"El saber de mis hijos hará mi grandeza"

**UNIVERSITY OF SONORA**

**CENTRAL REGION UNIT**

**SCHOOL OF ECONOMIC AND ADMINISTRATIVE SCIENCES**

**DEPARTMENT OF ECONOMY**

***DEGREE IN BUSINESS AND INTERNATIONAL COMMERCE***

**Identification Data**

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|---|---|
| **Subject:** New information and communication technologies | **Formative Pillar:** Common |
| **Teaching-learning process:** Workshop | **Pre-requirement: None** |
| **Hours per course:** Three, hours/week/month | **Post-requirement:** |
| **Nature of subject:** Mandatory | **Credit Value:** 3 |

**Introduction**

Communication and information technology plays an important role that increases as time passes within daily and professional lives. Computers, electronic communications, the growing volume of digital information, software applications, etc., have impacted the lives of everybody, that's why we say that we live in the information era.

This course is designed so that the student can acquire certain skills within current software applications, be aware of some basic computer concepts, and have him developed a strategy to learn new computational skills in an independent manner, allowing the student to adapt to the continuous changes in communication and information technology.

In order to comply with the objectives of this program and develop teaching and learning processes in practical ways, in a manner that is interrelated with the formative experiences of other educational spaces from the Common Formative Pillars, the preparation of teaching-learning guides is considered necessary in which the specific activities, methods, supplies, and means that can be employed in a common manner are specified.

**General objectives**

- Learn the basic operation of computers, accessories, and peripherals.
- Develop skills in the use of proper software skills to develop the corresponding academic activities.
- Develop skills to be able to find, evaluate, and process the resources on-line and take advantage of the new information technologies.
- Develop the skills needed to adapt to technological changes in Information.
- Develop skills needed to create simple web applications.
- Learn to live with and participate in the Internet community.

Acquire the social responsibilities of computer use.

**Thematic content**

When speaking about "computer literacy", it takes on a meaning of having acquired certain "skills", implying competence in a group of certain current applications, such as the ability to handle word-processors, e-mails, and web-browsers. But "computer literacy", suggests a very modest method approach in regards to accelerated change, due to the lack of "permanence". As technology changes in great bounds, the skills acquired become obsolete and there is no methodology to migrate towards new skills. There exists a better solution, which has to do with a strategy to adapt to technological changes. This involves learning enough fundamental materials, to be able to learn new methods to incorporate themselves into the computer culture and have the capacity to develop skills in an independent manner after having completed formal education.

With this approach, it is necessary to replace the term "computer literacy" for that of "fluidity", as a term that means a higher level of competence, being able to adapt to changes and survive in the Information Era. People with information technology fluidity are capable of creatively expressing themselves, reformulating knowledge, and synthesizing information. Technological fluidity in information technology of information is linked to a permanent learning process, in which individuals continuously apply what they learn. This allows them to adapt to change and acquire new skills, to be more efficient in information technology within their work and personal life.

To acquire fluidity in information technology, three types of skills are required: contemporary skills, fundamental concepts, and intellectual capacity.

1. Intellectual skills. This refers to the capacity acquired to apply information technology in sustained and complex situations, encapsulating high-level thoughts in the concept of information technology. These skills allow for the people to manipulate the subject to their own advantage and to be able to handle problems that are unintentional or unexpected when they occur. The intellectual capacities strengthen thoughts that are more abstract in regards to the information and its manipulation.

1.1 Become involved in sustained reasoning. Define and understand a problem. Find various solutions to solve a problem. Review the initial solution and improve them by reiteration. Redefine or relate the problem. Reasoning is used to plan, design, execute, and evaluate a solution. For example: Use of graphic or computer aided design programs, visualization and modeling environments, Internet search tools, or the use of any kind of technological tools which helps in finding a solution.

1.2 Know how to administrate complexity. Problems generally have a variety of solutions, each one with advantages and disadvantages, and sometimes require making sacrifices in order to implement the most appropriate solution. An activity sustained that involves information technology, will frequently be complex, involving a number of tasks, such as understanding the problem to be solved, formulate, design, and implement the solution, in addition to tests and evaluation of the results. The solution developed for the problem will count with various components such as hardware and software. A person should be able to propose a project, design a solution, integrate the components, respond to unexpected iterations, and diagnose what is required in each phase.

1.3 Test solutions. It is difficult to determine the scope, nature, and conditions under which a technological solution will operate. The solution to a problem should be proven in two manners. Determine if the solution is correct or appropriate for the problem at hand. The tests allow us to determine if the solution satisfies the goals of the design and operates under diverse conditions, taking into account that the majority of the systems will be used in manners that were not planned, as well as the manner in which they were, if any.

1.4 Administrate problems in regards to failures. When the systems and technological tools failed, the users need the ability to clean, which means, to detect, diagnose and correct the problems and failures. Filtering is a complex process which goes beyond technology and includes the social and personal aspects of the user. The filtering process, involves other capacities, such as sustained reasoning, administration of complexity and tests. For example, when a person tries to print a document and the printer does not work.

1.5 Organize and go through the structures of information and evaluate information. Many of the activities sustained involve the location, evaluation, validation, use and organization of the information. Also, this capacity involves the capacity to find and evaluate information and of different levels of sophistication.

1.6 Ability to collaborate. When a project needs to be divided between several people, different collaboration skills are involved. Amongst others, collaboration involves a strategy to divide a task into sections that could be divided individually. In practice, the division of a problem depends on the structure of such problem and the organizational structure of the team of people who will take part in the solution. Throughout collaboration, people require to eliminate duplication of efforts, as well as inconsistencies of the parts that submit to the integration of a final product. The information technologies used in collaboration (telephone, email, video conferences, collective web-pages, chat rooms, etc.) allows collaborators to work in a remote and asynchronous manner, and with more confidence than in person interaction.

1.7 Communication skills with another audience. Upon providing information to others, it is necessary to utilize the technology. This process can involve the use of images as words. Effective communication requires a certain familiarity with and requires understanding in favor of and against the various measures of communication, due to the fact that the technology involved can change the nature of communications. For example, it is easier to give an address using a paper or a map then using a telephone.

1.8 Wait for the unexpected. Even when the technology works as planned originally to solve a problem, it is possible that there are still unexpected behaviors, due to the fact that the system is found within a social and technological context that is more ample and which was not properly anticipated. These results can overshadow the solution planted.

1.9 Anticipate changing. Although the evolution of technology cannot be predicted with precision since it changes, computational fluidity provides an efficient capacity, from adaptation to new technologies and how to understand a new language or system, based on the understanding of previous technologies, perhaps similar.

1.10 Thinking in an abstract manner about information technology. One person that determines in an efficient manner how to apply information technology to their own personal needs will think in an abstractive manner about information technology.

2. Fundamental concepts. These are the main basic ideas and principles regarding computers, networks, and information that sustain technology. The concepts that explain the how and why of information technology, and give a vision of opportunities and limitations. The concepts are the raw material to understand the evolution of information technology.

2.1 Computers are systems. Develop the idea that a computational task is a discrete sequence

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2.1 Computers are systems. Develop the idea that a computational task is a discrete sequence of steps, the deterministic interpretation of the instructions, succession de instructions and flow control, as well as the distinction between name and value. Computers do what they are asked to do, and if a computer shows a certain capacity, it is because a programmer found the way to assign a task within a sequence of basic steps.

2.2 Information systems. Show general characteristics of an information system, including, amongst others, the hardware and software components, people and processes, interphases (technological and human-computer), databases, transactions, consistency, availability, persistent storage, registry, audits, security, privacy, and their technological support.

2.3 Networks. Key attributes and information network aspects, including their physical and logical structure.

2.4 Digital representation of information. General coding concepts of binary code information. Different information codes: ASCII, digital sound, images, videos/movies. Subjects as precision, conversion and interoperability (i.e., file formats), resolution, fidelity, transformation, compression, encryption, all are related.

2.5 Information organization. General concepts of information organization, including forms, structures, classification, and indexation as well as searching and evaluating the information quality, creation, presentation, and quotes. Text, image, video, and audio search motors.

2.6 Modeling and abstraction. The general methods and techniques to represent real life phenomenon such as computational models. Discrete and continuous models, discrete timing, events, randomization, and convergence.

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2.7 Algorithmic thoughts and programming. General concepts such as functional composition, repetition (iteration and/or recursion), basic data organization (registries, lists, arrangements), algorithms vs. programs, etc.

2.8 Universality of computers. Any computational task can be performed by a computer.

2.9 Limitations of information technology. General notions of complexity, growth rates, scales, tracking, decisions, etc. Text searching, order, task programming, and filtering examples.

2.10 Social impact of information and information technology. Techniques basis

regarding social concern about privacy, intellectual property, security, encryption, inferences in regards to personal characteristics based on electronic behavior, such as monitoring of websites visited, Internet behavior, such as Spam, censorship, and freedom of expression within the Internet environment.

4. Information technology skills. These are the skills used for the current computer applications and allow to immediately applying information technology. These skills provide practical experience in regards to when to acquire new skills.

3.1 Configure a personal computer. A person that uses a computer should be capable of using personal computer accessories and main peripherals (i.e., printer). This allows becoming familiar with the physical appearance of cables and understands how to configure a computer.

3.2 Use basic properties of an operating system. Current operating systems allow for the installation of new software, erase unwanted software, and involve applications. There exists allot of categories that could reasonably be included, such as becoming familiar with the operating system and if there is enough free disk space.

3.3 Use word processors to create documents. Currently, the minimal skills in this area include the capacity to select the letter type, format, organize, and prepare documents. The integration of images and other type of data have become necessary. It is also required to know how to create web pages using some type of web-page editing software.

3.4 Utilize a graphic design system to create illustrations, overhead transparencies, or many other idea based on images. This skill will involve the use of current programs that generate slides as well as the creation of graphics and systems.

3.5 Connect a computer to a network. This process can be simple as connecting the computer to a telephone network and subscribe to the Internet, but there also exists other options that are more complicated.

3.6 Use the Internet to find information and resources. Currently, the localization of information involves using search engines and web-browsers. The use of these technologies require an understanding of the user needs, and how these are related to what is available and what could possibly be found, also, the capacity to specify inquiries and evaluate results.

3.7 Use a computer to communicate with other people. Currently, e-mail is the main form of computer based communication. There exist other communication variants such as instant messaging, electronic message boards, forums, etc. The appearance of new communication forms is expected in the future.

3.8 Utilize a spread sheet for simple processing or for financial statements. This skill refers to the use of a specialized standard spreadsheet system and/or software suite (e.g., tax declarations).

3.9 Use a data base system to organize and access useful information. Currently, within

many workplaces, there exist database and administrators of personal data. Moreover, web database systems are becoming more popular.

3.10 Use on-line manuals and supplies to be able to learn new resources or how to use new resources. This ability involves the use of on-line help files as well as reading and understanding printed manuals. One aspect of this process is that of obtaining details and system characteristics that are familiar; one second aspect is the use of introductory notes to be able to capture the essential ideas and models of a new system.

Concepts, capacity, and skills are three types of knowing computational fluidity. In anything that has to with a specific activity that involves information technology, elements that involve each type of knowledge are included. The three types of knowledge are interdependent, each one reinforcing the other. A person that is fluid in information technology, evaluates, distinguishes, learns, and utilizes new technology based on personal and professional activities. The elements that are appropriate for each individual will depend on the area of special interest or specialization.

**Teaching-learning strategies**

Traditional learning (classroom) combined with computer based training tends to reduce the number of class sessions to a minimum.

The idea of having a hybrid course is to maximize the advantages of classroom presence compared to virtual classroom presence. The use of technology is not a complement or a mere added value, but it allows to perform certain activities on-line (assignments, evaluations, projects, consultations, etc.). This transference of activities allows for a load reduction of the professors and assistants, to be able to include different learning styles, personalize learning, and require less classroom hours.

Amongst the elements required to help support these hybrid courses, the following are mentioned: On-line learning environments, workshops, on-line hypermedia subjects, continuous educational programs, consultation and technical support programs, and discussion forums, amongst others.

We promote the learning paradigm change to a program centered on learning that is backed by a combination of interactive learning tools, passive and active conversations as well as personalized consultation. These subjects break the traditional hour schemes and structures.

These courses are modular and self paced, which can include group experiences as required or desirable, can be taken anywhere, diagnosing skills and level of confidence when the students begin their study program, obtain credits due to learning acquired outside the formal educational structures, and allows the students to advance in a faster manner due to the kind of program.

These programs are designed by teams of expert professors within the subjects, course designers, education specialists, and information technology specialists.

To create these on-line learning environments, we need to consider individual students instead of homogeneous groups. Instead of maintaining a vision that it is what students require or need, we should reflect and focus on creating environments that provide more options to the students.

Besides trying to reproduce the traditional on-line learning model, the idea is to create the so-called "resources" model, an environment in which the students interact and directly (or in groups) deal with the learning materials, under the guidance of a tutor. It is required that the student interacts with the learning materials allowing greater options of assignments and resources. The main objective is that the student is actively involved in the learning process, beyond simply reading a text.

The learning environments should include five aspects to increase the learning quality of the student:

1. The initial evaluation of knowledge/skills for each student and their preferred learning style.
2. Offer an ample variety of interactive learning materials and high quality activities.
3. Individual study programs.
4. Integrated continuous evaluation systems that allow for instant feedback.
5. Several appropriate personalized attention alternatives when required.

e student will face diverse scenarios in order to acquire cutting edge communication and information technological skills. The scenarios are characterized for workshop sessions in regards to some type of specific tool, lectures and on-line self-evaluation, participation in directed electronic forums, feedback surveys, instant messages, etc.

**Evaluation system**

Each Bachelor's Degree program can determine how many modules and which are the minimum requirements to satisfy the customers needs. There exist different forms of accreditation, for all of those students that have a basic domain of information technology.

a) Initial evaluation of the knowledge/skills of each student and their preferred learning style.
b) Integrated systems of continuous feedback evaluation which is instantaneous.

**Bibliography**

A combination of notes and on-line manuals available through an online website for the course.

**Teacher profile:**

1) Professional formation and/or degree in related area, teaching experience related to these subjects.
2) Accredit the teaching formation process that the Institution indicates.
3) Manage an interdisciplinary approach.
4) Two year teaching experience