Ministerio de Educación Pública
Departamento de Especialidades Técnicas

SECTOR:
COMMERCIAL AND SERVICES

PROGRAM
COMPUTER NETWORKING

CURRICULAR DESIGN ON COMPETENCY BASED-EDUCATION

HIGH-RANKING AUTHORITIES
Dr. Leonardo Garnier Rímolo
Minister of Public Education

MSc. Dyalah Calderón de la O.
Public Education Academic Vice-Minister

MSc. Silvia Víquez Ramírez
Public Education Administrative Vice-Minister

MBA. Mario Mora Quirós
Planning and Regional Coordination Vice-Minister

General Management of Technical Education and Entrepreneurial Abilities
Ing. Fernando Bogantes Cruz
Director

Technical Education Department
Ing. Gerardo Ávila Villalobos
Chief Department

MSc. Damaris Foster Lewis
Chief Curricular Section

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San José – Costa Rica

SECTOR:
COMMERCIAL AND SERVICES

PROGRAM:
COMPUTER NETWORKING

TWELFTH GRADE

DESIGNED BY

MSc. Jerry Quintero Figueroa
Computer Science National Advisor

MSc. Lizzette Vargas Murillo and MSc. Maricel Cox Alvarado
English National Advisors

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Contents

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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, Integrated 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

MSc. Priscilla Arce León. DANEA.
MSc. Viviana Richmond. (Human Sexuality Integral Education Department)
MSc. Mario Segura Castillo. (Educational Evaluation Department)
MSc. Carlos Rojas Montoya. (Environmental Education Department)

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 asses 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.

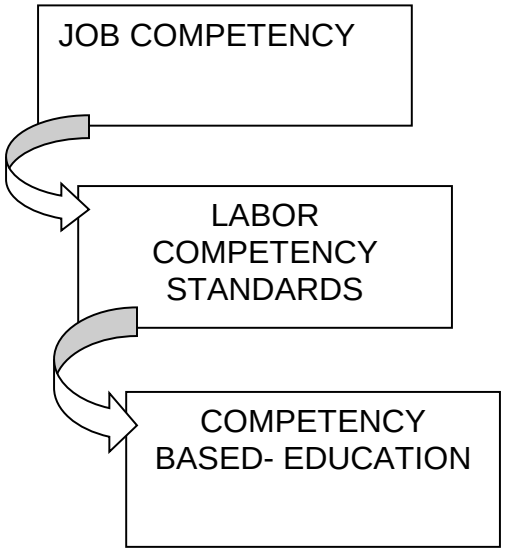
- The time allotted to practice and theory must be evenly distributed in accordance with the learning results to be developed.

- 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 manual, 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 [1]

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.



Group of abilities, knowledge, attitudes and necessary skills to carry out a specific job.

Quantitative criteria for a worker´s skills to enable the performance of a function or a task within a specific labor position.

Integral training process aimed at the development of the capacities or the individual's competencies according to current norms of an economic and productive activity.

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.

[1] Ávila, Gerardo y López, Xinia. Educación basada en normas de competencia. SINETEC. 2000.

Comparison between Technical Traditional Education And Competency- Based Education [2]

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.

[2] 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:[3]

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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[3] 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: twelfth
Teacher:		Year:
Values and attitudes:		

Learning Results / Study Block	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	1	2	3	
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: twelfth
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 field.
- 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.
- Uses computer as a tool in the tasks of the specialty.
- Applies standards of Occupational Health.
- Applies systems for preventive and corrective equipment maintenance, and specific machinery and tools for the specialty.
- Demonstrates professional ethics in carrying out duties that are part of the specialty.
- Organizes workshops according to the specific technical standards of the specialty.
- Protects the environment by removing pollution arising from industrial production processes.
- Uses rational materials, equipment, machinery and tools that are required in the specialty.
- Uses 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 presents 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
TOTAL	**24**	**24**	**24**

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 Software Application Website Design Specialized Information Systems Connectivity Total	24 Hrs 120Hrs 60 Hrs 18 Hrs 18 Hrs 240 Hrs				
Programación 8 horas	Herramientas Lógicas Algoritmos y Diagramas de Flujo Elementos de Programación Programación Total	48 Hrs 48 Hrs 64 Hrs 160 Hrs 320 Hrs				
Computer Maintenance 8 hours	Occupational Health Computer Architecture Maintenance & computer upgrading Total	64 Hrs 80 Hrs 176 Hrs 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 60 Hrs 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 252 Hrs 720 Hrs		
Computer Network 12 hours					Network Devices Network Technologies Computer Security Quality Culture Total	120Hrs 60Hrs 60Hrs 60Hrs 300Hrs
Network Operating Systems 10 hours					Operating Systems Network User Network Management Total	70Hrs 90Hrs 90Hrs 250Hrs

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

CURRICULAR MAP
COMPUTER NETWORKING
TENTH GRADE

SUBJECT- AREA	STUDY BLOCK	LEARNING RESULTS
Information and Communication Technologies 240 hours	Computer basis 24 hours	• Identify concepts, characteristics and elements for developing information and communication technologies. (ICT). • Interpret elements associated with national and international legislation (ICT). • Use basic norms for entering texts.
	Software Application 120 hours	• Apply basic norms of work to use computer equipment. • Solves virus problems in the computer. • Use functions in operating systems for computer hardware and software administration. • Use several tools for environment management in a graphical operating system. • Use tools for resources management. • Apply basic functions of a word processor in the production of documents. • Use spreadsheet tools for document production. • Determine properties and configuration of slide presentations. • Generate slides with basic elements. • Manipulate objects inside the slides file and assign special effects to presentations.

SUBJECT - AREA	STUDY BLOCK	LEARNING RESULTS
Information and Communication Technologies 240 hours	Website Design 60 hours	• Use applications related to the Internet and for searching and accessing information. • Distinguish basic elements related to the design of web pages. • Demonstrate basic norms for web pages design and Internet site construction. • Design web pages for publication of information on the Internet.
	Specialized Information Systems 18 hours	• Identify concepts, characteristics and applications of information systems. • Distinguish job environment elements from specialized information systems.
	Connectivity 18 hours	• Identify characteristics and requirements for the operation of mobile devices. • Recognize options for equipment or mobile devices connectivity. • Carry out connection and installation of mobile devices and computer equipment.

SUB - AREA	UNIDAD DE ESTUDIO	RESULTADOS DE APRENDIZAJE
Programación 320 horas	Herramientas Lógicas 48 horas	• Resolver problemas utilizando los diferentes sistemas numéricos. • Aplicar la lógica proposicional y la lógica de predicados en la determinación de la validez de una proposición dada. • Resolver problemas utilizando el álgebra de Boole. • Identificar los principios básicos relacionados con las permutaciones y combinaciones. • Solucionar problemas utilizando algoritmos, matrices y álgebra de matrices. • Utilizar las relaciones de recurrencia en el análisis de algoritmos. • Aplicar los conceptos de los mapas de Karnaugh en la resolución de problemas.

SUB - AREA	UNIDAD DE ESTUDIO	RESULTADOS DE APRENDIZAJE
Programación 320 horas	Algoritmos y Diagramas de Flujo 48 horas	• Aplicar los algoritmos y diagramas de flujo estructurado como herramientas para resolución lógica de problemas computacionales. • Aplicar la simbología para la construcción de algoritmos y diagramas de flujo. • Utilizar la simbología para la construcción de algoritmos y diagramas de flujo.
	Elementos de Programación 64 horas	• Distinguir los conceptos básicos relacionados con la programación estructurada. • Resolver problemas utilizando los elementos que intervienen en el desarrollo de un programa. • Construir bloques de decisión y condiciones compuestas para casos específicos. • Utilizar procedimientos y funciones como parte de la solución de problemas específicos. • Reconocer los elementos fundamentales para el uso de la sintaxis específica de un lenguaje orientado a la programación estructurada.
	Programación 160 horas	• Confeccionar los algoritmos necesarios para la solución de problemas específicos utilizando las herramientas disponibles. • Desarrollar programas sencillos utilizando estructuras de selección, operadores, estructuras de repetición y funciones. • Diseñar programas en un lenguaje de programación que contengan operaciones de manejo de entrada / salida.

SUBJECT - AREA	STUDY BLOCK	LEARNING RESULTS
Computer Maintenance 320 hours	Occupational Health 64 hours	• Describe main concepts and specific aspects of Occupational Health. • Illustrate the importance of security in accident prevention. • Apply basic norms for waste elimination management. • Evaluate the importance of danger area signals and access paths. • Apply security norms in diverse activities to prevent accidents in workplaces. • Distinguish causes and effects of accidents caused by fire; as well as preventive methods in workplaces. • Distinguish types of chemical agents associated with computer science to which the student is exposed in workplaces. • Apply different techniques to prevent work overload effects. • Apply different techniques to prevent electric risks. • Describe regulations of occupational health in the computer science field.

SUBJECT - AREA	STUDY BLOCK	LEARNING RESULTS
Computer Maintenance 320 hours	Computer Architecture 80 hours	• Describe internal components of the computer. • Describe external devices associated with the computer. • Describe different types of software used by the computer.
	Maintenance & Upgrading Computer 176 hours	• Describe health and security measures for working with the computer equipment and manual tools. • Build boot and recovery disks as part of the maintenance security or equipment upgrading processes. • Recognize basic norms to follow the preliminary revision and the inventory. • Distinguish adapters used in computers. • Recognize the installation and/or configuration procedure of different internal computer components. • Recognize the installation and configuration procedure of external computer devices. • Recognize the installation and configuration procedure of operating systems and other software in the computer. • Determine general computer network concepts.

SUBJECT-AREA	STUDY BLOCK	TARGET	LINGUISTIC ACHIEVEMENT
English for Communication 80 Hours	Building Personal Interaction at the Company. 10 hours	**Cognitive Target: 1** Exchanging information about: Personal interaction at the company, ways of interacting, meeting people, ethics, personal skills, cultural aspects	• Understanding simple familiar phrases and short statements. • Asking and responding to questions in clearly defined situations. • Reading personal information forms. • Reading a personal letter. • Writing about occupations and writing the name and address on an envelope.
	Daily Life Activities. 10 hours	**Cognitive Target: 2** Interprets and communicates information about: daily activities at home, school and job. Daily routines	• Making appointments for personal business. • Describing my personal schedules. • Talking about daily routines at home, at school and at work. • Predicting the content of a story from the title. • Writing about daily routine.

SUBJECT-AREA	STUDY BLOCK	TARGET	LINGUISTIC ACHIEVEMENT
English for Communication 80 Hours	Working Conditions and Success at Work. 10 hours	**Cognitive Target: 3** Interprets and communicates information about: someone ´s job, work tasks, and job positions, responsibilities	• Asking and answering about job positions and responding to job interview questions. • Describing someone´s job. and uncompleted work tasks. • Reading and interpreting a job application. and reading magazine articles. • Writing a paragraph describing a job I would like to have. • Filling out a job application.
	Describing Company Furniture, Equipment and Tools. 10 hours	**Cognitive Target: 4** Interprets and communicates information about: company furniture, equipment and tools	• Asking for and give information on companies and products, furniture. • Communicating messages with little or no difficulty about equipment and tools. • Reading and interpreting companies' descriptions. • Writing lists of equipment and tools from different companies.

SUBJECT-AREA	STUDY BLOCK	TARGET	LINGUISTIC ACHIEVEMENT
English for Communication 80 Hours	Talking about Plans, Personal and Educational Goals. 10 hours	**Cognitive Target: 5** Exchanging information about: leisure activities, holidays and special occasions. Planning educational and personal goals.	• Talking about holiday celebrations and leisure activities. • Describing the steps to fill out different types of forms for college enrollement • Reading news and articles about people´s plans. • Describing possible weekend activities.
	Communicating Effectively and Giving Presentations. 10 hours	**Cognitive Target: 6** Interprets and communicates information about: daily activities at home, school and job. Daily routines.	• Solving problems by phone and making telephone arrangements. • Describing what makes a good communicator. • Evaluating the effects of stress factors and getting advice on presenting. • Describing the facts that affect the success of a presentation.

SUBJECT-AREA	STUDY BLOCK	TARGET	LINGUISTIC ACHIEVEMENT
English for Communication 80 Hours	Raising Economic Success 20 hours	**Cognitive Target: 7** Using appropriate language for comparing goods, discussing advertisements, describing products and your preferences.	• Discussing about advertisements from different communication media. • Comparing goods and services and explaining the reasons why I like a product. • Describing product characteristics by contrasting and comparing different goods or services. • Expanding reading skills by reading job ads from newspapers or magazines and reading formal letters of complaint. • Writing a formal letter of complaint, completing a product comparison chart and writing an advertisement.

CURRICULAR MAP
COMPUTER NETWORKING
ELEVENTH GRADE

SUBJECT-AREA	STUDY BLOCK	TARGET	LINGUISTIC ACHIEVEMENT
English for Communication **80 Hours**	Safe Work 10 hours	**Cognitive Target: 1** Exchanging information about: safe and unsafe driving, accidents and job benefits	• Giving reasons for being late at work, school or meeting. • Identifying different signs and prevention procedures. • Describing consequences of accidents and prevention procedures at work. • Identifying special clothes and equipment used at work. • Scanning for specific information related to safety at work. • Reading stories about accidents at work and prevention measures. • Describing the advantages of working in a company.

SUBJECT-AREA	STUDY BLOCK	TARGET	LINGUISTIC ACHIEVEMENT
English for Communication **80 Hours**	Introduction to Business Activities. 10 hours	**Cognitive Target: 2** Interprets and communicates information about: Business Activities.	• Comparing the increasing profitability of department stores in our country. • Discussing conditions for starting new business in public and private sector companies. • Making predictions about products or services of the future. • Reading about the development of industries. • Providing advice for people who are starting a new business by writing a letter.

SUBJECT-AREA	STUDY BLOCK	TARGET	LINGUISTIC ACHIEVEMENT
English for Communication **80 Hours**	Regulations, Rules and Advice. 12 hours	**Cognitive Target: 3** Interprets and communicates information about: workplace rules and following them.	• Discussing situations when foreign business people make a "cultural mistake." • Talking to a manager about not following rules by structuring a conversation. • Comparing companies´ regulations and giving advice. • Learning about dress code in my country to put it into practice at school or work. • Writing employee dress-code rules to be applied in a company.

SUBJECT-AREA	STUDY BLOCK	TARGET	LINGUISTIC ACHIEVEMENT
English for Communication **80 Hours**	Complaints and Solving Problems 12 hours	**Cognitive Target: 4** Exchanging information about: making complaints, apologizing and solving problems	• Learning how to deal with a complaint by voice mail and automated telephone information. • Apologizing when it is required. • Solving problems at the office. • Dealing with problems, client complains and apologizing. • Comprehending the use of items in a first-aid kit. • Writing about solutions to a problem at work or school.

SUBJECT-AREA	STUDY BLOCK	TARGET	LINGUISTIC ACHIEVEMENT
English for Communication **80 Hours**	Following Instructions from Manual 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
English for Communication 80 Hours	Making Telephone Arrangements 12 hours	**Cognitive Target: 6** Exchanging information about: telephone calls and arrangements.	• Exchanging information in telephone conversations. • Expressing fluently leaving and taking a message. • Making an appointment by telephone. • 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. • Writing a paragraph about how culture affects business life.

SUBJECT-AREA	STUDY BLOCK	TARGET	LINGUISTIC ACHIEVEMENT
English for Communication 80 Hours	Entertaining! 12 hours	**Cognitive Target: 7** Demonstrate ability to work cooperatively with others.	• Entertaining guests and promoting leisure activities. • Listening to information about a TV schedule. • Discussing corporate entertaining. • Reading a journal about a trip or magazine descriptions. • Organizing a conference in another country including a variety of aspects.

SUBJECT - AREA	STUDY BLOCK	LEARNING RESULTS
Computer Network 720 hours	Data Communication Principles 108 hours	• Recognize concepts and fundamental elements associated with telephony. • Distinguish telematic services characteristics and applications. • Apply basic principles for data communication and network use. • Recognize concepts associated with data transmission. • Distinguish basic elements of OSI model and TCP/IP used in network building.
	Local Area network 108 hours	• Identify characteristics of local area network. • Apply concepts of network design and structured wiring used in LAN network. • Use concepts of IP, NAT and PAT in network routing structure. • Configure networks devices. • Use line console to apply commands of router configuration. • Use routing method for network device to send messages through the network. • Identify ISP services available in our country and service providers' responsibilities.

SUBJECT-AREA	STUDY BLOCK	LEARNING RESULTS
Computer Network 720 hours	Design and Network Representation 126 hours	• Apply procedures for drawing network elements used by specific software. • Design sketches using basic rules for labelling scale drawings, using a specific software. • Interpret architectural projects and network representation according to their components.
	Structured Wiring 126 hours	• Identify basic concepts associated with structured wiring. • Identify types of wire, characteristics and applications. • Recognize fundamental contents in the codes and norms related to wiring structure. • Apply technical norms in the construction and replacement of wiring systems.
	Physical Network Installation 252 hours	• Distinguish basic concepts related to building a computer network. • Install and configure peripheral equipment in terminals and network. • Install and configure types of network cards or wiring used in network building. • Apply installation concepts, configuration and expansion of a network. • Apply acquired knowledge, skills, and abilities regarding network by doing an internship.

SUB - AREA	UNIDAD DE ESTUDIO	RESULTADOS DE APRENDIZAJE
Manipulación de la Información 160 horas	Bases de Datos 40 horas	• Identificar los elementos fundamentales asociados con las bases de datos. • Describir las características de los diferentes modelos de bases de datos y el proceso de normalización. • Aplicar los elementos relacionados con el manejo de información para la construcción y mantenimiento de bases de datos. • Utilizar las funciones y herramientas disponibles para la creación o manejo de bases de datos.
	Introducción a la Programación en Ambiente Visual 60 horas	• Utilizar las funciones y herramientas disponibles en el entorno de trabajo. • Utilizar las funciones y herramientas disponibles en un lenguaje de ambiente visual para el control del programa. • Desarrollar programas utilizando los elementos de programación modular en un lenguaje de ambiente visual. • Diseñar la interfaz de usuario utilizando las diferentes herramientas disponibles. • Crear diferentes bases de datos y aplicaciones para el manejo o actualización de las mismas.

SUB - AREA	UNIDAD DE ESTUDIO	RESULTADOS DE APRENDIZAJE
Manipulación de la Información 160 horas	Gestión Empresarial 60 horas	• Reconocer los componentes del proceso administrativo en el ámbito de trabajo asociado a la informática. • Elaborar un plan de negocio para una micro empresa en el área de informática. • Utilizar diferentes estrategias para la gestión y desarrollo de proyectos informáticos • Aplicar destrezas, habilidades y conocimientos adquiridos referentes a la redes por medio de una pasantía

CURRICULAR MAP
COMPUTER NETWORKING
TWELFTH GRADE

SUBJECT AREA	STUDY BLOCK	LEARNING RESULTS
Computer Network 300 hours	Network Devices 120 hours	• Recognize concepts and basic elements in network switching of a company. • Distinguish characteristics of network routing for companies. • Apply basic principles to filter network traffic by using access control lists. • Analyze principles necessary for the solution of company network problems.
	Network Technologies 60 hours	• Distinguish characteristics and functioning of networking technologies. • Install and configure components for network expansion or creation. • Install and configure different types of network cards and wiring used in building network with technologies. • Apply techniques and strategies for administration and network maintenance.
	Computer Security 60 hours	• Distinguish basic concepts associated with computer security. • Distinguish security in different contexts and computer environment. • Recommend security methods and techniques according to systems and equipment characteristics.

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
Network Operating Systems 250 hours	Operating Systems 70 hours	• Characterize different operating systems using their technical characteristics. • Explain the administrative method of the processor, the processes, and the memory of its operating system. • Use operating system functions for device and file management. • Distinguish characteristics of the network function manager and the system used by the operating system. • Distinguish the characteristics of currently used main operating systems.
	Network User 90 hours	• Distinguish main characteristics of some network operating systems. • Use entrance functions, exit and interface of some network operating systems. • Use accessories and basic configuration of the network operating system. • Use basic tools of some operating systems for the user´s administration. • Use security and auditing elements of network operating systems.

SUBJECT AREA	STUDY BLOCK	LEARNING RESULTS
Network Operating Systems 250 hours	Network Management 90 hours	• Distinguish tools of some network operating systems for system administration. • Install and configure the work environment of some network operating systems. • Administer bills, groups and impression functions in some network operating systems. • Assign security and audit functions in some network operating systems. • Execute processes for the improvement of the performance and optimization of some network operating systems. • Use native available commands in some network operating systems.

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
English for Communication 50 Hours	Travel 10 hours	**Cognitive Target: 4** Interprets and communicates information about travelling	• Listening to statements about a map in order to get to any specific place. • Explaining leisure and entertainment possibilities to a visitor. • Discussing about weather concerns when travelling. • Reading a map from another country to find out cities and places. • Reading about environmental issues to plan a visit to a foreign country. • Revising a business plan to propose an international company. • Developing writing skills: making, accepting or declining an offer.

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

TWELFTH GRADE

SUBJECT– AREA: ENGLISH FOR COMMUNICATION

TWELFTH LEVEL

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

DISTRIBUTION OF UNITS
ENGLISH FOR COMMUNICATION

Twelfth Level

Units	Name	Time in hours	Weeks per study block
1	Day to day work	10 hrs	5 weeks
2	Customer service	10 hrs	5 weeks
3	Stand for excellence	10 hrs	5 weeks
4	Travel	10 hrs	5 weeks
5	Building an outstanding future career	10 hrs	5 weeks
	Total	50 hrs	25 weeks

Subject-area: English for Communication	Grade : Twelfth
Unit 1 **: Day to Day Work**	Hours per unit: 10 hours
Cognitive target: Exchanging information about: day to day work.	

LINGUISTIC ACHIEVEMENTS	CONTENT (FUNCTIONS AND LANGUAGE)	PROCEDURES	VALUES AND ATTITUDES	LEARNING OUTCOMES
LISTENING • Asking and giving information about work routines. • Describing times and conditions of my job and daily routines. **SPEAKING** • Expressing likes and dislikes in my daily life.	**Functions** • Asking questions regarding working routines. • Talking about your daily working schedule. • Describing likes and dislikes. • Examining job skills and qualifications. • Making wise choices.	**The students:** • Talk about which hours your prefer to work based on the business hours around the world. • Role play people saying what they like about their jobs. • Classify a list of items connected with work which are important and not important to you.	• Observe critically. • Exercises leadership	**The students:** • Ask and give information about working routines. • Describe times and conditions of my job. • Express likes and dislikes in my daily life.

LINGUISTIC ACHIEVEMENTS	CONTENT (FUNCTIONS AND LANGUAGE)	PROCEDURES	VALUES AND ATTITUDES	LEARNING OUTCOMES
READING • Reading an advertisement about a new product **WRITING** • Writing a plan to improve safety in my home.	**Language** • Prepositions. • Adverbs of frequency. • Phrasal Verbs. • Verbs followed by –ing. • Reported speech • Reported speech with say and tell. • Used to, be used.	**The students:** • Reading an online advertisement. • Read with understanding. • Planning for a safe environment. • Write a short letter describing the working conditions in a company you work. • Convey ideas in writing.	• Guide others. • Planning ahead of time.	**The students:** • Read an advertisement about a new product. • Write a plan to improve safety in your home.

Subject-area: English for Communication	Grade : Twelfth
Unit 2 : **Customer service**	Hours per unit: 10 hours
Cognitive target: Interprets and communicates information about: customer service	

LINGUISTIC ACHIEVEMENTS	CONTENT (FUNCTIONS AND LANGUAGE)	PROCEDURES	VALUES AND ATTITUDES	LEARNING OUTCOMES
LISTENING • Understanding specifications about the elements of effective telephone communications. • Applying techniques to improve effectiveness as a listener. **SPEAKING** • Defining the importance of proper telephone techniques in providing excellent service to customers	**Functions** • Identifying elements of effective telephone communication. • Managing to ensure courtesy in business telephone contacts. • Smiling before you pick up the phone. • Leaving a good last impression. • Letting customers know you want to help. • Asking the customer to repeat if the message is not clear.	**The students:** • Listen to oral techniques about courtesy • Comprehend how to determine the customer needs • Role play how to treat every caller as a welcome guest activity • Development of skills to become a good clerk in customer service by attending the telephone.	• Respect for different styles, methods and procedures. • Understand and be understood by others	**The students:** • Understand specifications about the elements of effective telephone communications. • Apply techniques to improve effectiveness as a listener. • Define the importance of proper telephone techniques in providing excellent service to customers

LINGUISTIC ACHIEVEMENTS	CONTENT (FUNCTIONS AND LANGUAGE)	PROCEDURES	VALUES AND ATTITUDES	LEARNING OUTCOMES
READING • Understanding details from texts, passages and others . **WRITING** • Stating the importance of attitude and creativity in providing high quality customer service.	**Language** • Define service mentality? • What is a customer? • How many customers do you think you can attend by day? • Which is the most important key in the service mentality? • Callers can hear your smile even when they can't see it • Give every caller the same courteous, friendly, professional treatment. • Take the initiative. • Greet the caller with a pleasant buffer. • Ask don't demand. • Politeness is never out of style. • Don't make or take calls anonymously	**The students:** • Development of skills to become a better clerk in customer service. • Completion of charts by listening to people speaking about the service attitude to provide high quality customer service.	• Learn from experience • Empathy • Enthusiasm • Ownership • Responsibility • Adaptability	**The students:** • Understand details from text, passages and others. • State the importance of attitude and creativity in providing high quality customer service.

Sub-area: English for Communication	Grade :Twelfth
Unit 3 **: Stand for excellence**	Hours per unit: 10 hours
Cognitive target: Exchanging information about: the ability to work cooperatively with others as a member of a team.	

LINGUISTIC ACHIEVEMENTS	CONTENT (FUNCTIONS AND LANGUAGE)	PROCEDURES	VALUES AND ATTITUDES	LEARNING OUTCOMES
LISTENING • Listening to a conversation between an employer and an employee and between coworkers. **SPEAKING** • Expressing encouragement when talking about programs and courses	**Functions** • Discussing about adult education. • Describing types of coursework. • Identifying job skills. • Defining feelings. • Stating work communication. • Defining job training.	**The students:** • Acquire and evaluate information. • Listen actively to conversations among to different people in order to take notes. • Role play a conversation between a parent and a child. • Interpret and communicate information.	• Plan for the future. • Take responsibility for learning. • Cooperate with others.	**The students:** • Listen to a conversation between an employer and an employee and between coworkers. • Express encouragement when talking about programs and courses

LINGUISTIC ACHIEVEMENTS	CONTENT (FUNCTIONS AND LANGUAGE)	PROCEDURES	VALUES AND ATTITUDES	LEARNING OUTCOMES
READING • Reading and discussing about job skills. **WRITING** • Organizing information regarding options between job benefits and personal qualities	**Language** • Simple present and present continuous. • Correlative conjunctions. • Expressing future time with will, be going to, and the present continuous. • Part time clauses with after, when, as soon as, before, and until. • Simple past and present perfect. • Express similarities with so, too, either and neither. • Reductions with n´ t.	**The students:** • Reading a career school advertisement. • Reading an email from a teacher. • Reading a job evaluation form. • Reading notes from an interview. • Reading a letter requesting a raise. • Write statements about yourself. • Make a list of programs and courses of interest to you. • Write a letter to a professor. • Fill out a work schedule. • List personal qualities on a chart. • Write a persuasive letter.	• Solve problems. • Make decisions.	**The students:** • Read and discuss about job skills. • Organize information regarding options between job benefits and personal qualities.

Subject-area: English for Communication	Grade: Twelfth
Unit 4 **: Travel**	Hours per unit: 10 hours
Cognitive target: Interprets and communicates information about travelling**.**	

LINGUISTIC ACHIEVEMENTS	CONTENT (FUNCTIONS AND LANGUAGE)	PROCEDURES	VALUES AND ATTITUDES	LEARNING OUTCOMES
LISTENING • Listening to statements about a map in order to get to any specific place. **SPEAKING** • Explaining leisure and entertainment possibilities to a foreigner. • Discussing about weather concerns when travelling.	**Functions** • Finding out about a city. • Making offers. • Thanking • Making recommendations. • Travelling for business and pleasure. • Copying with difficult travel situations. • Doing flight reservation. • Renting a car. • Giving and asking for directions. • Attending business events.	**The students:** • Listen to a statement about what people are doing in a business travel. • Role play about a visitor that is coming from abroad to your international marketing company and you are going to help organize her/his visit. • Discuss with a partner about entertainment and leisure activities for a visitor in a foreign country. • Pretend you work for a broadcast company and you are giving the weather report.	• Social and cultural background of people from different countries.	**The students:** • Listen to statements about a map in order to get to any specific place. • Explain leisure and entertainment possibilities to a visitor. • Discuss about weather concerns when travelling.

LINGUISTIC ACHIEVEMENTS	CONTENT (FUNCTIONS AND LANGUAGE)	PROCEDURES	VALUES AND ATTITUDES	LEARNING OUTCOMES
READING • Reading a map from another country to find out cities and places. • Reading about environmental issues to plan a visit a to a foreign country. **WRITING** • Revising a business plan to propose an international company. • Developing writing skills making, accepting or declining an offer.	**Language** • You ´re interested in…you should… • If you like…. You should… • Types of transportation. • Learning about culture. • Types of restaurants • Talk about weather. • Sightseeing. • Day trips. • Tipping • Prices in dollars and cents. • I´ d like… I´ d prefer. • I´ d like a single room. • I´ d prefer a nonsmoking room. • Questions: How long How do I get to there? How will you be paying? How long will you be staying?	**The students:** • Develop different reading skills interpreting information related to travelling • Write a short note suggesting what someone might enjoy in Costa Rica and offering your help while in a business travel. • Writing about severe weather conditions	• Cultural aspects presented at each country while you are in a business travel.	**The students:** • Read a map from another country to find out cities and places. • Read about environmental issues to take into account to visit a foreign country. • Revise a business plan to propose it to an international company. • Develop writing skills making, accepting or declining an offer.

Sub-area: English for Communication	Level: Twelfth
Unit 5**: Building an Outstanding Future Career**	Hours per unit: 10 hours
Cognitive target: Interprets and communicates information about: applying or transferring skills learned in one job situation to another.	

LINGUISTIC ACHIEVEMENTS	CONTENT (FUNCTIONS AND LANGUAGE)	PROCEDURES	VALUES AND ATTITUDES	LEARNING OUTCOMES
LISTENING • Listening to a discussion between two managers. **SPEAKING** • Discussing community problems and solutions by interviewing classmates. • Talking about life in a city and contrasting it with life in the country side.	**Functions** • Identifying career skills. • Attending to a job fair. • Participating in a job interview. • Defining the strengths and weaknesses. • Describing future plans. • Recognizing work standards. • Expressing emotions.	**The students:** • Identify how to interview appropriately. • Use sources of information about job opportunities such as job descriptions, job ads, and online searches and about job market. • Respond appropriately to common personal information questions. • Role play a conversation on how to relax before a job interview.	• Doing field work. • State goals for the immediate future. • Find problems in your community.	**The students:** • Listen to a discussion between two managers. • Discuss community problems and solutions by interviewing classmates. • Talk about life in a city and contrast it with life in the country side.

LINGUISTIC ACHIEVEMENTS	CONTENT (FUNCTIONS AND LANGUAGE)	PROCEDURES	VALUES AND ATTITUDES	LEARNING OUTCOMES
READING • Compare and contrasting the lives and goals of people regarding working conditions. **WRITING** • Developing consciousness about my skills, achievements and awards. • Organizing ideas to design an improvement plan to make a change in life.	**Language** • Real conditionals present and future. • Present unreal conditional. • Future continuous. • Infinitives of purpose. • Infinitives that follow adjectives.	**The students:** • Demonstrate the ability to apply or transfer skills learned in one job situation to another. • Read about careers and skills. • Read about how to have a successful interview. • Read a resume from a job seeker. • Read an employer ´s campaign to improve work conditions. • Make notes about your skills, achievements and awards. • Write a resume for themselves. • Write about how employees feel at work based on field work. • Write a paragraph with your goals for the next five years.	• Exercise leadership. • Allocate time	**The students:** • Compare and contrast the lives and goals of people regarding working conditions. • Develop consciousness about my skills, achievements and awards. • Organize ideas to design an improvement plan to change in life.

SUBJECT – AREA: COMPUTER NETWORK

SUBJECT – AREA: COMPUTER NETWORK

DESCRIPTION

The mid-level Technician in network will be able to install and maintain peripheral devices, terminals and servers in local area networks, infer and analyze diagnostic criteria.

Within this context, the computer network subject area illustrates theoretical and methodological aspects in order to use, configure and operate equipment, mobile devices, and network technologies. Students learn about computer security and auditing. This subject area is divided into four study blocks:

- Network devices
- Network Technologies
- Computer Security
- Quality Culture

GENERAL LEARNING RESULTS

Develop student knowledge, abilities and skills to:

- Install and configure components for integration in a computer network using different technologies
- Use fundamental concepts and strategies for Computer Security and Auditing
- Apply basic principles of Quality Culture and Customer Service in the performance of his/ her tasks.

DISTRIBUTION OF STUDY BLOCK
COMPUTER NETWORK

Study block	Name	Time in hours	Weeks per study block
I.	Network Devices	120	10
II.	Network Technologies	60	5
III.	Computer Security	60	5
IV.	Quality Culture	60	5
	TOTAL	300	25

TECHNICAL COMPETENCY STANDARDS OF EDUCATIONAL INSTITUTION

GENERAL DATA

Title: Network devices
Purpose: Execute the installation, configuration and expansion of network devices.
Competency level: Basic

UNITS OF JOB COMPETENCY THAT CONFORM THE STANDARDS

Title	Classification
Adequately defines elements used to segment the network.	Specific
Clearly recognizes the use of protocols to prevent loops in a switch.	Specific
Effectively uses the console commands to define the VLANs.	Specific
Correctly understands the interconnection of VLANs with devices through the use of trunk links.	Specific
Effectively defines elements used to prepare hierarchical IP network addresses.	Specific
Accurately recognizes the use of sub netting to create network structures.	Specific
Adequately uses VLSM for addressing through sub netting.	Specific
Effectively solves the use of NAT, PAT and the RIP, RIPV2, EIGRP, OSPF protocols, multiple protocols through console programming of the devices.	Specific
Effectively determines the use of the access control lists to prevent breaches in the security of the network.	Specific
Accurately recognizes the use of the access control lists by creating them from the console.	Specific
Effectively uses the access lists by using console for specific problems.	Specific
Correctly describes the concepts of monitoring and network maintenance.	Specific
Effectively recognizes switching and connectivity problems in order to solve them.	Specific
Effectively designs access control lists for specific problems.	Specific

Competency Elements

Reference	Title of the element
2 – 1	Installation, configuration and expansion of network devices.

Performance criteria:

1. Recognizes the fundamental concepts and elements in the switching network of the company.
2. Distinguishes the characteristics of network addressing for companies.
3. Applies basic principles for filtering network traffic using access control lists.
4. Analyzes the principles necessary for solving company network problems.

Application Field:

Category	Classes
Services	Provision of Technical Education Services

Performance Evidence:

1. Recognizes the use of protocols to prevent loops in a switch.
2. Uses the console commands to define the VLANs.
3. Recognizes the use of sub netting to create network structures.
4. Uses VLSM for addressing through sub netting.
5. Recognizes the use of the access control lists by creating them from the console.
6. Uses the access lists by using console for specific problems.
7. Recognizes switching and connectivity problems in order to solve them.

Knowledge Evidence:

1. Defines elements used to segment the network.
2. Defines elements used to prepare hierarchical IP network addresses.
3. Determines the use of the access control lists to prevent breaches in the security of the network.
4. Describes the concepts of monitoring and network maintenance.

Product Evidence:

1. Understands the interconnection of VLANs with devices through the use of trunk links.
2. Solves the use of NAT, PAT and the RIP, RIPV2, EIGRP, OSPF protocols, multiple protocols through console programming of the devices.
3. Designs access control lists for specific problems.

Sector: Commercial and Services	Program: Computer Networking
Subject area: Computer Network	Grade: Twelfth
Study block: Network Devices	Time: 120 hours
Purpose: Execute the installation, configuration, and expansion of network devices.	

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA
1. Recognize the fundamental concepts and elements in network switching of the company.	• Switching and segmentation of network • Prevention of loops in a switch (Root Bridges, spanning tree, RSTP) • Configuration of VLANs, (Virtual LAN) • Trunking and Inter-VLAN Routing	Teacher: • Defines elements used to segment the network. • Describes the use of protocols to prevent loops in a switch. • Illustrates the use of console commands to define the VLANs. • Illustrates the interconnection of VLANs with devices of trunk links.	Awareness of everything that surrounds us with the ability to anticipate events	• Recognizes the fundamental concepts and elements in the switching network of the company.

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA
		Student: • Defines elements used to segment the network. • Recognizes the use of protocols to prevent loops in a switch. • Uses the console commands to define the VLANs. • Understands the interconnection of VLANs with devices through the use of trunk links.		

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA

2. Distinguish network characteristics for addressing companies.	• Use of hierarchical IP network addresses
	• Use of the sub netting to create network structures
	• Use of VLSM
	  • Subnet masks
	  • Binary representation for sub netting
	  • Variable length subnet mask (VLSM)
	  • Implementation of VLSM for addressing
	• Use of routing with CIDR classifications
	• Use of NAT and PAT
	• Distance Vector Protocols (RIP, RIPV2, EIGRP
	• Link state routing protocols (OSPF, multiple protocols)
		<u>Teacher</u>:
		• Defines elements used to prepare hierarchical IP network addressing.
		• Describes the use of sub netting to create network structures.
		• Illustrates the use of the VLSM for addressing through sub netting.
		• Illustrates the use of NAT, PAT and RIP, RIPV2, EIGRP, OSPF protocols, multiple protocols through console programming of devices.
			• Develop an awareness of our surroundings and the ability to predict events.	• Distinguishes the characteristics of network addressing for companies.

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA
		Student: • Defines elements used to prepare hierarchical IP network addresses. • Recognizes the use of sub netting to create network structures. • Uses VLSM for addressing through sub netting. • Solves the use of NAT, PAT and the RIP, RIPV2, EIGRP, OSPF protocols, multiple protocols through console programming of the devices.		

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA
3. Apply basic principles for filtering network traffic using access control lists.	• Use of access control lists • Use of a Wildcard mask • Configuration of the access control lists (standard and extended) • Allow and deny specific traffic types • Routing with access control lists	Teacher: • Defines the use of access control lists to prevent breaches in the security of the network. • Describes the use of access control lists by creating them from the console. • Illustrates the use of the access lists by routing. Student: • Determines the use of the access control lists to prevent breaches in the security of the network. • Recognizes the use of the access control lists by creating them from the console. • Uses the access lists by using console for specific problems.	• Awareness of our surroundings and develop ability to predict events.	• Applies basic principles for filtering network traffic using access control lists.

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA
4. Analyze principles necessary for the solution of company network problems.	• Monitoring and maintenance • Solving addressing and connectivity problems • Routing problems • WAN configuration problems • Accessing control lists problems	Teacher: • Defines the concepts of monitoring and network maintenance. • Illustrates solutions to switching and connectivity problems. • Illustrates the uses of access control lists through problem-solving. Student: • Describes the concepts of monitoring and network maintenance. • Recognizes switching and connectivity problems in order to solve them. • Designs access control lists for specific problems.	• Awareness of our surroundings and develop ability to predict events.	• Analyzes the principles necessary for solving company network problems.

PRACTICE AND CHECKLIST

PRACTICE DEVELOPMENT

Study Block: Network Devices	PRACTICE No. 1

Purpose:

Scenario: Classroom	Time:

MATERIALS	MACHINERY	EQUIPMENT	TOOLS

Procedures:

Teacher:

- Defines elements used to segment the network.
- Describes the use of protocols to prevent loops in a switch.
- Illustrates the use of console commands to define the VLANs.
- Illustrates the interconnection of VLANs with devices of trunk links.
- Defines elements used to prepare hierarchical IP network addressing.
- Describes the use of sub netting to create network structures.
- Illustrates the use of the VLSM for addressing through sub netting.
- Illustrates the use of NAT, PAT and RIP, RIPV2, EIGRP, OSPF protocols, multiple protocols through console programming of devices.
- Defines the use of access control lists to prevent breaches in the security of the network.
- Describes the use of access control lists by creating them from the console.
- Illustrates the use of the access lists by routing.
- Defines the concepts of monitoring and network maintenance.
- Illustrates solutions to switching and connectivity problems.
- Illustrates the uses of access control lists through problem-solving.

RECOMMENDED CHECKLIST	Date:

Student's name:	

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
Adequately defines elements used to segment the network.			
Clearly recognizes the use of protocols to prevent loops in a switch.			
Effectively uses the console commands to define the VLANs.			
Correctly understands the interconnection of VLANs with devices through the use of trunk links.			
Effectively defines elements used to prepare hierarchical IP network addresses.			
Accurately recognizes the use of sub netting to create network structures.			
Adequately uses VLSM for addressing through sub netting.			
Effectively solves the use of NAT, PAT and the RIP, RIPV2, EIGRP, OSPF protocols, multiple protocols through console programming of the devices.			
Effectively determines the use of the access control lists to prevent breaches in the security of the network.			
Accurately recognizes the use of the access control lists by creating them from the console.			
Effectively uses the access lists by using console for specific problems.			
Correctly describes the concepts of monitoring and network maintenance.			
Effectively recognizes switching and connectivity problems in order to solve them.			
Effectively designs access control lists for specific problems.			

OBSERVATIONS:

CRITERIA FOR COMPETENCIES ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
Recognize the fundamental concepts and elements in network switching of the company.	Recognizes the fundamental concepts and elements in network switching of the company.	Defines elements used to segment the network.	Knowledge	Adequately defines elements used to segment the network.
		Recognizes the use of protocols to prevent loops in a switch.	Performance	Clearly recognizes the use of protocols to prevent loops in a switch.
		Uses the console commands to define the VLANs.	Performance	Effectively uses the console commands to define the VLANs.
		Understands the interconnection of VLANs with devices through the use of trunk links.	Product	Correctly understands the interconnection of VLANs with devices through the use of trunk links.

CRITERIA FOR COMPETENCIES ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
Distinguish network characteristics for addressing companies.	Distinguishes network characteristics for addressing companies.	Defines elements used to prepare hierarchical IP network addresses.	Knowledge	Effectively defines elements used to prepare hierarchical IP network addresses.
		Recognizes the use of sub netting to create network structures.	Performance	Accurately recognizes the use of sub netting to create network structures.
		Uses VLSM for addressing through sub netting.	Performance	Adequately uses VLSM for addressing through sub netting.
		Solves the use of NAT, PAT and the RIP, RIPV2, EIGRP, OSPF protocols, multiple protocols through console programming of the devices.	Product	Effectively solves the use of NAT, PAT and the RIP, RIPV2, EIGRP, OSPF protocols, multiple protocols through console programming of the devices.

CRITERIA FOR COMPETENCIES ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
Apply basic principles for filtering network traffic using access control lists.	Applies basic principles for filtering network traffic using access control lists.	Determines the use of the access control lists to prevent breaches in the security of the network.	Knowledge	Effectively determines the use of the access control lists to prevent breaches in the security of the network.
		Recognizes the use of the access control lists by creating them from the console.	Performance	Accurately recognizes the use of the access control lists by creating them from the console.
		Uses the access lists by using console for specific problems.	Performance	Effectively uses the access lists by using console for specific problems.
Analyze principles necessary for the solution of company network problems.	Analyzes principles necessary for the solution of company network problems.	Describes the concepts of monitoring and network maintenance.	Knowledge	Correctly describes the concepts of monitoring and network maintenance.
		Recognizes switching and connectivity problems in order to solve them.	Performance	Effectively recognizes switching and connectivity problems in order to solve them.
		Designs access control lists for specific problems.	Product	Effectively designs access control lists for specific problems.

TECHNICAL STANDARDS OF THE EDUCATIONAL INSTITUTION

GENERAL DATA

Title: Network Technologies
Purpose: Installation, configuration, and expansion of small networks with different technologies.
Competency level: Basic

UNITS OF JOB COMPETENCY THAT CONFORM THE STANDARDS

Title	Classification
Correctly identifies basic concepts associated with network technologies.	Specific
Effectively recognizes characteristics of each element.	Specific
Adequately describes the use of standards in LAN and WAN networks with different technologies.	Specific
Correctly applies the procedure to use protocols and addressing network technologies.	Specific
Effectively defines basic concepts related to the installation and configuration of equipment in network with different technologies.	Specific
Adequately identifies device characteristics.	Specific
Correctly describes the characteristics of components.	Specific
Correctly installs and configures devices.	Specific
Correctly identifies basic concepts related to network cards and cabling.	Specific
Effectively distinguishes the use of cable according to the network topology.	Specific
Adequately installs and configures network cards.	Specific
Correctly builds different types of network cable.	Specific
Correctly defines and interprets terms related to network installation, configuration, and expansion.	Specific
Adequately describes the procedure for network installation, configuration, and expansion.	Specific
Effectively installs and configures a network with different technologies.	Specific
Correctly shows the way for expanding a previously-built network with different technologies.	Specific
Correctly identifies basic concepts associated with network technologies.	Specific
Effectively recognizes characteristics of each element.	Specific

Competency Elements

Reference	Title of the element
2 - 2	Installation, configuration, and expansion of small networks with different technologies.

Performance criteria:

1. Distinguishes characteristics and functioning of networking technologies.
2. Installs and configure components for network expansion or creation.
3. Installs and configures various types of network cards and cabling used in the construction of network technologies.
4. Applies techniques and strategies for network management and maintenance.

Application Field:

Category	Class
Services	Provision of Technical Education Services.

Performance Evidence:

1. Recognizes characteristics of each element.
2. Describes the use of standards in LAN and WAN networks with different technologies.
3. Identifies device characteristics.
4. Describes the characteristics of components.
5. Distinguishes the use of cable according to the network topology.
6. Describes the procedure for network installation, configuration, and expansion.

Knowledge Evidence:

1. Identifies basic concepts associated with network technologies.
2. Defines basic concepts related to the installation and configuration of equipment in network with different technologies.
3. Identifies basic concepts related to network cards and cabling.
4. Defines and interprets terms related to network installation, configuration, and expansion.

Product Evidence:

1. Applies the procedure to use protocols and addressing network technologies.
2. Installs and configures devices.
3. Installs and configures network cards.
4. Builds different types of network cable.
5. Installs and configures a network with different technologies.
6. Shows the way for expanding a previously-built network with different technologies.

Sector: Commercial and Services	Program: Computer Networking
Subject area: Computer Network	Grade: Twelfth
Study Block: Network Technologies	Time: 60 hours
Purpose: Installation, configuration, and expansion of small networks with different technologies.	

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA

1. Distinguish characteristics and functioning of networking technologies.	• Elements of a network with different technologies:
	  • Servers
	  • Stations
	  • Cards:
	  • wired
	  • wireless
	  • Cabling
	  • Repeaters
	  • Hubs
	  • Routers
	  • Bridges
		<u>Teacher:</u>
		• Defines basic concepts associated with network technologies.
		• Describes characteristics of each element.
		• Illustrates the functioning of a variety of network elements with different technologies.
		• Exemplifies the use of standards in LAN and WAN networks technologies.
			• Behave honestly with peers.	• Distinguishes characteristics and functioning of networking technologies.

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA

	• LAN and WAN networks:
	  • Standards
	  • Layers
	  • Accesses
	  • Devices
	  • Transmission
	• IP Addressing.
	• ARP and RARP
	• TCP/IP
		<u>Student:</u>
		• Identifies basic concepts associated with network technologies.
		• Recognizes characteristics of each element.
		• Describes the use of standards in LAN and WAN networks with different technologies.
		• Applies the procedure to use protocols and addressing network technologies.		

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA

2. Install and configure components for network expansion or creation.	• Main peripherals in the terminals:
	  • Disk units
	  • CD – DVD reader or burner
	  • Mouse
	  • Keyboard
	  • Monitor
	  • Printers
	  • Scanner
	  • Digital cameras
	• Configuration of terminals for network access
		Teacher**:**
		• Defines basic concepts related to the installation and configuration of equipment in network with different technologies.
		• Identifies the component characteristics.
		• Illustrates the procedure for installation and configuration.
		• Installs and configures devices.
			• Behave honestly with peers.	• Installs and configure components for network expansion or creation.

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA
		Student : • Defines basic concepts related to the installation and configuration of equipment in network with different technologies. • Identifies device characteristics. • Describes the characteristics of components. • Installs and configures devices.		

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA

3. Install and configure various types of network cards and cabling used in the construction of network technologies.	• Network cards:
	  • wired
	  • wireless
	• Devices for the network' connection
	  • with cabling
	  • wireless
	• Cabling.
	  • Cable
	  • Connectors
		<u>Teacher:</u>
		• Identifies basic concepts related to network cards and cabling.
		• Illustrates the use of cables according to network topology.
		• Installs and configures network cards.
		• Builds different types of network cable.
			• Behave honestly with peers.	• Installs and configures various types of network cards and cabling used in the construction of network technologies.

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA
		Student: • Identifies basic concepts related to network cards and cabling. • Distinguishes the use of cable according to the network topology. • Installs and configures network cards. • Builds different types of network cable.		

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA

4. Apply techniques and strategies for network management and maintenance.	• Network installation and configuration:
	  • List for controlling the installation
	  • Required equipment and devices
	  • Installation and configuration of devices
	• Expansion of a network:
	  • Required equipment and devices
	  • Installation and configuration of equipment and devices
		<u>Teacher:</u>
		• Defines the terms related to the installation, configuration, and expansion of a network.
		• Describes the procedure for the installation, configuration and expansion of a network.
		• Installs and configures a network with different technologies.
		• Shows the way for the expansion of a previously- built network with different technologies.
			• Behave honestly with peers.	• Applies techniques and strategies for network management and maintenance.

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA
		Student: • Defines and interprets terms related to network installation, configuration, and expansion. • Describes the procedure for network installation, configuration, and expansion. • Installs and configures a network with different technologies. • Shows the way for expanding a previously-built network with different technologies.		

PRACTICE AND CHECKLIST

PRACTICE DEVELOPMENT

Study Block: Network Technologies	PRACTICE No. 1

Purpose:

Scenario: Classroom	Time:

MATERIALS	MACHINERY	EQUIPMENT	TOOLS

Procedures

Teacher:

- Defines basic concepts associated with network technologies.
- Describes characteristics of each element.
- Illustrates the functioning of a variety of network elements with different technologies.
- Exemplifies the use of standards in LAN and WAN networks technologies.
- Defines basic concepts related to the installation and configuration of equipment in network with different technologies.
- Identifies the component characteristics.
- Illustrates the procedure for installation and configuration.
- Installs and configures devices.
- Identifies basic concepts related to network cards and cabling.
- Illustrates the use of cables according to network topology.
- Installs and configures network cards.
- Builds different types of network cable.
- Defines the terms related to the installation, configuration, and expansion of a network.
- Describes the procedure for the installation, configuration and expansion of a network.
- Installs and configures a network with different technologies.
- Shows the way for the expansion of a previously- built network with different technologies.

RECOMMENDED CHECKLIST	Date:

Student's name:	

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 identifies basic concepts associated with network technologies.			
Effectively recognizes characteristics of each element.			
Adequately describes the use of standards in LAN and WAN networks with different technologies.			
Correctly applies the procedure to use protocols and addressing network technologies.			
Effectively defines basic concepts related to the installation and configuration of equipment in network with different technologies.			
Adequately identifies device characteristics.			
Correctly describes the characteristics of components.			
Correctly installs and configures devices.			
Correctly identifies basic concepts related to network cards and cabling.			
Effectively distinguishes the use of cable according to the network topology.			
Adequately installs and configures network cards.			
Correctly builds different types of network cable.			
Correctly defines and interprets terms related to network installation, configuration, and expansion.			
Adequately describes the procedure for network installation, configuration, and expansion.			
Effectively installs and configures a network with different technologies.			
Correctly shows the way for expanding a previously-built network with different technologies.			

OBSERVATIONS:

CRITERIA FOR COMPETENCIES ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
Distinguish characteristics and functioning of networking technologies.	Distinguishes characteristics and functioning of networking technologies.	Identifies basic concepts associated with network technologies.	Knowledge	Correctly identifies basic concepts associated with network technologies.
		Recognizes characteristics of each element.	Performance	Effectively recognizes characteristics of each element.
		Describes the use of standards in LAN and WAN networks with different technologies.	Performance	Adequately describes the use of standards in LAN and WAN networks with different technologies.
		Applies the procedure to use protocols and addressing network technologies.	Product	Correctly applies the procedure to use protocols and addressing network technologies.
Install and configure components for network expansion or creation.	Installs and configure components for network expansion or creation.	Defines basic concepts related to the installation and configuration of equipment in network with different technologies.	Knowledge	Effectively defines basic concepts related to the installation and configuration of equipment in network with different technologies.
		Identifies device characteristics.	Performance	Adequately identifies device characteristics.
		Describes the characteristics of components.	Performance	Correctly describes the characteristics of components.
		Installs and configures devices.	Product	Correctly installs and configures devices.

CRITERIA FOR COMPETENCIES ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
Install and configures various types of network cards and cabling used in the construction of network technologies.	Installs and configures various types of network cards and cabling used in the construction of network technologies.	Identifies basic concepts related to network cards and cabling.	Knowledge	Correctly identifies basic concepts related to network cards and cabling.
		Distinguishes the use of cable according to the network topology.	Performance	Effectively distinguishes the use of cable according to the network topology.
		Installs and configures network cards.	Product	Adequately installs and configures network cards.
		Builds different types of network cable.	Product	Correctly builds different types of network cable.
Apply techniques and strategies for network management and maintenance.	Applies techniques and strategies for network management and maintenance.	Defines and interprets terms related to network installation, configuration, and expansion.	Knowledge	Correctly defines and interprets terms related to network installation, configuration, and expansion.
		Describes the procedure for network installation, configuration, and expansion.	Performance	Adequately describes the procedure for network installation, configuration, and expansion.
		Installs and configures a network with different technologies.	Product	Effectively installs and configures a network with different technologies.
		Shows the way for expanding a previously-built network with different technologies.	Product	Correctly shows the way for expanding a previously-built network with different technologies.

TECHNICAL COMPETENCY STANDARDS OF EDUCATIONAL INSTITUTION

GENERAL DATA

Title: Computer Security
Purpose: Distinguish the main aspects of information security.
Competency level: Basic

UNITS OF JOB COMPETENCY THAT CONFORM THE STANDARDS

Title	Classification
Effectively states the concepts related to computer security and auditing.	Specific
Accurately recognizes types of evaluation executed in computer security and auditing.	Specific
Correctly explains the functions of information security and auditing.	Specific
Effectively distinguishes strategies used to perform the types of evaluation required for information security and auditing.	Specific
Effectively identifies the origin of ICT threats.	Specific
Effectively defines the concept of computer viruses.	Specific
Effectively describes characteristics of computer viruses.	Specific
Correctly distinguishes strategies and methods for the detection and elimination of computer viruses.	Specific
Correctly defines basic concepts associated with prevention in computer security.	Specific
Clearly identifies techniques that may prevent incidents.	Specific
Correctly recognizes procedures for the selection and implementation of prevention strategies.	Specific
Correctly distinguishes ways to prevent company accidents.	Specific

Competency Elements

Reference	Title of the element
2 - 3	Distinguish the main aspects of information security.

Performance criteria:

1. Distinguishes basic concepts associated with computer security.
2. Analyzes security in computer contexts and environments.
3. Recommends security methods and techniques according to systems and equipment characteristics.

Application Field:

Category	Classes
Services	Provision of Technical Education Services

Performance Evidence:

1. Recognizes types of evaluation executed in computer security and auditing.
2. Explains the functions of information security and auditing.
3. Distinguishes strategies used to perform the types of evaluation required for information security and auditing.
4. Describes characteristics of computer viruses.
5. Distinguishes strategies and methods for the detection and elimination of computer viruses.
6. Recognizes procedures for the selection and implementation of prevention strategies.
7. Distinguishes ways to prevent company accidents.

Knowledge Evidence:

1. States the concepts related to computer security and auditing.
2. Identifies the origin of ICT threats.
3. Defines the concept of computer viruses.
4. Defines basic concepts associated with prevention in computer security.
5. Identifies techniques that may prevent incidents.

Product Evidence:

1. Applies security methods and techniques according to the characteristics of the systems and equipment available for the solution of cases.

Sector: Commercial and Services	Program: Computer Networking
Subject area: Computer Network	Grade: Twelfth
Study Block: Computer Security	Time: 60 hours
Purpose: Distinguish the main aspects of information security.	

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA

1. Distinguish basic concepts associated with computer security.	• Computer security:
	  • Concept
	  • Characteristics
	  • Value company's information
	  • Functions of information security
	  • Security - physical, logical and digital
		Teacher:
		• Defines concepts related to information security and auditing.
		• Describes types of evaluation used in information security and auditing.
		• Illustrates functions of computer security and auditing.
		• Presents strategies used to perform types of evaluation required for computer security and auditing.
			The fundamental rights of each individual are treated clearly with respect.	• Distinguishes basic concepts associated with computer security.

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA

	• Information auditing:
	  • Concept
	  • Types
	  • Evaluation of:
	  • the organic structure
	  • human resources
	  • systems
	  • computer equipment
	  • security
		Student:
		• States the concepts related to computer security and auditing.
		• Recognizes types of evaluation executed in computer security and auditing.
		• Explains the functions of information security and auditing.
		• Distinguishes strategies used to perform the types of evaluation required for information security and auditing.		

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA
2. Analyze security in computer contexts and environments.	• Threats and vulnerabilities: • Origin of the threats • Main forms of attack to information technologies • Risks - accidental or intentional • Attacks -internal and external • Encroachments • Costs of the incidents for companies	Teacher: • Identifies the origin of threats to ICT. • Illustrates costs represented by these incidents to the company. • Defines the concept of computer virus. • Explains strategies and methods for the detection and elimination of information viruses.	• The fundamental rights of each individual are treated clearly with respect.	• Analyzes security in computer contexts and environments.

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA

	• computer viruses:
	  • Concept
	  • Types of virus
	  • Malware propagation
	  • Virus detection and elimination
		Student:
		• Identifies the origin of ICT threats.
		• Defines the concept of computer viruses.
		• Describes characteristics of computer viruses.
		• Distinguishes strategies and methods for the detection and elimination of computer viruses.		

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA

3. Recommend security methods and techniques according to systems and equipment characteristics.	• Prevention in computer security:
	  • Encryption:
	  • Concept
	  • Characteristics
	  • Encryption techniques
	  • symmetric encryption and public classes
	  • Authentication
	  • Selection and management of passwords
	  • Backups
	  • Consequences of risks and prevention
		Teacher:
		• Defines basic concepts associated with prevention in information security.
		• Identifies techniques that may be applied to prevent incidents.
		• Describes procedures for the selection and implementation of prevention strategies.
		• Illustrates ways to prevent incidents in the company.
			• The fundamental rights of each individual are treated clearly with respect.	• Recommends security methods and techniques according to systems and equipment characteristics.

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA

	• Protection of data:
	  • Concept
	  • Types of protection
	  • Issues in the protection of company data
		Student:
		• Defines basic concepts associated with prevention in computer security.
		• Identifies techniques that may prevent incidents.
		• Recognizes procedures for the selection and implementation of prevention strategies.
		• Distinguishes ways to prevent company accidents.		

PRACTICE AND CHECKLIST

PRACTICE DEVELOPMENT

Study Block: Computer Security	PRACTICE No. 1

Purpose:

Scenario: Classroom	Time:

MATERIALS	MACHINERY	EQUIPMENT	TOOLS

Procedures

Teacher:

- Defines concepts related to information security and auditing.
- Describes types of evaluation used in information security and auditing.
- Illustrates functions of computer security and auditing.
- Presents strategies used to perform types of evaluation required for computer security and auditing.
- Identifies the origin of threats to ICT.
- Illustrates costs represented by these incidents to the company.
- Defines the concept of computer virus.
- Explains strategies and methods for the detection and elimination of information viruses.
- Defines basic concepts associated with prevention in information security.
- Identifies techniques that may be applied to prevent incidents.
- Describes procedures for the selection and implementation of prevention strategies.
- Illustrates ways to prevent incidents in the company.

RECOMMENDED CHECKLIST	Date:

Student's name:	

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
Effectively states the concepts related to computer security and auditing.			
Accurately recognizes types of evaluation executed in computer security and auditing.			
Correctly explains the functions of information security and auditing.			
Effectively distinguishes strategies used to perform the types of evaluation required for information security and auditing.			
Effectively identifies the origin of ICT threats.			
Effectively defines the concept of computer viruses.			
Effectively describes characteristics of computer viruses.			
Correctly distinguishes strategies and methods for the detection and elimination of computer viruses.			
Correctly defines basic concepts associated with prevention in computer security.			
Clearly identifies techniques that may prevent incidents.			
Correctly recognizes procedures for the selection and implementation of prevention strategies.			
Correctly distinguishes ways to prevent company accidents.			

OBSERVATIONS:

CRITERIA FOR COMPETENCY ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
Distinguish basic concepts associated with computer security.	Distinguishes the basic concepts associated with computer security.	States the concepts related to computer security and auditing.	Knowledge	Effectively states the concepts related to computer security and auditing.
		Recognizes types of evaluation executed in computer security and auditing.	Performance	Accurately recognizes types of evaluation executed in computer security and auditing.
		Explains the functions of information security and auditing.	Performance	Correctly explains the functions of information security and auditing.
		Distinguishes strategies used to perform the types of evaluation required for information security and auditing.	Performance	Effectively distinguishes strategies used to perform the types of evaluation required for information security and auditing.

CRITERIA FOR COMPETENCY ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
Analyze security in different computer contexts and environments.	Analyzes the security in different computer contexts and environments.	Identifies the origin of ICT threats.	Knowledge	Effectively identifies the origin of ICT threats.
		Defines the concept of computer viruses.	knowledge	Effectively defines the concept of computer viruses.
		Describes characteristics of computer viruses.	Performance	Effectively describes characteristics of computer viruses.
		Distinguishes strategies and methods for the detection and elimination of computer viruses.	Performance	Correctly distinguishes strategies and methods for the detection and elimination of computer viruses.
Recommend security methods and techniques according to systems and equipment characteristics.	Recommends security methods and techniques according to systems and equipment characteristics.	Defines basic concepts associated with prevention in computer security.	knowledge	Correctly defines basic concepts associated with prevention in computer security.
		Identifies techniques that may prevent incidents.	knowledge	Clearly identifies techniques that may prevent incidents.
		Recognizes procedures for the selection and implementation of prevention strategies.	Performance	Correctly recognizes procedures for the selection and implementation of prevention strategies.
		Distinguishes ways to prevent company accidents.	Performance	Correctly distinguishes ways to prevent company accidents.

TECHNICAL COMPETENCY STANDARDS OF EDUCATIONAL INSTITUTION

GENERAL DATA

Title: Quality Culture
Purpose: Distinguish the main aspects related to quality and customer service.
Competency level: Basic

UNITS OF JOB COMPETENCY THAT CONFORM THE STANDARDS

Title	Classification
Correctly states the concepts associated with quality.	Specific
Clearly explains the importance of quality within the process of globalization.	Specific
Adequately identifies the benefits provided by a change towards quality.	Specific
Effectively uses the different tools in specific cases.	Specific
Accurately describes the factors that determine the customer's behavior.	Specific
Effectively distinguishes the way in which the customer's needs and expectations are presented.	Specific
Adequately recognizes the consequences to the company of not satisfying the customer.	Specific
Correctly indicates the basic principles of customer service.	Specific
Effectively identifies the characteristics of groups and teams.	Specific
Adequately recognizes the characteristics of groups and teams.	Specific
Effectively distinguishes the attitudes and personal values required for team work and negotiation.	Specific
Correctly explains the circumstances and elements that may influence team work.	Specific

Competency Elements

Reference	Title of the element
2-4	Main aspects related to quality and customer service.

Performance criteria:

1. Relates basic principles of quality with the development of daily tasks of a Computer systems technician.

2. Applies the concepts associated with customer service in the tasks performance related to a computer systems technician.
3. Recognizes the contributions of team work to achieve the target goals.

Application Field:

Category	Classes
Services	Provision of Technical Education Services

Performance Evidence:

1. Explains the importance of quality within the process of globalization.
2. Identifies the benefits provided by a change towards quality.
3. Uses the different tools in specific cases.
4. Describes factors that determine customer's behavior.
5. Distinguishes the way in which the customer's needs and expectations are presented.
6. Explains the service cycle and each moments of the truth.
7. Recognizes the consequences to the company for not satisfying the customer.
8. Distinguishes the attitudes and personal values required for team work and negotiation.
9. Indicates the differences between groups and teams.

Knowledge Evidence:

1. States the concepts associated with quality.
2. Indicates the basic principles of customer service.
3. Identifies the characteristics of groups and teams.
4. Recognizes the characteristics of groups and teams.

Product Evidence:

1. Classifies the types of customers.

Sector: Commercial and Services	Program: Computer Networking
Subject area: Computer Network	Grade: Twelfth
Study block: Quality Culture	Time: 60 hours
Purpose: Distinguish the main aspects related to quality and customer service.	

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA
1. Relate basic principles of quality to the development of daily tasks of a computer systems technician.	• Quality: • Concept • Characteristics • Quality in different fields: • Personal • Family • Community • Professional • Importance within the context of globalization: • Benefits • Improving quality	Teacher: • Defines concepts associated with quality. • Shows the benefits of improving quality. • Establishes the importance of methods of obtaining quality. • Explains the importance of statistical control. • Exemplifies the use of specific methods in the program.	• Respect each person.	• Relates basic principles of quality to the development of daily tasks of a computer systems technician.

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA

	• Continuous improvement:
	  • Concept
	  • Importance of measuring quality
	  • Statistical
	  • Quality control
	  • Tools for continuous improvement:
	  • Brainstorming
	  • Flux diagram
	  • Cause-effect diagram
	  • Pareto chart
		<u>Student</u>:
		• States the concepts associated with quality.
		• Explains the importance of quality within the process of globalization.
		• Identifies the benefits provided by improvement.
		• Uses different tools in specific cases.		

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA

2. Applies concepts associated with customer service in the performance of tasks related to a computer systems technician.	• Customer:
	  • Concept
	  • Characteristics
	  • Conditioning factors
	  • Needs and expectations
	• Customer satisfaction:
	  • Customer classification
	  • The service cycle (moments of truth).
	  • Consequences of not satisfying the customer
	• Human relations :
	  • Concept
	  • Empathy
	  • Values
	• Etiquette and protocol:
	  • Rules of conduct in the:
	  • community
	  • company
		Teacher:
		• Defines concepts related to the customer.
		• Illustrates consequences to a company for not satisfying the customer.
		• Identifies human relations processes.
		• Explains the relationship between values and human relations.
			• Respect each person.	• Applies concepts associated with customer service in the performance of tasks related to a computer systems technician.

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA

	• Basic norms for the establishment of interpersonal relationships
	• Hierarchies and norms of conduct.
	• Customer service:
	  • Concept
	  • Characteristics
	  • Importance
	  • Fundamental principles
		Student:
		• Describes factors that determine customer's behavior.
		• Distinguishes the way in which the customer's needs and expectations are presented.
		• Recognizes the consequences to the company for not satisfying the customer.
		• Indicates the basic principles of customer service.		

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA

3. Recognize the contribution of team work to achieve target goals.	• Team work:
	  • Concept
	  • Characteristics
	  • Importance
	  • Attitudes and personal values necessary for team work
	  • Elements that influence team work
	• Group:
	  • Concept
	  • Characteristics
	• Difference between groups and teams
	• Negotiation
	  • Concept
	  • Characteristics
	  • Principles
	  • Attitudes and personal values necessary for the negotiation
		<u>Teacher</u>:
		• Identifies characteristics of groups and teams.
		• Describes these characteristics of groups and teams.
		• Explains the circumstances and elements that may influence team work.
		• Exemplifies team work process and efficient negotiation.
			• Respect each person.	• Recognizes the contributions of team work to achieve target goals.

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA
		Student: • Identifies the characteristics of groups and teams. • Recognizes their characteristics. • Distinguishes the attitudes and personal values required for team work and negotiation. • Explains the circumstances and elements that may influence team work.		

PRACTICE AND CHECKLIST

PRACTICE DEVELOPMENT

Study Block: Quality Culture	PRACTICE No. 1

Purpose:

Scenario: Classroom	Time:

MATERIALS	MACHINERY	EQUIPMENT	TOOLS

Procedures

Teacher:

- Defines the concepts associated with quality.
- Shows the benefits provided by a change towards quality.
- Establishes the importance of methods to obtain quality.
- Explains the importance of statistical control.
- Exemplifies the use of the methods in specific cases of the Program.
- Defines concepts related to the customer.
- Illustrates consequences to a company for not satisfying the customer.
- Identifies processes by which human relations are established.
- Explains the relationship between values and human relations.
- Identifies the characteristics of groups and teams.
- Describes the characteristics of groups and teams.
- Explains the circumstances and elements that may influence team work.
- Exemplifies team work process and efficient negotiation.

RECOMMENDED CHECKLIST	Date:

Student's name:	

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 states the concepts associated with quality.			
Clearly explains the importance of quality within the process of globalization.			
Adequately identifies the benefits provided by a change towards quality.			
Effectively uses the different tools in specific cases.			
Accurately describes factors that determine customer's behavior.			
Effectively distinguishes the way in which the customer's needs and expectations are presented.			
Adequately recognizes the consequences to the company for not satisfying the customer.			
Correctly indicates the basic principles of customer service.			
Effectively identifies the characteristics of groups and teams.			
Adequately recognizes the characteristics of groups and teams.			
Effectively distinguishes the attitudes and personal values required for team work and negotiation.			
Correctly explains the circumstances and elements that may influence team work.			

OBSERVATIONS:

CRITERIA FOR COMPETENCY ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
Relate basic principles of quality with the development of daily tasks of a Computer systems technician.	Relates basic principles of quality with the development of daily tasks of a Computer systems technician. .	States the concepts associated with quality	knowledge	Correctly states the concepts associated with quality.
		Explains the importance of quality within the process of globalization	Performance	Clearly explains the importance of quality within the process of globalization.
		Identifies the benefits provided by a change towards quality	Performance	Adequately identifies the benefits provided by a change towards quality.
		Uses the different tools in specific cases	Performance	Effectively uses the different tools in specific cases.

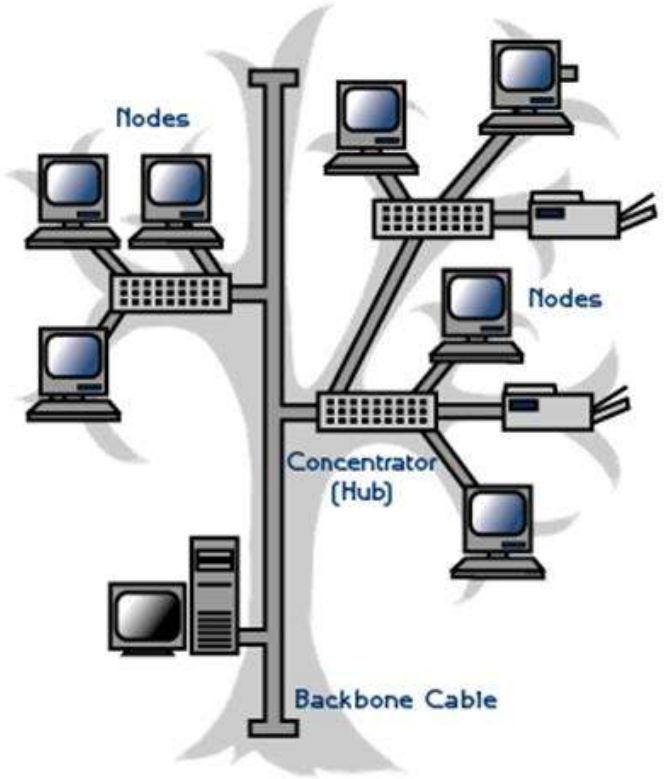
CRITERIA FOR COMPETENCY ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
Applies the concepts associated with customer service in the tasks performance related to a computer systems technician	Applies the concepts associated with customer service in the tasks performance related to a computer systems technician.	Describes factors that determine customer's behavior.	Performance	Accurately describes factors that determine customer's behavior.
		Distinguishes the way in which the customer's needs and expectations are presented.	Product	Effectively distinguishes the way in which the customer's needs and expectations are presented.
		Recognizes the consequences to the company for not satisfying the customer.	Performance	Adequately recognizes the consequences to the company for not satisfying the customer.
		Indicates the basic principles of customer service.	Performance	Correctly indicates the basic principles of customer service.

CRITERIA FOR COMPETENCY ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
Recognize the contribution of team work to achieve the target goals.	Recognizes the contributions of team work to achieve the target goals.	Identifies the characteristics of groups and teams.	knowledge	Effectively identifies the characteristics of groups and teams.
		Recognizes the characteristics of groups and teams.	knowledge	Adequately recognizes the characteristics of groups and teams.
		Distinguishes the attitudes and personal values required for team work and negotiation.	Performance	Effectively distinguishes the attitudes and personal values required for team work and negotiation.
		Explains the circumstances and elements that may influence team work.	Performance	Correctly explains the circumstances and elements that may influence team work.

SUBJECT AREA: NETWORK OPERATING SYSTEMS



SUBJECT AREA: NETWORK OPERATING SYSTEMS

D E S C R I P T I O N

The mid-level Technician in COMPUTER NETWORK must have a good command of the fundamental concepts of the operating systems, both as user and manager. The understanding of the main aspects of the installation and maintenance of software multiuser is important. Likewise, although not less important, is the physical aspect, meaning of the cards, connectors, cabling, and other devices that integrate the network.

In this subject area we present three units:

- Operating systems: the definition of fundamental concepts of existing operating systems in the market, including the commercial and free software.
- Network User: Contains fundamental concepts related to the use and management of the network resources.
- Network Management: Incorporates the functions and tools enabling the handling and management of all available resources in this type of network.

GENERAL LEARNING RESULTS

Develop the knowledge, abilities, and basic skills in the student to so that he/she will be able to:

- Select different operating systems based on their technical characteristics
- Perform effectively as a user in the sphere of the network's operating system .
- Develop functions for network management.

DISTRIBUTION OF STUDY BLOCK

NETWORK OPERATING SYSTEMS

Study blocks	Name	Time in hours	Weeks per study block
I.	Operating Systems	70	7
II.	Network User	90	9
III.	Network Management	90	9
	TOTAL	250	25

TECHNICAL COMPETENCY STANDARDS OF EDUCATIONAL INSTITUTION

GENERAL DATA

Title: Operating Systems
Purpose: Select different operating systems for their technical characteristics.
Competency level: Basic

UNITS OF JOB COMPETENCY THAT CONFORM THE STANDARDS

Title	Classification
Properly defines basic concepts related to the operating systems.	Specific
Accurately identifies functions and characteristics of the operating system.	Specific
Clearly describes the operating system calls.	Specific
Correctly uses the functions of the command interpreter.	Specific
Effectively identifies basic concepts related to memory management.	Specific
Properly recognizes the processes carried out by the operating system for the memory assignment.	Specific
Clearly shows different processes developed by the operating system for memory management.	Specific
Accurately identifies basic concepts related to the processor manager.	Specific
Correctly recognizes processes carried out by the operating system for the assignment of the processor.	Specific
Effectively recognizes processes carried out by the operating system for the planning of processes and policy definition.	Specific
Correctly shows different algorithms developed by the operating system for the processor manager.	Specific
Effectively identifies basic concepts related to the management of processes.	Specific
Properly recognizes processes carried out by the operating system.	Specific
Effectively shows typical multiprocessing configurations.	Specific
Properly defines basic concepts related to the operating systems.	Specific
Clearly identifies characteristics and functions of direct access media and storage devices.	Specific
Clearly recognizes different components of the I/O subsystem.	Specific
Correctly explains the communication process between devices.	Specific
Effectively observes the management process of the I/O requests.	Specific

Title	Classification
Effectively describes the file manager's interactions.	Specific
Clearly recognizes different elements of file organization.	Specific
Effectively describes the method for the assignment of physical storage and data compression.	Specific
Clearly uses the access methods of the operating system.	Specific
Properly distinguishes network operating systems and their characteristics.	Specific
Clearly recognizes characteristics and functions of each element in the development of the DOS.	Specific
Effectively recognizes the characteristics and functions of the NOS elements.	Specific
Clearly observes operations performed by the network function manager.	Specific
Clearly identifies stages of the evaluation process of an operating system.	Specific
Properly recognizes the system manager components.	Specific
Clearly explains the functions of the security management system.	Specific
Effectively applies the performance measurement process.	Specific
Effectively lists main historical facts related to each operating system.	Specific
Clearly identifies the main characteristics of each operating system.	Specific
Correctly differentiates between the designs goals of each operating system.	Specific
Effectively relates management processes of the memory, processor, devices, files, and others in each operating system.	Specific
Correctly compares security mechanisms used by the different operating system.	Specific
Effectively observes the user interface used by each operating system.	Specific

Competency Elements

Reference	Title of the element
3-1	Select different operating systems for their technical characteristics.

Performance criteria:

1. Characterizes different operating systems using their technical characteristics.
2. Explains the administrative method of the processor, the processes and the memory of its operating system.
3. Uses operating system functions for device and file management.
4. Distinguishes characteristics of the network function manager and the system used by the operating system.

5. Distinguishes the characteristics of currently used main operating systems.

Application Field:

Category	Class
Services	Provision of Technical Education Services

Performance Evidence:

1. Describes the operating system calls.
2. Uses the functions of the command interpreter.
3. Recognizes the processes carried out by the operating system for the memory assignment.
4. Recognizes processes carried out by the operating system for the assignment of the processor.
5. Recognizes processes carried out by the operating system for the planning of processes and policy definition.
6. Recognizes processes carried out by the operating system.
7. Recognizes different components of the I/O subsystem.
8. Explains the communication process between devices.
9. Observes the management process of the I/O requests.
10. Recognizes different elements of file organization.
11. Uses the access methods of the operating system.
12. Distinguishes network operating systems and their characteristics.
13. Recognizes characteristics and functions of each element in the development of the DOS.
14. Recognizes the characteristics and functions of the NOS elements
15. Observes operations performed by the network function manager.
16. Recognizes the system manager components.
17. Explains the functions of the security management system.
18. Lists main historical facts related to each operating system.
19. Compares security mechanisms used by the different operating system.
20. Observes the user interface used by each operating system.

Knowledge Evidence:

1. Defines basic concepts related to the operating systems.
2. Identifies functions and characteristics of the operating system.
3. Identifies basic concepts related to memory management.
4. Identifies basic concepts related to the processor manager.
5. Identifies basic concepts related to the management of processes.
6. Identifies characteristics and functions of direct access media and storage devices.
7. Describes the file manager's interactions.
8. Describes the method for the assignment of physical storage and data compression.
9. Identifies stages of the evaluation process of an operating system.
10. Identifies the main characteristics of each operating system.

Product Evidence:

1. Shows different processes developed by the operating system for memory management.
2. Shows different algorithms developed by the operating system for the processor manager.
3. Shows typical multiprocessing configurations.
4. Applies the performance measurement process.
5. Differentiates between the design´s goals of each operating system.
6. Relates management processes of the memory, processor, devices, files, and others in each operating system.

Sector: Commercial and Services	Program: Computer Networking
Subject area: Network Operating Systems	Grade: Twelfth
Study block: Operating Systems	Time: 70 hours
Purpose: Select different operating systems for their technical characteristics.	

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA
1. Characterize different operating systems using their technical characteristics.	• Operating systems: • Concept • Evolution • Characteristics • Types • Managers • Calls to the system • Structure • Command interpreter	Teacher: • Defines basic concepts for the development of operating systems. • Identifies the functions and characteristics of the operating system. • Describes the managers and the operating system calls. • Illustrates the functions of the command interpreter.	• Respect: each person.	• Characterizes different operating systems using their technical characteristics.

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA
		Student: • Defines basic concepts related to the operating systems. • Identifies functions and characteristics of the operating system. • Describes the operating system calls. • Uses the functions of the command interpreter.		

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA

2. Explain the administrative method of the processor, the processes, and the memory of its operating system.	• Memory management:
	  • Concepts
	  • Partitions
	  • Assignment of memory in pages
	  • Pagination on demand
	  • Page replacement
	  • Assignment of memory
	  • Virtual memory
		<u>Teacher:</u>
		• Defines concepts related to memory management by the operating system.
		• Describes the processes of memory assignment, pagination and page replacement.
		• Illustrates different processes used by the operating system for memory management.
		<u>Student:</u>
		• Identifies basic concepts related to memory management.
		• Recognizes the processes carried out by the operating system for the memory assignment.
		• Shows different processes developed by the operating system for memory management.
			• Respect: each person.	• Explains the administrative method of the processor, the processes and the memory of its operating system.

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA

	• Processor manager:
	  • Process planner:
	  • Job status and processes.
	  • Control unit processes
	  • Control unit processes and queues
	  • Planning policies of processes
	  • Algorithms for process planning
		<u>Teacher:</u>
		• Defines concepts related to the processor administration by the operating system.
		• Describes the planning of processes development.
		• Illustrates planning policies of processes defined for management by the operating system
		• Illustrates process planning algorithms used by the operating system.		

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA

	• Process manager:
	  • Mutual unit
	  • Parallel procedure
	  • Typical multiprocessing configurations
	  • Synchronization of processes
	  • Cooperation of processes
	  • Concurrent programming
		<u>Student:</u>
		• Identifies basic concepts related to the processor manager.
		• Recognizes processes carried out by the operating system for the assignment of the processor.
		• Recognizes processes carried out by the operating system for the planning of processes and policy definition.
		• Shows different algorithms developed by the operating system for the processor manager.		

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA
		Teacher: • Defines concepts related to process management used by the operating system. • Describes the unit processes used by the operating system. • Illustrates typical multiprocessing configurations used for memory management by operating system. • Illustrates software applications for the synchronization of processes.		

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA
		Student: • Identifies basic concepts related to the management of processes. • Recognizes processes carried out by the operating system. • Shows typical multiprocessing configurations. • Observes software applications for the synchronization of processes.		

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA

3. Use operating system functions for device and file management.	• Device manager:
	  • System devices
	  • Direct access storage media
	  • Direct access to storage devices:
	  • Fixed head DASD
	  • Mobile head DASD
	  • Optical storage in disk
	  • Required access time
	  • Components of the I/O subsystem
	  • Communication between devices
		<u>Teacher:</u>
		• Defines basic concepts.
		• Describes characteristics and functions of direct access media and storage devices.
		• Illustrates different components of the I/O subsystem.
		• Illustrates the communication process between devices.
			• Respect: each person.	• Uses operating system functions for device and file management.

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA

	• Management of I/O requests:
	  • Search device strategies
	  • Latency strategies
		Student:
		• Identifies characteristics and functions of direct access media and storage devices.
		• Recognizes different components of the I/O subsystem.
		• Explains the communication process between devices.
		• Observes the management process of the I/O requests.		

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA

	• File manager:
	  • Functions
	  • Interaction:
	  • Volume configuration
	  • Subdirectories
	  • File identification rule
	  • Organization of files:
	  • Record format
	  • Physical organization
	  • Physical storage assignment:
	  • Data compression
	  • Access methods:
	  • Sequential
	  • Direct
	  • Levels in a system of file management
		<u>Teacher:</u>
		• Describes the file manager's interactions.
		• Describes different elements of file organization.
		• Illustrates the method for the assignment of physical storage and data compression.
		• Illustrates access methods.		

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA
		Student: • Describes the file manager's interactions. • Recognizes different elements of file organization. • Describes the method for the assignment of physical storage and data compression. • Uses the access methods of the operating system.		

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA

4. Distinguish characteristics of the network function manager and the system used by the operating system.	• Network functions manager :
	  • History
	  • Comparison between network operating systems and distributors
	  • Managers of:
	  • memory
	  • processes
	  • devices
	  • files
	  • network
	  • NOS Development:
	  • Characteristics
	  • Functions
		Teacher:
		• Compares network operating systems as distributors.
		• Describes characteristics and functions of each element in the development of DOS.
		• Describes characteristics and functions of the NOS elements.
		• Illustrates operations performed by the network function manager.
			• Respect: clearness regarding each person.	• Distinguishes characteristics of the network function manager and the system used by the operating system.

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA
		Student: • Distinguishes network operating systems and their characteristics. • Recognizes characteristics and functions of each element in the development of the DOS. • Recognizes the characteristics and functions of the NOS elements. • Observes operations performed by the network function manager.		

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA
	• Systems manager • Evaluation of an operating system • Components • Security: • Levels of protection • Management systems • Assault to the system • Assaults to the network and Internet • Performance measurement: • Tools • Monitoring	<u>Teacher:</u> • Defines basic concepts related to the system manager. • Describes the evaluation process of an operating system. • Illustrates the functions, levels, and security management systems. • Illustrates the performance measurement process.		

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA
		Student: • Identifies stages of the evaluation process of an operating system. • Recognizes the system manager components. • Explains the functions of the security management system. • Applies the performance measurement process.		

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA

5. Distinguish the characteristics of currently used main operating systems.	• MS – DOS:
	  • History
	  • Design goals
	  • Management of:
	  • Memory
	  • Processor
	  • Devices
	  • Files
	  • User interface
		<u>Teacher:</u>
		• Tells the main historical facts related to each operating system.
		• Summarizes the main characteristics of each system.
		• Describes the design goals of each operating system.
		<u>Student:</u>
		• Lists main historical facts related to each operating system.
		• Identifies the main characteristics of each operating system.
		• Differentiates between the designs goals of each operating system.
			• Respect: clearness regarding each person.	• Distinguishes the characteristics of currently used main operating systems.

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA

	• Windows:
	  • History
	  • Design goals
	  • Management of:
	  • the memory
	  • the processor
	  • the devices
	  • the files
	  • the network
	  • the security
	  • User interface
	• UNIX – Linux:
	  • History
	  • Design goals
	  • Management of:
	  • the memory
	  • the processor
	  • the devices
	  • the files
	  • the network
	  • the security
		<u>The Teacher:</u>
		• Exemplifies the management processes for the memory, processor, devices, files and others in each one of the operating systems.
		• Compares the security management Mechanisms between the different operating systems.
		• Explains the characteristics of the user interface in each one of the systems.		

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA

	• Other available systems:
	  • History
	  • Design goals
	  • Management of:
	  • memory
	  • processor
	  • devices
	  • files
	  • network
	  • security
	  • User interface
		<u>Student:</u>
		• Relates management processes of the memory, processor, devices, files, and others in each operating system.
		• Compares security mechanisms used by the different operating system.
		• Observes the user interface used by each operating system.		

PRACTICE AND CHECKLIST

PRACTICE DEVELOPMENT

Study Block: Operating Systems	PRACTICE No. 1

Purpose:

Scenario: Classroom	Duration:

MATERIALS	MACHINERY	EQUIPMENT	TOOLS

Procedures
Teacher: • Defines basic concepts for the development of operating systems. • Identifies the functions and characteristics of the operating system. • Describes the managers and the operating system calls. • Illustrates the functions of the command interpreter. • Defines concepts related to memory management by the operating system. • Describes the processes of memory assignment, pagination and page replacement. • Illustrates different processes used by the operating system for memory management. • Defines concepts related to the processor administration by the operating system. • Describes the planning of processes development. • Illustrates planning policies of processes defined for management by the operating system • Illustrates process planning algorithms used by the operating system. • Defines concepts related to process management used by the operating system. • Describes the unit processes used by the operating system. • Illustrates typical multiprocessing configurations used for memory management by operating system. • Illustrates software applications for the synchronization of processes. • Defines basic concepts. • Describes characteristics and functions of direct access media and storage devices. • Illustrates different components of the I/O subsystem. • Illustrates the communication process between devices. • Describes the file manager's interactions. • Describes different elements of file organization. • Illustrates the method for the assignment of physical storage and data compression.

Procedures
Teacher: • Illustrates access methods. • Compares network operating systems as distributors. • Describes characteristics and functions of each element in the development of DOS. • Describes characteristics and functions of the NOS elements. • Illustrates operations performed by the network function manager. • Defines basic concepts related to the system manager. • Describes the evaluation process of an operating system. • Illustrates the functions, levels, and security management systems. • Illustrates the performance measurement process. • Tells the main historical facts related to each operating systems. • Summarizes the main characteristics of each system. • Describes the design goals of each operating systems. • Exemplifies the management processes for the memory, processor, devices, files and others in each one of the operating systems. • Compares the security management • Mechanisms between the different operating systems. • Explains the characteristics of the user interface in each one of the systems.

RECOMMENDED CHECKLIST	Date:

Student's name:	

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 defines basic concepts related to the operating systems.			
Accurately identifies functions and characteristics of the operating system.			
Clearly describes the operating system calls.			
Correctly uses the functions of the command interpreter.			
Effectively identifies basic concepts related to memory management.			
Properly recognizes the processes carried out by the operating system for the memory assignment.			
Clearly shows different processes developed by the operating system for memory management.			
Accurately identifies basic concepts related to the processor manager.			
Correctly recognizes processes carried out by the operating system for the assignment of the processor.			
Effectively recognizes processes carried out by the operating system for the planning of processes and policy definition.			
Correctly shows different algorithms developed by the operating system for the processor manager.			
Effectively identifies basic concepts related to the management of processes.			
Properly recognizes processes carried out by the operating system.			
Effectively shows typical multiprocessing configurations.			

DEVELOPMENT	YES	NOT YET	NOT APPLICABLE
Clearly identifies characteristics and functions of direct access media and storage devices.			
Clearly recognizes different components of the I/O subsystem.			
Correctly explains the communication process between devices.			
Effectively observes the management process of the I/O requests.			
Effectively describes the file manager's interactions.			
Clearly recognizes different elements of file organization.			
Effectively describes the method for the assignment of physical storage and data compression.			
Clearly uses the access methods of the operating system.			
Properly distinguishes network operating systems and their characteristics.			
Clearly recognizes characteristics and functions of each element in the development of the DOS.			
Effectively recognizes the characteristics and functions of the NOS elements.			
Clearly observes operations performed by the network function manager.			
Clearly identifies stages of the evaluation process of an operating system.			
Properly recognizes the system manager components.			
Clearly explains the functions of the security management system.			
Effectively applies the performance measurement process.			
Effectively lists main historical facts related to each operating system.			
Clearly identifies the main characteristics of each operating system.			
Correctly differentiates between the designs goals of each operating system.			
Effectively relates management processes of the memory, processor, devices, files, and others in each operating system.			
Correctly compares security mechanisms used by the different operating system.			
Effectively observes the user interface used by each operating system.			

OBSERVATIONS:

CRITERIA FOR COMPETENCY ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
Characterize different operating systems using their technical characteristics.	Characterizes different operating systems using their technical characteristics	Defines basic concepts related to the operating systems.	knowledge	Properly defines basic concepts related to the operating systems.
		Identifies functions and characteristics of the operating system.	knowledge	Accurately identifies functions and characteristics of the operating system.
		Describes the operating system calls.	Performance	Clearly describes the operating system calls.
		Uses the functions of the command interpreter.	Performance	Correctly uses the functions of the command interpreter.

CRITERIA FOR COMPETENCY ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
Explain the administrative method of the processor, the processes, and the memory of its operating system.	Explains the administrative method of the processor, the processes, and the memory of its operating system.	Identifies basic concepts related to memory management.	Knowledge	Effectively identifies basic concepts related to memory management.
		Recognizes the processes carried out by the operating system for the memory assignment.	Performance	Properly recognizes the processes carried out by the operating system for the memory assignment.
		Shows different processes developed by the operating system for memory management.	Product	Clearly shows different processes developed by the operating system for memory management.
		Identifies basic concepts related to the processor manager.	knowledge	Accurately identifies basic concepts related to the processor manager.
		Recognizes processes carried out by the operating system for the assignment of the processor.	Performance	Correctly recognizes processes carried out by the operating system for the assignment of the processor.
		Recognizes processes carried out by the operating system for the planning of processes and policy definition.	Performance	Effectively recognizes processes carried out by the operating system for the planning of processes and policy definition.

CRITERIA FOR COMPETENCY ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
		Shows different algorithms developed by the operating system for the processor manager.	Product	Correctly shows different algorithms developed by the operating system for the processor manager.
		Identifies basic concepts related to the management of processes.	Knowledge	Effectively identifies basic concepts related to the management of processes.
		Recognizes processes carried out by the operating system.	Performance	Properly recognizes processes carried out by the operating system.
		Shows typical multiprocessing configurations.	Product	Effectively shows typical multiprocessing configurations.

CRITERIA FOR COMPETENCY ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
Use operating system functions for device and file management.	Uses operating system functions for device and file management.	Identifies characteristics and functions of direct access media and storage devices.	Knowledge	Clearly identifies characteristics and functions of direct access media and storage devices.
		Recognizes different components of the I/O subsystem.	Performance	Clearly recognizes different components of the I/O subsystem.
		Explains the communication process between devices.	Performance	Correctly explains the communication process between devices.
		Observes the management process of the I/O requests.	Performance	Effectively observes the management process of the I/O requests.
		Describes the file manager's interactions.	Knowledge	Effectively describes the file manager's interactions.

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
		Recognizes different elements of file organization.	Performance	Clearly recognizes different elements of file organization.
		Describes the method for the assignment of physical storage and data compression.	knowledge	Effectively describes the method for the assignment of physical storage and data compression.
		Uses the access methods of the operating system.	Performance	Clearly uses the access methods of the operating system.

CRITERIA FOR COMPETENCY ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
Distinguish characteristics of the network function manager and the system used by the operating system.	Distinguishes characteristics of the network function manager and the system used by the operating system.	Distinguishes network operating systems and their characteristics.	Performance	Properly distinguishes network operating systems and their characteristics.
		Recognizes characteristics and functions of each element in the development of the DOS.	Performance	Clearly recognizes characteristics and functions of each element in the development of the DOS.
		Recognizes the characteristics and functions of the NOS elements.	Performance	Effectively recognizes the characteristics and functions of the NOS elements.
		Observes operations performed by the network function manager.	Performance	Clearly observes operations performed by the network function manager.
		Identifies stages of the evaluation process of an operating system.	Knowledge	Clearly identifies stages of the evaluation process of an operating system.

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
		Recognizes the system manager components.	Performance	Properly recognizes the system manager components.
		Explains the functions of the security management system.	Performance	Clearly explains the functions of the security management system.
		Applies the performance measurement process.	Product	Effectively applies the performance measurement process.

CRITERIA FOR COMPETENCY ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
Distinguish the characteristics of currently used main operating systems.	Distinguishes the characteristics of currently used main operating systems.	Lists main historical facts related to each operating system.	Performance	Effectively lists main historical facts related to each operating system.
		Identifies the main characteristics of each operating system.	Knowledge	Clearly identifies the main characteristics of each operating system.
		Differentiates between the design´s goals of each operating system.	Product	Correctly differentiates between the design´s goals of each operating system.
		Relates management processes of the memory, processor, devices, files, and others in each operating system.	Product	Effectively relates management processes of the memory, processor, devices, files, and others in each operating system.
		Compares security mechanisms used by the different operating system.	Performance	Correctly compares security mechanisms used by the different operating system.
		Observes the user interface used by each operating system.	Performance	Effectively observes the user interface used by each operating system.

TECHNICAL COMPETENCY STANDARDS OF EDUCATIONAL INSTITUTION

GENERAL DATA

Title: Network User
Purpose: Efficient user in the network operating system environment.
Competency level: Basic

UNITS OF JOB COMPETENCY THAT CONFORM THE STANDARDS

Title	Classification
Correctly identifies concepts related to the network operating system.	Specific
Effectively recognizes differences between existing versions of each network operating system.	Specific
Adequately explains decision making-criteria for choosing one version.	Specific
Effectively indicates the elements integrating a network.	Specific
Effectively identifies elements of windows work.	Specific
Effectively recognizes characteristics and applications of functions and tools.	Specific
Correctly creates direct access to programs.	Specific
Correctly uses the logon and logoff commands in the environment of the operating system and tools available.	Specific
Correctly identifies configuration accessories and elements.	Specific
Effectively explains characteristics and applications of each one.	Specific
Effectively recognizes the use of each element of the network operating system.	Specific
Effectively experiments using each element.	Specific
Effectively identifies tasks associated with Microsoft windows file management.	Specific
Correctly recognizes procedures to track down and manage files.	Specific
Correctly carries out various operations for file management.	Specific
Correctly manipulates files using available tools.	Specific
Correctly identifies tasks associated with user´s administration in the system.	Specific
Effectively explains procedures for user's administration.	Specific

Title	Classification
Correctly carries out operations for handling aspects related to users.	Specific
Correctly manages user accounts and properties.	Specific
Effectively identifies tasks associated with security, management of backups, and shared resources.	Specific
Correctly explains procedures for security management, backups, and shared resources.	Specific
Adequately uses security operations and shared resources management.	Specific

Competency Elements

Reference	Title of the element
3 - 2	Efficient user in the network operating system environment.

Performance criteria:

1. Distinguishes the main characteristics of some network operating systems.
2. Uses the functions of input, output, and others available in the interface of some network operating systems.
3. Uses accessories and basic configuration of the network operating system.
4. Uses basic tools of some operating systems for the user´s administration.
5. Uses the security and auditing elements of network operating systems.

Application Field:

Category	Classes
Services	Provision of Technical Education Services

Performance evidence:

1. Explains decision making-criteria for choosing one version.
2. Indicates the elements integrating a network.
3. Recognizes characteristics and applications of functions and tools.
4. Explains characteristics and applications of each one.
5. Recognizes the use of each element of the network operating system.
6. Experiments using each element.
7. Recognizes procedures to track down and manage files.

8. Carries out various operations for file management.
9. Explains procedures for user's administration.
10. Carries out operations for handling aspects related to users.
11. Explains procedures for security management, back-ups, and shared resources.

Product evidence:

1. Creates direct access to programs.
2. Uses the logon and logoff commands in the environment of the operating system and tools available.
3. Manipulates files using available tools.
4. Manages user accounts and properties.
5. Uses security operations and shared resources management.

Knowledge evidence:

1. Identifies concepts related to the network operating system.
2. Recognizes differences between existing versions of each network operating system.
3. Identifies elements windows work.
4. Identifies configuration accessories and elements.
5. Identifies tasks associated with Microsoft Windows file management.
6. Identifies tasks associated with user´s administration in the system.
7. Identifies tasks associated with security, management of backups, and shared resources.

Sector: Commercial and Services	Program: Computer Networking
Subject area: Network Operating Systems	Grade: Twelfth
Study block: Network User	Time: 90 hours
Purpose: Efficient user in the network operating system environment.	

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA

1. Distinguish the main characteristics of some network operating systems.	• Network Operating Systems:
	  • Concept
	  • Characteristics
	  • Requirements
	  • Applications, advantages, and disadvantages
	  • Differences between versions
	  • Criteria decision making for choosing one existing version
	• Network Elements
	• Groups and domains in a network
	• Network customers
		Teacher:
		• Defines concepts related to the network operating system
		• Discusses criteria for decision making among one of the existing systems.
		• Illustrates elements that integrate a network.
		• Illustrates the use of groups and domains.
			Awareness of our strengths and weaknesses.	• Distinguishes the main characteristics of some network operating systems.

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA
		Student: • Identifies concepts related to the network operating system. • Recognizes differences between existing versions of each network operating system. • Explains decision making-criteria for choosing one version. • Indicates the elements integrating a network.		

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA

2. Use the functions of input, output, and others available in the interface of some network operating systems.	• Basic elements in windows work:
	  • Toolbar
	  • Menus
	  • Functions and work tool
	  • Direct connections to programs
	  • Work windows
	  • Dialogue chart
	  • Input and output system
	  • Help
		<u>Teacher:</u>
		• Defines elements of windows work.
		• Describes characteristics and applications of functions and tools.
		• Illustrates the use and creation of direct access.
		• Shows the use of the logon and logoff commands in the environment operating system.
			• Awareness of our strengths and weaknesses.	• Uses the functions of input, output, and others available in the interface of some network operating systems.

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA
		Student: • Identifies elements of windows work. • Recognizes characteristics and applications of functions and tools. • Creates direct access to programs. • Uses the logon and logoff commands in the environment of the operating system and tools available.		

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA

3. Use accessories and basic configuration of the network operating system.	• Available accessories, functions, or tools.
	• Basic configuration:
	  • Graphic resolution of the monitor
	  • Keyboard language
	  • Configurations of a regional order (date formats, hour, and numbers)
	  • Computer storage units or devices.
	  • Information of the system
	  • Version of the system
	  • Computer memory
		<u>Teacher:</u>
		• Lists configuration accessories and elements.
		• Describes characteristics and applications of each accessory.
		• Shows the use of each element.
		• Experiments using each element.
		<u>Student:</u>
		• Identifies configuration accessories and elements.
		• Explains characteristics and applications of each one.
		• Recognizes the use of each element of the network operating system.
		• Experiments using each element.
			• Humility: Awareness of our strengths and weaknesses.	• Uses accessories and basic configuration of the network operating system.

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA

	• Execution of programs:
	  • Multitask concept
	  • Locate files or directories
	  • Basic operations of file management
	  • Manipulation of files
	  • Recovery of deleted files
	  • Transfer and updating files modified outside the station
		<u>Teacher:</u>
		• Identifies tasks associated with Microsoft Windows file management.
		• Reviews procedures to track down and manage files.
		• Shows various operations for file management.
		• Manipulates files using available tools.		

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA
		Student: • Identifies tasks associated with Microsoft Windows file management. • Recognizes procedures to track down and manage files. • Carries out various operations for file management. • Manipulates files using available tools.		

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA
4. Use basic tools of some operating systems for the user´s administration.	• Role of the user within the system • Creation of user accounts and assignment of basic properties • Options in the user management menu	<u>Teacher:</u> • Identifies tasks associated with the system's user´s management. • Reviews procedures for user's administration. • Shows operations for handling aspects related to users. • Manages user accounts and properties.	• Humility: Awareness of our strengths and weaknesses.	• Uses basic tools of some operating systems for the user´s administration.

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA
		Student: • Identifies tasks associated with user´s administration in the system. • Explains procedures for user's administration. • Carries out operations for handling aspects related to users. • Manages user accounts and properties.		

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA
5. Use security and auditing elements of network operating systems.	• Security and auditing • Backups • Shared resources • Permits for shared resource storage • Ease and procedure to create network units • Install and share printers	Teacher: • Identifies tasks associated with security, handling of backups, and shared resources. • Shows related operations. • Uses security, auditing and back-ups. Student: • Identifies tasks associated with security, management of backups, and shared resources. • Explains procedures for security management, back-ups, and shared resources. • Uses security operations and shared resources management.	• Awareness of who we are, of our strengths and weaknesses.	• Uses the security and auditing elements of network operating systems.

PRACTICE AND CHECKLIST

PRACTICE DEVELOPMENT

Study Block: Network User	PRACTICE No. 1

Purpose:

Scenario: Classroom	Time:

MATERIALS	MACHINERY	EQUIPMENT	TOOLS

Procedures
Teacher: • Defines concepts related to the network operating system • Discusses criteria for decision making among one of the existing systems. • Illustrates elements that integrate a network. • Illustrates the use of groups and domains. • Defines elements of windows work. • Describes characteristics and applications of functions and tools. • Illustrates the use and creation of direct access. • Shows the use of the logon and logoff commands in the environment operating system. • Lists configuration accessories and elements. • Describes characteristics and applications of each accessory. • Shows the use of each element. • Experiments using each element. • Identifies tasks associated with Microsoft Windows file management. • Reviews procedures to track down and manage files. • Shows various operations for file management. • Manipulates files using available tools. • Identifies tasks associated with the system's user´s management. • Reviews procedures for user's administration. • Shows operations for handling aspects related to users. • Manages user accounts and properties. • Identifies tasks associated with security, handling of backups, and shared resources. • Shows related operations. • Uses security, auditing and backups.

RECOMMENDED CHECKLIST	Date:

Student's name:	

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 identifies concepts related to the network operating system.			
Effectively recognizes differences between existing versions of each network operating system.			
Adequately explains decision making-criteria for choosing one version.			
Effectively indicates the elements integrating a network.			
Effectively identifies elements of windows work.			
Effectively recognizes characteristics and applications of functions and tools.			
Correctly creates direct access to programs.			
Correctly uses the logon and logoff commands in the environment of the operating system and tools available.			
Correctly identifies configuration accessories and elements.			
Effectively explains characteristics and applications of each one.			
Effectively recognizes the use of each element of the network operating system.			
Effectively experiments using each element.			
Effectively identifies tasks associated with Microsoft windows file management.			
Correctly recognizes procedures to track down and manage files.			
Correctly carries out various operations for file management.			
Correctly manipulates files using available tools.			
Correctly identifies tasks associated with user´s administration in the system.			
Effectively explains procedures for user's administration.			

DEVELOPMENT	YES	NOT YET	NOT APPLICABLE
Correctly carries out operations for handling aspects related to users.			
Correctly manages user accounts and properties.			
Effectively identifies tasks associated with security, management of backups, and shared resources.			
Correctly explains procedures for security management, backups, and shared resources.			
Adequately uses security operations and shared resources management.			

OBSERVATIONS:

CRITERIA FOR COMPETENCY ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
Distinguish the main characteristics of some network operating systems.	Distinguishes the main characteristics of some network operating systems.	Identifies concepts related to the network operating system.	Knowledge	Correctly identifies concepts related to the network operating system.
		Recognizes differences between existing versions of each network operating system.	Knowledge	Effectively recognizes differences between existing versions of each network operating system.
		Explains decision making-criteria for choosing one version.	Performance	Adequately explains decision making-criteria for choosing one version.
		Indicates the elements integrating a network.	Performance	Effectively indicates the elements integrating a network.
Use the functions of input, output, and others available in the interface of some network operating systems.	Uses the functions of input, output, and others available in the interface of some network operating systems.	Identifies elements of windows work.	Knowledge	Effectively identifies elements of windows work.
		Recognizes characteristics and applications of functions and tools.	Performance	Effectively recognizes characteristics and applications of functions and tools.
		Creates direct access to programs.	Product	Correctly creates direct access to programs.
		Uses the logon and logoff commands in the environment of the operating system and tools available.	Product	Correctly uses the logon and logoff commands in the environment of the operating system and tools available.

CRITERIA FOR COMPETENCY ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
Use accessories and basic configuration of the network operating system.	Uses accessories and basic configuration of the network operating system.	Identifies configuration accessories and elements.	Knowledge	Correctly identifies configuration accessories and elements.
		Explains characteristics and applications of each one.	Performance	Effectively explains characteristics and applications of each one.
		Recognizes the use of each element of the network operating system.	Performance	Effectively recognizes the use of each element of the network operating system.
		Experiments using each element.	Performance	Effectively experiments using each element.
		Identifies tasks associated with Microsoft Windows file management.	Knowledge	Effectively identifies tasks associated with Microsoft windows file management.
		Recognizes procedures to track down and manage files.	Performance	Correctly recognizes procedures to track down and manage files.
		Carries out various operations for file management.	Performance	Correctly carries out various operations for file management.
		Manipulates files using available tools.	Product	Correctly manipulates files using available tools.

CRITERIA FOR COMPETENCY ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
Use basic tools of some operating systems for the user´s administration.	Uses basic tools of some operating systems for the user´s administration.	Identifies tasks associated with user´s administration in the system.	knowledge	Correctly identifies tasks associated with user´s administration in the system.
		Explains procedures for user's administration.	Performance	Effectively explains procedures for user's administration.
		Carries out operations for handling aspects related to users.	Performance	Correctly carries out operations for handling aspects related to users.
		Manages user accounts and properties.	Product	Correctly manages user accounts and properties.
Use security and auditing elements of network operating systems.	Uses security and auditing elements of network operating systems.	Identifies tasks associated with security, management of backups, and shared resources.	Knowledge	Effectively identifies tasks associated with security, management of backups, and shared resources.
		Explains procedures for security management, back-ups, and shared resources.	Performance	Correctly explains procedures for security management, backups, and shared resources.
		Uses security operations and shared resources management.	Product	Adequately uses security operations and shared resources management.

TECHNICAL COMPETENCY STANDARDS OF EDUCATIONAL INSTITUTION

GENERAL DATA

Title: Network Management
Purpose: Manage networks.
Competency level: Specific

UNITS OF JOB COMPETENCY THAT CONFORM THE STANDARDS

Title	Classification
Effectively recognizes basic tools for the administration of the system.	Specific
Correctly distinguishes characteristics of these tools.	Specific
Adequately illustrates the process of creation and manipulation of groups.	Specific
Correctly uses tools for the administration of the system.	Specific
Efficiently identifies basic considerations for the network system's installation and configuration	Specific
Effectively prepares elements for the installation and removal of the network system	Specific
Correctly follows the network system's installation and removal procedures	Specific
Correctly uses the procedure for the configuration and activation of services.	Specific
Correctly identifies basic concepts related to accounts, groups, and files management.	Specific
Adequately recognizes the procedure for management of accounts, groups, and files.	Specific
Effectively uses the printing process of the network system.	Specific
Correctly manages accounts, groups, and files of the network system.	Specific
Clearly defines basic concepts related to security and auditing.	Specific
Correctly describes the procedure for the assignment of security.	Specific
Effectively applies the system's policy management process.	Specific
Clearly uses monitoring events for the system's log generation.	Specific
Clearly identifies basic concepts related to the optimization processes.	Specific
Correctly recognizes the procedure for using the performance counters and indicators	Specific
Correctly uses the performance monitor	Specific
Effectively defines basic concepts related to the use of network system's commands.	Specific
Clearly recognizes the characteristics and applications of the network system's commands.	Specific
Correctly uses the syntax defined for the network system's commands.	Specific
Correctly applies different network system's commands for performance of the tasks.	Specific

Competency Elements

Reference	Title of the element
3 - 4	Manage network.

Performance criteria:

1. Distinguishes the tools of some network operating systems for the administration of the system.
2. Installs and configures the work environment of some network operating systems.
3. Manages accounts, groups, and printing functions in some network operating systems.
4. Assigns security and auditing functions in certain network operating systems.
5. Execution of the processes for performance improvement and optimization of some network operating systems.
6. Uses the native commands available in some network operating systems.

Application Field:

Category	Class
Services	Provision of Technical Education Services

Performance evidence:

1. Distinguishes characteristics of these tools.
2. Illustrates the process of creation and manipulation of groups.
3. Uses tools for the administration of the system.
4. Prepares elements for the installation and removal of the network system
5. Follows the network system's installation and removal procedures
6. Recognizes the procedure for management of accounts, groups, and files.
7. Describes the procedure for the assignment of security.
8. Recognizes the procedure for using the performance counters and indicators
9. Recognizes the characteristics and applications of the network system's commands.

Knowledge evidence:

1. Recognizes basic tools for the administration of the system.
2. Identifies basic considerations for the network system's installation and configuration
3. Identifies basic concepts related to accounts, groups, and files management.
4. Defines basic concepts related to security and auditing.
5. Identifies basic concepts related to the optimization processes.
6. Defines basic concepts related to the use of network system's commands.

Product evidence:

1. Uses the procedure for the configuration and activation of services.
2. Uses the printing process of the network system.
3. Manages accounts, groups, and files of the network system
4. Applies the system's policy management process.
5. Uses monitoring events for the system's log generation.
6. Uses the performance monitor.
7. Uses the syntax defined for the network system's commands.
8. Applies different network system's commands for performance of the tasks.

Sector: Commercial and Services	Program: Computer Networking
Subject area: Network Operating Systems	Grade: Twelfth
Study block: Network Management	Time: 90 hours
Purpose: Manage network.	

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA

1. Distinguish tools of some network operating systems in order to manage the system.	• Failure tolerant method
	• Memory management:
	  • Domains and their management
	  • Confidential relationship
	• Groups:
	  • work
	  • local
	  • global
	  • predefined
		<u>Teacher:</u>
		• Describes basic management tools.
		• Illustrates the use and applications of each tool.
		• Illustrates the process of creation and manipulation of groups.
		• Shows the mechanism used for memory management.
			• Awareness of everything that surrounds us and our capacity to anticipate events.	• Distinguishes the tools of some network operating systems for the administration of the system.

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA
		Student: • Recognizes basic tools for the administration of the system. • Distinguishes characteristics of these tools. • Illustrates the process of creation and manipulation of groups. • Uses tools for the administration of the system.		

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA

2. Install and configure the work environment of some network operating systems.	• Considerations for installation:
	  • Requirements for installation
	  • Installation options
	  • Steps for installation of the network system
	  • Activation of the network system
	  • Creation of an emergency disk and boot disk
	  • Removal of the network system
	  • Elimination of the network system from a partition
		<u>Teacher:</u>
		• Describes basic considerations for the network system's installation and configuration of the network system.
		• Prepares necessary elements for the network system's installation and removal procedures.
		• Illustrates the network system's installation and removal procedures.
		• Demonstrates the installation and removal processes of the network system
			• Awareness of everything that surrounds us and our capacity to anticipate events.	• Installs and configures the work environment of some network operating systems.

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA

	• Configuration and services:
	  • Methods to modify configuration programs
	  • Security policies editor and current configuration of the system
	• Personalize the network's environment, the protocols, and network cards
	• Management of the services and the initially installed services
		<u>Student:</u>
		• Identifies basic considerations for the network system's installation and configuration
		• Prepares elements for the installation and removal of the network system
		• Follows the network system's installation and removal procedures
		• Uses the procedure for the configuration and activation of services.		

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA

3. Manages accounts, groups, and printing functions in some network operating systems.	• Managing accounts and groups:
	  • Predefined users and groups
	• File Systems:
	  • Folder sharing
	  • Compression
	  • Disk management
	• Printing the network system:
	  • Configuration of local and network printers.
	  • Management of printing processes
		<u>Teacher:</u>
		• Defines basic concepts related to the management of accounts, groups, and files.
		• Describes the procedure for management of accounts, groups and files.
		• Illustrates the printing process of the network system.
		• Shows the procedure for the management of accounts and groups.
			• Awareness of everything that surrounds us and our capacity to anticipate events.	• Manages accounts, groups, and printing functions in some network operating systems.

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA
		Student: • Identifies basic concepts related to accounts, groups, and files management. • Recognizes the procedure for management of accounts, groups, and files. • Uses the printing process of the network system. • Manages accounts, groups, and files of the network system.		

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA

4. Assign security and auditing functions in certain network operating systems.	• Security :
	  • Auditing as security control
	  • Security model
	  • Permits that it manages for the objects
	  • Policy system Administration
	• Monitoring events:
	  • Log of events
	  • Types of generated events
	  • Log Maintenance
		<u>Teacher:</u>
		• Defines basic concepts related to security and auditing.
		• Describes the procedure for security assignment.
		• Illustrates the system's policy management process.
		• Shows the use of the monitor of events.
			• Awareness of everything that surrounds us and our capacity to anticipate events.	• Assigns security and auditing functions in certain network operating systems.

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA
		Student: • Defines basic concepts related to security and auditing. • Describes the procedure for the assignment of security. • Applies the system's policy management process. • Uses monitoring events for the system's log generation.		

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA
5. Execution of the processes for improving performance and optimizing certain network operating systems.	• Performance and optimization: • Important terms for performance • 16 bits applications • System performance's counters and indicators • Use of monitor performance	<u>Teacher:</u> • Defines basic concepts related to optimization processes • Describes the procedure for using performance counters and indicators • Shows the use of monitor performance <u>Student:</u> • Identifies basic concepts related to the optimization processes. • Recognizes the procedure for using the performance counters and indicators • Uses the performance monitor.	• Awareness of everything that surrounds us and the capacity to anticipate events.	• Execution of the processes for performance improvement and optimization of some network operating systems.

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA

6. Use native commands available in some network operating systems.	• Native commands of the network system:
	  • Concept
	  • Characteristics
	  • Applications
	  • Syntax
	  • List of commands
		<u>Teacher:</u>
		• Defines basic concepts related to the use of commands of the network system.
		• Describes characteristics and applications of the network system's commands.
		• Illustrates the syntax used by the network system's commands.
		• Uses different network system's commands.
			• Awareness of everything that surrounds us and the capacity to anticipate events.	• Uses the native commands available in some network operating systems.

LEARNING RESULTS	CONTENTS	TEACHING - LEARNING STRATEGIES	VALUES AND ATTITUDES	PERFORMANCE CRITERIA
		Student: • Defines basic concepts related to the use of network system's commands. • Recognizes the characteristics and applications of the network system's commands. • Uses the syntax defined for the network system's commands. • Applies different network system's commands for performance of the tasks.		

PRACTICE AND CHECKLIST

PRACTICE DEVELOPMENT

Study Block: Network Management	PRACTICE No. 1

Purpose:

Scenario: Classroom	Duration:

MATERIALS	MACHINERY	EQUIPMENT	TOOLS

Procedures

Teacher:

- Describes basic management tools.
- Illustrates the use and applications of each tool.
- Illustrates the process of creation and manipulation of groups.
- Shows the mechanism used for memory management.
- Describes basic considerations for the network system's installation and configuration of the network system.
- Prepares necessary elements for the network system's installation and removal procedures.
- Illustrates the network system's installation and removal procedures.
- Demonstrates the installation and removal processes of the network system
- Defines basic concepts related to the management of accounts, groups, and files.
- Describes the procedure for management of accounts, groups and files.
- Illustrates the printing process of the network system.
- Shows the procedure for the management of accounts and groups.
- Defines basic concepts related to security and auditing.
- Describes the procedure for security assignment.
- Illustrates the system's policy management process.
- Shows the use of the monitor of events.
- Defines basic concepts related to optimization processes
- Describes the procedure for using performance counters and indicators
- Shows the use of monitor performance
- Defines basic concepts related to the use of commands of the network system.
- Describes characteristics and applications of the network system's commands.
- Illustrates the syntax used by the network system's commands.

RECOMMENDED CHECKLIST	Date:

Student's name:	

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
Effectively recognizes basic tools for the administration of the system.			
Correctly distinguishes characteristics of these tools.			
Adequately illustrates the process of creation and manipulation of groups.			
Correctly uses tools for the administration of the system.			
Efficiently identifies basic considerations for the network system's installation and configuration			
Effectively prepares elements for the installation and removal of the network system			
Correctly follows the network system's installation and removal procedures			
Correctly uses the procedure for the configuration and activation of services.			
Correctly identifies basic concepts related to accounts, groups, and files management.			
Adequately recognizes the procedure for management of accounts, groups, and files.			
Effectively uses the printing process of the network system.			
Correctly manages accounts, groups, and files of the network system.			
Clearly defines basic concepts related to security and auditing.			
Correctly describes the procedure for the assignment of security.			
Effectively applies the system's policy management process.			

DEVELOPMENT	YES	NOT YET	NOT APPLICABLE
Clearly uses monitoring events for the system's log generation.			
Clearly identifies basic concepts related to the optimization processes.			
Correctly recognizes the procedure for using the performance counters and indicators			
Correctly uses the performance monitor			
Effectively defines basic concepts related to the use of network system's commands.			
Clearly recognizes the characteristics and applications of the network system's commands.			
Correctly uses the syntax defined for the network system's commands.			
Correctly applies different network system's commands for performance of the tasks.			

OBSERVATIONS:

CRITERIA FOR COMPETENCY ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
Distinguish tools of some network operating systems in order to manage the system.	Distinguishes tools of some network operating systems in order to manage the system.	Recognizes basic tools for the administration of the system.	Knowledge	Effectively recognizes basic tools for the administration of the system.
		Distinguishes characteristics of these tools.	Performance	Correctly distinguishes characteristics of these tools.
		Illustrates the process of creation and manipulation of groups.	Performance	Adequately illustrates the process of creation and manipulation of groups.
		Uses tools for the administration of the system.	Performance	Correctly uses tools for the administration of the system.
Install and configure the work environment of some network operating systems.	Installs and configures the work environment of some network operating systems.	Identifies basic considerations for the network system's installation and configuration	Knowledge	Efficiently identifies basic considerations for the network system's installation and configuration
		Prepares elements for the installation and removal of the network system	Performance	Effectively prepares elements for the installation and removal of the network system
		Follows the network system's installation and removal procedures	Performance	Correctly follows the network system's installation and removal procedures
		Uses the procedure for the configuration and activation of services.	Product	Correctly uses the procedure for the configuration and activation of services.

CRITERIA FOR COMPETENCY ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
Manages accounts, groups, and printing functions in some network operating systems.	Manages accounts, groups and printing functions in some network operating systems.	Identifies basic concepts related to accounts, groups, and files management.	Knowledge	Correctly identifies basic concepts related to accounts, groups, and files management.
		Recognizes the procedure for management of accounts, groups, and files.	Performance	Adequately recognizes the procedure for management of accounts, groups, and files.
		Uses the printing process of the network system.	Product	Effectively uses the printing process of the network system.
		Manages accounts, groups, and files of the network system	Product	Correctly manages accounts, groups, and files of the network system.
Assign security and auditing functions in certain network operating systems.	Assigns security and auditing functions in certain network operating systems.	Defines basic concepts related to security and auditing.	Knowledge	Clearly defines basic concepts related to security and auditing.
		Describes the procedure for the assignment of security.	Performance	Correctly describes the procedure for the assignment of security.
		Applies the system's policy management process.	Product	Effectively applies the system's policy management process.
		Uses monitoring events for the system's log generation.	Product	Clearly uses monitoring events for the system's log generation.

CRITERIA FOR COMPETENCY ASSESSMENT

LEARNING RESULTS	PERFORMANCE CRITERIA	EVIDENCE	TYPE	EVIDENCE OF SUFFICIENCIES
Execution of the processes for improving performance and optimizing certain network operating systems	Execution of the processes for improving performance and optimizing certain network operating systems.	Identifies basic concepts related to the optimization processes.	Knowledge	Clearly identifies basic concepts related to the optimization processes.
		Recognizes the procedure for using the performance counters and indicators	Performance	Correctly recognizes the procedure for using the performance counters and indicators
		Uses the performance monitor.	Product	Correctly uses the performance monitor
Use native commands available in some network operating systems.	Uses native commands available in some network operating systems.	Defines basic concepts related to the use of network system's commands.	Knowledge	Effectively defines basic concepts related to the use of network system's commands.
		Recognizes the characteristics and applications of the network system's commands.	Performance	Clearly recognizes the characteristics and applications of the network system's commands.
		Uses the syntax defined for the network system's commands.	Product	Correctly uses the syntax defined for the network system's commands.
		Applies different network system's commands for performance of the tasks.	Product	Correctly applies different network system's commands for performance of the tasks.

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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.

INTERNSHIPS AND PRACTICE IN COMPANIES
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: Place and date:			Signature:	

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 and 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 add number of students in the class, either one students will be left without a job, or, if you think this is too cruel, you should alter one of the advertisements to read.

Example:

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

Taken from Oxford University Press.

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 if 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 stereoentering 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 you 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
• Reading • Vocabulary • Formal Speech • Journal/Diary Keeping • Creative Writing • Poetry • Verbal Debate • Impromptu Speaking • Humor/Jokes • Storytelling	• Abstract Symbols/ Formulas • Outlining • Graphic Organizers • Number Sequences • Calculation • Deciphering Codes • Forcing Relationships • Syllogisms • Problem Solving • Pattern	• Guided Imagery • Active Imagination • Color Schemes • Patterns/ Designs • Painting • Drawing • Mind-Mapping • Pretending • Sculpture • Pictures	• Folk/Creative Dance • Role Playing • Physical Gestures • Drama • Martial Arts • Body Language • Physical Exercise • Mime • Inventing • Sports Games	• Rhythmic Patterns • Vocal Sounds/Tones • Music Composition/ Creation • Percussion Vibrations • Humming • Environmental Sounds • Instrumental Sounds • Singing • Tonal Patterns • Music Performance	• Giving Feedback • Intuiting Others' Feelings • Cooperative Learning Strategies • Person-to-Person Communication • Empathy Practices • Division of Labor • Collaboration Skills • Receiving Feedback • Sensing Others' Motives • Group Projects	• Silent Reflection Methods • Met cognition Techniques • Thinking Strategies • Emotional Processing • "Know Thyself" Procedures • Mindfulness Practices • Focusing/ Concentration Skills • Higher-Order Reasoning • Complex Guided Imagery • "Centering" Practices

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	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.