicos.</li> <li>• Resuelve problemas concretos utilizando las Leyes de De Morgan.</li> <li>• Utiliza las tablas de verdad para resolver problemas de razonamiento.</li> <li>• Aplica los principios del razonamiento y las demostraciones en la solución de problemas.</li> </ul>		

RESULTADOS DE APRENDIZAJE	CONTENIDOS	ESTRATEGIAS DE ENSEÑANZA - APRENDIZAJE	VALORES Y ACTITUDES	CRITERIOS DE DESEMPEÑO
3. Resolver problemas utilizando el álgebra de Boole.	<ul style="list-style-type: none"> <li>• Álgebra de Boole:               <ul style="list-style-type: none"> <li>• Definición</li> <li>• Teoremas y propiedades del Álgebra de Boole</li> <li>• Compuertas</li> <li>• Principios de dualidad.</li> </ul> </li> <li>• Circuitos combinatorios.</li> </ul>	<u>El o la docente:</u> <ul style="list-style-type: none"> <li>• Define conceptos básicos relacionados con el Álgebra de Boole.</li> <li>• Describe los usos y aplicaciones de los Teoremas y propiedades del Álgebra de Boole, compuertas y los principios de dualidad.</li> <li>• Ilustra la aplicación del Álgebra de Boole en la solución de problemas.</li> <li>• Soluciona situaciones propuestas utilizando el álgebra de Boole.</li> </ul>	<ul style="list-style-type: none"> <li>• Esfuerzo que se realiza para conseguir algo por uno mismo o con la ayuda de los demás.</li> </ul>	<ul style="list-style-type: none"> <li>• Resuelve ejercicios utilizando el Álgebra de Boole.</li> </ul>

RESULTADOS DE APRENDIZAJE	CONTENIDOS	ESTRATEGIAS DE ENSEÑANZA - APRENDIZAJE	VALORES Y ACTITUDES	CRITERIOS DE DESEMPEÑO
		<p><u>El o la estudiante:</u></p> <ul style="list-style-type: none"> <li>• Identifica los conceptos relacionados con el Álgebra de Boole.</li> <li>• Describe los usos y aplicaciones de los Teoremas y propiedades del Álgebra de Boole, compuertas y los principios de dualidad.</li> <li>• Utiliza los circuitos combinatorios para la solución de problemas.</li> <li>• Resuelve ejercicios utilizando el Álgebra de Boole.</li> </ul>		

RESULTADOS DE APRENDIZAJE	CONTENIDOS	ESTRATEGIAS DE ENSEÑANZA - APRENDIZAJE	VALORES Y ACTITUDES	CRITERIOS DE DESEMPEÑO
4. Identificar los principios básicos relacionados con las permutaciones y combinaciones.	<ul style="list-style-type: none"> <li>Principios Básicos de permutaciones y combinaciones:               <ul style="list-style-type: none"> <li>Conceptos</li> <li>Características</li> <li>Aplicaciones para la solución de problemas.</li> </ul> </li> <li>Coeficientes binomiales e identidades combinatorias:               <ul style="list-style-type: none"> <li>Conceptos</li> <li>Características</li> <li>Aplicaciones para la solución de problemas.</li> </ul> </li> </ul>	<u>El o la docente:</u> <ul style="list-style-type: none"> <li>Define conceptos básicos relacionados con las permutaciones y combinaciones.</li> <li>Describe las características, propiedades y aplicaciones.</li> <li>Ilustra su aplicación en la solución de problemas.</li> <li>Utiliza los principios de permutaciones y combinaciones en el análisis de algoritmos.</li> </ul>	<ul style="list-style-type: none"> <li>Esfuerzo que se realiza para conseguir algo por uno mismo o con la ayuda de los demás.</li> </ul>	<ul style="list-style-type: none"> <li>Identifica los principios de permutaciones y combinaciones en el análisis de algoritmos.</li> </ul>

RESULTADOS DE APRENDIZAJE	CONTENIDOS	ESTRATEGIAS DE ENSEÑANZA - APRENDIZAJE	VALORES Y ACTITUDES	CRITERIOS DE DESEMPEÑO
		<p><u>El o la estudiante:</u></p> <ul style="list-style-type: none"> <li>• Define conceptos básicos relacionados con las permutaciones y combinaciones.</li> <li>• Describe las características, propiedades y aplicaciones.</li> <li>• Resuelve problemas utilizando permutaciones y combinaciones.</li> <li>• Utiliza los principios de permutaciones y combinaciones en el análisis de algoritmos.</li> </ul>		

RESULTADOS DE APRENDIZAJE	CONTENIDOS	ESTRATEGIAS DE ENSEÑANZA - APRENDIZAJE	VALORES Y ACTITUDES	CRITERIOS DE DESEMPEÑO
5. Solucionar problemas utilizando algoritmos, matrices y álgebra de matrices.	<ul style="list-style-type: none"> <li>• Matrices y álgebra de matrices:               <ul style="list-style-type: none"> <li>• Conceptos</li> <li>• Características</li> <li>• Aplicaciones para la solución de problemas</li> </ul> </li> </ul>	<u>El o la docente:</u> <ul style="list-style-type: none"> <li>• Define conceptos básicos relacionados con matrices y álgebra de matrices.</li> <li>• Describe las características, propiedades y aplicaciones de las matrices y álgebra de matrices.</li> <li>• Soluciona problemas utilizando matrices y álgebra de matrices.</li> <li>• Utiliza los principios para el análisis de la complejidad de los algoritmos.</li> </ul>	<ul style="list-style-type: none"> <li>• Esfuerzo que se realiza para conseguir algo por uno mismo o con la ayuda de los demás.</li> </ul>	<ul style="list-style-type: none"> <li>• Soluciona problemas utilizando algoritmos, matrices y álgebra de matrices.</li> </ul>



RESULTADOS DE APRENDIZAJE	CONTENIDOS	ESTRATEGIAS DE ENSEÑANZA - APRENDIZAJE	VALORES Y ACTITUDES	CRITERIOS DE DESEMPEÑO
		<p><u>El o la estudiante:</u></p> <ul style="list-style-type: none"> <li>• Define los conceptos básicos relacionados con matrices y álgebra de matrices.</li> <li>• Identifica las características, propiedades y aplicaciones de los matrices y álgebra de matrices.</li> <li>• Soluciona problemas utilizando algoritmos, matrices y álgebra de matrices.</li> <li>• Utiliza los principios para el análisis de la complejidad de los algoritmos.</li> </ul>		

RESULTADOS DE APRENDIZAJE	CONTENIDOS	ESTRATEGIAS DE ENSEÑANZA - APRENDIZAJE	VALORES Y ACTITUDES	CRITERIOS DE DESEMPEÑO
6. Utilizar las relaciones de recurrencia en el análisis de algoritmos.	<ul style="list-style-type: none"> <li>Relaciones de recurrencia:               <ul style="list-style-type: none"> <li>Sucesión del Fibonacci</li> <li>Torres de Hanoi</li> <li>Función Arkermam</li> <li>Resolución de relaciones de recurrencia.</li> </ul> </li> </ul>	<p><u>El o la docente:</u></p> <ul style="list-style-type: none"> <li>Define conceptos básicos relacionados con relaciones de recurrencia.</li> <li>Describe las características, propiedades y aplicaciones.</li> <li>Ilustra su aplicación en la solución de problemas.</li> <li>Soluciona problemas utilizando relaciones de recurrencia.</li> </ul>	<ul style="list-style-type: none"> <li>Esfuerzo que se realiza para conseguir algo por uno mismo o con la ayuda de los demás.</li> </ul>	<ul style="list-style-type: none"> <li>Utiliza las relaciones de recurrencia en el análisis de algoritmos.</li> </ul>

RESULTADOS DE APRENDIZAJE	CONTENIDOS	ESTRATEGIAS DE ENSEÑANZA - APRENDIZAJE	VALORES Y ACTITUDES	CRITERIOS DE DESEMPEÑO
		<p><u>El o la estudiante:</u></p> <ul style="list-style-type: none"> <li>• Define conceptos básicos aplicados a las relaciones de recurrencia.</li> <li>• Reconoce las características, propiedades y aplicaciones.</li> <li>• Soluciona problemas utilizando relaciones de recurrencia.</li> <li>• Aplica las relaciones de recurrencia en el análisis de algoritmos.</li> </ul>		

RESULTADOS DE APRENDIZAJE	CONTENIDOS	ESTRATEGIAS DE ENSEÑANZA - APRENDIZAJE	VALORES Y ACTITUDES	CRITERIOS DE DESEMPEÑO
7. Aplicar los conceptos de los mapas de Karnaugh en la resolución de problemas.	<ul style="list-style-type: none"> <li>• Mapas de Karnaugh:               <ul style="list-style-type: none"> <li>• Concepto</li> <li>• Aplicaciones</li> <li>• Resolución de problemas.</li> </ul> </li> </ul>	<u>El o la docente:</u> <ul style="list-style-type: none"> <li>• Define los conceptos relacionados con los mapas de Karnaugh.</li> <li>• Describe las aplicaciones de los mapas de Karnaugh.</li> <li>• Demuestra el funcionamiento de los mapas de Karnaugh.</li> <li>• Soluciona problemas específicos utilizando mapas de Karnaugh.</li> </ul>	<ul style="list-style-type: none"> <li>• Esfuerzo que se realiza para conseguir algo por uno mismo o con la ayuda de los demás.</li> </ul>	<ul style="list-style-type: none"> <li>• Aplica los conceptos de los mapas de Karnaugh en la resolución de problemas.</li> </ul>

RESULTADOS DE APRENDIZAJE	CONTENIDOS	ESTRATEGIAS DE ENSEÑANZA - APRENDIZAJE	VALORES Y ACTITUDES	CRITERIOS DE DESEMPEÑO
		<p><u>El o la estudiante</u></p> <ul style="list-style-type: none"> <li>• Identifica los conceptos relacionados con los mapas de Karnaugh.</li> <li>• Reconoce las aplicaciones de los mapas de Karnaugh.</li> <li>• Explica el funcionamiento de los mapas de Karnaugh.</li> <li>• Soluciona problemas específicos utilizando mapas de Karnaugh.</li> </ul>		

PRÁCTICAS Y LISTAS DE COTEJO

DESARROLLO DE LA PRÁCTICA

UNIDAD DE ESTUDIO: Herramientas Lógicas

PRÁCTICA No. 1

Propósito:

Escenario: Aula

Duración:

MATERIALES	MAQUINARIA	EQUIPO	HERRAMIENTA

## Procedimientos

El o la docente:

- Identifica los diferentes sistemas de numeración.
- Describe el procedimiento para realizar el cambio de base.
- Explica el procedimiento para realizar las operaciones básicas en los diferentes sistemas numéricos.
- Soluciona problemas utilizando los diferentes sistemas numéricos.
- Diferencia las conectivas lógicas básicas.
- Utiliza las Leyes de De Morgan para resolver problemas específicos.
- Determina la diferencia entre las conectivas lógicas básicas.
- Identifica en una tabla de verdad, si una expresión dada es tautología, contradicción o contingencia.
- Define conceptos básicos relacionados con el Álgebra de Boole.
- Describe los usos y aplicaciones de los Teoremas y propiedades del Álgebra de Boole, compuertas y los principios de dualidad.
- Ilustra la aplicación del Álgebra de Boole en la solución de problemas.
- Soluciona situaciones propuestas utilizando el álgebra de Boole.

## Procedimientos

El o la docente:

- Define conceptos básicos relacionados con las permutaciones y combinaciones.
- Describe las características, propiedades y aplicaciones.
- Ilustra su aplicación en la solución de problemas.
- Utiliza los principios de permutaciones y combinaciones en el análisis de algoritmos.
- Define conceptos básicos relacionados con matrices y álgebra de matrices.
- Describe las características, propiedades y aplicaciones de las matrices y álgebra de matrices.
- Soluciona problemas utilizando matrices y álgebra de matrices.
- Utiliza los principios para el análisis de la complejidad de los algoritmos.
- Define conceptos básicos relacionados con relaciones de recurrencia.
- Describe las características, propiedades y aplicaciones.
- Ilustra su aplicación en la solución de problemas.
- Soluciona problemas utilizando relaciones de recurrencia.
- Define los conceptos relacionados con los mapas de Karnaugh.
- Describe las aplicaciones de los mapas de Karnaugh.
- Demuestra el funcionamiento de los mapas de Karnaugh.
- Soluciona problemas específicos utilizando mapas de Karnaugh.



LISTA DE COTEJO SUGERIDA	Fecha:
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Nombre del o la estudiante:	
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Instrucciones:

- A continuación se presentan los criterios que van a ser verificados en el desempeño del o la estudiante mediante la observación del mismo. De la siguiente lista marque con una "X" aquellas observaciones que hayan sido cumplidas por el o la estudiante durante su desempeño.

DESARROLLO	SI	AUN NO	NO APLICA
Reconoce con claridad los diferentes sistemas de numeración.			
Realizar el cambio de base en los diferentes sistemas numéricos eficientemente.			
Realiza las operaciones básicas en los diferentes sistemas numéricos correctamente.			
Soluciona con eficiencia problemas utilizando los diferentes sistemas numéricos.			
Utiliza con eficiencia las diferentes conectivas en la solución de problemas específicos.			
Resuelve sin margen de error problemas concretos utilizando las Leyes de De Morgan.			
Utiliza adecuadamente las tablas de verdad para resolver problemas de razonamiento.			
Aplica con claridad los principios del razonamiento y las demostraciones en la solución de problemas.			
Identifica sin error los conceptos relacionados con el Álgebra de Boole.			
Describe acertadamente los usos y aplicaciones de los Teoremas y propiedades del Álgebra de Boole, compuertas y los principios de dualidad.			
Utiliza correctamente los circuitos combinatorios para la solución de problemas.			
Define claramente los conceptos básicos relacionados con las permutaciones y combinaciones.			
Describe con claridad las características, propiedades y aplicaciones.			

DESARROLLO	SI	AUN NO	NO APLICA
Resuelve problemas utilizando permutaciones y combinaciones sin margen de error.			
Utiliza los principios de permutaciones y combinaciones en el análisis de algoritmos de forma correcta.			
Define adecuadamente los conceptos básicos relacionados con matrices y álgebra de matrices.			
Identifica con claridad las características, propiedades y aplicaciones de los matrices y álgebra de matrices.			
Soluciona problemas utilizando algoritmos, matrices y álgebra de matrices sin margen de error.			
Utiliza de forma correcta los principios para el análisis de la complejidad de los algoritmos.			
Define correctamente los conceptos básicos relacionados con matrices y álgebra de matrices.			
Define adecuadamente los conceptos básicos aplicados a las relaciones de recurrencia.			
Reconoce las características, propiedades y aplicaciones con claridad.			
Soluciona problemas utilizando relaciones de recurrencia sin margen de error.			
Aplica las relaciones de recurrencia en el análisis de algoritmos correctamente.			
Identifica con claridad los conceptos relacionados con los mapas de Karnaugh.			
Reconoce con precisión las aplicaciones de los mapas de Karnaugh.			
Explica adecuadamente el funcionamiento de los mapas de Karnaugh.			
Soluciona problemas específicos utilizando mapas de Karnaugh, sin margen de error.			

OBSERVACIONES:

### CRITERIOS PARA LA EVALUACIÓN DE LAS COMPETENCIAS

RESULTADOS DE APRENDIZAJE	CRITERIOS DE DESEMPEÑO	EVIDENCIAS	TIPO	SUFICIENCIAS DE EVIDENCIA
Resolver problemas utilizando los diferentes sistemas numéricos.	Resuelve problemas utilizando los diferentes sistemas numéricos.	Reconoce los diferentes sistemas de numeración.	Conocimiento	Reconoce con claridad los diferentes sistemas de numeración.
		Realizar el cambio de base en los diferentes sistemas numéricos.	Desempeño	Realizar el cambio de base en los diferentes sistemas numéricos eficientemente.
		Realiza las operaciones básicas en los diferentes sistemas numéricos.	Desempeño	Realiza las operaciones básicas en los diferentes sistemas numéricos correctamente.
		Soluciona problemas utilizando los diferentes sistemas numéricos.	Producto	Soluciona con eficiencia problemas utilizando los diferentes sistemas numéricos.

### CRITERIOS PARA LA EVALUACIÓN DE LAS COMPETENCIAS

RESULTADOS DE APRENDIZAJE	CRITERIOS DE DESEMPEÑO	EVIDENCIAS	TIPO	SUFICIENCIAS DE EVIDENCIA
Aplicar la lógica proposicional y la lógica de predicados en la determinación de la validez de una proposición dada.	Aplica la lógica proposicional y la lógica de predicados en la determinación de la validez de una proposición dada.	Utiliza las diferentes conectivas en la solución de problemas específicos.	Producto	Utiliza con eficiencia las diferentes conectivas en la solución de problemas específicos.
		Resuelve problemas concretos utilizando las Leyes de De Morgan.	Producto	Resuelve sin margen de error problemas concretos utilizando las Leyes de De Morgan.
		Utiliza las tablas de verdad para resolver problemas de razonamiento.	Producto	Utiliza adecuadamente las tablas de verdad para resolver problemas de razonamiento.
		Aplica los principios del razonamiento y las demostraciones en la solución de problemas.	Producto	Aplica con claridad los principios del razonamiento y las demostraciones en la solución de problemas.

### CRITERIOS PARA LA EVALUACIÓN DE LAS COMPETENCIAS

RESULTADOS DE APRENDIZAJE	CRITERIOS DE DESEMPEÑO	EVIDENCIAS	TIPO	SUFICIENCIAS DE EVIDENCIA
Resolver problemas utilizando el álgebra de Boole.	Resuelve ejercicios utilizando el Álgebra de Boole.	Identifica los conceptos relacionados con el Álgebra de Boole.	Desempeño	Identifica sin error los conceptos relacionados con el Álgebra de Boole.
		Describe los usos y aplicaciones de los Teoremas y propiedades del Álgebra de Boole, compuertas y los principios de dualidad.	Conocimiento	Describe acertadamente los usos y aplicaciones de los Teoremas y propiedades del Álgebra de Boole, compuertas y los principios de dualidad.
		Utiliza los circuitos combinatorios para la solución de problemas.	Producto	Utiliza correctamente los circuitos combinatorios para la solución de problemas.
		Resuelve ejercicios utilizando el Álgebra de Boole.	Producto	Identifica sin error los conceptos relacionados con el Álgebra de Boole.

### CRITERIOS PARA LA EVALUACIÓN DE LAS COMPETENCIAS

RESULTADOS DE APRENDIZAJE	CRITERIOS DE DESEMPEÑO	EVIDENCIAS	TIPO	SUFICIENCIAS DE EVIDENCIA
Identificar los principios básicos relacionados con las permutaciones y combinaciones.	Identifica los principios de permutaciones y combinaciones en el análisis de algoritmos.	Define conceptos básicos relacionados con las permutaciones y combinaciones.	Conocimiento	Define claramente los conceptos básicos relacionados con las permutaciones y combinaciones.
		Describe las características, propiedades y aplicaciones.	Desempeño	Describe con claridad las características, propiedades y aplicaciones.
		Resuelve problemas utilizando permutaciones y combinaciones.	Producto	Resuelve problemas utilizando permutaciones y combinaciones sin margen de error.
		Utiliza los principios de permutaciones y combinaciones en el análisis de algoritmos.	Producto	Utiliza los principios de permutaciones y combinaciones en el análisis de algoritmos de forma correcta.

### CRITERIOS PARA LA EVALUACIÓN DE LAS COMPETENCIAS

RESULTADOS DE APRENDIZAJE	CRITERIOS DE DESEMPEÑO	EVIDENCIAS	TIPO	SUFICIENCIAS DE EVIDENCIA
Solucionar problemas utilizando algoritmos, matrices y álgebra de matrices.	Soluciona problemas utilizando algoritmos, matrices y álgebra de matrices.	Define los conceptos básicos relacionados con matrices y álgebra de matrices.	Conocimiento	Define adecuadamente los conceptos básicos relacionados con matrices y álgebra de matrices.
		Identifica las características, propiedades y aplicaciones de los matrices y álgebra de matrices.	Conocimiento	Identifica con claridad las características, propiedades y aplicaciones de los matrices y álgebra de matrices.
		Soluciona problemas utilizando algoritmos, matrices y álgebra de matrices.	Producto	Soluciona problemas utilizando algoritmos, matrices y álgebra de matrices sin margen de error.
		Utiliza los principios para el análisis de la complejidad de los algoritmos.	Desempeño	Utiliza de forma correcta los principios para el análisis de la complejidad de los algoritmos.

### CRITERIOS PARA LA EVALUACIÓN DE LAS COMPETENCIAS

RESULTADOS DE APRENDIZAJE	CRITERIOS DE DESEMPEÑO	EVIDENCIAS	TIPO	SUFICIENCIAS DE EVIDENCIA
Utilizar las relaciones de recurrencia en el análisis de algoritmos.	Utiliza las relaciones de recurrencia en el análisis de algoritmos.	Define conceptos básicos aplicados a las relaciones de recurrencia.	Conocimiento	Define adecuadamente los conceptos básicos aplicados a las relaciones de recurrencia.
		Reconoce las características, propiedades y aplicaciones.	Desempeño	Reconoce las características, propiedades y aplicaciones con claridad.
		Soluciona problemas utilizando relaciones de recurrencia.	Desempeño	Soluciona problemas utilizando relaciones de recurrencia sin margen de error.
		Aplica las relaciones de recurrencia en el análisis de algoritmos.	Producto	Aplica las relaciones de recurrencia en el análisis de algoritmos correctamente.



### CRITERIOS PARA LA EVALUACIÓN DE LAS COMPETENCIAS

RESULTADOS DE APRENDIZAJE	CRITERIOS DE DESEMPEÑO	EVIDENCIAS	TIPO	SUFICIENCIAS DE EVIDENCIA
Aplicar los conceptos de los mapas de Karnaugh en la resolución de problemas.	Aplica los conceptos de los mapas de Karnaugh en la resolución de problemas.	Identifica los conceptos relacionados con los mapas de Karnaugh.	Conocimiento	Identifica con claridad los conceptos relacionados con los mapas de Karnaugh.
		Reconoce las aplicaciones de los mapas de Karnaugh.	Conocimiento	Reconoce con precisión las aplicaciones de los mapas de Karnaugh.
		Explica el funcionamiento de los mapas de Karnaugh.	Desempeño	Explica adecuadamente el funcionamiento de los mapas de Karnaugh.
		Soluciona problemas específicos utilizando mapas de Karnaugh.	Producto	Soluciona problemas específicos utilizando mapas de Karnaugh, sin margen de error.

## NORMA TÉCNICA DE INSTITUCIÓN EDUCATIVA

### DATOS GENERALES

Título: Algoritmos y Diagramas de Flujo  
 Propósito: Utilizar los algoritmos y diagramas de flujo como herramienta para la solución de problemas.  
 Nivel de competencia: Básica

### UNIDADES DE COMPETENCIA LABORAL QUE CONFORMAN LA NORMA

Título	Clasificación
Define los conceptos relacionados con algoritmos y diagramas de flujo sin margen de error.	Específica
Identifica con claridad los pasos de desarrollo de un algoritmo.	Específica
Reconoce acertadamente el uso de la simbología para la elaboración de diagramas	Específica
Resuelve correctamente problemas utilizando las técnicas de los algoritmos.	Específica
Reconoce acertadamente la simbología a utilizar en la construcción de diagramas.	Específica
Identifica con precisión los pasos para construir diagramas de flujo.	Específica
Elabora diagramas de flujo utilizando la simbología descrita sin margen de error.	Específica
Interpreta diagramas de flujo contruidos para solucionar problemas específicos sin margen de error.	Específica
Identifica con claridad los principales conceptos relacionados con la programación.	Específica
Diferencia eficientemente los lenguajes utilizados en programación.	Específica
Clasifica las diferentes etapas de la programación sin margen de error.	Específica
Reconoce eficientemente las estructuras lógicas.	Específica
Explica con claridad el funcionamiento de cada una de las estructuras.	Específica
Aplica las técnicas de diagramación en la resolución de problemas utilizando los ciclos y estructuras condicionales sin margen de error.	Específica
Resuelve problemas utilizando ciclos y estructuras condicionales de forma correcta.	Específica

### Elementos de competencia

Referencia	Título del elemento
2 – 2	Utilizar los algoritmos y diagramas de flujo como herramienta para la solución de problemas.

### Criterios de desempeño:

1. Aplica los algoritmos y diagramas de flujo estructurado como herramientas para resolución lógica de problemas computacionales.
2. Utiliza la simbología para la construcción de algoritmos y diagramas de flujo.
3. Utiliza las técnicas de diagramación en la resolución de problemas utilizando los ciclos y estructuras condicionales.

### Campo de aplicación:

Categoría	Clase
Servicios	Prestación de servicios de Educación Técnica

### Evidencias de desempeño:

1. Identifica los pasos de desarrollo de un algoritmo.
2. Reconoce el uso de la simbología para la elaboración de diagramas.
3. Identifica los pasos para construir diagramas de flujo.
4. Explica el funcionamiento de cada una de las estructuras.
5. Aplica las técnicas de diagramación en la resolución de problemas utilizando los ciclos y estructuras condicionales.

Evidencias de conocimiento:

1. Define los conceptos relacionados con algoritmos y diagramas de flujo.
2. Reconoce la simbología a utilizar en la construcción de diagramas.
3. Reconoce las estructuras lógicas.

Evidencias de producto:

1. Resuelve problemas utilizando las técnicas de los algoritmos.
2. Elabora diagramas de flujo utilizando la simbología descrita.
3. Interpreta diagramas de flujo construidos para solucionar problemas específicos.
4. Resuelve problemas utilizando ciclos y estructuras condicionales.

Modalidad: Comercial y de Servicios	Especialidad: Informática Bilingüe en Redes de Computadoras
Sub-área: Programación	Año: Décimo
Unidad de Estudio: Algoritmos y Diagramas de Flujo	Tiempo Estimado: 48 horas
Propósito: Utilizar los algoritmos y diagramas de flujo como herramienta para la solución de problemas.	

RESULTADOS DE APRENDIZAJE	CONTENIDOS	ESTRATEGIAS DE ENSEÑANZA - APRENDIZAJE	VALORES Y ACTITUDES	CRITERIOS DE DESEMPEÑO
1. Aplicar los algoritmos y diagramas de flujo estructurado como herramientas para resolución lógica de problemas computacionales.	<ul style="list-style-type: none"> <li>Introducción a los algoritmos:               <ul style="list-style-type: none"> <li>Diseño de algoritmos.</li> <li>Entradas, salidas, límites y procesos</li> <li>Diseño Top-down</li> <li>Implementación de herramientas para algoritmos.</li> <li>Representación gráfica del algoritmo (diagrama)</li> <li>Normalización de simbología</li> <li>Pseudocódigo.</li> </ul> </li> </ul>	<u>El o la docente:</u> <ul style="list-style-type: none"> <li>Define algoritmo y diagrama de flujo.</li> <li>Describe los diferentes pasos en el desarrollo de un algoritmo.</li> <li>Demuestra el uso de la simbología para la elaboración de diagramas</li> <li>Resuelve problemas con la utilización de dicha técnica.</li> </ul>	<ul style="list-style-type: none"> <li>Unión y colaboración mutua para conseguir un fin común.</li> </ul>	<ul style="list-style-type: none"> <li>Aplica los algoritmos y diagramas de flujo estructurado como herramientas para resolución lógica de problemas computacionales.</li> </ul>

RESULTADOS DE APRENDIZAJE	CONTENIDOS	ESTRATEGIAS DE ENSEÑANZA - APRENDIZAJE	VALORES Y ACTITUDES	CRITERIOS DE DESEMPEÑO
		<p><u>El o la estudiante:</u></p> <ul style="list-style-type: none"> <li>• Define los conceptos relacionados con algoritmos y diagramas de flujo.</li> <li>• Identifica los pasos de desarrollo de un algoritmo.</li> <li>• Reconoce el uso de la simbología para la elaboración de diagramas</li> <li>• Resuelve problemas utilizando las técnicas de los algoritmos.</li> </ul>		

RESULTADOS DE APRENDIZAJE	CONTENIDOS	ESTRATEGIAS DE ENSEÑANZA - APRENDIZAJE	VALORES Y ACTITUDES	CRITERIOS DE DESEMPEÑO
2. Utilizar la simbología para la construcción de algoritmos y diagramas de flujo.	<ul style="list-style-type: none"> <li>• Símbolos de diagrama de flujo estandarizados.</li> <li>• Tipos de datos: <ul style="list-style-type: none"> <li>• Operadores</li> <li>• Asignación de variables</li> <li>• Expresiones lógicas y aritméticas</li> <li>• Ciclos (estructuras anidadas).</li> </ul> </li> <li>• Análisis y verificación de algoritmos.</li> </ul>	<p><u>El o la docente:</u></p> <ul style="list-style-type: none"> <li>• Cita la importancia de la utilización de símbolos en la construcción de diagramas.</li> <li>• Describe los diferentes símbolos estructurados para la resolución de problemas.</li> <li>• Aplica técnicas para el análisis y verificación de algoritmos.</li> <li>• Analiza problemas y resultados en la realización de algoritmos.</li> </ul>	<ul style="list-style-type: none"> <li>• Unión y colaboración mutua para conseguir un fin común.</li> </ul>	<ul style="list-style-type: none"> <li>• Utiliza la simbología para la construcción de algoritmos y diagramas de flujo.</li> </ul>

RESULTADOS DE APRENDIZAJE	CONTENIDOS	ESTRATEGIAS DE ENSEÑANZA - APRENDIZAJE	VALORES Y ACTITUDES	CRITERIOS DE DESEMPEÑO
		<p><u>El o la estudiante:</u></p> <ul style="list-style-type: none"> <li>• Reconoce la simbología a utilizar en la construcción de diagramas.</li> <li>• Identifica los pasos para construir diagramas de flujo.</li> <li>• Elabora diagramas de flujo utilizando la simbología descrita.</li> <li>• Interpreta diagramas de flujo contruidos para solucionar problemas específicos.</li> </ul>		



RESULTADOS DE APRENDIZAJE	CONTENIDOS	ESTRATEGIAS DE ENSEÑANZA - APRENDIZAJE	VALORES Y ACTITUDES	CRITERIOS DE DESEMPEÑO
3. Utilizar las técnicas de diagramación en la resolución de problemas utilizando los ciclos y estructuras condicionales.	<ul style="list-style-type: none"> <li>Estructuras lógicas:               <ul style="list-style-type: none"> <li>Condiciones</li> <li>Ciclos.</li> </ul> </li> </ul>	<u>El o la docente:</u> <ul style="list-style-type: none"> <li>Define las estructuras lógicas.</li> <li>Describe el funcionamiento de cada estructura lógica.</li> <li>Ilustra el uso de estructuras en la construcción de algoritmos.</li> <li>Formula problemas utilizando ciclos y estructuras condicionales.</li> </ul>	<ul style="list-style-type: none"> <li>Unión y colaboración mutua para conseguir un fin común.</li> </ul>	<ul style="list-style-type: none"> <li>Utiliza las técnicas de diagramación en la resolución de problemas utilizando los ciclos y estructuras condicionales.</li> </ul>

RESULTADOS DE APRENDIZAJE	CONTENIDOS	ESTRATEGIAS DE ENSEÑANZA - APRENDIZAJE	VALORES Y ACTITUDES	CRITERIOS DE DESEMPEÑO
		<p><u>El o la estudiante:</u></p> <ul style="list-style-type: none"> <li>• Reconoce las estructuras lógicas.</li> <li>• Explica el funcionamiento de cada una de las estructuras.</li> <li>• Aplica las técnicas de diagramación en la resolución de problemas utilizando los ciclos y estructuras condicionales.</li> <li>• Resuelve problemas utilizando ciclos y estructuras condicionales.</li> </ul>		

PRÁCTICAS Y LISTAS DE COTEJO

DESARROLLO DE LA PRÁCTICA

UNIDAD DE ESTUDIO: Algoritmos y Diagramas de Flujo	PRÁCTICA No. 1
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Propósito:

Escenario: Aula	Duración:
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MATERIALES	MAQUINARIA	EQUIPO	HERRAMIENTA

## Procedimientos

El o la docente:

- Define algoritmo y diagrama de flujo.
- Describe los diferentes pasos en el desarrollo de un algoritmo.
- Demuestra el uso de la simbología para la elaboración de diagramas
- Resuelve problemas con la utilización de dicha técnica.
- Cita la importancia de la utilización de símbolos en la construcción de diagramas.
- Describe los diferentes símbolos estructurados para la resolución de problemas.
- Aplica técnicas para el análisis y verificación de algoritmos.
- Analiza problemas y resultados en la realización de algoritmos.
- Define las estructuras lógicas.
- Describe el funcionamiento de cada estructura lógica.
- Ilustra el uso de estructuras en la construcción de algoritmos.
- Formula problemas utilizando ciclos y estructuras condicionales.

LISTA DE COTEJO SUGERIDA	Fecha:
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Nombre del o la estudiante:	
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Instrucciones:

- A continuación se presentan los criterios que van a ser verificados en el desempeño del o la estudiante mediante la observación del mismo. De la siguiente lista marque con una "X" aquellas observaciones que hayan sido cumplidas por el o la estudiante durante su desempeño.

DESARROLLO	SI	AUN NO	NO APLICA
Define los conceptos relacionados con algoritmos y diagramas de flujo sin margen de error.			
Identifica con claridad los pasos de desarrollo de un algoritmo.			
Reconoce acertadamente el uso de la simbología para la elaboración de diagramas			
Resuelve correctamente problemas utilizando las técnicas de los algoritmos.			
Reconoce acertadamente la simbología a utilizar en la construcción de diagramas.			
Identifica con precisión los pasos para construir diagramas de flujo.			
Elabora diagramas de flujo utilizando la simbología descrita sin margen de error.			
Interpreta diagramas de flujo contruidos para solucionar problemas específicos sin margen de error.			
Identifica con claridad los principales conceptos relacionados con la programación.			
Diferencia eficientemente los lenguajes utilizados en programación.			
Clasifica las diferentes etapas de la programación sin margen de error.			
Reconoce eficientemente las estructuras lógicas.			
Explica con claridad el funcionamiento de cada una de las estructuras.			
Aplica las técnicas de diagramación en la resolución de problemas utilizando los ciclos y estructuras condicionales sin margen de error.			
Resuelve problemas utilizando ciclos y estructuras condicionales de forma correcta.			

OBSERVACIONES:

### CRITERIOS PARA LA EVALUACIÓN DE LAS COMPETENCIAS

RESULTADOS DE APRENDIZAJE	CRITERIOS DE DESEMPEÑO	EVIDENCIAS	TIPO	SUFICIENCIAS DE EVIDENCIA
Aplicar los algoritmos y diagramas de flujo estructurado como herramientas para resolución lógica de problemas computacionales.	Aplica los algoritmos y diagramas de flujo estructurado como herramientas para resolución lógica de problemas computacionales.	Define los conceptos relacionados con algoritmos y diagramas de flujo.	Conocimiento	Define los conceptos relacionados con algoritmos y diagramas de flujo sin margen de error.
		Identifica los pasos de desarrollo de un algoritmo.	Desempeño	Identifica con claridad los pasos de desarrollo de un algoritmo.
		Reconoce el uso de la simbología para la elaboración de diagramas	Desempeño	Reconoce acertadamente el uso de la simbología para la elaboración de diagramas
		Resuelve problemas utilizando las técnicas de los algoritmos.	Producto	Resuelve correctamente problemas utilizando las técnicas de los algoritmos.

### CRITERIOS PARA LA EVALUACIÓN DE LAS COMPETENCIAS

RESULTADOS DE APRENDIZAJE	CRITERIOS DE DESEMPEÑO	EVIDENCIAS	TIPO	SUFICIENCIAS DE EVIDENCIA
Utilizar la simbología para la construcción de algoritmos y diagramas de flujo.	Utiliza la simbología para la construcción de algoritmos y diagramas de flujo.	Reconoce la simbología a utilizar en la construcción de diagramas.	Conocimiento	Reconoce acertadamente la simbología a utilizar en la construcción de diagramas.
		Identifica los pasos para construir diagramas de flujo.	Desempeño	Identifica con precisión los pasos para construir diagramas de flujo.
		Elabora diagramas de flujo utilizando la simbología descrita.	Producto	Elabora diagramas de flujo utilizando la simbología descrita sin margen de error.
		Interpreta diagramas de flujo construidos para solucionar problemas específicos.	Producto	Interpreta diagramas de flujo construidos para solucionar problemas específicos sin margen de error.

### CRITERIOS PARA LA EVALUACIÓN DE LAS COMPETENCIAS

RESULTADOS DE APRENDIZAJE	CRITERIOS DE DESEMPEÑO	EVIDENCIAS	TIPO	SUFICIENCIAS DE EVIDENCIA
Utilizar las técnicas de diagramación en la resolución de problemas utilizando los ciclos y estructuras condicionales.	Utiliza las técnicas de diagramación en la resolución de problemas utilizando los ciclos y estructuras condicionales.	Reconoce las estructuras lógicas.	Conocimiento	Reconoce eficientemente las estructuras lógicas.
		Explica el funcionamiento de cada una de las estructuras.	Desempeño	Explica con claridad el funcionamiento de cada una de las estructuras.
		Aplica las técnicas de diagramación en la resolución de problemas utilizando los ciclos y estructuras condicionales.	Desempeño	Aplica las técnicas de diagramación en la resolución de problemas utilizando los ciclos y estructuras condicionales sin margen de error.
		Resuelve problemas utilizando ciclos y estructuras condicionales.	Producto	Resuelve problemas utilizando ciclos y estructuras condicionales de forma correcta.



## NORMA TÉCNICA DE INSTITUCIÓN EDUCATIVA

### DATOS GENERALES

Título: Elementos de Programación  
 Propósito: Utilizar las herramientas y funciones básicas de la programación estructurada para la solución de problemas sencillos.  
 Nivel de competencia: Básica

### UNIDADES DE COMPETENCIA LABORAL QUE CONFORMAN LA NORMA

Título	Clasificación
Identifica con claridad los principales conceptos relacionados con la programación.	Específica
Diferencia acertadamente los lenguajes utilizados en programación.	Específica
Clasifica eficientemente las diferentes etapas de la programación.	Específica
Identifica con precisión las reglas para el desarrollo de programas.	Específica
Reconoce la secuencia o estructura que debe cumplir un programa sin margen de error.	Específica
Utiliza identificadores, tipos de datos, constantes y variables de forma correcta.	Específica
Utiliza con precisión las herramientas para el diseño de pantallas.	Específica
Define con claridad los conceptos y características de los bloques de decisión o condiciones compuestas.	Específica
Identifica eficientemente los usos y aplicaciones de los bloques de decisión o condiciones compuestas.	Específica
Reconoce las consideraciones para la construcción de bloques de decisión y condiciones compuestas con eficiencia.	Específica
Aplica los criterios para la construcción de los bloques de decisión o condiciones compuestas de forma correcta.	Específica
Identifica claramente las diferentes estructuras repetitivas utilizadas.	Específica
Reconoce los aspectos que inciden en la solución de los problemas usando estructuras repetitivas sin margen de error.	Específica
Resuelve problemas utilizando estructuras repetitivas con precisión.	Específica
Define con exactitud las funciones y procedimientos como herramienta para la solución de problemas.	Específica
Enumera con precisión las características y usos de los procedimientos y funciones.	Específica
Resuelve problemas específicos utilizando funciones y procedimientos con precisión.	Específica

Elementos de competencia

Referencia	Título del elemento
2 – 3	Utilizar las herramientas y funciones básicas de la programación estructurada para la solución de problemas sencillos.

Criterios de desempeño:

1. Distinguir los conceptos básicos relacionados con la programación estructurada.
2. Resolver problemas utilizando los elementos que intervienen en el desarrollo de un programa.
3. Construir bloques de decisión y condiciones compuestas para casos específicos.
4. Resolver problemas utilizando estructuras repetitivas.
5. Utilizar procedimientos y funciones como parte de la solución de problemas específicos.

Campo de aplicación:

Categoría	Clase
Servicios	Prestación de servicios de Educación Técnica

Evidencias de desempeño:

1. Diferencia los lenguajes utilizados en programación.
2. Clasifica las diferentes etapas de la programación.
3. Utiliza identificadores, tipos de datos, constantes y variables.
4. Utiliza las herramientas para el diseño de pantallas.
5. Aplica los criterios para la construcción de los bloques de decisión o condiciones compuestas.
6. Enumera las características y usos de los procedimientos y funciones.
7. Diferencia el uso de funciones y procedimientos de acuerdo con el problema a resolver.

Evidencias de conocimiento:

1. Identifica los principales conceptos relacionados con la programación.
2. Identifica las reglas para el desarrollo de programas.

3. Reconoce la secuencia o estructura que debe cumplir un programa.
4. Identifica los usos y aplicaciones de los bloques de decisión o condiciones compuestas.
5. Reconoce las consideraciones para la construcción de bloques de decisión y condiciones compuestas.
6. Identifica las diferentes estructuras repetitivas utilizadas.
7. Reconoce los aspectos que inciden en la solución de los problemas usando estructuras repetitivas.
8. Define las funciones y procedimientos como herramienta para la solución de problemas.

Evidencias de producto:

1. Resuelve problemas utilizando estructuras repetitivas.
2. Resuelve problemas específicos utilizando funciones y procedimientos.

Modalidad: Comercial y de Servicios	Especialidad: Informática Bilingüe en Redes de Computadoras
Sub-área: Programación	Año: Décimo
Unidad de Estudio: Elementos de Programación	Tiempo Estimado: 64 horas
Propósito: Utilizar las herramientas y funciones básicas de la programación estructurada para la solución de problemas sencillos.	

RESULTADOS DE APRENDIZAJE	CONTENIDOS	ESTRATEGIAS DE ENSEÑANZA - APRENDIZAJE	VALORES Y ACTITUDES	CRITERIOS DE DESEMPEÑO
1. Distinguir los conceptos básicos relacionados con la programación estructurada.	<ul style="list-style-type: none"> <li>• Conceptos básicos:               <ul style="list-style-type: none"> <li>• Programa fuente</li> <li>• Programa objeto</li> <li>• Compilador e intérprete.</li> <li>• Lenguajes:                   <ul style="list-style-type: none"> <li>• Imperativos</li> <li>• Declarativos</li> <li>• De máquina.</li> </ul> </li> </ul> </li> </ul>	<u>El o la docente:</u> <ul style="list-style-type: none"> <li>• Define los conceptos básicos de programación.</li> <li>• Describe las aplicaciones de los diferentes conceptos.</li> <li>• Ejemplifica las diferentes etapas de la programación.</li> </ul>	<ul style="list-style-type: none"> <li>• Unión y colaboración mutua para conseguir un fin común.</li> </ul>	<ul style="list-style-type: none"> <li>• Distingue los conceptos básicos relacionados con la programación estructurada.</li> </ul>

RESULTADOS DE APRENDIZAJE	CONTENIDOS	ESTRATEGIAS DE ENSEÑANZA - APRENDIZAJE	VALORES Y ACTITUDES	CRITERIOS DE DESEMPEÑO
	<ul style="list-style-type: none"> <li>• Programación estructurada:               <ul style="list-style-type: none"> <li>• Concepto</li> <li>• Características</li> <li>• Etapas:                   <ul style="list-style-type: none"> <li>• Creación de programas</li> <li>• Implementación</li> <li>• Corrida</li> <li>• Ejecución.</li> </ul> </li> </ul> </li> </ul>	<p><u>El o la estudiante:</u></p> <ul style="list-style-type: none"> <li>• Identifica los principales conceptos relacionados con la programación.</li> <li>• Diferencia los lenguajes utilizados en programación.</li> <li>• Clasifica las diferentes etapas de la programación.</li> </ul>		

RESULTADOS DE APRENDIZAJE	CONTENIDOS	ESTRATEGIAS DE ENSEÑANZA - APRENDIZAJE	VALORES Y ACTITUDES	CRITERIOS DE DESEMPEÑO
2. Resolver problemas utilizando los elementos que intervienen en el desarrollo de un programa.	<ul style="list-style-type: none"> <li>Estructura de un programa:               <ul style="list-style-type: none"> <li>Encabezados, declaraciones, partes de programas.</li> <li>Identificadores:                   <ul style="list-style-type: none"> <li>Reglas</li> <li>Definición de nombres.</li> </ul> </li> <li>Tipos de datos</li> <li>Constantes y variables</li> <li>Operadores aritméticos y lógicos</li> <li>Expresiones aritméticas y lógicas</li> <li>Funciones predefinidas</li> <li>Herramientas para el diseño de pantallas.</li> </ul> </li> </ul>	<p><u>El o la docente:</u></p> <ul style="list-style-type: none"> <li>Define las reglas para el desarrollo de programas.</li> <li>Describe la secuencia o estructura que debe cumplir un programa.</li> <li>Explica el concepto y usos de identificadores, tipos de datos, constantes y variables.</li> <li>Describe las reglas para la utilización de los diferentes elementos y funciones.</li> </ul>	<ul style="list-style-type: none"> <li>Unión y colaboración mutua para conseguir un fin común.</li> </ul>	<ul style="list-style-type: none"> <li>Resuelve problemas utilizando los elementos que intervienen en el desarrollo de un programa.</li> </ul>

RESULTADOS DE APRENDIZAJE	CONTENIDOS	ESTRATEGIAS DE ENSEÑANZA - APRENDIZAJE	VALORES Y ACTITUDES	CRITERIOS DE DESEMPEÑO
		<p><u>El o la estudiante:</u></p> <ul style="list-style-type: none"> <li>• Identifica las reglas para el desarrollo de programas.</li> <li>• Reconoce la secuencia o estructura que debe cumplir un programa.</li> <li>• Utiliza identificadores, tipos de datos, constantes y variables.</li> <li>• Utiliza las herramientas para el diseño de pantallas.</li> </ul>		

RESULTADOS DE APRENDIZAJE	CONTENIDOS	ESTRATEGIAS DE ENSEÑANZA - APRENDIZAJE	VALORES Y ACTITUDES	CRITERIOS DE DESEMPEÑO
3. Construir bloques de decisión y condiciones compuestas para casos específicos.	<ul style="list-style-type: none"> <li>• Bloques de decisión:               <ul style="list-style-type: none"> <li>• Concepto</li> <li>• Características</li> <li>• Usos y aplicaciones</li> <li>• Estructura.</li> </ul> </li> <li>• Condiciones:               <ul style="list-style-type: none"> <li>• Concepto</li> <li>• Características</li> <li>• Usos y aplicaciones</li> <li>• Estructura.</li> </ul> </li> <li>• Expresiones Booleanas:               <ul style="list-style-type: none"> <li>• Concepto</li> <li>• Características</li> <li>• Usos y aplicaciones</li> <li>• Estructura.</li> </ul> </li> </ul>	<u>El o la docente:</u> <ul style="list-style-type: none"> <li>• Define los conceptos y características de los bloques de decisión o condiciones compuestas.</li> <li>• Describe los usos y aplicaciones de los bloques de decisión o condiciones compuestas.</li> <li>• Explica las consideraciones para la construcción de bloques de decisión y condiciones compuestas.</li> <li>• Describe los aspectos que inciden en la construcción de los bloques de decisión o condiciones compuestas.</li> </ul>	<ul style="list-style-type: none"> <li>• Unión y colaboración mutua para conseguir un fin común.</li> </ul>	<ul style="list-style-type: none"> <li>• Construye bloques de decisión y condiciones compuestas para casos específicos.</li> </ul>



RESULTADOS DE APRENDIZAJE	CONTENIDOS	ESTRATEGIAS DE ENSEÑANZA - APRENDIZAJE	VALORES Y ACTITUDES	CRITERIOS DE DESEMPEÑO
	<ul style="list-style-type: none"> <li>• Estructuras de decisión:               <ul style="list-style-type: none"> <li>• Concepto</li> <li>• Características</li> <li>• Usos y aplicaciones.</li> </ul> </li> <li>• Estructura para la declaración:               <ul style="list-style-type: none"> <li>• Decisiones múltiples</li> <li>• Decisiones anidadas.</li> </ul> </li> </ul>	<p><u>El o la estudiante:</u></p> <ul style="list-style-type: none"> <li>• Define los conceptos y características de los bloques de decisión o condiciones compuestas.</li> <li>• Identifica los usos y aplicaciones de los bloques de decisión o condiciones compuestas.</li> <li>• Reconoce las consideraciones para la construcción de bloques de decisión y condiciones compuestas.</li> <li>• Aplica los criterios para la construcción de los bloques de decisión o condiciones compuestas.</li> </ul>		

RESULTADOS DE APRENDIZAJE	CONTENIDOS	ESTRATEGIAS DE ENSEÑANZA - APRENDIZAJE	VALORES Y ACTITUDES	CRITERIOS DE DESEMPEÑO
4. Resolver problemas utilizando estructuras repetitivas.	<ul style="list-style-type: none"> <li>• Estructuras repetitivas:               <ul style="list-style-type: none"> <li>• Concepto</li> <li>• Características</li> <li>• Usos y aplicaciones.</li> </ul> </li> <li>• Contadores y acumuladores:               <ul style="list-style-type: none"> <li>• Conceptos</li> <li>• Aplicaciones</li> <li>• Estructura.</li> </ul> </li> <li>• Ciclos:               <ul style="list-style-type: none"> <li>• Concepto</li> <li>• Características</li> <li>• Usos y aplicaciones.</li> </ul> </li> <li>• Ciclos anidados:               <ul style="list-style-type: none"> <li>• Concepto</li> <li>• Características</li> <li>• Usos y aplicaciones.</li> </ul> </li> </ul>	<p><u>El o la docente:</u></p> <ul style="list-style-type: none"> <li>• Define los conceptos básicos relacionados con las estructuras repetitivas.</li> <li>• Describe el funcionamiento de las diferentes estructuras.</li> <li>• Demuestra el uso de las diferentes estructuras de acuerdo con el problema a resolver.</li> </ul>	<ul style="list-style-type: none"> <li>• Unión y colaboración mutua para conseguir un fin común.</li> </ul>	<ul style="list-style-type: none"> <li>• Resuelve problemas utilizando estructuras repetitivas.</li> </ul>

RESULTADOS DE APRENDIZAJE	CONTENIDOS	ESTRATEGIAS DE ENSEÑANZA - APRENDIZAJE	VALORES Y ACTITUDES	CRITERIOS DE DESEMPEÑO
		<p><u>El o la estudiante:</u></p> <ul style="list-style-type: none"> <li>• Identifica las diferentes estructuras repetitivas utilizadas.</li> <li>• Reconoce los aspectos que inciden en la solución de los problemas usando estructuras repetitivas.</li> <li>• Resuelve problemas utilizando estructuras repetitivas.</li> </ul>		

RESULTADOS DE APRENDIZAJE	CONTENIDOS	ESTRATEGIAS DE ENSEÑANZA - APRENDIZAJE	VALORES Y ACTITUDES	CRITERIOS DE DESEMPEÑO
5. Utilizar procedimientos y funciones como parte de la solución de problemas específicos.	<ul style="list-style-type: none"> <li>• Procedimiento:               <ul style="list-style-type: none"> <li>• Concepto</li> <li>• Características</li> <li>• Usos y aplicaciones</li> <li>• Invocación</li> <li>• Uso de variables globales y locales</li> <li>• Parámetros por valor y referencia</li> <li>• Creación de un procedimiento.</li> </ul> </li> </ul>	<u>El o la docente:</u> <ul style="list-style-type: none"> <li>• Define los conceptos relacionados con el uso de procedimientos y funciones.</li> <li>• Identifica las normas para la invocación, uso de variables y parámetros en los procedimientos y funciones.</li> <li>• Ejemplifica el método para la creación de procedimientos y funciones.</li> </ul>	<ul style="list-style-type: none"> <li>• Unión y colaboración mutua para conseguir un fin común.</li> </ul>	<ul style="list-style-type: none"> <li>• Utiliza procedimientos y funciones como parte de la solución de problemas específicos.</li> </ul>

RESULTADOS DE APRENDIZAJE	CONTENIDOS	ESTRATEGIAS DE ENSEÑANZA - APRENDIZAJE	VALORES Y ACTITUDES	CRITERIOS DE DESEMPEÑO
	<ul style="list-style-type: none"> <li>• Funciones:               <ul style="list-style-type: none"> <li>• Concepto</li> <li>• Características</li> <li>• Usos y aplicaciones</li> <li>• Invocación</li> <li>• Uso de variables globales y locales</li> <li>• Parámetros por valor y referencia</li> <li>• Creación de funciones.</li> </ul> </li> </ul>	<p><u>El o la estudiante:</u></p> <ul style="list-style-type: none"> <li>• Define las funciones y procedimientos como herramienta para la solución de problemas.</li> <li>• Enumera las características y usos de los procedimientos y funciones.</li> <li>• Resuelve problemas específicos utilizando funciones y procedimientos.</li> </ul>		

PRÁCTICAS Y LISTAS DE COTEJO

DESARROLLO DE LA PRÁCTICA

UNIDAD DE ESTUDIO: Elementos de Programación | PRÁCTICA No. 1

Propósito:

Escenario: Laboratorio de cómputo | Duración:

MATERIALES	MAQUINARIA	EQUIPO	HERRAMIENTA

## Procedimientos

El o la docente:

- Define los conceptos básicos de programación.
- Describe las aplicaciones de los diferentes conceptos.
- Ejemplifica las diferentes etapas de la programación.
- Define las reglas para el desarrollo de programas.
- Describe la secuencia o estructura que debe cumplir un programa.
- Explica el concepto y usos de identificadores, tipos de datos, constantes y variables.
- Describe las reglas para la utilización de los diferentes elementos y funciones.
- Define los conceptos y características de los bloques de decisión o condiciones compuestas.
- Describe los usos y aplicaciones de los bloques de decisión o condiciones compuestas.
- Explica las consideraciones para la construcción de bloques de decisión y condiciones compuestas.
- Describe los aspectos que inciden en la construcción de los bloques de decisión o condiciones compuestas.
- Define los conceptos básicos relacionados con las estructuras repetitivas.
- Describe el funcionamiento de las diferentes estructuras.
- Demuestra el uso de las diferentes estructuras de acuerdo con el problema a resolver.
- Define los conceptos relacionados con el uso de procedimientos y funciones.
- Identifica las normas para la invocación, uso de variables y parámetros en los procedimientos y funciones.
- Ejemplifica el método para la creación de procedimientos y funciones.

LISTA DE COTEJO SUGERIDA	Fecha:
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Nombre del o la estudiante:	
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Instrucciones:

- A continuación se presentan los criterios que van a ser verificados en el desempeño del o la estudiante mediante la observación del mismo. De la siguiente lista marque con una “X” aquellas observaciones que hayan sido cumplidas por el o la estudiante durante su desempeño.

DESARROLLO	SI	AUN NO	NO APLICA
Identifica con claridad los principales conceptos relacionados con la programación.			
Diferencia acertadamente los lenguajes utilizados en programación.			
Clasifica eficientemente las diferentes etapas de la programación.			
Identifica con precisión las reglas para el desarrollo de programas.			
Reconoce la secuencia o estructura que debe cumplir un programa sin margen de error.			
Utiliza identificadores, tipos de datos, constantes y variables de forma correcta.			
Utiliza con precisión las herramientas para el diseño de pantallas.			
Define con claridad los conceptos y características de los bloques de decisión o condiciones compuestas.			
Identifica eficientemente los usos y aplicaciones de los bloques de decisión o condiciones compuestas.			
Reconoce las consideraciones para la construcción de bloques de decisión y condiciones compuestas con eficiencia.			
Aplica los criterios para la construcción de los bloques de decisión o condiciones compuestas de forma correcta.			
Identifica claramente las diferentes estructuras repetitivas utilizadas.			
Reconoce los aspectos que inciden en la solución de los problemas usando estructuras repetitivas sin margen de error.			



DESARROLLO	SI	AUN NO	NO APLICA
Resuelve problemas utilizando estructuras repetitivas con precisión.			
Define con exactitud las funciones y procedimientos como herramienta para la solución de problemas.			
Enumera con precisión las características y usos de los procedimientos y funciones.			
Resuelve problemas específicos utilizando funciones y procedimientos con precisión.			

OBSERVACIONES:

### CRITERIOS PARA LA EVALUACIÓN DE LAS COMPETENCIAS

RESULTADOS DE APRENDIZAJE	CRITERIOS DE DESEMPEÑO	EVIDENCIAS	TIPO	SUFICIENCIAS DE EVIDENCIA
Distinguir los conceptos básicos relacionados con la programación estructurada.	Distingue los conceptos básicos relacionados con la programación estructurada.	Identifica los principales conceptos relacionados con la programación.	Conocimiento	Identifica con claridad los principales conceptos relacionados con la programación.
		Diferencia los lenguajes utilizados en programación.	Desempeño	Diferencia acertadamente los lenguajes utilizados en programación.
		Clasifica las diferentes etapas de la programación.	Desempeño	Clasifica eficientemente las diferentes etapas de la programación.
Resolver problemas utilizando los elementos que intervienen en el desarrollo de un programa.	Resuelve problemas utilizando los elementos que intervienen en el desarrollo de un programa.	Identifica las reglas para el desarrollo de programas.	Conocimiento	Identifica con precisión las reglas para el desarrollo de programas.
		Reconoce la secuencia o estructura que debe cumplir un programa.	Conocimiento	Reconoce la secuencia o estructura que debe cumplir un programa sin margen de error.
		Utiliza identificadores, tipos de datos, constantes y variables.	Desempeño	Utiliza identificadores, tipos de datos, constantes y variables de forma correcta.
		Utiliza las herramientas para el diseño de pantallas.	Desempeño	Utiliza con precisión las herramientas para el diseño de pantallas.

### CRITERIOS PARA LA EVALUACIÓN DE LAS COMPETENCIAS

RESULTADOS DE APRENDIZAJE	CRITERIOS DE DESEMPEÑO	EVIDENCIAS	TIPO	SUFICIENCIAS DE EVIDENCIA
Construir bloques de decisión y condiciones compuestas para casos específicos.	Construye bloques de decisión y condiciones compuestas para casos específicos.	Define los conceptos y características de los bloques de decisión o condiciones compuestas.	Conocimiento	Define con claridad los conceptos y características de los bloques de decisión o condiciones compuestas.
		Identifica los usos y aplicaciones de los bloques de decisión o condiciones compuestas.	Conocimiento	Identifica eficientemente los usos y aplicaciones de los bloques de decisión o condiciones compuestas.
		Reconoce las consideraciones para la construcción de bloques de decisión y condiciones compuestas.	Conocimiento	Reconoce las consideraciones para la construcción de bloques de decisión y condiciones compuestas con eficiencia.
		Aplica los criterios para la construcción de los bloques de decisión o condiciones compuestas.	Desempeño	Aplica los criterios para la construcción de los bloques de decisión o condiciones compuestas de forma correcta.
Resolver problemas utilizando estructuras repetitivas.	Resuelve problemas utilizando estructuras repetitivas.	Identifica las diferentes estructuras repetitivas utilizadas.	Conocimiento	Identifica claramente las diferentes estructuras repetitivas utilizadas.
		Reconoce los aspectos que inciden en la solución de los problemas usando estructuras repetitivas.	Conocimiento	Reconoce los aspectos que inciden en la solución de los problemas usando estructuras repetitivas sin margen de error.
		Resuelve problemas utilizando estructuras repetitivas.	Producto	Resuelve problemas utilizando estructuras repetitivas con precisión.

### CRITERIOS PARA LA EVALUACIÓN DE LAS COMPETENCIAS

RESULTADOS DE APRENDIZAJE	CRITERIOS DE DESEMPEÑO	EVIDENCIAS	TIPO	SUFICIENCIAS DE EVIDENCIA
Utilizar procedimientos y funciones como parte de la solución de problemas específicos.	Utiliza procedimientos y funciones como parte de la solución de problemas específicos.	Define las funciones y procedimientos como herramienta para la solución de problemas.	Conocimiento	Define con claridad las funciones y procedimientos como herramienta para la solución de problemas
		Enumera las características y usos de los procedimientos y funciones.	Desempeño	Enumera con precisión. las características y usos de los procedimientos y funciones
		Diferencia el uso de funciones y procedimientos de acuerdo con el problema a resolver.	Desempeño	Diferencia adecuadamente el uso de funciones y procedimientos de acuerdo con el problema a resolver
		Resuelve problemas específicos utilizando funciones y procedimientos.	Producto	Resuelve problemas específicos utilizando funciones y procedimientos con precisión.

## NORMA TÉCNICA DE INSTITUCIÓN EDUCATIVA

### DATOS GENERALES

Título: Programación  
 Propósito: Crear programas de un nivel de complejidad bajo.  
 Nivel de competencia: Básica

### UNIDADES DE COMPETENCIA LABORAL QUE CONFORMAN LA NORMA

Título	Clasificación
Define con claridad los conceptos básicos relacionados con la programación.	Específica
Explica claramente cada una de las funciones del compilador.	Específica
Identifica con precisión las funciones y aplicaciones del compilador.	Específica
Utiliza la sintaxis del lenguaje en el desarrollo de programas con precisión.	Específica
Identifica eficientemente las estructuras de selección y repetición.	Específica
Declara e invoca funciones con precisión.	Específica
Produce programas sencillos utilizando las estructuras y funciones con precisión.	Específica
Diseña programas sencillos sin margen de error.	Específica
Define los conceptos y características de las opciones o formatos de entrada / salida con precisión.	Específica
Identifica acertadamente los usos y aplicaciones de las opciones o formatos de entrada / salida.	Específica
Reconoce el uso de funciones para el manejo de la entrada / salida con eficiencia.	Específica
Aplica correctamente el procedimiento para la impresión y el uso de opciones para la definición de formatos de entrada.	Específica
Aplica adecuadamente el procedimiento para el uso de opciones para la definición de formatos de entrada.	Específica
Desarrolla programas en que implementen el manejo de entrada / salida con exactitud.	Específica

### Elementos de competencia

Referencia	Título del elemento
2 - 4	Crear programas de un nivel de complejidad bajo.

### Criterios de desempeño:

1. Utiliza la sintaxis de programación en el desarrollo de programas en un lenguaje específico.
2. Desarrolla programas sencillos utilizando estructuras de selección, operadores, estructuras de repetición y funciones.
3. Diseña programas en un lenguaje de programación que contengan operaciones de manejo de entrada / salida.

### Campo de aplicación:

Categoría	Clase
Servicios	Prestación de servicios de Educación Técnica

### Evidencias de desempeño:

1. Explica cada una de las funciones del compilador.
2. Identifica las funciones y aplicaciones del compilador.
3. Utiliza la sintaxis del lenguaje en el desarrollo de programas.
4. Identifica las estructuras de selección y repetición.
5. Describe el uso de operadores.

### Evidencias de conocimiento:

1. Define los conceptos básicos relacionados con la programación.
2. Define los conceptos y características de las opciones o formatos de entrada / salida.
3. Identifica los usos y aplicaciones de las opciones o formatos de entrada / salida.

### Evidencias de producto:

1. Produce programas sencillos utilizando las estructuras y funciones.
2. Declara e invoca funciones y procedimientos.
3. Aplica el procedimiento para la impresión.
4. Aplica correctamente el procedimiento para la impresión y el uso de opciones para la definición de formatos de entrada.
5. Desarrolla programas en que implementen el manejo de entrada / salida.

Modalidad: Comercial y de Servicios	Especialidad: Informática Bilingüe en Redes de Computadoras
Sub-área: Programación	Año: Décimo
Unidad de Estudio: Programación	Tiempo Estimado: 160 horas
Propósito: Crear programas de un nivel de complejidad bajo.	

RESULTADOS DE APRENDIZAJE	CONTENIDOS	ESTRATEGIAS DE ENSEÑANZA - APRENDIZAJE	VALORES Y ACTITUDES	CRITERIOS DE DESEMPEÑO
1. Utilizar la sintaxis de programación en el desarrollo de programas en un lenguaje específico.	<ul style="list-style-type: none"> <li>• Funciones, usos y aplicaciones del compilador.</li> <li>• Conceptos básicos del lenguaje:               <ul style="list-style-type: none"> <li>• Variables</li> <li>• Constantes</li> <li>• Tipos de datos</li> <li>• Palabras reservadas</li> <li>• Operadores.</li> </ul> </li> </ul>	<u>El o la docente:</u> <ul style="list-style-type: none"> <li>• Explica el uso del compilador.</li> <li>• Describe las aplicaciones del compilador.</li> <li>• Demuestra las funciones del compilador.</li> <li>• Aplica la sintaxis utilizada por el lenguaje.</li> </ul>	<ul style="list-style-type: none"> <li>• Unión y colaboración mutua para conseguir un fin común.</li> </ul>	<ul style="list-style-type: none"> <li>• Utiliza la sintaxis de programación en el desarrollo de programas en un lenguaje específico.</li> </ul>

RESULTADOS DE APRENDIZAJE	CONTENIDOS	ESTRATEGIAS DE ENSEÑANZA - APRENDIZAJE	VALORES Y ACTITUDES	CRITERIOS DE DESEMPEÑO
		<p><u>El o la estudiante :</u></p> <ul style="list-style-type: none"> <li>• Define los conceptos básicos relacionados con la programación.</li> <li>• Explica cada una de las funciones del compilador.</li> <li>• Identifica las funciones y aplicaciones del compilador.</li> <li>• Utiliza la sintaxis del lenguaje en el desarrollo de programas.</li> </ul>		



RESULTADOS DE APRENDIZAJE	CONTENIDOS	ESTRATEGIAS DE ENSEÑANZA - APRENDIZAJE	VALORES Y ACTITUDES	CRITERIOS DE DESEMPEÑO
2. Desarrollar programas sencillos utilizando estructuras de selección, operadores, estructuras de repetición y funciones.	<ul style="list-style-type: none"> <li>Operadores:               <ul style="list-style-type: none"> <li>De asignación</li> <li>Incrementales</li> <li>Decrementales</li> <li>Lógicos.</li> </ul> </li> <li>Estructuras de selección.</li> <li>Estructuras de repetición.</li> <li>Funciones o procedimientos:               <ul style="list-style-type: none"> <li>Definición</li> <li>Llamado</li> <li>Por valor</li> <li>Por referencia.</li> </ul> </li> </ul>	<p><u>El o la docente:</u></p> <ul style="list-style-type: none"> <li>Define las estructuras y operadores utilizados.</li> <li>Describe el uso e invocación de funciones o procedimientos.</li> <li>Ejemplifica el uso de estructuras de selección y repetición para la solución de problemas.</li> <li>Ilustra el uso de funciones en el desarrollo de programas.</li> </ul> <p><u>El o la estudiante:</u></p> <ul style="list-style-type: none"> <li>Identifica las estructuras de selección y repetición.</li> <li>Declara e invoca funciones.</li> <li>Produce programas sencillos utilizando las estructuras y funciones.</li> <li>Diseña programas sencillos.</li> </ul>	<ul style="list-style-type: none"> <li>Unión y colaboración mutua para conseguir un fin común.</li> </ul>	<ul style="list-style-type: none"> <li>Desarrolla programas sencillos utilizando estructuras de selección, operadores, estructuras de repetición y funciones.</li> </ul>

RESULTADOS DE APRENDIZAJE	CONTENIDOS	ESTRATEGIAS DE ENSEÑANZA - APRENDIZAJE	VALORES Y ACTITUDES	CRITERIOS DE DESEMPEÑO
3. Diseñar programas en un lenguaje de programación que contengan operaciones de manejo de entrada / salida.	<ul style="list-style-type: none"> <li>• Entrada / salida de datos:               <ul style="list-style-type: none"> <li>• Concepto</li> <li>• Características</li> <li>• Usos y aplicaciones</li> <li>• Sintaxis</li> <li>• Impresión.</li> </ul> </li> <li>• Tipos de datos de entrada y salida:               <ul style="list-style-type: none"> <li>• Numéricos</li> <li>• Caracteres</li> <li>• Cadenas</li> <li>• Otros.</li> </ul> </li> <li>• Tamaños de los campos.</li> <li>• Uso de banderas.</li> <li>• Formato de entrada:               <ul style="list-style-type: none"> <li>• Aplicaciones</li> <li>• Sintaxis.</li> </ul> </li> </ul>	<p><u>El o la docente:</u></p> <ul style="list-style-type: none"> <li>• Define los conceptos y características de las opciones o formatos de entrada / salida.</li> <li>• Describe los usos y aplicaciones de las opciones o formatos de entrada / salida.</li> <li>• Ejemplifica el procedimiento para la impresión.</li> <li>• Desarrolla programas en que implementen el manejo de entrada / salida.</li> </ul>	<ul style="list-style-type: none"> <li>• Unión y colaboración mutua para conseguir un fin común.</li> </ul>	<ul style="list-style-type: none"> <li>• Diseña programas en un lenguaje de programación que contengan operaciones de manejo de entrada / salida.</li> </ul>

RESULTADOS DE APRENDIZAJE	CONTENIDOS	ESTRATEGIAS DE ENSEÑANZA - APRENDIZAJE	VALORES Y ACTITUDES	CRITERIOS DE DESEMPEÑO
		<p><u>El o la estudiante:</u></p> <ul style="list-style-type: none"> <li>• Define los conceptos y características de las opciones o formatos de entrada / salida.</li> <li>• Identifica los usos y aplicaciones de las opciones o formatos de entrada / salida.</li> <li>• Aplica el procedimiento para la impresión y el uso de opciones para la definición de formatos de entrada.</li> <li>• Desarrolla programas en que implementen el manejo de entrada / salida.</li> </ul>		

PRÁCTICAS Y LISTAS DE COTEJO

DESARROLLO DE LA PRÁCTICA

UNIDAD DE ESTUDIO: Programación	PRÁCTICA No. 1
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Propósito:

Escenario: Laboratorio de cómputo	Duración:
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MATERIALES	MAQUINARIA	EQUIPO	HERRAMIENTA

## Procedimientos

El o la docente:

- Explica el uso del compilador.
- Describe las aplicaciones del compilador.
- Demuestra las funciones del compilador.
- Aplica la sintaxis utilizada por el lenguaje.
- Define las estructuras y operadores utilizados.
- Describe el uso e invocación de funciones o procedimientos.
- Ejemplifica el uso de estructuras de selección y repetición para la solución de problemas.
- Ilustra el uso de funciones en el desarrollo de programas.
- Define los conceptos y características de las opciones o formatos de entrada / salida.
- Describe los usos y aplicaciones de las opciones o formatos de entrada / salida.
- Ejemplifica el procedimiento para la impresión.
- Desarrolla programas en que implementen el manejo de entrada / salida.

LISTA DE COTEJO SUGERIDA	Fecha:
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Nombre del o la estudiante:	
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Instrucciones:

- A continuación se presentan los criterios que van a ser verificados en el desempeño del o la estudiante mediante la observación del mismo. De la siguiente lista marque con una “X” aquellas observaciones que hayan sido cumplidas por el o la estudiante durante su desempeño.

DESARROLLO	SI	AUN NO	NO APLICA
Define con claridad los conceptos básicos relacionados con la programación.			
Explica claramente cada una de las funciones del compilador.			
Identifica con precisión las funciones y aplicaciones del compilador.			
Utiliza la sintaxis del lenguaje en el desarrollo de programas con precisión.			
Identifica eficientemente las estructuras de selección y repetición.			
Declara e invoca funciones con precisión.			
Produce programas sencillos utilizando las estructuras y funciones con precisión.			
Diseña programas sencillos sin margen de error.			
Define los conceptos y características de las opciones o formatos de entrada / salida con precisión.			
Identifica acertadamente los usos y aplicaciones de las opciones o formatos de entrada / salida.			
Reconoce el uso de funciones para el manejo de la entrada / salida con eficiencia.			
Aplica correctamente el procedimiento para la impresión y el uso de opciones para la definición de formatos de entrada.			
Aplica adecuadamente el procedimiento para el uso de opciones para la definición de formatos de entrada.			
Desarrolla programas en que implementen el manejo de entrada / salida con exactitud.			

OBSERVACIONES:

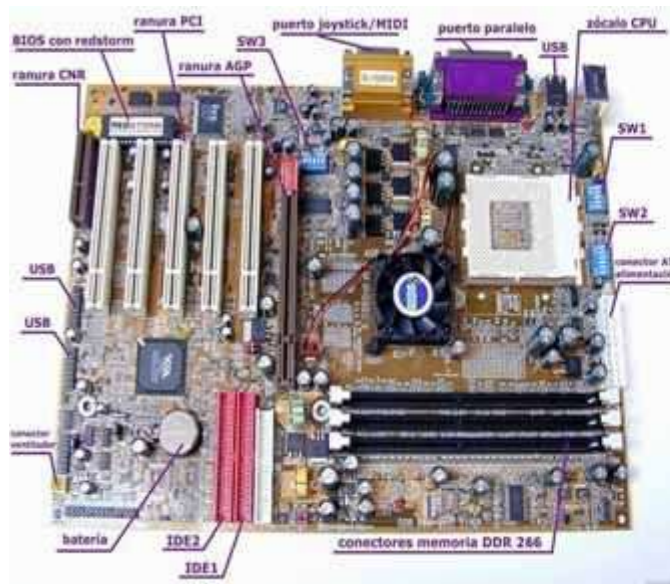
### CRITERIOS PARA LA EVALUACIÓN DE LAS COMPETENCIAS

RESULTADOS DE APRENDIZAJE	CRITERIOS DE DESEMPEÑO	EVIDENCIAS	TIPO	SUFICIENCIAS DE EVIDENCIA
Utilizar la sintaxis de programación en el desarrollo de programas en un lenguaje específico.	Utiliza la sintaxis del lenguaje de programación en el desarrollo de programas.	Define los conceptos básicos relacionados con la programación.	Conocimiento	Define con claridad los conceptos básicos relacionados con la programación.
		Explica cada una de las funciones del compilador.	Desempeño	Explica claramente cada una de las funciones del compilador.
		Identifica las funciones y aplicaciones del compilador.	Desempeño	Identifica con precisión las funciones y aplicaciones del compilador.
		Utiliza la sintaxis del lenguaje en el desarrollo de programas.	Desempeño	Utiliza la sintaxis del lenguaje en el desarrollo de programas con precisión.
Desarrollar programas sencillos utilizando estructuras de selección, operadores, estructuras de repetición y funciones.	Desarrolla programas sencillos utilizando estructuras de selección, operadores, estructuras de repetición y funciones.	Identifica las estructuras de selección y repetición.	Desempeño	Identifica eficientemente las estructuras de selección y repetición.
		Declara e invoca funciones.	Producto	Declara e invoca funciones con precisión.
		Produce programas sencillos utilizando las estructuras y funciones.	Producto	Produce programas sencillos utilizando las estructuras y funciones con precisión.
		Diseña programas sencillos.	Producto	Diseña programas sencillos sin margen de error.

RESULTADOS DE APRENDIZAJE	CRITERIOS DE DESEMPEÑO	EVIDENCIAS	TIPO	SUFICIENCIAS DE EVIDENCIA
Diseñar programas en un lenguaje de programación que contengan operaciones de manejo de entrada / salida.	Diseña programas en un lenguaje de programación que contengan operaciones de manejo de entrada / salida.	Define los conceptos y características de las opciones o formatos de entrada / salida.	Conocimiento	Define los conceptos y características de las opciones o formatos de entrada / salida con precisión.
		Identifica los usos y aplicaciones de las opciones o formatos de entrada / salida.	Conocimiento	Identifica acertadamente los usos y aplicaciones de las opciones o formatos de entrada / salida.
		Aplica el procedimiento para la impresión.	Producto	Aplica correctamente el procedimiento para la impresión.
		Aplica el procedimiento para la impresión y el uso de opciones para la definición de formatos de entrada.	Producto	Aplica correctamente el procedimiento para la impresión y el uso de opciones para la definición de formatos de entrada.
		Desarrolla programas en que implementen el manejo de entrada / salida.	Producto	Desarrolla programas en que implementen el manejo de entrada / salida con exactitud.



## SUBJECT AREA: COMPUTER MAINTENANCE



## **SUBJECT- AREA: COMPUTER MAINTENANCE DESCRIPTION**

The subject area of Computer Maintenance is composed of three study blocks, with 8 hours per week. This subject area should be developed to be totally focused on practice, so theory is conceived as a support to practice.

- Occupational Health: promotes the development of abilities and skills for the prevention of risk situations or accidents at work.
- Computer Architecture: introduces the basic concepts of internal computer operation, identifying each one of its components, technical characteristics, specifications and technical approaches necessary for their selection and recommendation.
- Computer Maintenance and Upgrade: contains the development of knowledge, abilities and skills for the installation and configuration of computer components, both internal and external.

### **GENERAL OBJECTIVES**

Develop in the student the knowledge, abilities and necessary skills to:

1. Apply the fundamental concepts related to occupational health in the computer science field.
2. Distinguish or recommend efficiently and with technical approaches the computer components.
3. Apply procedures of maintenance and upgrade of personal computers.

**DISTRIBUTION OF STUDY BLOCKS  
COMPUTER MAINTENANCE**

<b>Study blocks</b>	<b>Name</b>	<b>Time in hours</b>	<b>Weeks per study block</b>
I.	Occupational Health	64	8
II.	Computer Architecture	80	10
III.	Maintenance & Upgrading Computer	176	22
	<b>TOTAL</b>	<b>320</b>	<b>40</b>

## TECHNICAL COMPETENCY STANDARDS OF EDUCATIONAL INSTITUTION

### GENERAL DATA

Title: Occupational Health  
 Purpose: Application of fundamental concepts related to occupational health in computer science field.  
 Competition level: Basic

### UNITS OF JOB COMPETENCY THAT CONFORM THE STANDARDS

Title	Classification
Properly explains the contributions of occupational health through historical development.	Specific
Clearly identifies main concepts related to occupational health.	Specific
Appropriately differentiates between occupational illness and professional disease.	Specific
Correctly infers the importance of occupational health in the workplace.	Specific
Correctly describes primary and immediate causes of accidents.	Specific
Appropriately differentiates primary and immediate causes in real work situations.	Specific
Correctly recognizes primary and secondary causes and their importance in the prevention of accidents.	Specific
Clearly identifies unsafe conditions in the work environment associated with information technology.	Specific
Correctly defines the concepts of wastes and garbage.	Specific
Clearly identifies the types of wastes and garbage.	Specific
Clearly identifies methods for the management and elimination of wastes and garbage.	Specific
Correctly uses forms of managing wastes originated from computers appropriately.	Specific
Correctly explains the importance of the use of symbols and demarcation of risk areas properly.	Specific
Correctly illustrates the uses of symbology and demarcation areas in the work environment.	Specific
Appropriately differentiates colors according to their use.	Specific
Correctly applies procedures for demarcation of dangerous areas and access roads.	Specific
Clearly identifies basic principles for the storing and transporting of materials and equipment.	Specific
Properly explains measures that should be taken to lift loads.	Specific
Correctly uses appropriate techniques to lift objects.	Specific

Correctly defines concepts related to fire-related accidents.	Specific
Clearly identifies methods to prevent fire-related accidents in the work environment.	Specific
Properly explains methods of accidents prevention in the workplace.	Specific
Appropriately demonstrates the use of portable equipment for fire extinction.	Specific
Properly explains basic concepts associated with each one of the agents.	Specific
Correctly classifies different causal agents of occupational illnesses.	Specific
Correctly recognizes consequences of each one of the agents.	Specific
Appropriately recognizes importance of control of agents for prevention of occupational illnesses.	Specific
Properly explains the concept of workload.	Specific
Correctly differs among physical and mental load.	Specific
Successfully describes consequences of physical and mental workload on people and productivity.	Specific
Appropriately recommends methods to prevent excessive physical and mental workload.	Specific
Clearly identifies electric risks and the possible injuries that they cause.	Specific
Correctly recognizes effects of electricity upon contact with the human body.	Specific
Correctly relates the field of computer science with the main sources of risk.	Specific
Correctly recommends ways to prevent accidents.	Specific
Properly enumerates the laws and regulations in the field of occupational health.	Specific
Appropriately summarizes the most important aspects of law 6727, general regulation of occupational safety and regulation of commissions of occupational health.	Specific
Correctly illustrates application of some articles with real situations related to the computer science field.	Specific

### Competency Elements

Reference	Title of the element
3 – 1	Application of fundamental concepts related to occupational health in computer science field.

### Performance Criteria:

1. Describes main concepts and specific aspects of Occupational Health.
2. Illustrates the importance of security in accident prevention.

3. Applies basic norms for waste elimination management.
4. Evaluates the importance of danger area signals and access paths.
5. Applies security norms in diverse activities to prevent accidents in workplaces.
6. Distinguishes causes and effects of accidents caused by fire; as well as preventive methods in workplaces.
7. Distinguishes types of agents to which one is exposed in the work environment associated with computer science.
8. Applies different techniques to prevent work overload effects.
9. Applies different techniques to prevent electric risks.
10. Describe regulations of occupational health in the computer science field.

Application Field:

Category	Class
Services	Provision of Technical Education Services

Performance Evidence:

1. Differentiates between occupational illness and professional disease.
2. Infers the importance of occupational health in the workplace.
3. Differentiates primary and immediate causes in real work situations.
4. Uses forms of managing wastes originated from computers.
5. Explains the importance of the use of symbols and demarcation of risk areas.
6. Illustrates the uses of symbology and demarcation areas in the work environment.
7. Differentiates colors according to their use.
8. Explains measures that should be taken to lift loads.
9. Explains methods of accidents prevention in the workplace.
10. Explains basic concepts associated with each one of the agents.
11. Classifies different causal agents of occupational illnesses.
12. Recognizes consequences of each one of the agents.
13. Recognizes importance of control of agents for prevention of occupational illnesses.
14. Differs among physical and mental load.

15. Recognizes effects of electricity upon contact with the human body.
16. Relates the field of computer science with the main sources of risk.
17. Summarizes the most important aspects of Law 6727, General Regulation of Occupational Safety and Regulation of Commissions of Occupational Health.
18. Illustrates application of some articles with real situations related to the computer science field.

#### Knowledge Evidence:

1. Explains the contributions of Occupational Health through historical development.
2. Identifies main concepts related to occupational health.
3. Describes primary and immediate causes of accidents.
4. Identifies unsafe conditions in the work environment associated with information technology.
5. Defines the concepts of wastes and garbage.
6. Identifies the types of wastes and garbage.
7. Identifies methods for the management and elimination of wastes and garbage.
8. Identifies basic principles for the storage and transport of materials and equipment.
9. Defines concepts related to fire-related accidents.
10. Identifies methods to prevent fire-related accidents in the work environment.
11. Explains the concept of workload.
12. Describes consequences of physical and mental workload on people and productivity.
13. Identifies electric risks and the possible injuries that they cause.
14. Enumerates the laws and regulations in the field of occupational health.

#### Product Evidence:

1. Recognizes primary and secondary causes and their importance in the prevention of accidents.
2. Applies procedures for demarcation of dangerous areas and access roads.
3. Uses appropriate techniques to lift objects.
4. Demonstrates the use of portable equipment for fire extinction.
5. Recommends methods to prevent excessive physical and mental workload.

6. Recommends ways to prevent accidents.



Sector: Commercial and Services	Program: Computer Networking
Subject Area: Maintenance and upgrading computer	Grade: Tenth
Study block: Occupational Health	Time: 64 hours
Purpose: Application of fundamental concepts related to occupational health in computer science field.	

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
1. Describe main concepts and specific aspects of Occupational Health.	<ul style="list-style-type: none"> <li>Historical development of occupational health</li> <li>Concept of:               <ul style="list-style-type: none"> <li>Work</li> <li>Health</li> <li>Occupational Health</li> <li>Risk of work</li> <li>Accidents</li> <li>Occupational disease</li> <li>Professional disease</li> </ul> </li> </ul>	<u>Teacher:</u> <ul style="list-style-type: none"> <li>Describes historical facts related to occupational health.</li> <li>Defines basic concepts related to occupational health.</li> <li>Differentiates occupational illnesses from professional illnesses.</li> <li>Illustrates real situations with different concepts related to occupational health.</li> </ul>	<ul style="list-style-type: none"> <li>Awareness about consequences of our actions.</li> </ul>	<ul style="list-style-type: none"> <li>Describes main concepts and specific aspects of Occupational Health.</li> </ul>

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
		<p><u>Student:</u></p> <ul style="list-style-type: none"> <li>• Explains the contributions of Occupational Health through historical development.</li> <li>• Identifies main concepts related to occupational health.</li> <li>• Differentiates between occupational illness and professional disease.</li> <li>• Infers the importance of occupational health in the workplace.</li> </ul>		

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
<p>2. Illustrate the importance of security in accident prevention.</p>	<ul style="list-style-type: none"> <li>• Primary causes:               <ul style="list-style-type: none"> <li>• Physical or psychological stress</li> <li>• Mental or psychological stress</li> <li>• Lack of Motivation</li> <li>• Others</li> </ul> </li> <li>• Immediate causes:               <ul style="list-style-type: none"> <li>• Operate equipment without authorization</li> <li>• Failure to risk warning</li> <li>• Using appropriate equipment incorrectly</li> <li>• Lifting objects without an appropriate technique</li> </ul> </li> </ul>	<p><u>Teacher:</u></p> <ul style="list-style-type: none"> <li>• Describes primary causes of accidents.</li> <li>• Differentiates the primary and immediate causes in real situations at work.</li> <li>• Analyzes the primary and secondary causes and their importance in the prevention of accidents.</li> <li>• Evaluates preventive measures taken in the work environment.</li> </ul>	<ul style="list-style-type: none"> <li>• Awareness about the consequences of our actions.</li> </ul>	<ul style="list-style-type: none"> <li>• Illustrates the importance of security in accident prevention.</li> </ul>

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
	<ul style="list-style-type: none"> <li>• Make jokes, to play among others</li> <li>• Others</li> <li>• Insecure conditions</li> <li>• Workplaces with little space</li> <li>• Deficiencies in warning systems and signals</li> <li>• Disorder or lack of cleaning in the workspaces</li> <li>• Dangerous environmental conditions</li> <li>• Others</li> </ul>	<p><u>Student:</u></p> <ul style="list-style-type: none"> <li>• Describes primary and immediate causes of accidents.</li> <li>• Differentiates primary and immediate causes in real work situations</li> <li>• Recognizes primary and secondary causes and their importance in the prevention of accidents.</li> <li>• Identifies unsafe conditions in the work environment associated with information technology.</li> </ul>		

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
<p>3. Apply basic norms for waste elimination management.</p>	<ul style="list-style-type: none"> <li>• Order and cleanliness in the prevention of accidents</li> <li>• Wastes:               <ul style="list-style-type: none"> <li>• Concept</li> <li>• Types</li> <li>• Originated from computers</li> <li>• Elimination and managing</li> </ul> </li> <li>• Garbage:               <ul style="list-style-type: none"> <li>• Concept</li> <li>• Types</li> <li>• Classification</li> <li>• Elimination and managing</li> </ul> </li> </ul>	<p><u>Teacher:</u></p> <ul style="list-style-type: none"> <li>• Defines the concept and importance of cleanliness, wastes and garbage.</li> <li>• Identifies the types of wastes and garbage.</li> <li>• Identifies methods for the management and elimination of wastes and garbage.</li> <li>• Illustrates different forms of managing the computer waste.</li> </ul>	<ul style="list-style-type: none"> <li>• Awareness about the consequences of our actions.</li> </ul>	<ul style="list-style-type: none"> <li>• Applies basic norms for waste elimination management.</li> </ul>

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
		<p><u>Student:</u></p> <ul style="list-style-type: none"> <li>• Defines the concepts of wastes and garbage.</li> <li>• Identifies the types of wastes and garbage.</li> <li>• Identifies methods for the management and elimination of wastes and garbage.</li> <li>• Uses forms of managing computing waste.</li> </ul>		

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
<p>4. Evaluate the importance of danger area signals and access paths.</p>	<ul style="list-style-type: none"> <li>• Symbols and danger signs</li> <li>• Demarcation of machines, risk areas and safety roads</li> <li>• Normalization of colors</li> <li>• Importance of colors in safety</li> <li>• Colors that are used: red, orange, blue, violet, white, black or gray</li> </ul>	<p><u>Teacher:</u></p> <ul style="list-style-type: none"> <li>• Defines symbology concepts, signposting and demarcation of safety areas.</li> <li>• Illustrates the uses of symbology and demarcation areas in the work environment.</li> <li>• Interprets colors according to their use.</li> <li>• Evaluates the danger areas and roads access in the workplace.</li> </ul>	<ul style="list-style-type: none"> <li>• Awareness about the consequences of our actions.</li> </ul>	<ul style="list-style-type: none"> <li>• Evaluates the importance of danger area signals and access paths.</li> </ul>

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
		<p><u>Student:</u></p> <ul style="list-style-type: none"> <li>• Explains the importance of the use of symbols and demarcation of risk areas.</li> <li>• Illustrates the uses of symbology and demarcation areas in the work environment.</li> <li>• Differentiates colors according to their use.</li> <li>• Applies procedures for demarcation of dangerous areas and access roads.</li> </ul>		



LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
<p>5. Apply security norms in diverse activities to prevent accidents in workplaces.</p>	<ul style="list-style-type: none"> <li>• Material storage and equipment</li> <li>• Material transportation</li> <li>• Proper lifting Techniques</li> </ul>	<p><u>Teacher:</u></p> <ul style="list-style-type: none"> <li>• Defines storage concepts, transportation and lift materials and equipment.</li> <li>• Explains measures that should be taken to lift loads.</li> <li>• Uses appropriate techniques to lift objects.</li> </ul>	<ul style="list-style-type: none"> <li>• Awareness about the consequences of our actions.</li> </ul>	<ul style="list-style-type: none"> <li>• Applies security norms in diverse activities to prevent accidents in workplaces.</li> </ul>

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
		<p><u>Student:</u></p> <ul style="list-style-type: none"> <li>• Identifies basic principles for the storage and transport of materials and equipment.</li> <li>• Explains measures that should be taken to lift loads.</li> <li>• Uses appropriate techniques to lift objects.</li> </ul>		

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
<p>6. Distinguish causes and effects of accidents caused by fire; as well as preventive methods in workplaces.</p>	<ul style="list-style-type: none"> <li>• Concepts of:               <ul style="list-style-type: none"> <li>• Igneology</li> <li>• Fire</li> <li>• Ignition</li> <li>• Flames</li> <li>• Fumes</li> <li>• Flammable</li> </ul> </li> <li>• Methods to prevent fire-related accidents</li> <li>• Portable equipment (extinguishers):               <ul style="list-style-type: none"> <li>• Classification and types</li> <li>• General rules for the use of extinguisher</li> <li>• Fire extinguisher equipment</li> </ul> </li> </ul>	<p><u>Teacher:</u></p> <ul style="list-style-type: none"> <li>• Explains concepts and the importance of fire-related accidents prevention during work activity.</li> <li>• Describes methods to prevent fire-related accidents in the work environment.</li> <li>• Analyzes and locates specifications needed to use basic equipment to combat fires.</li> <li>• Illustrates correct use of equipment.</li> </ul>	<ul style="list-style-type: none"> <li>• Awareness about the consequences of our actions.</li> </ul>	<ul style="list-style-type: none"> <li>• Distinguishes causes and effects of accidents caused by fire; as well as preventive methods in workplaces.</li> </ul>

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
		<p><u>Student:</u></p> <ul style="list-style-type: none"> <li>• Defines concepts related to fire-related accidents.</li> <li>• Identifies methods to prevent fire-related accidents in the work environment.</li> <li>• Explains methods of accidents prevention in the workplace.</li> <li>• Demonstrates the use of portable equipment for fire extinguishing.</li> </ul>		

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
<p>7. Distinguish types of chemical agents associated with computer science to which the student is exposed in workplaces.</p>	<ul style="list-style-type: none"> <li>• Agent concept.</li> <li>• Types of agents:               <ul style="list-style-type: none"> <li>• Physical</li> <li>• Chemical</li> <li>• Biological</li> <li>• Ergonomic</li> </ul> </li> <li>• Exposure:               <ul style="list-style-type: none"> <li>• Time</li> <li>• Intensity</li> </ul> </li> <li>• Airing:               <ul style="list-style-type: none"> <li>• Concept</li> <li>• Importance</li> <li>• Local and general airing</li> </ul> </li> <li>• Illumination:               <ul style="list-style-type: none"> <li>• Concept</li> <li>• Importance</li> <li>• Main variables of the illumination</li> <li>• Size of the object</li> </ul> </li> </ul>	<p><u>Teacher:</u></p> <ul style="list-style-type: none"> <li>• Explains the basic concepts associated with each one of the agents.</li> <li>• Classifies different types of causal agents of occupational illnesses.</li> <li>• Identifies the existing different control means for each one of the agents.</li> <li>• Explains the importance of the control of agents for prevention of occupational illnesses.</li> </ul>	<ul style="list-style-type: none"> <li>• Awareness about the consequences of our actions.</li> </ul>	<ul style="list-style-type: none"> <li>• Distinguishes types of chemical agents associated with computer science to which Student is exposed in workplaces.</li> </ul>

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
	<ul style="list-style-type: none"> <li>• Shine and contrast</li> <li>• Visual sharpness</li> <li>• Noise:               <ul style="list-style-type: none"> <li>• Mechanics of audition</li> <li>• Properties of noise</li> <li>• Physiological effects of noise</li> <li>• Means of noise control</li> </ul> </li> </ul>	<p><u>Student</u></p> <ul style="list-style-type: none"> <li>• Explains basic concepts associated with each one of the agents.</li> <li>• Classifies different causal agents of occupational illnesses.</li> <li>• Recognizes consequences of each one of the agents.</li> <li>• Recognizes importance of control of agents for prevention of occupational illnesses.</li> </ul>		

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
<p>8. Apply different techniques to prevent work overload effects.</p>	<ul style="list-style-type: none"> <li>• Concept of:               <ul style="list-style-type: none"> <li>• Workload</li> <li>• Fatigue</li> <li>• Stress</li> <li>• Physical load</li> </ul> </li> </ul>	<p><u>Teacher:</u></p> <ul style="list-style-type: none"> <li>• Defines concepts related to workload.</li> <li>• Distinguishes between physical and mental load.</li> <li>• Illustrates consequences of physical and mental workload on people.</li> <li>• Discusses recommendations to prevent excessive physical and mental workload.</li> </ul>	<ul style="list-style-type: none"> <li>• Aware about the consequences of our actions.</li> </ul>	<ul style="list-style-type: none"> <li>• Applies different techniques to prevent work overload effects.</li> </ul>

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
		<p><u>Student:</u></p> <ul style="list-style-type: none"> <li>• Explains the concept of workload.</li> <li>• Differs among physical and mental load.</li> <li>• Describes consequences of physical and mental workload on people and productivity.</li> <li>• Recommends methods to prevent excessive physical and mental workload.</li> </ul>		



LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
<p>9. Apply different techniques to prevent electric risks.</p>	<ul style="list-style-type: none"> <li>• Electric risks:               <ul style="list-style-type: none"> <li>• Injury provoked by electricity</li> <li>• The electric current and the human body</li> </ul> </li> <li>• Effects of contact with electricity:               <ul style="list-style-type: none"> <li>• Chemical</li> <li>• Caloric</li> <li>• Nervous system</li> </ul> </li> <li>• Sources of risk:               <ul style="list-style-type: none"> <li>• Cables and extensions</li> <li>• Connections and facilities</li> <li>• Electric equipment</li> </ul> </li> </ul>	<p><u>Teacher:</u></p> <ul style="list-style-type: none"> <li>• Identifies sources of electric risks and the possible effects.</li> <li>• Describes effects that electricity can cause upon contact with the human body.</li> <li>• Illustrates with real situations the sources of risk and consequences.</li> <li>• Compares issues studied with the field of computer science.</li> </ul>	<ul style="list-style-type: none"> <li>• Awareness about the consequences of our actions.</li> </ul>	<ul style="list-style-type: none"> <li>• Applies different techniques to prevent electric risks.</li> </ul>

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
		<p><u>Student:</u></p> <ul style="list-style-type: none"> <li>• Identifies electric risks and the possible injuries that they cause.</li> <li>• Recognizes effects of electricity upon contact with the human body.</li> <li>• Relates the field of computer science with the main sources of risk.</li> <li>• Recommends ways to prevent accidents.</li> </ul>		

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
<p>10. Describe regulations of occupational health in the computer science field.</p>	<ul style="list-style-type: none"> <li>• Law 6727 about risks of work:               <ul style="list-style-type: none"> <li>• The workers' rights</li> <li>• The workers' obligations</li> <li>• The boss's obligations</li> </ul> </li> <li>• General of Regulation of Occupational Safety</li> <li>• Regulation of Commissions of Occupational Health</li> </ul>	<p><u>Teacher:</u></p> <ul style="list-style-type: none"> <li>• Mentions the most important elements in each law or regulation.</li> <li>• Discusses selected articles for each of the documents.</li> <li>• Analyzes cases to apply the law and regulations in the computer science field.</li> </ul>	<ul style="list-style-type: none"> <li>• Aware about the consequences of our actions.</li> </ul>	<ul style="list-style-type: none"> <li>• Describes regulations of occupational health in the computer science field.</li> </ul>

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
		<p><u>Student:</u></p> <ul style="list-style-type: none"> <li>• Enumerates the laws and regulations in the field of occupational health.</li> <li>• Summarizes the most important aspects of Law 6727, General Regulation of Occupational Safety and Regulation of Commissions of Occupational Health.</li> <li>• Illustrates application of some articles with real situations related to the computer science field.</li> </ul>		

PRACTICE AND CHECKLIST

DEVELOPMENT PRACTICE

STUDY BLOCK: Occupational Health

PRACTICE N° 1

Purpose:

Scenario: Classroom

TIME:

MATERIALS	MACHINERY	EQUIPMENT	TOOL

## Procedures

### Teacher:

- Describes historical facts related to occupational health.
- Defines basic concepts related to occupational health.
- Differentiates occupational illnesses from professional illnesses.
- Illustrates real situations with different concepts related to occupational health.
- Describes primary causes of accidents.
- Differentiates the primary and immediate causes in real situations at work.
- Analyzes the primary and secondary causes and their importance in the prevention of accidents.
- Evaluates preventive measures taken in the work environment.
- Defines the concept and importance of cleanliness and order.
- Defines the concepts of wastes and garbage.
- Identifies the types of wastes and garbage.
- Identifies methods for the management and elimination of wastes and garbage.
- Illustrates different forms of managing the wastes originated from computers.
- Defines symbology concepts, signposting and demarcation of safety areas.
- Illustrates the uses of symbology and demarcation areas in the work environment.
- Interprets colors according to their use.
- Evaluates the danger areas and roads access in the workplace.
- Defines storage concepts, transportation and lift materials and equipment.
- Identifies basic principles for storage and transportation of materials and equipment.
- Explains measures that should be taken to lift loads.
- Uses appropriate techniques to lift objects.
- Explains concepts and the importance of fire-related accidents prevention during work activity.
- Describes methods to prevent fire-related accidents in the work environment.
- Analyzes and locates specifications needed to use basic equipment to combat fires.
- Illustrates correct use of equipment.

## Procedures

### Teacher:

- Explains the basic concepts associated with each one of the agents.
- Classifies different types of causal agents of occupational illnesses.
- Identifies the existing different control means for each one of the agents.
- Explains the importance of the control of agents for prevention of occupational illnesses.
- Defines concepts related to workload.
- Distinguishes between physical and mental load.
- Illustrates consequences of physical and mental workload on people.
- Discusses recommendations to prevent excessive physical and mental workload.
- Identifies sources of electric risks and the possible effects.
- Describes effects that electricity can cause upon contact with the human body.
- Illustrates with real situations the sources of risk and consequences.
- Compares issues studied with the field of computer science.
- Mentions the most important elements in each law or regulation.
- Discusses selected articles for each of the documents.
- Analyzes cases to apply the law and regulations in the computer science field.

SUGGESTED CHECKLIST	Date:
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Student's name:	
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**Instructions:**  
These criteria will verify student performance by observation. Write an "X" in the column that best describes each student performance.

DEVELOPMENT	YES	NOT YET	NOT APPLICABLE
Properly explains the contributions of occupational health through historical development.			
Clearly identifies main concepts related to occupational health.			
Appropriately differentiates between occupational illness and professional disease.			
Correctly infers the importance of occupational health in the workplace.			
Correctly describes primary and immediate causes of accidents.			
Appropriately differentiates primary and immediate causes in real work situations.			
Correctly recognizes primary and secondary causes and their importance in the prevention of accidents.			
Clearly identifies unsafe conditions in the work environment associated with information technology.			
Correctly defines the concepts of wastes and garbage.			
Clearly identifies the types of wastes and garbage.			
Clearly identifies methods for the management and elimination of wastes and garbage.			
Correctly uses forms of managing wastes originated from computers appropriately.			
Correctly explains the importance of the use of symbols and demarcation of risk areas properly.			
Correctly illustrates the uses of symbology and demarcation areas in the work environment.			
Appropriately differentiates colors according to their use.			
Correctly applies procedures for demarcation of dangerous areas and access roads.			



DEVELOPMENT	YES	NOT YET	NOT APPLICABLE
Clearly identifies basic principles for the storing and transporting of materials and equipment.			
Clearly identifies basic principles for the storage and transport of materials and equipment.			
Clearly identifies methods to prevent fire-related accidents in the work environment.			
Properly explains methods of accidents prevention in the workplace.			
Appropriately demonstrates the use of portable equipment for fire extinction.			
Properly explains basic concepts associated with each one of the agents.			
Correctly classifies different causal agents of occupational illnesses.			
Correctly recognizes consequences of each one of the agents.			
Appropriately recognizes importance of control of agents for prevention of occupational illnesses.			
Properly explains the concept of workload.			
Correctly differs among physical and mental load.			
Successfully describes consequences of physical and mental workload on people and productivity.			
Appropriately recommends methods to prevent excessive physical and mental workload.			
Clearly identifies electric risks and the possible injuries that they cause.			
Correctly recognizes effects of electricity upon contact with the human body.			
Correctly relates the field of computer science with the main sources of risk.			
Correctly recommends ways to prevent accidents.			
Properly enumerates the laws and regulations in the field of occupational health.			
Appropriately summarizes the most important aspects of law 6727, general regulation of occupational safety and regulation of commissions of occupational health.			
Correctly illustrates application of some articles with real situations related to the computer science field.			

OBSERVATIONS:

### CRITERIA FOR COMPETENCY ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
Describe main concepts and specific aspects of Occupational Health.	Describes main concepts and specific aspects of Occupational Health.	Explains the contributions of Occupational Health through historical development.	Knowledge	Properly explains the contributions of occupational health through historical development.
		Identifies main concepts related to occupational health.	Knowledge	Clearly identifies main concepts related to occupational health.
		Differentiates between occupational illness and professional disease.	Performance	Appropriately differentiates between occupational illness and professional disease.
		Infers the importance of occupational health in the workplace.	Performance	Correctly infers the importance of occupational health in the workplace.

### CRITERIA FOR COMPETENCY ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
Illustrate the importance of security in accident prevention	Illustrates the importance of security in accident prevention	Describes primary and immediate causes of accidents.	Knowledge	Correctly describes primary and immediate causes of accidents.
		Differentiates primary and immediate causes in real work situations	Performance	Appropriately differentiates primary and immediate causes in real work situations.
		Recognizes primary and secondary causes and their importance in the prevention of accidents.	Product	Correctly recognizes primary and secondary causes and their importance in the prevention of accidents.
		Identifies unsafe conditions in the work environment associated with information technology.	Knowledge	Clearly identifies unsafe conditions in the work environment associated with information technology.

### CRITERIA FOR COMPETENCY ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
Apply basic norms for waste elimination management.	Applies basic norms for waste elimination management.	Defines the concepts of wastes and garbage.	Knowledge	Correctly defines the concepts of wastes and garbage.
		Identifies the types of wastes and garbage.	Knowledge	Clearly identifies the types of wastes and garbage.
		Identifies methods for the management and elimination of wastes and garbage.	Knowledge	Clearly identifies methods for the management and elimination of wastes and garbage.
		Uses forms of managing wastes originated from computers.	Performance	Correctly uses forms of managing wastes originated from computers appropriately.
Evaluate the importance of danger area signals and access paths	Evaluates the importance of danger area signals and access paths	Explains the importance of the use of symbols and demarcation of risk areas.	Performance	Correctly explains the importance of the use of symbols and demarcation of risk areas properly.
		Illustrates the uses of symbology and demarcation areas in the work environment.	Performance	Correctly illustrates the uses of symbology and demarcation areas in the work environment.
		Differentiates colors according to their use.	Performance	Appropriately differentiates colors according to their use.
		Applies procedures for demarcation of dangerous areas and access roads.	Product	Correctly applies procedures for demarcation of dangerous areas and access roads.

### CRITERIA FOR COMPETENCY ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
Apply security norms in diverse activities to prevent accidents in workplaces.	Applies security norms in diverse activities to prevent accidents in workplaces.	Identifies basic principles for the storage and transport of materials and equipment	Knowledge	Clearly identifies basic principles for the storage and transport of materials and equipment
		Explains measures that should be taken to lift loads.	Performance	Correctly explains measures that should be taken to lift loads.
		Uses appropriate techniques to lift objects.	Product	Correctly uses appropriate techniques to lift objects.
Distinguish causes and effects of accidents caused by fire; as well as preventive methods in workplaces.	Distinguishes causes and effects of accidents caused by fire; as well as preventive methods in workplaces.	Defines concepts related to fire-related accidents.	Knowledge	Correctly defines concepts related to fire-related accidents.
		Identifies methods to prevent fire-related accidents in the work environment.	Knowledge	Clearly identifies methods to prevent fire-related accidents in the work environment.
		Explains methods of accidents prevention in the workplace.	Performance	Properly explains methods of accidents prevention in the workplace.
		Demonstrates the use of portable equipment for fire extinction.	Product	Appropriately demonstrates the use of portable equipment for fire extinction.

### CRITERIA FOR COMPETENCY ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
Distinguish types of chemical agents associated with computer science to which Student is exposed in workplaces.	Distinguishes types of chemical agents associated with computer science to which Student is exposed in workplaces.	Explains basic concepts associated with each one of the agents.	Performance	Properly explains basic concepts associated with each one of the agents.
		Classifies different causal agents of occupational illnesses.	Performance	Correctly classifies different causal agents of occupational illnesses.
		Recognizes consequences of each one of the agents.	Performance	Correctly recognizes consequences of each one of the agents.
		Recognizes importance of control of agents for prevention of occupational illnesses.	Performance	Appropriately recognizes importance of control of agents for prevention of occupational illnesses.
Apply different techniques to prevent work overload effects.	Applies different techniques to prevent work overload effects.	Explains the concept of workload.	Knowledge	Properly explains the concept of workload.
		Differs among physical and mental load.	Performance	Correctly differs among physical and mental load.
		Describes consequences of physical and mental workload on people and productivity.	Knowledge	Successfully describes consequences of physical and mental workload on people and productivity.
		Recommends methods to prevent excessive physical and mental workload.	Product	Appropriately recommends methods to prevent excessive physical and mental workload.

### CRITERIA FOR COMPETENCY ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
Apply different techniques to prevent electric risks.	Applies different techniques to prevent electric risks.	Identifies electric risks and the possible injuries that they cause.	Knowledge	Clearly identifies electric risks and the possible injuries that they cause.
		Recognizes effects of electricity upon contact with the human body.	Performance	Correctly recognizes effects of electricity upon contact with the human body.
		Relates the field of computer science with the main sources of risk.	Performance	Correctly relates the field of computer science with the main sources of risk.
		Recommends ways to prevent accidents.	Product	Correctly recommends ways to prevent accidents.
Describe regulations of occupational health in the computer science field.	Describes regulations of occupational health in the computer science field.	Enumerates the laws and regulations in the field of occupational health.	Knowledge	Properly enumerates the laws and regulations in the field of occupational health.
		Summarizes the most important aspects of Law 6727, General Regulation of Occupational Safety and Regulation of Commissions of Occupational Health.	Performance	Appropriately summarizes the most important aspects of law 6727, general regulation of occupational safety and regulation of commissions of occupational health.
		Illustrates application of some articles with real situations related to the computer science field.	Performance	Correctly illustrates application of some articles with real situations related to the computer science field.

## TECHNICAL COMPETENCY STANDARDS OF EDUCATIONAL INSTITUTION

### GENERAL DATA

Title: Computer Architecture  
 Purpose: Distinguish or recommend, efficiently and with technical approaches, components of the computer.  
 Competition level: Basic

### UNITS OF JOB COMPETENCY THAT CONFORM THE STANDARDS

Title	Classification
Correctly defines basic concepts related to different components of the computer.	Specific
Clearly explains basic concepts related to the components of the computer.	Specific
Properly identifies each element and its technical characteristics.	Specific
Correctly describes the operation of the computer components.	Specific
Properly identifies storage devices and technical characteristics of each one.	Specific
Appropriately uses technical approaches for the selection of storage devices.	Specific
Correctly recognizes adapters of e/s.	Specific
Appropriately describes technical characteristics of each one of the devices.	Specific
Correctly describes technical characteristics of adapters and modem.	Specific
Clearly explains card operation.	Specific
Correctly identifies each of the components mentioned.	Specific
Correctly describes characteristics of each device.	Specific
Clearly describes technical characteristics of the other components.	Specific
Properly explains operation of the other components.	Specific
Correctly differentiates types of buses, switches, jumpers, cables and others.	Specific
Clearly recognizes peripheral devices.	Specific
Correctly explains characteristics of different devices.	Specific
Correctly points out considerations of compatibility between equipment and software.	Specific
Correctly defines basic concepts related to different components of the computer.	Specific
Correctly uses technical approaches for their selection and recommendation.	Specific
Clearly identifies basic concepts related to different software.	Specific



Correctly describes characteristics of each software types.  
Correctly explains the process for the licensing of software.

Specific  
Specific

### Competency Elements

Indexes	Title of the element
3 – 2	Distinguish or recommend, efficiently and with technical approaches, components of the computer.

#### Performance Criteria:

1. Describes internal components of the computer.
2. Describes external devices associated with the computer.
3. Describes different types of software used by the computer.

#### Application Field:

Category	Class
Services	Provision of Technical Education Services

#### Performance Evidence:

1. Explains basic concepts related to the components of the computer.
2. Describes the operation of the computer components.
3. Describes technical characteristics of each one of the devices.
4. Explains card operation.
5. Describes characteristics of each device.
6. Describes technical characteristics of the other components.
7. Explains operation of the other components.
8. Explains characteristics of different devices.
9. Points out considerations of compatibility between equipment and software.

10. Describes characteristics of each software types
11. Explains process for the licensing of software.

Knowledge Evidence:

1. Defines basic concepts related to different components of the computer.
2. Identifies each element and its technical characteristics.
3. Identifies storage devices and technical characteristics of each one.
4. Recognizes adapters of E/S.
5. Describes technical characteristics of adapters and modem.
6. Identifies each of the components mentioned.
7. Recognizes peripheral devices.
8. Identifies basic concepts related to different software.

Product Evidence:

1. Uses technical approaches for the selection of storage devices.
2. Differentiates types of buses, switches, jumpers, cables and others.
3. Uses technical approaches for their selection and recommendation.
4. Investigates the procedure for purchase and Licensing of software.

Sector: Commercial and Services	Program: Computer Networking
Subject Area: Computer Maintenance	Grade: Tenth
Study block: Computer Architecture	Time: 80 hours
Purpose: Distinguish or recommend, efficiently and with technical approaches, the components of the computer.	

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
1. Describe internal components of the computer.	<ul style="list-style-type: none"> <li>• Basic (hardware) components:               <ul style="list-style-type: none"> <li>• BIOS</li> <li>• Memory:                   <ul style="list-style-type: none"> <li>• Types</li> <li>• Characteristic</li> <li>• Speeds</li> </ul> </li> <li>• Processor:                   <ul style="list-style-type: none"> <li>• History</li> <li>• Types or families</li> <li>• Technical characteristics</li> <li>• Mathematical coprocessor</li> <li>• Caché</li> </ul> </li> <li>• Sink of heat or fan</li> <li>• Card mother:                   <ul style="list-style-type: none"> <li>• Types</li> <li>• Technical characteristics</li> <li>• Parts</li> <li>• Grooves or sockets</li> </ul> </li> </ul> </li> </ul>	<p><u>Teacher:</u></p> <ul style="list-style-type: none"> <li>• Defines basic concepts related to components of the computer.</li> <li>• Describes components of the computer.</li> <li>• Explains technical characteristics of the components of the computer.</li> <li>• Examines technical approaches for the selection of different components.</li> </ul>	<ul style="list-style-type: none"> <li>• Carry out an effort to obtain a result with the help of others.</li> </ul>	<ul style="list-style-type: none"> <li>• Describes internal components of the computer.</li> </ul>

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
		<p><u>Student:</u></p> <ul style="list-style-type: none"> <li>• Defines basic concepts related to different components of the computer.</li> <li>• Explains basic concepts related to the components of the computer.</li> <li>• Identifies each element and its technical characteristics.</li> <li>• Describes the operation of the computer components.</li> </ul>		

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
	<ul style="list-style-type: none"> <li>• Storage devices:               <ul style="list-style-type: none"> <li>• Floppy disks</li> <li>• Hard disks</li> <li>• CD</li> <li>• DVD</li> <li>• ZIP</li> <li>• Tape</li> <li>• Others</li> </ul> </li> <li>• Multimedia</li> <li>• Video:               <ul style="list-style-type: none"> <li>• Cards</li> <li>• Types</li> <li>• Characteristic</li> <li>• Memory</li> <li>• Monitors:                   <ul style="list-style-type: none"> <li>• Resolution of the monitor</li> <li>• Sizes</li> <li>• Cards for video capture</li> </ul> </li> </ul> </li> <li>• Sound:               <ul style="list-style-type: none"> <li>• Sound cards</li> <li>• Formats MIDI, WAV, MP3</li> <li>• CD, CD-R AND DVD</li> </ul> </li> </ul>	<p><u>Teacher:</u></p> <ul style="list-style-type: none"> <li>• Defines basic concepts related to the storage devices.</li> <li>• Describes technical characteristics of each of the devices.</li> <li>• Differentiates technical approaches for the selection of each device.</li> <li>• Defines basic concepts related to the adapters of E/S.</li> </ul> <p><u>Student:</u></p> <ul style="list-style-type: none"> <li>• Identifies storage devices and technical characteristics of each.</li> <li>• Uses technical approaches for the selection of storage devices.</li> <li>• Recognizes adapters of E/S.</li> <li>• Describes technical characteristics of each devices.</li> </ul>		

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
	<ul style="list-style-type: none"> <li>• Adapters of E/S and ports:               <ul style="list-style-type: none"> <li>• Concept</li> <li>• Characteristic</li> <li>• Types:                   <ul style="list-style-type: none"> <li>• Series</li> <li>• Parallel</li> <li>• Wireless</li> <li>• USB</li> </ul> </li> </ul> </li> <li>• Modems:               <ul style="list-style-type: none"> <li>• Concept</li> <li>• Characteristic</li> <li>• Types:                   <ul style="list-style-type: none"> <li>• Internal</li> <li>• External</li> </ul> </li> <li>• Speeds</li> </ul> </li> <li>• Software and cards of net (NIC) interface:               <ul style="list-style-type: none"> <li>• Concept</li> <li>• Characteristic</li> <li>• MAC address</li> </ul> </li> </ul>	<p><u>Teacher:</u></p> <ul style="list-style-type: none"> <li>• Describes technical characteristics of each of the described devices.</li> <li>• Illustrates operation of each of the devices.</li> <li>• Describes technical characteristics of the modems.</li> <li>• Describes technical characteristics.</li> </ul> <p><u>Student:</u></p> <ul style="list-style-type: none"> <li>• Describes technical characteristics of adapters and modem.</li> <li>• Explains card operation.</li> <li>• Identifies each of the components mentioned.</li> <li>• Describes characteristics of each device.</li> </ul>		

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
	<ul style="list-style-type: none"> <li>• Other components:               <ul style="list-style-type: none"> <li>• Buses</li> <li>• Switches and jumpers</li> <li>• Cables, bands and strips</li> <li>• Wireless devices</li> <li>• Portable devices:                   <ul style="list-style-type: none"> <li>• Encluster</li> <li>• Units of massive storage</li> <li>• Cellular</li> </ul> </li> </ul> </li> </ul>	<p><u>Teacher:</u></p> <ul style="list-style-type: none"> <li>• Describes technical characteristics of each one of the other components.</li> <li>• Illustrates operation of each device.</li> <li>• Describes technical characteristics of the components.</li> </ul> <p><u>Student:</u></p> <ul style="list-style-type: none"> <li>• Describes technical characteristics of the other components.</li> <li>• Explains operation of the other components.</li> <li>• Differentiates types of buses, switches, jumpers, cables and others.</li> </ul>		

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
<p>2. Describe external devices associated with the computer.</p>	<ul style="list-style-type: none"> <li>• Outlying devices:               <ul style="list-style-type: none"> <li>• Printers</li> <li>• Scanners</li> <li>• Plotters</li> <li>• Digital cameras</li> <li>• Speakers, microphones and headsets</li> <li>• Types</li> <li>• Technical specifications</li> <li>• Recommendations for their selection</li> </ul> </li> </ul>	<p><u>Teacher:</u></p> <ul style="list-style-type: none"> <li>• Defines basic concepts related to peripheral devices.</li> <li>• Describes characteristics of different devices.</li> <li>• Points out considerations of compatibility between equipment and software.</li> <li>• Analyzes approaches to use for their selection.</li> </ul>	<ul style="list-style-type: none"> <li>• Carry out an effort to obtain a result for oneself or with the help of others.</li> </ul>	<ul style="list-style-type: none"> <li>• Describes external devices associated with the computer.</li> </ul>



LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
		<p><u>Student:</u></p> <ul style="list-style-type: none"> <li>• Recognizes peripheral devices.</li> <li>• Explains characteristics of different devices.</li> <li>• Points out considerations of compatibility between equipment and software.</li> <li>• Uses technical approaches for their selection and recommendation.</li> </ul>		

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
<p>3. Describe different types of software used by the computer.</p>	<ul style="list-style-type: none"> <li>• Basic (software) components:               <ul style="list-style-type: none"> <li>• Operating system:                   <ul style="list-style-type: none"> <li>• Way text</li> <li>• Graphic way</li> <li>• Net</li> </ul> </li> <li>• Of application</li> <li>• Of development</li> <li>• Of configuration</li> </ul> </li> <li>• Software licensing               <ul style="list-style-type: none"> <li>• Concept</li> <li>• Importance</li> <li>• Advantages</li> <li>• Purchase procedure</li> <li>• Royalties and intellectual property (existing laws)</li> </ul> </li> </ul>	<p><u>Teacher:</u></p> <ul style="list-style-type: none"> <li>• Defines basic concepts related to different software types.</li> <li>• Describes characteristics of each software type.</li> <li>• Explains technical characteristics and applications of each software type.</li> <li>• Illustrates procedure for the purchase and licensing of software.</li> </ul>	<p>Carries out an effort to obtain a result for oneself or with the help of others.</p>	<ul style="list-style-type: none"> <li>• Describes different types of software used by the computer.</li> </ul>

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
		<p><u>Student:</u></p> <ul style="list-style-type: none"> <li>• Identifies basic concepts related to different software.</li> <li>• Describes characteristics of each software types.</li> <li>• Explains process for the Licensing of software.</li> <li>• Investigates the procedure for purchase and Licensing of software.</li> </ul>		

PRACTICE AND CHECKLIST

PRACTICE DEVELOPMENT

Study Block: Computer Architecture

PRACTICE N° 1

Purpose:

Scenario: Computer Maintenance Shop

TIME:

MATERIALS	MACHINERY	EQUIPMENT	TOOL

## Procedures

### Teacher:

- Defines basic concepts related to the different components of the computer.
- Describes components of the computer.
- Explains technical characteristics of the components of the computer.
- Examines technical approaches for the selection of different components.
- Defines basic concepts related to the storage devices.
- Describes technical characteristics of each of the devices.
- Differentiates technical approaches for the selection of each device.
- Defines basic concepts related to the adapters of E/S.
- Describes technical characteristics of each of the described devices.
- Illustrates operation of each device.
- Describes technical characteristics of the modems.
- Describes technical characteristics.
- Defines basic concepts related to peripheral devices.
- Describes characteristics of different devices.
- Points out considerations of compatibility between equipment and software.
- Analyzes approaches to use for their selection.
- Defines basic concepts related to different software types.
- Describes characteristics of each software type.
- Explains technical characteristics and applications of each software type.
- Illustrates procedure for the purchase and Licensing of software.

SUGGESTED CHECKLIST	Date:
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Student's name:	
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**Instructions:**  
These criteria will verify student performance by observation. Write an "X" in the column that best describes each student performance.

DEVELOPMENT	YES	NOT YET	NOT APPLICABLE
Correctly defines basic concepts related to different components of the computer.			
Clearly explains basic concepts related to the components of the computer.			
Properly identifies each element and its technical characteristics.			
Correctly describes the operation of the computer components.			
Properly identifies storage devices and technical characteristics of each one.			
Appropriately uses technical approaches for the selection of storage devices.			
Correctly recognizes adapters of e/s.			
Appropriately describes technical characteristics of each one of the devices.			
Correctly describes technical characteristics of adapters and modem.			
Clearly explains card operation.			
Correctly identifies each of the components mentioned.			
Correctly describes characteristics of each device.			
Clearly describes technical characteristics of the other components.			
Properly explains operation of the other components.			
Correctly differentiates types of buses, switches, jumpers, cables and others.			
Clearly recognizes peripheral devices.			
Correctly explains characteristics of different devices.			
Correctly points out considerations of compatibility between equipment and software.			

DEVELOPMENT	YES	NOT YET	NOT APPLICABLE
Correctly uses technical approaches for their selection and recommendation.			
Clearly identifies basic concepts related to different software.			
Correctly describes characteristics of each software types.			
Correctly explains process for the licensing of software.			
Clearly investigates the procedure for purchase and Licensing of software.			

OBSERVATIONS:

### CRITERIA FOR COMPETENCY ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
Describe internal components of the computer.	Describes internal components of the computer.	Defines basic concepts related to different components of the computer.	Knowledge	Correctly defines basic concepts related to different components of the computer.
		Explains basic concepts related to the components of the computer.	Performance	Clearly explains basic concepts related to the components of the computer.
		Identifies each element and its technical characteristics.	Knowledge	Properly identifies each element and its technical characteristics.
		Describes the operation of the computer components.	Performance	Correctly describes the operation of the computer components.
		Identifies storage devices and technical characteristics of each one.	Knowledge	Properly identifies storage devices and technical characteristics of each one.
		Uses technical approaches for the selection of storage devices.	Product	Appropriately uses technical approaches for the selection of storage devices.
		Recognizes adapters of E/S.	Knowledge	Correctly recognizes adapters of e/s.
		Describes technical characteristics of each one of the devices.	Performance	Appropriately describes technical characteristics of each one of the devices.



### CRITERIA FOR COMPETENCY ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
		Describes technical characteristics of adapters and modem.	Knowledge	Correctly describes technical characteristics of adapters and modem.
		Explains card operation.	Performance	Clearly explains card operation.
		Identifies each of the components mentioned.	Knowledge	Correctly identifies each of components mentioned.
		Describes characteristics of each device.	Performance	Correctly describes characteristics of each device.
		Describes technical characteristics of the other components.	Performance	Clearly describes technical characteristics of the other components.
		Explains operation of the other components.	Performance	Properly explains operation of the other components.
		Differentiates types of buses, switches, jumpers, cables and others.	Product	Correctly differentiates types of buses, switches, jumpers, cables and others.

### CRITERIA FOR COMPETENCY ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
Describe external devices associated with the computer.	Describes external devices associated with the computer.	Recognizes peripheral devices.	Knowledge	Clearly recognizes peripheral devices.
		Explains characteristics of different devices.	Performance	Correctly explains characteristics of different devices.
		Points out considerations of compatibility between equipment and software.	Performance	Correctly points out considerations of compatibility between equipment and software.
		Uses technical approaches for their selection and recommendation.	Product	Correctly uses technical approaches for their selection and recommendation.
Describe different types of software used by the computer.	Describes different types of software used by the computer.	Identifies basic concepts related to different software.	Knowledge	Clearly identifies basic concepts related to different software.
		Describes characteristics of each software types.	Performance	Correctly describes characteristics of each software types.
		Explains process for the Licensing of software.	Performance	Correctly explains process for the licensing of software.
		Investigates the procedure for purchase and Licensing of software.	Product	Clearly investigates the procedure for purchase and Licensing of software.

## TECHNICAL COMPETENCY STANDARDS OF EDUCATIONAL INSTITUTION

### GENERAL DATA

Title: Maintenance & Upgrading Computer  
 Purpose: Efficient application of maintenance procedures for upgrading of personal computers.  
 Competition level: Basic

### UNITS OF JOB COMPETENCY THAT CONFORM THE STANDARDS

Title	Classification
Clearly recognizes norms and measures of security to apply in the shop.	Specific
Efficiently uses the correct procedures for equipment manipulation and tools.	Specific
Correctly observes actions to execute in the event of accidents.	Specific
Correctly applies established procedural norms in the shop.	Specific
Clearly recognizes the application and use of boot disks and recovery.	Specific
Efficiently follows the procedure for the creation of boot disks and recovery.	Specific
Efficiently uses of boot disks in different operating systems.	Specific
Clearly recognizes basic norms to follow for the preliminary revision and inventory.	Specific
Correctly formulates a preliminary report and a system inventory.	Specific
Efficiently uses software and tools of the system for diagnosis of damages.	Specific
Correctly detects errors and damages in different systems.	Specific
Appropriately describes the procedure for the removal of adapters.	Specific
Clearly recognizes the procedure for the adapter removal.	Specific
Correctly follows the procedure for the adapter installation and configuration.	Specific
Efficiently connects different cables.	Specific
Appropriately describes the procedure for the removal of existing components.	Specific
Clearly recognizes the procedure for removal and installation of components.	Specific
Correctly follows the procedure for installation and configuration of each component.	Specific
Efficiently configures equipment after the installation of new components.	Specific
Appropriately describes the procedure for installation of peripheral devices.	Specific
Clearly recognizes the procedure for removal and installation of existing components.	Specific

Efficiently configures the equipment after installation of new components.	Specific
Correctly verifies results of the installation and configuration.	Specific
Appropriately identifies requirements to install software.	Specific
Clearly recognizes the procedure for installation and configuration of operating systems and other software.	Specific
Efficiently installs different operating systems and software in computers with particular characteristics.	Specific
Efficiently executes tests of the system and installed software.	Specific
Correctly mentions concepts related to networks.	Specific
Correctly enumerates types of networks that exist in the market.	Specific
Appropriately describes internet protocols used in networks.	Specific
Efficiently illustrates physical components used in networks.	Specific

#### Competency Elements

Indexes	Title of the element
3 - 3	Efficient application of the procedures of the maintenance and upgrade of personal computers.

#### Performance Criteria:

1. Describes health and security measures for working with the computer equipment and manual tools.
2. Build boot and recovery disks as part of the maintenance security or equipment upgrading processes.
3. Recognizes basic norms to follow the preliminary revision and the inventory.
4. Distinguishes adapters used in computers.
5. Recognizes the installation and/or configuration procedure of different internal computer components.
6. Recognizes the installation and configuration procedure of external computer devices.
7. Recognizes the installation and configuration procedure of operating systems and other software in the computer.
8. Determinates general computer network concepts.

Application Field:

Category

Class

Services

Provision of Technical Education Services

Performance Evidence:

1. Uses the correct procedures for equipment manipulation and tools.
2. Observes actions to execute in the event of accidents.
3. Applies established procedural norms in the shop.
4. Follows the procedure for the creation of boot disks and recovery.
5. Uses software and tools of the system for diagnosis of damages.
6. Recognizes the procedure for the adapter removal.
7. Follows the procedure for the adapter installation and configuration.
8. Recognizes the procedure for removal and installation of components.
9. Follows the procedure for installation and configuration of each component.
10. Recognizes the procedure for removal and installation of existing components.
11. Installs different operating systems and software in computers with particular characteristics.
12. Describes Internet protocols used in networks.

Knowledge Evidence:

1. Recognizes norms and measures of security to apply in the shop.
2. Recognizes the application and use of boot disks and recovery.
3. Recognizes basic norms to follow for the preliminary revision and inventory.
4. Describes the procedure for the removal of adapters.
5. Describes the procedure for the removal of existing components.
6. Describes the procedure for installation of peripheral devices.
7. Identifies requirements to install software.
8. Recognizes the procedure for installation and configuration of operating systems and other software.
9. Mentions concepts related to networks.
10. Enumerates types of networks that exist in the market.

Product Evidence:

1. Use of boot disks in different operating systems.
2. Formulates a preliminary report and a system inventory.
3. Detects errors and damages in different systems.
4. Connects different cables.
5. Configures the equipment after installation of new components.
6. Verifies results of the installation and configuration.
7. Executes tests of the system and installed software.
8. Illustrates physical components used in networks.

Sector: Commercial and Services	Program: Computer Networking
Subject Area: Computer Maintenance	Grade: Tenth
Study block: Maintenance & Upgrading Computer	Time: 176 hours
Purpose: Efficient application of the procedures of the maintenance and upgrade of personal computers.	

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
1. Describe health and security measures for working with the computer equipment and manual tools.	<ul style="list-style-type: none"> <li>• Electric risks</li> <li>• Concepts</li> <li>• Sources of risk</li> <li>• Safety measures</li> <li>• Manual tools</li> <li>• Norms for the manipulation of tools</li> <li>• Care and storage of tools</li> <li>• Behavior norms in the shop</li> <li>• Work in the event of accident</li> </ul>	<u>Teacher:</u> <ul style="list-style-type: none"> <li>• Defines basic concepts related to safety and hygiene in the shop.</li> <li>• Describes norms and measures of safety.</li> <li>• Illustrates correct procedures for equipment and tool manipulation.</li> <li>• Exemplifies actions to execute in the event of accidents.</li> </ul>	<ul style="list-style-type: none"> <li>• Aware of consequences of our actions.</li> </ul>	<ul style="list-style-type: none"> <li>• Describes health and security measures for working with the computer equipment and manual tools.</li> </ul>

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
		<p><u>Student:</u></p> <ul style="list-style-type: none"> <li>• Recognizes norms and measures of security to apply in the shop.</li> <li>• Uses the correct procedures for equipment manipulation and tools.</li> <li>• Observes actions to execute in the event of accidents.</li> <li>• Applies established procedural norms in the shop.</li> </ul>		



LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
<p>2. Build boot and recovery disks as part of the maintenance security or equipment upgrading processes.</p>	<ul style="list-style-type: none"> <li>• Boot disks and recovery:               <ul style="list-style-type: none"> <li>• Concept</li> <li>• Applications</li> <li>• Procedure for the creation in different operating systems</li> </ul> </li> <li>• Use</li> </ul>	<p><u>Teacher:</u></p> <ul style="list-style-type: none"> <li>• Defines basic concepts related to boot disks and recovery.</li> <li>• Describes applications and uses of boot disks and recovery.</li> <li>• Uses boot disks in different operating systems.</li> </ul> <p><u>Student:</u></p> <ul style="list-style-type: none"> <li>• Recognizes the application and use of boot disks and recovery.</li> <li>• Follows the procedure for the creation of boot disks and recovery.</li> <li>• Use of boot disks in different operating systems.</li> </ul>	<ul style="list-style-type: none"> <li>• Aware of consequences of our actions.</li> </ul>	<ul style="list-style-type: none"> <li>• Builds boot and recovery disks as part of the maintenance security or equipment upgrading processes.</li> </ul>

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
<p>3. Recognize basic norms to follow the preliminary revision and the inventory.</p>	<ul style="list-style-type: none"> <li>• Preliminary revision of the state of the system</li> <li>• Elaboration of an inventory of system components</li> <li>• Software for the system diagnosis</li> <li>• Preventive maintenance and techniques</li> </ul>	<p><u>Teacher:</u></p> <ul style="list-style-type: none"> <li>• Describes the importance of carrying out a preliminary revision and a system inventory.</li> <li>• Defines basic norms to follow for preliminary revision and inventory.</li> <li>• Formulates a preliminary report and an inventory of system.</li> <li>• Demonstrates software use and tools of diagnosis system.</li> </ul>	<ul style="list-style-type: none"> <li>• Aware of consequences of our actions.</li> </ul>	<ul style="list-style-type: none"> <li>• Recognizes basic norms to follow the preliminary revision and the inventory.</li> </ul>

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
		<p><u>Student:</u></p> <ul style="list-style-type: none"> <li>• Recognizes basic norms to follow for the preliminary revision and inventory.</li> <li>• Formulates a preliminary report and a system inventory.</li> <li>• Uses software and tools of the system for diagnosis of damages.</li> <li>• Detects errors and damages in different systems.</li> </ul>		

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
4. Distinguish adapters used in computers.	<ul style="list-style-type: none"> <li>• Adapters:               <ul style="list-style-type: none"> <li>• Concepts</li> <li>• Characteristic</li> <li>• Types                   <ul style="list-style-type: none"> <li>• IRQ</li> <li>• DMA</li> <li>• Others</li> </ul> </li> <li>• Directioning</li> <li>• Plug and play</li> <li>• Removal</li> <li>• Installation</li> <li>• Configuration</li> <li>• Connection of cables</li> </ul> </li> </ul>	<p><u>Teacher:</u></p> <ul style="list-style-type: none"> <li>• Describes the procedure for the removal of adapters.</li> <li>• Describes the procedure for the installation and configuration of adapters.</li> <li>• Illustrates the procedure for the installation and configuration of each component.</li> <li>• Demonstrates the process for cables connection.</li> </ul>	<ul style="list-style-type: none"> <li>• Aware of consequences of our actions.</li> </ul>	<ul style="list-style-type: none"> <li>• Distinguishes adapters used in computers.</li> </ul>

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
		<p><u>Student:</u></p> <ul style="list-style-type: none"> <li>• Describes the procedure for the removal of adapters.</li> <li>• Recognizes the procedure for the adapter removal.</li> <li>• Follows the procedure for the adapter installation and configuration.</li> <li>• Connects different cables.</li> </ul>		

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
<p>5. Recognize the installation and/or configuration procedure of different internal computer components.</p>	<ul style="list-style-type: none"> <li>• Basic components:               <ul style="list-style-type: none"> <li>• BIOS</li> <li>• Memory</li> <li>• Processor</li> <li>• Caché</li> <li>• Dissipator of heat</li> <li>• Badge bases</li> </ul> </li> <li>• Storage devices:               <ul style="list-style-type: none"> <li>• Floppy disks</li> <li>• Hard disks</li> <li>• CD</li> <li>• DVD</li> <li>• ZIP</li> <li>• Others.</li> </ul> </li> <li>• Multimedias:               <ul style="list-style-type: none"> <li>• Video cards</li> <li>• Cards for TV</li> <li>• Sound cards</li> <li>• CD-ROM</li> <li>• CD-R</li> </ul> </li> </ul>	<p><u>Teacher:</u></p> <ul style="list-style-type: none"> <li>• Describes the procedure for the removal of existing components.</li> <li>• Describes the procedure for the installation of each component.</li> <li>• Illustrates the procedure for the installation and configuration of each component.</li> <li>• Configures equipment after the installation of new components.</li> </ul>	<ul style="list-style-type: none"> <li>• Aware of consequences of our actions.</li> </ul>	<ul style="list-style-type: none"> <li>• Recognizes the installation and/or configuration procedure of different internal computer components.</li> </ul>

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
	<ul style="list-style-type: none"> <li>• Modems:               <ul style="list-style-type: none"> <li>• Internal</li> <li>• External</li> </ul> </li> <li>• Net cards</li> </ul>	<p><u>Student:</u></p> <ul style="list-style-type: none"> <li>• Describes the procedure for the removal of existing components.</li> <li>• Recognizes the procedure for removal and installation of components.</li> <li>• Follows the procedure for installation and configuration of each component.</li> <li>• Configures equipment after the installation of new components.</li> </ul>		

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
<p>6. Recognize the installation and configuration procedure of external computer devices.</p>	<ul style="list-style-type: none"> <li>• Outlying devices:               <ul style="list-style-type: none"> <li>• Printers</li> <li>• Scanners</li> <li>• Plotters</li> <li>• Digital cameras</li> <li>• Speakers, microphones and headsets</li> </ul> </li> <li>• Driver:               <ul style="list-style-type: none"> <li>• Versions</li> <li>• Compatibility</li> <li>• Devices USB</li> </ul> </li> <li>• Resolution of hardware problems and outlying devices</li> </ul>	<p><u>Teacher:</u></p> <ul style="list-style-type: none"> <li>• Describes the procedure for installation of peripheral devices.</li> <li>• Explains the procedure for installation of each component.</li> <li>• Configures the equipment after installation of new components.</li> <li>• Recognize common problems of the hardware.</li> </ul>	<ul style="list-style-type: none"> <li>• Aware of consequences of our actions.</li> </ul>	<ul style="list-style-type: none"> <li>• Recognizes the installation and configuration procedure of external computer devices.</li> </ul>



LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
		<p><u>Student:</u></p> <ul style="list-style-type: none"> <li>• Describes the procedure for installation of peripheral devices.</li> <li>• Recognizes the procedure for removal and installation of existing components.</li> <li>• Configures the equipment after installation of new components.</li> <li>• Verifies results of the installation and configuration.</li> </ul>		

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
<p>7. Recognize the installation and configuration procedure of operating systems and other software in the computer.</p>	<ul style="list-style-type: none"> <li>• Revision of requirements of the software</li> <li>• Installation and configuration:               <ul style="list-style-type: none"> <li>• Operating systems</li> <li>• Application software</li> <li>• Others</li> </ul> </li> <li>• Detection of installed devices</li> <li>• Tests</li> </ul>	<p><u>Teacher:</u></p> <ul style="list-style-type: none"> <li>• Identifies requirements to install software.</li> <li>• Describes the procedure for installation and configuration of operating systems and other software.</li> <li>• Installs operating systems and software in different computers.</li> <li>• Executes tests of the system and installed software.</li> </ul>	<ul style="list-style-type: none"> <li>• Aware of consequences of our actions.</li> </ul>	<ul style="list-style-type: none"> <li>• Recognizes the installation and configuration procedure of operating systems and other software in the computer.</li> </ul>

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
		<p><u>Student:</u></p> <ul style="list-style-type: none"> <li>• Identifies requirements to install software.</li> <li>• Recognizes the procedure for installation and configuration of operating systems and other software.</li> <li>• Installs different operating systems and software in computers with particular characteristics.</li> <li>• Executes tests of the system and installed software.</li> </ul>		

LEARNING RESULTS	CONTENTS	TEACHING – LEARNING STRATEGIES	VALUE AND ATTITUDES	PERFORMANCE CRITERIA
<p>8. Determine general computer network concepts.</p>	<ul style="list-style-type: none"> <li>• Principles of networks:               <ul style="list-style-type: none"> <li>• Definition</li> <li>• Benefits</li> <li>• Types of nets:                   <ul style="list-style-type: none"> <li>• LAN</li> <li>• WAN</li> <li>• WLAN                       <ul style="list-style-type: none"> <li>• Peer to peer</li> <li>• Client / server</li> </ul> </li> </ul> </li> </ul> </li> <li>• Basic concepts of nets and technologies:               <ul style="list-style-type: none"> <li>• Band width and transmission of data</li> <li>• Addressing IP</li> <li>• DHCP</li> </ul> </li> <li>• Protocols of Internet and the applications:               <ul style="list-style-type: none"> <li>• ICMP</li> </ul> </li> <li>• Physical components of a network</li> <li>• Characteristic of network cables</li> </ul>	<p><u>Teacher:</u></p> <ul style="list-style-type: none"> <li>• Defines concepts related to networks.</li> <li>• Describes types of networks that exist in the market.</li> <li>• Describes internet protocols used in networks.</li> <li>• Illustrates physical components used in networks.</li> </ul> <p><u>Student:</u></p> <ul style="list-style-type: none"> <li>• Mentions concepts related to networks.</li> <li>• Enumerates types of networks that exist in the market.</li> <li>• Describes Internet protocols used in networks.</li> <li>• Illustrates physical components used in networks.</li> </ul>	<ul style="list-style-type: none"> <li>• Aware of consequences of our actions.</li> </ul>	<ul style="list-style-type: none"> <li>• Determines general computer network concepts.</li> </ul>

PRACTICE AND CHECKLIST

PRACTICE DEVELOPMENT

Study Block: Maintenance & Upgrading Computer

PRACTICE N° 1

Purpose:

Scenario: Maintenance Laboratory

TIME:

MATERIALS	MACHINERY	EQUIPMENT	TOOL

## Procedures

Teacher:

- Defines basic concepts related to safety and hygiene in the shop.
- Describes norms and measures of safety.
- Illustrates correct procedures for equipment and tool manipulation.
- Exemplifies actions to execute in the event of accidents.
- Defines basic concepts related to boot disks and recovery.
- Describes applications and uses of boot disks and recovery.
- Uses boot disks in different operating systems.
- Describes the importance of carrying out a preliminary revision and a system inventory.
- Defines basic norms to follow for preliminary revision and inventory.
- Formulates a preliminary report and an inventory of system.
- Demonstrates software use and tools of diagnosis system.
- Describes the procedure for the removal of adapters.
- Describes the procedure for the installation and configuration of adapters.
- Illustrates the procedure for the installation and configuration of each component.
- Demonstrates the process for cables connection.
- Describes the procedure for the removal of existing components.
- Describes the procedure for the installation of each component.
- Illustrates the procedure for the installation and configuration of each component.
- Configures equipment after the installation of new components.
- Describes the procedure for installation of peripheral devices.
- Explains the procedure for installation of each component.
- Configures the equipment after installation of new components.
- Recognize common problems of the hardware.
- Identifies requirements to install software.
- Describes the procedure for installation and configuration of operating systems and other software.

## Procedures

Teacher:

- Installs operating systems and software in different computers.
- Executes tests of the system and installed software.
- Identifies requirements to install software.
- Recognizes the procedure for installation and configuration of operating systems and other software.
- Installs different operating systems and software in computers with particular characteristics.
- Executes tests of the system and installed software.
- Defines concepts related to networks.
- Describes types of networks that exist in the market.
- Describes internet protocols used in networks.
- Illustrates physical components used in networks.

SUGGESTED CHECKLIST	Date:
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Student's name:	
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**Instructions:**  
These criteria will verify student performance by observation. Write an "X" in the column that best describes each student performance.

DEVELOPMENT	YES	NOT YET	NOT APPLICABLE
Clearly recognizes norms and measures of security to apply in the shop.			
Efficiently uses the correct procedures for equipment manipulation and tools.			
Correctly observes actions to execute in the event of accidents.			
Correctly applies established procedural norms in the shop.			
Clearly recognizes the application and use of boot disks and recovery.			
Efficiently follows the procedure for the creation of boot disks and recovery.			
Efficiently uses of boot disks in different operating systems.			
Clearly recognizes basic norms to follow for the preliminary revision and inventory.			
Correctly formulates a preliminary report and a system inventory.			
Efficiently uses software and tools of the system for diagnosis of damages.			
Correctly detects errors and damages in different systems.			
Appropriately describes the procedure for the removal of adapters.			
Clearly recognizes the procedure for the adapter removal.			
Correctly follows the procedure for the adapter installation and configuration.			
Efficiently connects different cables.			
Appropriately describes the procedure for the removal of existing components.			
Clearly recognizes the procedure for removal and installation of components.			
Correctly follows the procedure for installation and configuration of each component.			
Efficiently configures equipment after the installation of new components.			



DEVELOPMENT	YES	NOT YET	NOT APPLICABLE
Appropriately describes the procedure for installation of peripheral devices.			
Clearly recognizes the procedure for removal and installation of existing components.			
Efficiently configures the equipment after installation of new components.			
Correctly verifies results of the installation and configuration.			
Appropriately identifies requirements to install software.			
Clearly recognizes the procedure for installation and configuration of operating systems and other software.			
Efficiently installs different operating systems and software in computers with particular characteristics.			
Efficiently executes tests of the system and installed software.			
Correctly mentions concepts related to networks.			
Correctly enumerates types of networks that exist in the market.			
Appropriately describes internet protocols used in networks.			
Efficiently illustrates physical components used in networks.			

OBSERVATIONS:

### CRITERIA FOR COMPETENCY ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
Describe health and security measures for working with the computer equipment and manual tools.	Describes health and security measures for working with the computer equipment and manual tools.	Recognizes norms and measures of security to apply in the shop.	Knowledge	Clearly recognizes norms and measures of security to apply in the shop.
		Uses the correct procedures for equipment manipulation and tools.	Performance	Efficiently uses the correct procedures for equipment manipulation and tools.
		Observes actions to execute in the event of accidents.	Performance	Correctly observes actions to execute in the event of accidents.
		Applies established procedural norms in the shop.	Performance	Correctly applies established procedural norms in the shop.
Build boot and recovery disks as part of the maintenance security or equipment upgrading processes.	Build boot and recovery disks as part of the maintenance security or equipment upgrading processes.	Recognizes the application and use of boot disks and recovery.	Knowledge	Clearly recognizes the application and use of boot disks and recovery.
		Follows the procedure for the creation of boot disks and recovery.	Performance	Efficiently follows the procedure for the creation of boot disks and recovery.
		Use of boot disks in different operating systems.	Product	Efficiently use of boot disks in different operating systems.

### CRITERIA FOR COMPETENCY ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
Recognize basic norms to follow the preliminary revision and the inventory.	Recognizes basic norms to follow the preliminary revision and the inventory.	Recognizes basic norms to follow for the preliminary revision and inventory.	Knowledge	Clearly recognizes basic norms to follow for the preliminary revision and inventory.
		Formulates a preliminary report and a system inventory.	Product	Correctly formulates a preliminary report and a system inventory.
		Uses software and tools of the system for diagnosis of damages.	Performance	Efficiently uses software and tools of the system for diagnosis of damages.
		Detects errors and damages in different systems.	Product	Correctly detects errors and damages in different systems.
Distinguish adapters used in computers.	Distinguishes adapters used in computers.	Describes the procedure for the removal of adapters.	Knowledge	Appropriately describes the procedure for the removal of adapters.
		Recognizes the procedure for the adapter removal.	Performance	Clearly recognizes the procedure for the adapter removal.
		Follows the procedure for the adapter installation and configuration.	Performance	Correctly follows the procedure for the adapter installation and configuration.
		Connects different cables.	Product	Efficiently connects different cables.

### CRITERIA FOR COMPETENCY ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
Recognize the installation and/or configuration procedure of different internal computer components.	Recognizes the installation and/or configuration procedure of different internal computer components.	Describes the procedure for the removal of existing components.	Knowledge	Appropriately describes the procedure for the removal of existing components.
		Recognizes the procedure for removal and installation of components.	Performance	Clearly recognizes the procedure for removal and installation of components.
		Follows the procedure for installation and configuration of each component.	Performance	Correctly follows the procedure for installation and configuration of each component.
		Configures equipment after the installation of new components.	Product	Efficiently configures equipment after the installation of new components.

### CRITERIA FOR COMPETENCY ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
Recognize the installation and configuration procedure of external computer devices.	Recognizes the installation and configuration procedure of external computer devices.	Describes the procedure for installation of peripheral devices.	Knowledge	Appropriately describes the procedure for installation of peripheral devices.
		Recognizes the procedure for removal and installation of existing components.	Performance	Clearly recognizes the procedure for removal and installation of existing components.
		Configures the equipment after installation of new components.	Product	Efficiently configures the equipment after installation of new components.
		Verifies results of the installation and configuration.	Product	Correctly verifies results of the installation and configuration.
Recognize the installation and configuration procedure of operating systems and other software in the computer.	Recognizes the installation and configuration procedure of operating systems and other software in the computer.	Identifies requirements to install software.	Knowledge	Appropriately identifies requirements to install software.
		Recognizes the procedure for installation and configuration of operating systems and other software.	Knowledge	Clearly recognizes the procedure for installation and configuration of operating systems and other software.
		Installs different operating systems and software in computers with particular characteristics.	Performance	Efficiently installs different operating systems and software in computers with particular characteristics.
		Executes tests of the system and installed software.	Product	Efficiently executes tests of the system and installed software.

### CRITERIA FOR COMPETENCY ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
Determine general computer network concepts.	Determines general computer network concepts.	Mentions concepts related to networks.	Knowledge	Correctly mentions concepts related to networks.
		Enumerates types of networks that exist in the market.	Knowledge	Correctly enumerates types of networks that exist in the market.
		Describes Internet protocols used in networks.	Performance	Appropriately describes internet protocols used in networks.
		Illustrates physical components used in networks.	Product	Efficiently illustrates physical components used in networks.

# **SUBJECT AREA: ENGLISH FOR COMMUNICATION**

## **TENTH LEVEL**



*English classes have given me confidence in the four skills, no matter what profession I choose!*

## DISTRIBUTION OF UNITS ENGLISH FOR COMMUNICATION

### Tenth Level

Unit	Name of the unit	Estimated time in hours	Amount of weeks per unit
1	Building personal interaction at the company	10 hrs	5 weeks
2	Daily life activities	10 hrs	5 weeks
3	Working conditions and success at work	10 hrs	5 weeks
4	Describing a company, equipment and tools.	10 hrs	5 weeks
5	Talking about plans, personal and educational goals.	10 hrs	5 weeks
6	Communicating Effectively	10 hrs	5 weeks
7	Raising Economic Success	20 hrs	10 weeks
	<b>Total</b>	<b>80 hrs</b>	<b>40 weeks</b>



Sub-área: English for communication	Level: Tenth
Unit 1: <b>Building personal interaction at the company</b>	
Hours per unit: 10 hours	
<b>Cognitive target:</b> Exchanging information about personal interaction at the company, ways of interacting, meeting people, ethics, personal skills, cultural aspects	

LINGUISTIC ACHIEVEMENTS	CONTENT (FUNCTIONS AND LANGUAGE)	PROCEDURES	VALUES AND ATTITUDES	LEARNING OUTCOMES
<p><b>LISTENING</b></p> <ul style="list-style-type: none"> <li>Understanding simple familiar phrases and short statements.</li> </ul> <p><b>SPEAKING</b></p> <ul style="list-style-type: none"> <li>Asking and responding to questions in clearly defined situations.</li> </ul>	<p><b>Functions</b></p> <ul style="list-style-type: none"> <li>Identifying oneself to others in the company</li> <li>Expressing likes, dislikes and preferences and personal qualities in a professional environment..</li> <li>Asking for and giving information about personal skills.</li> </ul>	<p><b>Students:</b></p> <ul style="list-style-type: none"> <li>Listen to input language.</li> <li>Identify basic vocabulary from oral and visual stimuli.</li> <li>Perform instructions given by Teacher or partners.</li> </ul>	<ul style="list-style-type: none"> <li>Politeness when dealing with others.</li> <li>Friendliness with others.</li> <li>Self-respect for others.</li> </ul>	<p><b>Students:</b></p> <ul style="list-style-type: none"> <li>Show my understanding by giving word phrases and sentences through repetition.</li> <li>Predict meaning by exchanging greetings, introductions leave takings, personal information</li> </ul>

LINGUISTIC ACHIEVEMENTS	CONTENT (FUNCTIONS AND LANGUAGE)	PROCEDURES	VALUES AND ATTITUDES	LEARNING OUTCOMES
<p><b>READING</b></p> <ul style="list-style-type: none"> <li>• Reading personal information forms.</li> <li>• Reading a personal letter.</li> </ul> <p><b>WRITING</b></p> <ul style="list-style-type: none"> <li>• Writing about occupations and writing the name and address on an envelope.</li> </ul>	<ul style="list-style-type: none"> <li>• Expressing opinions and concerns.</li> <li>• Approving or disapproving different practices in a working environment</li> <li>• Asking for and giving information about occupations.</li> <li>• Solving problems</li> <li>• Agreeing and disagreeing</li> </ul> <p><b>Language</b></p> <ul style="list-style-type: none"> <li>• High frequency questions.</li> <li>• Personal and company names and job titles.</li> <li>• I consider, disagree , agree</li> <li>• I am concern about...</li> <li>• I think...</li> <li>• Greetings, introductions and leave takings.</li> <li>• May I introduce myself?</li> </ul>	<p><b>Students:</b></p> <ul style="list-style-type: none"> <li>• Match meanings with visual images such as pictures, drawings and charts.</li> <li>• Participate in oral tasks such as oral interaction scenarios or other types of role playing to fulfill the topic by giving the sets of rules</li> <li>• Apply the information heard to what he/has to do</li> </ul>	<ul style="list-style-type: none"> <li>• Good working habits.</li> <li>• Politeness when dealing with others.</li> </ul>	<ul style="list-style-type: none"> <li>• Ask and respond to questions by using expressions and role plays on the topic being studied.</li> <li>• Express personal responses, likes, dislikes and feeling by giving my opinion regarding the topic.</li> <li>• Read any material related to the topic by using the acquired knowledge.</li> <li>• Convey ideas by writing any description, filling out forms or other documents.</li> </ul>

Sub-área: English for Communication	Level: Tenth
Unit 2: <b>Daily life activities</b>	Hours per unit: 10 hours
<b>Cognitive target:</b> Interprets and communicates information about: daily activities at home, school and job	

LINGUISTIC ACHIEVEMENTS	CONTENT (FUNCTIONS AND LANGUAGE)	PROCEDURES	VALUES AND ATTITUDES	LEARNING OUTCOMES
<p><b>LISTENING</b></p> <ul style="list-style-type: none"> <li>• Making appointments for personal business.</li> </ul> <p><b>SPEAKING</b></p> <ul style="list-style-type: none"> <li>• Describing my personal schedules.</li> <li>• Talking about daily routines at home, at school and at work.</li> </ul>	<p><b>Functions</b></p> <ul style="list-style-type: none"> <li>• Interpreting and communicating information.</li> <li>• Participating as a member of a team.</li> <li>• Acquiring and evaluating information.</li> <li>• Making appointments.</li> <li>• Communicating schedule information at home, school and work.</li> <li>• Identifying and listing daily activities.</li> </ul>	<p><b>Students:</b></p> <ul style="list-style-type: none"> <li>• Identify sounds, words, and vocabulary to carry out actions.</li> <li>• Participate in dialogues and role-plays.</li> <li>• I describe activities and routines.</li> <li>• Identify clues, and main ideas from texts.</li> </ul>	<ul style="list-style-type: none"> <li>• Self-respect and respect for other people's preferences.</li> <li>• Sensitivity towards other people's likes and dislikes.</li> <li>• Tolerance for other people's opinions, ideas.</li> </ul>	<p><b>Students:</b></p> <ul style="list-style-type: none"> <li>• Make appointments for personal business.</li> </ul> <p><b>SPEAKING</b></p> <ul style="list-style-type: none"> <li>• Describe my personal schedules.</li> <li>• Talk about daily routines at home, at school and at work.</li> </ul>

LINGUISTIC ACHIEVEMENTS	CONTENT (FUNCTIONS AND LANGUAGE)	PROCEDURES	VALUES AND ATTITUDES	LEARNING OUTCOMES
<p><b>READING</b></p> <ul style="list-style-type: none"> <li>Predicting the content of a story from the title.</li> </ul> <p><b>WRITING</b></p> <ul style="list-style-type: none"> <li>Writing about daily routine.</li> </ul>	<ul style="list-style-type: none"> <li>Responding to basic information in the target language.</li> </ul> <p><b>Language</b></p> <ul style="list-style-type: none"> <li>Simple present: statements, spelling rules.</li> <li>Adverbs of frequency.</li> <li>Expressions of frequency.</li> <li>Routines. sleep , go to the movies, swim, and walk.</li> <li>I feel happy, she is angry, etc</li> <li>I like..., I prefer...</li> </ul>	<p><b>Students:</b></p> <ul style="list-style-type: none"> <li>Use vocabulary to make descriptions in a written way.</li> <li>Use information in contexts.</li> <li>Produce short pieces of writing.</li> </ul>	<ul style="list-style-type: none"> <li>Respect for other people's opinions.</li> <li>Respect for people's behaviour and way of being.</li> </ul>	<p><b>Students:</b></p> <ul style="list-style-type: none"> <li>Predict the content of a story from the title.</li> <li>Write about daily routine.</li> </ul>

Sub-área: English for Communication	Level: Tenth
Unit 3: <b>Working conditions and success at work</b>	Hours per unit: 10 hours
<b>Cognitive target:</b> Interprets and communicates information about: someone 's job, working tasks, and job positions, responsibilities	

LINGUISTIC ACHIEVEMENTS	CONTENT (FUNCTIONS AND LANGUAGE)	PROCEDURES	VALUES AND ATTITUDES	LEARNING OUTCOMES
<p><b>LISTENING</b></p> <ul style="list-style-type: none"> <li>Asking and answering about job positions and respond to job interview questions</li> </ul> <p><b>SPEAKING</b></p> <ul style="list-style-type: none"> <li>Describing someone 's job. and uncompleted work tasks.</li> </ul>	<p><b>Functions</b></p> <ul style="list-style-type: none"> <li>Expressing likes, dislikes, preferences and personal qualities in a professional environment.</li> <li>Exchanging information about the company structure and working conditions.</li> <li>Identifying important issues.</li> </ul>	<p><b>Students:</b></p> <ul style="list-style-type: none"> <li>Practice having a job interview.</li> <li>Participate in oral tasks such as oral interaction, scenarios or other types of role playing to fulfill the topic by giving the sets of rules.</li> <li>Ask and answer questions about work responsibilities, schedules, benefits and requirements for jobs.</li> </ul>	<ul style="list-style-type: none"> <li>Politeness when dealing with others.</li> <li>Friendliness with others.</li> <li>Self-respect for others.</li> </ul>	<p><b>Students:</b></p> <ul style="list-style-type: none"> <li>Ask and answer about working conditions by pretending being in a job interview.</li> <li>Describe a job by reporting complete tasks based on the newspaper information.</li> </ul>

LINGUISTIC ACHIEVEMENTS	CONTENT (FUNCTIONS AND LANGUAGE)	PROCEDURES	VALUES AND ATTITUDES	LEARNING OUTCOMES
<p><b>READING</b></p> <ul style="list-style-type: none"> <li>• Reading and interpret a job application. and reading magazine article.</li> </ul> <p><b>WRITING</b></p> <ul style="list-style-type: none"> <li>• Writing a paragraph describing a job I would like to have.</li> <li>• Filling out a job application.</li> </ul>	<ul style="list-style-type: none"> <li>• Solving problems</li> <li>• Describing facts and situations.</li> <li>• Contrasting and comparing information.</li> </ul> <p><b>Language</b></p> <ul style="list-style-type: none"> <li>• Simple present. Yes/no questions. Information questions.</li> <li>• Personal and Company names and job titles.</li> <li>• Personal Information</li> <li>• Adverbs and adverbial phrases of frequency..</li> <li>• Human Resources Manager</li> </ul>	<p><b>Students:</b></p> <ul style="list-style-type: none"> <li>• Read newspaper job ads.</li> <li>• Negotiate and communicate information..</li> <li>• Acquire and evaluate information.</li> <li>• Organize and maintain information.</li> </ul>	<ul style="list-style-type: none"> <li>• Good working habits.</li> <li>• Politeness when dealing with others.</li> </ul>	<p><b>Students:</b></p> <ul style="list-style-type: none"> <li>• Read and interpret a job application. and reading magazine article.</li> <li>• Write a paragraph describing a job I would like to have.</li> <li>• Filling out a job application</li> </ul>

Subject Area: English for communication	Level: Tenth
Unit 4: <b>Describing a company, equipment and tools.</b>	Hours per unit: 10 hours
Cognitive target: Interprets and communicates information about: company furniture, equipment and tools	

LINGUISTIC ACHIEVEMENTS	CONTENT (FUNCTIONS AND LANGUAGE)	PROCEDURES	VALUES AND ATTITUDES	LEARNING OUTCOMES
<p><b>LISTENING</b></p> <ul style="list-style-type: none"> <li>Asking for and give information on companies and products, furniture.</li> </ul> <p><b>SPEAKING</b></p> <ul style="list-style-type: none"> <li>Communicating messages with little or no difficulty about equipment and tools.</li> </ul>	<p><b>Functions</b></p> <ul style="list-style-type: none"> <li>Identifying, classifying, and locating furniture, equipment .</li> <li>Asking for and giving information about company furniture, equipment and tools.</li> <li>Describing types of tools, ergonomics, processes and operations.</li> </ul>	<p><b>Students:</b></p> <ul style="list-style-type: none"> <li>Pretend working for a company.</li> <li>Talk about types of business, equipment, furniture and tools.</li> <li>Find the characteristics of the perfect partner.</li> </ul>	<ul style="list-style-type: none"> <li>Establish differences and similarities in a place full of technological equipment with a place with little technology.</li> <li>Respect for norms, rules and regulations</li> </ul>	<p><b>Students:</b></p> <ul style="list-style-type: none"> <li>Ask and answer information to describe a company equipment.</li> <li>Communicate information and my opinions regarding a company.</li> </ul>

LINGUISTIC ACHIEVEMENTS	CONTENT (FUNCTIONS AND LANGUAGE)	PROCEDURES	VALUES AND ATTITUDES	LEARNING OUTCOMES
<p><b>READING</b></p> <ul style="list-style-type: none"> <li>• Reading and interpreting companies descriptions.</li> </ul> <p><b>WRITING</b></p> <ul style="list-style-type: none"> <li>• Writing lists of equipment and tools from different companies.</li> </ul>	<ul style="list-style-type: none"> <li>• Removing the ink container and replace it with a new one.</li> <li>• Describing Measurements.</li> <li>• Check the pieces of furniture, adjust the___ to your own ergonomic.</li> <li>• Describing items used in a company: carbon copy, notations, <b>Language</b> <ul style="list-style-type: none"> <li>• Conjunctions: as if, after, and others.</li> <li>• Infinitives, participles, gerunds, parallel dangling structures.</li> <li>• The imperative.</li> <li>• Sequencing.</li> </ul> </li> </ul>	<p><b>Students:</b></p> <ul style="list-style-type: none"> <li>• Role-play situations such as interviews, dialogues, conversations, and others.</li> <li>• Exchange information with partners about the topic being studied.</li> <li>• Classify sets given under rules, norms or warnings.</li> <li>• Use technology to organize information</li> <li>• Search basic information on names, ID cards, and others.</li> <li>• Produce oral situations. (Interviews, dialogues, conversations.)</li> </ul>	<ul style="list-style-type: none"> <li>• Responsibility when using special machines.</li> <li>• Differences and similarities in a place full of technological equipment with one with little technology.</li> </ul>	<p><b>Students:</b></p> <ul style="list-style-type: none"> <li>• Read information and interpret it by seeking companies descriptions or visiting them.</li> <li>• Write lists of equipment and tools from different companies.</li> </ul>



Subject Area: English for communication	Level: Tenth
Unit 5: <b>Talking about plans, personal and educational goals.</b>	Hours per unit: 10 hours
<b>Cognitive target:</b> Exchanging information about: leisure activities, holidays and special occasions. Planning educational and personal goals	

LINGUISTIC ACHIEVEMENTS	CONTENT (FUNCTIONS AND LANGUAGE)	PROCEDURES	VALUES AND ATTITUDES	LEARNING OUTCOMES
<p><b>LISTENING</b></p> <ul style="list-style-type: none"> <li>Talking about holiday celebrations. And leisure activities</li> </ul> <p><b>SPEAKING</b></p> <ul style="list-style-type: none"> <li>Describing the steps to fill out different type of forms by doing college enrollement.</li> </ul>	<p><b>Functions</b></p> <ul style="list-style-type: none"> <li>Planning for the immediate future.</li> <li>Planning for long term future activities.</li> <li>Setting personal and professional goals.</li> <li>Setting a schedule for leisure activities with friends and family.</li> <li>Applying for enrollment in college</li> </ul>	<p><b>Students:</b></p> <ul style="list-style-type: none"> <li>Use prior knowledge to carry out tasks.</li> <li>Use expressions to talk about something.</li> <li>Extract main points and details in written and oral texts.</li> <li>Present short speeches about holidays and celebrations in English speaking countries.</li> </ul>	<ul style="list-style-type: none"> <li>Effort to complete an immediate or future plan..</li> <li>Discipline to perform the tasks.</li> <li>Efficiency when performing tasks.</li> </ul>	<p><b>Students:</b></p> <ul style="list-style-type: none"> <li>Talk about holiday celebrations and leisure activities in English speaking countries by presenting short speeches.</li> <li>Describe the steps to fill out different type of forms by doing college enrollement.</li> </ul>

LINGUISTIC ACHIEVEMENTS	CONTENT (FUNCTIONS AND LANGUAGE)	PROCEDURES	VALUES AND ATTITUDES	LEARNING OUTCOMES
<p><b>READING</b></p> <ul style="list-style-type: none"> <li>Reading news and articles about people's plans.</li> </ul> <p><b>WRITING</b></p> <ul style="list-style-type: none"> <li>Describing possible weekend activities.</li> </ul>	<p><b>Language</b></p> <ul style="list-style-type: none"> <li>Future with be going to: statements, yes/no questions.</li> <li>Future with might statements.</li> <li>Infinitives with want, plan, need: statements.</li> <li>Future with: will statements</li> </ul>	<p><b>Students:</b></p> <ul style="list-style-type: none"> <li>Produce short pieces of writing, descriptions, and others.</li> <li>Identify cultural features and values in different cultures from a written text.</li> <li>Practice of values to analyze our culture and others.</li> </ul>	<ul style="list-style-type: none"> <li>Leadership in specific situations in life.</li> <li>Self-respect for others at job or at school.</li> <li>Good working habits.</li> </ul>	<p><b>Students:</b></p> <ul style="list-style-type: none"> <li>Read news and articles about people's plans.</li> <li>Describe possible weekend activities.</li> </ul>

Subject Area: English for Communication	Level: Tenth
Unit 6: <b>Communicating Effectively</b>	Hours per unit: 10 hours
<b>Cognitive target:</b> Interprets and communicates information about: daily activities at home, school and job. Daily routines	

LINGUISTIC ACHIEVEMENTS	CONTENT (FUNCTIONS AND LANGUAGE)	PROCEDURES	VALUES AND ATTITUDES	LEARNING OUTCOMES
<p><b>LISTENING</b></p> <ul style="list-style-type: none"> <li>Solving problems by phone and making telephone arrangements.</li> </ul> <p><b>SPEAKING</b></p> <ul style="list-style-type: none"> <li>Describing what makes a good communicator.</li> </ul>	<p><b>Functions</b></p> <ul style="list-style-type: none"> <li>Getting people's attention and introducing a speaker.</li> <li>Talking about improving English skills when giving a speech.</li> <li>Making a short speech.</li> <li>Distinguishing speeches for different occasions</li> <li>Responding to criticism when giving a presentation.</li> </ul>	<p><b>Students:</b></p> <ul style="list-style-type: none"> <li>Prepare a presentation by using all the material presented by the professor.</li> <li>Give oral performances by speaking from notes.</li> <li>Gain audience attention through the use of words and visuals.</li> </ul>	<ul style="list-style-type: none"> <li>Show respect for cultural, individual, ethical, and social diversity.</li> <li>Demonstrate concern when interacting with the social, natural and cultural environment.</li> </ul>	<p><b>Students:</b></p> <ul style="list-style-type: none"> <li>Solve problems and make telephone arrangements by phone.</li> <li>Describe what a good communicator is by responding to criticism when giving a short speech.</li> </ul>

LINGUISTIC ACHIEVEMENTS	CONTENT (FUNCTIONS AND LANGUAGE)	PROCEDURES	VALUES AND ATTITUDES	LEARNING OUTCOMES
<p><b>READING</b></p> <ul style="list-style-type: none"> <li>Evaluating the effects of stress factors and get advice on presenting.</li> </ul> <p><b>WRITING</b></p> <ul style="list-style-type: none"> <li>Describing the facts that affect the success of a presentation.</li> </ul>	<p><b>Language</b></p> <ul style="list-style-type: none"> <li>Sentence stress.</li> <li>Phrasal/ prepositional verbs.</li> <li>Pausing for effect.</li> <li>Ethical vocabulary.</li> <li>Intonation.</li> </ul>	<ul style="list-style-type: none"> <li>Listen carefully to the material presented by the professor to identify specific information.</li> <li>Complete dialogues by using specific information.</li> <li>Practice oral interaction using proper pronunciation and language</li> <li>Apply background and new knowledge to interact in interviews, dialogues, and speeches.</li> </ul>	<ul style="list-style-type: none"> <li>Responsibility to give and follow directions.</li> <li>Show responsibility when giving oral presentations.</li> <li>Demonstrate respect for orders and instructions requested at school/ work.</li> </ul>	<p><b>Students:</b></p> <ul style="list-style-type: none"> <li>Evaluate the effects of stress factors and get advice on presenting skills by doing specific readings.</li> <li>Describing the facts that affect the success of a presentation.</li> </ul>

Subject Area: English for communication	Level: Tenth
Unit 7: <b>Raising Economic Success</b>	Hours per unit: 20 hours
<b>Cognitive target:</b> Using appropriate language for comparing goods, discussing advertisements, describing products and your preferences.	

LINGUISTIC ACHIEVEMENTS	CONTENT (FUNCTIONS AND LANGUAGE)	PROCEDURES	VALUES AND ATTITUDES	LEARNING OUTCOMES
<p><b>LISTENING</b></p> <ul style="list-style-type: none"> <li>Discussing about advertisements from different means of communication.</li> </ul> <p><b>SPEAKING</b></p> <ul style="list-style-type: none"> <li>Comparing goods and services and explaining the reasons why I like a product.</li> <li>Describing product characteristics by contrasting and comparing different goods or services.</li> </ul>	<p><b>Functions</b></p> <ul style="list-style-type: none"> <li>Shopping for appliances.</li> <li>Interpreting job ads.</li> <li>Examining alternatives and choosing.</li> <li>Discussing advantages and disadvantages of borrowing money to different sources.</li> </ul>	<p><b>Students:</b></p> <ul style="list-style-type: none"> <li>Listen actively using prior knowledge.</li> <li>Use expressions to talk about advertisements.</li> <li>Present short speeches contrasting and comparing products.</li> <li>Speak fluently so others can understand.</li> </ul>	<ul style="list-style-type: none"> <li>Participation as a member of a team.</li> <li>Develop critical thinking.</li> <li>Learn to negotiate.</li> <li>Organization and keeping information.</li> </ul>	<p><b>Students:</b></p> <ul style="list-style-type: none"> <li>Discuss about advertisements by comparing different means of communication.</li> <li>Comparing goods and services by explaining the reasons why I prefer any product.</li> <li>Describe product characteristics by contrasting and comparing different goods or services.</li> </ul>

LINGUISTIC ACHIEVEMENTS	CONTENT (FUNCTIONS AND LANGUAGE)	PROCEDURES	VALUES AND ATTITUDES	LEARNING OUTCOMES
<p><b>READING</b></p> <ul style="list-style-type: none"> <li>Expanding reading skills by reading job ads from newspaper or magazines. And reading formal letters of complaint.</li> </ul> <p><b>WRITING</b></p> <ul style="list-style-type: none"> <li>Writing a formal letter of complaint, completing a product comparison chart and writing an advertisement.</li> </ul>	<p><b>Language</b></p> <ul style="list-style-type: none"> <li>The comparative form of adjectives.</li> <li>(not) as + adjective +as.</li> <li>The superlative adjectives.</li> <li>Superlatives with most and more.</li> <li>Prepositions.</li> </ul>	<ul style="list-style-type: none"> <li>Read a list of risks and distinguish daily risks from business risks.</li> <li>Use prior knowledge to read with understanding.</li> <li>I extract main points and details in written and oral texts.</li> <li></li> </ul>	<ul style="list-style-type: none"> <li>Allocates material and facility resources.</li> <li>Cooperate with others.</li> <li>Reflect and evaluate.</li> <li>I solve problems and make decisions</li> </ul>	<p><b><u>Students:</u></b></p> <ul style="list-style-type: none"> <li>Expand reading skills by reading job ads from newspaper or magazines. And reading formal letters of complaint.</li> <li>Write a formal letter of complaint, completing a product comparison chart and writing an advertisement.</li> </ul>

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# ANNEXES

## ANNEX 1

### PORTFOLIO OF EVIDENCE

#### 1. CONCEPT

A portfolio of evidence is the collection of evidence which assesses a student's work in order to show what he/she has achieved in each subject area according to the Technical Job Competency Standards.

It is a file of evidence made by a student who is guided by a teacher. This tool helps to organize the student's evidence complied during the evaluation process and assessment of real jobs to demonstrate his/her competence. The analysis of evidence determines the student's efforts and achievements in a variety of subject areas.

This feature allows the teacher to have a complete collection of tools for verifying evidence of learning compared to specifications in the Technical Competency Standards of each study block. Thus, the teacher is able to judge whether all the information gathered represents the student's ability.

#### 2. ADVANTAGES

- Allows for a broader and deeper vision of a student's achievements, strengths, and weaknesses
- Promotes student / teacher participation in monitoring and evaluating their own teaching-learning process which prepares the student to make effective decisions
- Provides feedback on the teaching- learning process in order to make constant improvements
- Encourages processes, such as data collection, systematization, evaluation, and decision making

#### 3. USES AND APPLICATIONS

For teachers

- It allows for decision-making according to each student's characteristics
- Helps monitor the student's progress and learning results
- Enables the development of a training process, which constantly develops individual abilities

For students

- Allows for active and responsible participation in the development of their knowledge, skills, and abilities
- Develops the self-evaluation processes, learning results, and performance criteria suggested for each study block

#### **4. STRATEGIES**

Elements to consider when building a portfolio of evidence :

Direct Evidence

- Practices
- Checklists, observation sheets, rating scales
- Product

Indirect evidence

- Reports
- Projects

Additional Evidence

- Interviews (oral questions)
- Questionnaires
- Tests
- Simulations

It is important to remember that the portfolio of evidence is a means to gather information which then permits an accurate decision of the teacher. Therefore it is necessary to:

- design a simple low cost construction model for the student
- explain the basic rules for building the portfolio to the students at the beginning of the school year
- provide a written report to parents about the importance of the portfolio in the assessment process
- define rules regarding portfolio use and handling by both students and teachers.

The portfolio of evidence may be different in content and presentation, but should be standardized so that:

- teachers have a clear idea of the required elements in order to be able to give an opinion about the student's competency. It is important to design a complete organizational structure related to the portfolio.
- it allows the student to use it as a personal tool to reflect his/her creativity.

## 5. PORTFOLIO COMPONENTS

It is recommended that the portfolio of evidence contain at least the following elements:

- FRONT PAGE
- CONTENTS
- GENERAL INFORMATION
  - Name of Technical High School
  - Name of the program
  - Grade
- GENERAL INFORMATION ABOUT THE SUBJECT AREA
  - Name of the subject area
  - Name of the teacher
  - Number of hours
- GENERAL INFORMATION ABOUT THE STUDENT
  - Name
  - Home address
  - Phone numbers (home, cell, others)
  - E-mail
  - Parents' names
  - Parents' phones
- ACADEMIC BACKGROUND

- Courses
- Internship
- Company Practices

- DIAGNOSIS

- Tests
- Questionnaires
- Interviews

- EVALUATION

- Description of the evaluation requirements for the subject area to be explained by the teacher at the beginning of the school year

- EVIDENCE

- Knowledge

- Questionnaires
    - Written tests

- Performance

- Laboratory practices or workshop
    - Performance tests

- Product

- Samples of developed tasks
    - Checklist

- EVALUATION TOOLS

- Classwork - only the rubrics or checklists
    - Extraclass work - only the rubrics or checklists



- PORTFOLIO TOOLS  
-Checklist sheets or rubrics used by teachers for portfolio assessment.
- OTHER RELEVANT MATERIALS.

## 6. PORTFOLIO REVIEW EVIDENCE

The teacher should set a timetable to periodically check the portfolio and this schedule should be given to students at the beginning of the course.

Tools must be designed specifically for portfolio assessment in order to perform this task objectively. This information, once implemented, will be given to the student to put into his/her portfolio of evidence.

## 7. STEPS TO DESIGN ENGLISH SUBJECT AREA OF PORTFOLIO OF EVIDENCE (FOR ENGLISH TEACHERS ONLY)

- Teachers must follow the previous portfolio building guidelines.
- Teachers must remember that English subject area should be included in the same portfolio of evidence ( there is not need to have an extra portfolio for English)
- For the English subject area, you must provide an introduction and then four sections properly labeled for each skill: listening, speaking, reading, and writing.
- Teachers and students should include only assessment rubrics which demonstrate the evidence of language learning in each skill, as well as meaningful activity reports, documents, or other projects.
- There should be a brief description of the process and evaluation tools used by the teacher. Generally, three types of evaluation will be present: teacher performed, peer assessment (feedback to improve the quality of work performance) and self-assessment. The first and last types are mandatory, while the second is optional.
- Remember that the teacher should personally and continuously monitor student progress, providing feedback on the teaching-learning process and ongoing evaluation of student performance. Creativity is essential in this process.
- It is important that teachers develop a holistic scale to assess all four sections of the portfolio.

## 8. WHAT KIND OF DOCUMENTS AND PAPERS ARE INCLUDED IN THE ENGLISH SECTION OF THE PORTFOLIO?

- It should include a checklist for evaluating class work, outside-of-class work, applied tests, the holistic scale.
- Rubrics for listening, speaking, reading, writing as evidence: for example: writing samples, lists of books that have been read by students, recordings and the student's favorite assignments or any work that illustrates the competence acquisition in a particular skill.
- The portfolio is usually associated with written language, but can also include recordings with examples of oral production.
- The portfolio should not be converted into a file containing a student papers, but must include reflections by the students themselves and by the teachers. Any information that effectively supports assessment should be taken into account. The use of portfolios encourages change in classroom practices through improvements in assessment, motivation, and participation of students in their learning.
- Every student product included in the portfolio should be dated with a brief description of purpose of inclusion and other relevant comments.
- For practical reasons, the number of documents ( papers, files, archive, diaries, documents, dossier file, letters, records) in the portfolio should be limited to facilitate review and evaluation.

**MINISTRY OF PUBLIC EDUCATION  
TECHNICAL EDUCATION DEPARTMENT  
TECHNICAL HIGH SCHOOL .....**

# **PORFOLIO OF EVIDENCE**

**STUDENT:**

**DATE AND PLACE**

## CONTENTS

## PORTFOLIO OF EVIDENCE

TECHNICAL HIGH SCHOOL:	
Program:	
Grade:	
Subject area:	
Study block:	
Number of hours:	

Student's name and last name:
-------------------------------

## RESUME

### PERSONAL INFORMATION

- Name:
- Birthdate:
- Address:
- Phone number:
- E-mail:
- Parents` names:
- Parents' phone and address:

### ACADEMIC BACKGROUND

- Elementary School:
- High School:
- Courses:
  - 1.
  - 2.

<b>INTERNSHIPS AND PRACTICE IN COMPANIES</b>
Company:
Address:
Phone number:
Activities:

## **EVIDENCE**

The following sheets are the necessary evidence to demonstrate student's competency.

Each evidence (knowledge, performance, and product) is included in the table of contents.



### LEARNING RESULTS COMPARISON SHEET

Study Block:					
Title:					
Purpose:					
Learning Results	Performance Criteria	Evidence	Competent		
			Yes	Not yet	
Student`s name:			Signature:		
Teacher`s name:			Signature:		
Place and date:					

## CONCLUSIONS

### Observations:

1. After checking the evidence presented by .....(student's name) and the comparison with the learning results, it can be stated:

For the learning result .....(write the learning result), it is demonstrated that ...

### Recommendations:

These recommendations should go in both directions according to the student's assessment:

- A. Validation of the scope of learning results according to findings
- B. Recommended improvement measures, specifying the student's weaknesses and possible teaching strategies to improve the results: from participating in a specific activity, receiving reinforcement from the teacher, doing more practices to submitting evidence to demonstrate the development of the required knowledge, skills, or ability

## ANNEX 2

### Communicative Activities

#### SPEAKING ACTIVITIES

##### Activity 1

Name: A day in the life.

Topic: Asking about events.

Materials: A piece of paper for each group.

Objectives: To practice asking questions in the past tense.

Process: The class is divided into groups. One member of each group leaves the room. The remaining group members decide on how the person who is outside spent the previous day. They draw up an exact time schedule from 8am to 8pm and describe where the person was, what he did, who he talked to. The people who were outside are called back in. There they try to find out, how the group thinks they spent the previous day. Then he gives the correct responses.

*Taken from Cambridge University Press.*

## Activity 2

Name: Chit Chat

Topic: Personal information

Materials: Design a questionnaire sheet and one information sheet with names of people, age, country, marital status, job, hobbies

Objectives: The objective of the game is practice questions to find all people described in the questionnaire.

Process: The game may be played with any number. If there are more than 16 students in the class, the activity must be practiced in two groups. Copy one role card and one questionnaire for each student in the class. Distribute one role card to each student and allow a little time for them to become familiar with the information, then give each student the questionnaire. Each student must move around the room asking each other questions until they have found all the people described on the questionnaire.

Example:

QUESTIONNAIRE	ROLE CARD
A technician with two children. A grandmother who lives in ... A 24 Grade old nurse An electrician who plays the guitar	John Peter Age:26 Lives in London Married Two children:Tim and Andy Job: technician Hobbies: tennis, football

*Taken from Oxford University Press*

### Activity 3

- Name:** Looking for a job
- Topic:** Talking about abilities
- Language:** Use of can to express ability.
- Materials:** A set of cards for each student in the class.
- Objectives:** To practice the use of can + abilities.
- Vocabulary:** Abilities.
- Process:** The game may be played with any number of students. Copy enough cards for everyone in the class, make sure that for every employee's card there is a corresponding employer's card. Give out one card to everyone in the class. The object of the game is for every employee to find a job, and for every employer to find a suitable person for the job. To do this, employers will have to move around the class, interviewing candidates for the jobs. They should only take candidates who fulfill all the requirements listed on the advertisement. The game is finished when everyone has a job. If you have an odd number of students in the class, either one student will be left without a job, or, if you think this is too cruel, you should alter one of the advertisements to read.

**Example:**

*Taken from Oxford University Press.*

<p><b>You can:</b></p> <p>swim                      draw and paint  speak French            play the piano  type                        sing</p>	<p>WANTED: <i>KINDER GARDEN TEACHER</i></p> <p><i>Must be able to:</i></p> <p><i>Swim, sing</i>  <i>Speak French, play the piano</i></p>
<p><b>You can:</b></p> <p>Take shorthand                      type  Play the piano                        drive  Speak French and German        swim</p>	<p>WANTED: SECRETARY</p> <p><i>Must be able to</i></p> <p>Type  Take shorthand  Speak French and German</p>

#### Activity 4

- Name: Job Prestige  
Topic: Occupations  
Materials: Prepare a list with 15 different occupations, give a list to every student.  
Objectives: To practice speaking about occupations.

Process: Outline the task. Give a list of occupation to each student and tell them to rank them according to two criteria. First arrange them in the order in which these jobs are regarded and paid for in our society. Secondly, make a list according to the importance of the job. Divide the class in pairs, let students compare their lists and priorities, ask them why do they agree or disagree with their classmate list. Write the differences on the board to discuss with the rest of the class.

*Taken from Cambridge University Press.*

#### Activity 5

- Name: Secret Topic  
Topic: Arguing, Expressing one's opinions  
Materials: A piece of paper with a topic on it.  
Objectives: To discuss and express one's opinions about a specific topic.

Process: Two students agree on a topic they want to talk about without telling the others what it is. Students start discussing their topic without mentioning it. The others listen. Anyone in the rest of the group who thinks he knows what they are talking about, joins in their conversation. When about a third or half of the class have joined in the game is stopped.

*Taken from Cambridge University Press.*

## LISTENNING ACTIVITIES

### Activity 1

Name: Debate the Issue  
Topic: Discussion  
Materials: Select a sequence which features a controversial issue.  
Objectives: To promote communicative competence.

Process: Write a motion on the board related to the topic of the video. for example: everyone should have the right to possess a gun for self protection. Tell Students that you are going to play a sequence related to that motion. As they watch the video, they are to decide how they feel about the motion, play the sequence, tell Students that they are now going to participate in a debate, Ask for volunteers to argue 'pro' and 'con'. Select an equal number of students between 2 and 4, to form two debating teams. Appoint one student from each team to act as captain. Captains will give their presentations first and summarize their team's argument at the end. If there is time, play the sequence again.

*Taken from Prentice Hall Regents.*

### Activity 2

Name: Assemble the script/video  
Topic: Listening comprehension  
Materials: Select a sequence in which the dialogue provides several clues to the action, and the picture frequently suggest what is being said. You will need two rooms and an audiocassette recorder. Before class, record the sound track of the sequence onto an audiocassette.



**Objectives:** To practice listening, speaking and writing.

**Process:** Divide Students into two teams and possibly into subgroups. Tell Students that you are going to play a short sequence. Explain that one team will have the soundtrack only. They must imagine the pictures. The other team will have the video without the sound, they must write the dialogue script. If necessary, give a very brief hint about the subject-matter of the sequence, the names of characters, etc. Team 1 takes the audiocassette recorder to the other room, they play the soundtrack and write down what they think the situation is, who the characters are, what happens during the sequence. Stay with team 2, play the complete sequence with the sound turned down, they play it shot by shot without sound, pausing to allow the team to write the dialogue. Bring team 1 back into the classroom. Divide Students into pairs with one member from team1 working with one member from team 2. Each pair takes a piece of paper with a line down the middle. They must now write the script (short description on the left of the line, dialogue on the right).

*Taken from Prentice Hall Regents.*

### **Activity 3**

**Name:** Analyzing Commercials/video

**Topic:** Discussion, Listening, Note-taking

**Materials:** Select one or more commercials which provide enough relevant information and discussion points for this activity. Duplicate the handout, make one copy for each student.

**Objectives:** To discuss, to listen and take notes about a tv commercial.

**Process:** In class: Distribute the handout. Go over it with Students to make sure they understand the kind of information required. Tell Students that you are going to play a TV commercial. Their task is to complete the chart with information from the commercial. Play the commercial, several times if necessary. Students work individually to complete the chart, as they finish, ask Students to compare their answers with those of another student. Play the commercial again. Students confirm or modify their answers. *Taken from Prentice Hall Regents.*

## READING ACTIVITIES

### Activity 1

Name: Ten things to Do Before Reading

Topic: Practice previewing

Material: Reading passages from students' books

Objective: To preview a reading to see what students already know in terms of content and vocabulary.

Process: Ask students to brainstorm for answers to the following questions, then write ideas on the board.

1. Look at the title and the heading for each section. What do you think this passage is going to be about?
2. Look at the pictures. What do you think this passage is going to be about?
3. Read the first and last paragraphs and the first sentence of each paragraph. What do you think this passage is going to be about?
4. Read the title. Now quickly scan the passage and circle all the words that have a connection to the title.
5. Scan the passage and cross out all the words you don't know. After you read the passage again carefully, look up the words in a dictionary.
6. After looking at the title, pictures, and so on, brainstorm the specific words you expect to see in the passage.
7. After looking at the title and pictures, make up some questions you think this passage might answer.
8. What kind of passage is this? (fiction?-nonfiction?-what kind?) Why would somebody read this? For information? Pleasure?
9. Choose words from the passage and write them on the board. Ask students to scan the passage and circle them.
10. Tell a story about the background of the reading passage, or summarize the passage itself. Ask students to take notes or draw a picture of the story as you speak.

**HAVE EVERYONE READ THE PASSAGE.**

*Taken from new Ways in Teaching Reading.*

## Activity 2

Name: Newspaper Posters

Topic: Encourage students to read different sections of a newspaper.

Material: Articles from newspapers. Large poster boards, scissors, glue and markers.

Objective: Understanding the content of the sections in a newspaper is essential to give students access to more of the English-speaking world around them.

Process: Clip an assortment of articles and other items from newspapers. Be sure to include enough items from all parts of the papers for all the groups to have plenty to choose from.

Provide a list of all categories to be included in the posters. For example: Front page, metro, business, sports, lifestyles, entertainment, classifieds.

Put Students into groups. Each group uses a poster board and creates a poster that represents the various items found in the different sections, choosing from the articles and items you provide. Ask Students to label the categories.

*Taken from new Ways in Teaching Reading.*

## Activity 3

Name: Monitoring Comprehension

Topic: Monitor students comprehension while reading

Material: Article with long, descriptive paragraphs.

Objective: Allow students to reflect on their understanding of the article at different stages, to predict what may come next and to evaluate how well they are reading while they are engaged in doing it.

Process: Using the article you have selected, prepare questions for each paragraph that Students have to answer: Ask readers to reflect on what may come next, and draw on previous cultural and personal experience. Include some questions specifically about monitoring, in addition to the questions about comprehension, for example: *When you ran into a difficult word or meaning, what did you do? Did you reread the word? Read ahead hoping to find the answer? Look in a dictionary? Ask someone else?* Cut the reading passage into paragraph pieces that you can tape in different places around the classroom in random order. Group Students and send them around the classroom together, with each group starting at a d different location. Encourage students to work together and answer the questions as a group. They should discuss how they understood the text in order to answer the questions about comprehension and monitoring. Have each group piece together the reading text in the correct order. A general discussion at the end may focus on the main ideas, how students felt as they read each paragraph, and what strategies they used to figure out the paragraph order. After each paragraph, insert a clue, rather than a question, to find the next paragraph. Clues could include pieces from the next or last paragraph.

*Taken from new Ways in Teaching Reading.*

## WRITING ACTIVITIES

### Activity 1

Name: Letters to complaint

Topic: Learn to complain in writing

Material: Chalkboard or overhead projector (OHP).

Objective: Sensitizes students to the differences in register between written and spoken forms, focusing on different language functions, for example, apologizing, giving invitations, offering congratulations, and offering condolences.

Process:

1. Ask students if they have ever written a letter of complaint. Elicit from students what kind of things people complain about in writing, for example, faults in new consumer products, poor services, incorrect bills. Write these up on the board.
2. Using some of the examples on the board, establish who Students would write to if they were to write a letter of complaint. For example, about a faulty CD player, they would write to the shop manager.
3. In pairs ask students to simulate
  - (a) a conversation with a friend about a CD player they have just bought, but which doesn't work properly.
  - (b) a phone call between a consumer with a complaint and the official person they are complaining to, for example, someone who has just bought a CD player that doesn't work properly and the manager of the shop they bought it from.
4. Ask students to write a letter of complaint to the manager of the shop.
5. In pairs ask students to discuss the differences between complaining: orally to a friend, orally to an official person and in writing to an official person.
6. Elicit differences from students and write them on the board in three columns: oral/friend, oral/official, written/official. The differences should include actual examples of language used.
7. Highlight the differences that have emerged among the three columns and focus on forms that would be appropriate for the letter. Then ask students to write another letter of complaint.

*Taken from new Ways in Teaching Writing.*

## Activity 2

Name: Practical Business Writing

Topic: Inform someone or request information

Material: Paper, appropriate addresses and references. Three standard business letters.

Objective: Give students a formula or a template for business letters, you foster confidence and facility with the language in a realistic situation while teaching both the process and the product

Process: 1. Present the following 10 principles to summarize the basics of business letter writing:

- Write concisely, eliminating stock phrases that serve no purpose, and using reasonably short sentences. Avoid jargon in favor of common words and phrases.
  - Consider the reader's background and expected attitude toward the message, tailoring the words to the reader's situation and level of understanding.
  - Write positively, eliminating negative words from the message.
  - Strive for clarity, using familiar words and ensuring that grammar, punctuation, and spelling are correct.
  - Check that the information in the message is accurate.
  - Look for omissions and inconsistencies to ensure completeness.
  - Strive for concreteness with specific amounts and figures, rather than abstract concepts.
  - Use active, rather than passive, constructions to foster clarity as well as brevity.
  - Ensure fairness-avoid evidence of stereotyping and prejudice.
  - Finally, practice ethicality, ensuring that no impossible promises are made, no matter how much goodwill they might create.
2. Present a business letter format and guidelines for one of these three basic business letters: Inquiry letter, Order letter, Request for Assistance
3. Ask students to write a letter.
4. Have students evaluate their own or a peer's paper using the guidelines for the type of letter and also the 10 principles.

### Activity 3

Name: Authentic Texts for Writing

Topic: Organize an effective memorandum

Material: Sample office memoranda. An editing checklist

Objective: Produce writing that reflects the conventions of professional communication.

Process:

1. Collect examples of effective office memoranda of the type you want your students to practice writing themselves (About six examples are sufficient). Collect poorly written or weakly organized ones as well for text-revising practice. In addition, find an example of a checklist for writing effective memorandum that you feel will be useful to your students (see Appendix)
2. Distribute copies of the memorandum to pairs or groups of students.
3. Ask students to examine and compare the memoranda and to answer questions such as the following:
  - Where can you find information about the sender and receiver of the message?
  - What function does the subject heading serve?
  - How many paragraphs are there in the example? Are the paragraphs long and short?
  - Reading only the first paragraph, can you tell the main subject of concern in each example?
  - Do the sentences vary in the length and type?
  - Do the writers use different tenses in their writing?
  - Can you spot any grammatical or spelling errors?
  - Compare the examples, how do the writers end the memo?
4. As Students work through the memoranda and the questions, ask them to develop the checklist that they think captures the essence of an effective memorandum. The CHECKLIST should consider issues of content, grammar, clarity, conciseness and style.

5. Allow students up to 45 minutes for this activity and then have groups present their information.
6. Now distribute copies of your own editing checklist or writing guide.
7. Review the checklist and compare what each element includes with the information students have produced.
8. Summarize the main points of writing an effective memorandum and prepare students for the writing task.
9. Distribute copies of poorly written memorandum for the groups to analyze, using the checklist to guide them.
10. Each group should suggest how the memorandum can be improved.
11. After discussion, students should rewrite the weak examples on group or individual basis.

## **SAMPLE EDITING CHECKLIST**

### **Content**

- Use informative and specific headings
- Paragraph by idea.
- Retain first choice words.
- Eliminate unnecessary details.
- Proportion should match emphasis.
- Check accuracy and completeness of factual information.

### **Grammar**

- Do not write fragments for sentences.
- Avoid run-on or fused sentences.
- Do not dangle verbal.
- Use parallel structure.
- Make pronouns agree with their antecedents.
- Make verbs agree with their subjects.



- Do not change tenses or words unnecessarily.
- Punctuate correctly.
- Choose appropriate words and phrases.
- Spell correctly.

### Style

- Vary sentences patterns and length.
- Substitute stronger verbs for weak ones.
- Prefer a personal, conversational tone.
- Adjust the tone and formality to suit the purpose and audience.
- Clarity
- Prefer short sentences and simple words.
- Use concrete words and phrases over vague general ones.
- Sequence ideas to indicate emphasis.
- Link properly to show relationship.
- Show clear transitions between ideas.
- Use clear references.
- Place modifiers correctly.
- Conciseness
- Prefer active-voice verbs and action verbs.
- Be emphatic and to the point.
- Highlight the main verbs of sentences.
- Cut clichés, redundancies and little-word padding.
- Eliminate needless repetition.

*Taken from new Ways in Teaching Writing.*

## ANNEX 3

### LISTENING TASKS

1. Outstanding researchers have referred to the development of this skill as the most important when babies start learning their native language. Non native speakers of any language, need to follow the same process when learning that language.

(Source: D. Nunan 1998 *Second Language Teaching and Learning* . Boston: Heinle & Heinle.)

#### WHY SPEAKING DELAY?

- Some people believe that learning a language is building a *map of meaning in the mind*. However, talking is not the best way to build up this cognitive map in the mind. To do this, the best method is to practice meaningful listening.
- *The listening-only period* is a time of observation and learning which provides the basis for the other language skills. It builds up the necessary knowledge for using the language.
- When this knowledge is clear and complete, the *learner can begin to speak*.

#### FIVE CONDITIONS FOR LANGUAGE LEARNING TO OCCUR:

- **The Message:**

The learners' attention is focused on the message (function), not on grammatical rules because language acquisition is considered to be an unconscious process. The form of the message requires:

1. The application of conscious language rules,
2. Lots of time to analyze the process of the rules and exceptions, consciously or by heart.

- **Understanding:**

The learner must infer the meaning of most of the message through techniques of simplification of grammar and vocabulary and by using organizational and contextual aids to understanding.

- **Quantity:**

It is necessary a great deal of listening activity before learners feel ready to speak.

- **Interest:**

The learners would like to listen to a relevant message related to their interests.

- **Low Anxiety:**

Listening is a receptive skill. The learners see the learning experiences very easy and relaxed. There is no reason for fears to arise.

Adapted from Nord, J. R. *Developing Listening Fluency before Speaking*, 1980: p. 17

### ANNEX 4 MULTIPLE INTELLIGENCES THEORY

Verbal/linguistic	Logical/mathematical	Visual spatial	Bodily/kinesthetic	Musical/rhythmic	Interpersonal	Intrapersonal
<ul style="list-style-type: none"> <li>• Reading</li> <li>• Vocabulary</li> <li>• Formal Speech</li> <li>• Journal/Diary Keeping</li> <li>• Creative Writing</li> <li>• Poetry</li> <li>• Verbal Debate</li> <li>• Impromptu Speaking</li> <li>• Humor/Jokes</li> <li>• Storytelling</li> </ul>	<ul style="list-style-type: none"> <li>• Abstract Symbols/Formulas</li> <li>• Outlining</li> <li>• Graphic Organizers</li> <li>• Number Sequences</li> <li>• Calculation</li> <li>• Deciphering Codes</li> <li>• Forcing Relationships</li> <li>• Syllogisms</li> <li>• Problem Solving</li> <li>• Pattern</li> </ul>	<ul style="list-style-type: none"> <li>• Guided Imagery</li> <li>• Active Imagination</li> <li>• Color Schemes</li> <li>• Patterns/ Designs</li> <li>• Painting</li> <li>• Drawing</li> <li>• Mind-Mapping</li> <li>• Pretending</li> <li>• Sculpture</li> <li>• Pictures</li> </ul>	<ul style="list-style-type: none"> <li>• Folk/Creative Dance</li> <li>• Role Playing</li> <li>• Physical Gestures</li> <li>• Drama</li> <li>• Martial Arts</li> <li>• Body Language</li> <li>• Physical Exercise</li> <li>• Mime</li> <li>• Inventing</li> <li>• Sports Games</li> </ul>	<ul style="list-style-type: none"> <li>• Rhythmic Patterns</li> <li>• Vocal Sounds/Tones</li> <li>• Music Composition/Creation</li> <li>• Percussion Vibrations</li> <li>• Humming</li> <li>• Environmental Sounds</li> <li>• Instrumental Sounds</li> <li>• Singing</li> <li>• Tonal Patterns</li> <li>• Music Performance</li> </ul>	<ul style="list-style-type: none"> <li>• Giving Feedback</li> <li>• Intuiting Others' Feelings</li> <li>• Cooperative Learning Strategies</li> <li>• Person-to-Person Communication</li> <li>• Empathy Practices</li> <li>• Division of Labor</li> <li>• Collaboration Skills</li> <li>• Receiving Feedback</li> <li>• Sensing Others' Motives</li> <li>• Group Projects</li> </ul>	<ul style="list-style-type: none"> <li>• Silent Reflection Methods</li> <li>• Met cognition Techniques</li> <li>• Thinking Strategies</li> <li>• Emotional Processing</li> <li>• "Know Thyself" Procedures</li> <li>• Mindfulness Practices</li> <li>• Focusing/ Concentration Skills</li> <li>• Higher-Order Reasoning</li> <li>• Complex Guided Imagery</li> <li>• "Centering" Practices</li> </ul>

## GLOSSARY

Some terms have been used in this Syllabus, which may be unfamiliar to you. Simple definitions are included for this purpose.

Activity	Situation in which a lot of things are being done, usually in order to achieve a particular purpose.
Assessment	The learner's ability to reflect on the results of his/her learning process.
Attitudes	Expressions of positive or negative feelings towards the learning of a foreign language.
Awareness	Acquaintance, consciousness with knowledge.
Communication	Activity or process of giving information to other people or other living thing, using signals such as speech, body movements or radio signals.
Communicative Competence	The ability not only to apply the grammatical rules of a language in order to form grammatically correct sentences, but also to know when and where to use these sentences and to whom. It includes knowledge of the grammar and vocabulary of the language. Knowledge of rules of speaking, (knowing how to begin and end conversations, what topics may be talked about in different times of speech events, knowing which address forms should be used with different persons.) Knowing how to use language appropriately.
Curriculum subject.	Knowledge, skills, materials, learning activities and terminal behavior required in teaching of any subject.

Cultural Component	The part of the language which includes the total set of beliefs, attitudes, customs, behavior, social habits, etc. Of the members of a particular society.
Evaluation	The whole process of determining the effectiveness of teaching and learning.
Feedback	Monitoring and adapting one's actions on the basis of the perceived effect on the environment. In Language activities, it is a response to the reactions of listeners and readers.
Formal Component	The part of the language which includes the linguistic patterns (structures).
Formative Evaluation	A learning activity through which Students learn from their own mistakes.
Function	A Communicative purpose of a piece of language.
Functional Component	A part of the language which refers to it as an instrument of social interaction rather than a system that is viewed in isolation. Language is often expressive and social. Language is often described as having three main functions: descriptive, expressive and social.
Global Development	The insertion of individual and national working forces into the world development.
Group work	Work in which the class is broken into small groups of few students. They may work simultaneously on the same topic but with different material on each table.
Input	Oral or visual stimuli from the formal or informal learning setting.

Integration of Skills	The teaching of the language skills in conjunction with each other, as when a lesson involves activities that relate listening and speaking.
Interaction	Communication between two people.
Learner	A person who is learning a subject or a skill.
Learning Strategy	A way in which a learner attempts to work out the meanings and uses of words, grammatical rules, and other aspects of language.
Learning Styles	The particular way in which the learner tries learning new things. There are four different learning styles.
Mediation	Action of changing events, experiences or sets of circumstances.
Methodology	The study of the whole process of language teaching with the aim of improving its efficiency.
Monitoring	Learners try to correct any errors what they have just said. The teacher may help them to do it by imitating her/him.
Pair-work	Work in which two students perform a task or different tasks simultaneously.
Principle	General rule you follow to achieve something.
Procedure	Action or series of actions to be completed in order to carry out a process.
Process	A series of actions that are carried out in order to achieve a particular result.
Profile	Amount of language learned at the end of the process.

Role –Play	Drama-like classroom activities in which Students take the roles of different participants in the situations. They may act out which might typically happen in that situation.
Skill	Knowledge and ability that enables you to do something well. Linguistic skills enable you to fulfill the communication needs.
Student/Learner	In a communicative approach, a student/learner is the person on whom the learning process is centered. Student learns by doing. She/he becomes an independent and interdependent learner.
Sub-Skills	A division of the skills, such as discriminating sounds in connected speech, understanding relations within a sentence identifying the purpose and scope of a presentation.
Syllabus	An educational program which states: a.) The educational purpose of the program (the ends). b.) The content, teaching procedures and learning experiences which will be necessary to achieve this purpose. c.) Some means for assessing whether or not the educational ends have been achieved.
Tasks	Steps or actions, which are carried out during an activity.
Warm-up	To stimulate the interest and the participation of the learner in an activity.