

# ESCOM

## SECRETARÍA ACADÉMICA DIRECCIÓN DE EDUCACIÓN SUPERIOR

## SYNTHESIZED SCHOOL PROGRAM

DUDDAAE AE TUE LEADUNA			
LEARNING UNIT:	Graphical User Interfaces	LEVEL:	111
ACADEMIC PROGRAM:	Ingeniería en Sistemas Computacionales.		
ACADEMIC UNIT:	Escuela Superior de Cómputo		

#### PURPOSE OF THE LEARNING UNIT:

The student evaluates functional and safe graphical systems with high usability, based on the Human Computer Interaction.

#### CONTENTS:

- I. Human Computer Interaction Foundations.
- II. Design Process.
- III. Models and Theories

## **TEACHING PRINCIPLES:**

The teacher will apply a Project-Based learning process, through heuristic methods carrying out learning activities that will develop abstraction abilities, analysis and design of different ways to interact with computational systems; using theoretical and practical tools, such as guidelines, and different principles and theories. The activities that will carry out are: collaborative and participative work, brainstorm, documental research, complementary subject presentation and prototyping design. Moreover, an autonomous learning will be encouraged by the development of a final software project.

#### **EVALUATION AND PASSING REQUIREMENTS:**

The program will evaluate the students in a continuous formative and summative way, which will lead into the completion of learning portfolio. Some other assessing methods will be used, such as revisions, practical's, class participation, exercises, learning evidences and a final project.

Other means to pass this Unit of Learning:

• Official recognition by either another IPN Academic Unit of the IPN or by a national or international external academic institution besides IPN.

#### **REFERENCES:**

- Dix A., Finlay J., Abowd G., Russell B. (2004). *Human-Computer Interaction* (3<sup>a</sup> Ed.). England: Ed. Pearson Prentice Hall. ISBN 978-0-13-046109-4.
- Jhonson Jeff (2010). Designing with the Mind in Mind: Simple Guide to Understanding User Interface Design Rules. Morgan Kauffman Publications. Elsevier. ISBN: 978-0-12-375030-3.
- Sears A., Jacko J. (2008) Human-Computer Interaction Handbook Fundamental Evolving, Technologies and Emerging Applications. (2<sup>a</sup> Ed.).USA: Taylor and Francis Group. ISBN 13: 978-0-8058-5870-9.
- Sharp H., Rogers Y., Preece J. (2007) Interaction Design: Beyond Human Computer Interaction. (2<sup>a</sup> Ed.). John Wiley & Sons. ISBN: 0-470-01866-6.
- Shneiderman B., Plaisant C. (2010). *Designing the User Interface Strategies for Effective Human-Computer Interaction* (5<sup>a</sup> Ed.). USA: Addison Wesley ISBN 13: 978-0-321-53735-5.



## SECRETARÍA ACADÉMICA



## DIRECCIÓN DE EDUCACIÓN SUPERIOR

ACADEMIC UNIT: Escuela Superior de Cómputo. ACADEMIC PROGRAM: Ingeniería en Sistemas Computacionales LATERAL OUTPUT: Analista Programador de Sistemas de Información. FORMATION AREA: Professional. MODALITY: Presence. LEARNING UNIT: Graphical User Interfaces. TYPE OF LEARNING UNIT: Theorical - Practical, Optative. VALIDITY: August, 2011 LEVEL: III. CREDITS: 7.5 Tepic, 4.39 SATCA

## ACADEMIC AIM

Furthermore, this program develops the abilities to design efficient graphical interfaces for the creation of computational systems and their evaluation. It contributes to the debit profile reinforcing its integration of the knowledge of other Units of Learning to plan, to negotiate and to foment the analysis skills; designing and coordinating projects in the context of graphical user interfaces. It dominates the practical and methodological principles, aspects for the construction of systems. Decision making, solution of problems, collaborative and participative work, assertive communication, and creative, strategic thought.

This unit has the units Object-Oriented Analysis and Design, Software Engineering, Object-Oriented Programming, Data Structures and Data Bases. The consequent units are Terminal Work I and II.

#### AIM OF THE LEARNING UNIT:

The student evaluates functional and safe graphical systems with high usability based on the human - computer interaction.

#### **CREDITS HOURS**

THEORETICAL CREDITS / WEEK: 3.0

PRACTICAL CREDITS / WEEK: 1.5

**THEORETICAL HOURS / SEMESTER:** 54

PRACTICAL HOURS / SEMESTER: 27

**AUTONOMOUS LEARNING HOURS: 54** 

81

CREDITS HOURS / SEMESTER:

LEARNING UNIT DESIGNED BY: Academia de Ciencias de la Computación

REVISED BY: Dr. Flavio Arturo Sánchez Garfias. Subdirección Académica

APPROVED BY: Ing. Apolinar Francisco Cruz Lázaro. Presidente del CTCE AUTHORIZED BY: Comisión de Programas Académicos del Consejo General Consultivo del IPN

Ing. Rodrigo de Jesús Serrano Domínguez Secretario Técnico de la Comisión de Programas Académicos



## SECRETARÍA ACADÉMICA



## DIRECCIÓN DE EDUCACIÓN SUPERIOR

LEARNI	NG UNIT: Graphical User Interfaces			PA	<b>GE:</b> 3	OUT OF 8			
THEMA	THEMATIC UNIT:   TITLE: Human – Computer Interaction Foundations								
The stud	UNIT OF COMPETENCE The student implements graphical interfaces using the human – computer foundations.								
No.	CONTENTS	Teacher Led- instruction HOURS		Autonomous Learning HOURS		REFERENCES KEY			
		Т	Р	Т	Р				
1.1 1.1.1	The Human Human Memory	1.0	1.0	3.0	1.0	1B, 3C			
1.1.2 1.1.3 1.2 1.2.1 1.2.2	Thinking: reasoning and problem solving Psychology and the design of interactive systems The Computer Text Entry Devices Positioning, pointing and drawing	1.5	0.5	3.0	2.0				
1.2.3 1.2.4 1.3 1.3.1 1.3.2 1.3.3 1.3.4 1.3.5 1.4	Display Devices, virtual reality and 3D interaction Physical Controls, Sensors and Special Devices The Interaction Models of Interaction Ergonomics Interaction Styles Elements of the WIMP interface Interactivity and the context of the interaction Paradigms	2.0	1.0	3.0	1.0				
		1.5		1.0	1.0				
	Subtotals:	6.0	2.5	10.0	5.0				
<b>TEACHING PRINCIPLES</b> This thematic unit must begin with a framing of the course. It will use a Project-Based learning strategy and heuristic method, with the techniques of documentary research, led discussion, concept mapping, problem solving, practical work and production of learning evidence and the accomplishment of a project proposal.									
LEARNING EVALUATION									
Diagnos Project F	tic Test Portfolio: Solution Proposals of problems 10% Report of Practicals 20% Project Proposal and Analysis 30% Writing Learning Evidence 35% Self-Evaluation Rubric 3%								



## SECRETARÍA ACADÉMICA



## DIRECCIÓN DE EDUCACIÓN SUPERIOR

LEARNING UNIT:

Graphical User Interfaces

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THEMATIC UNIT: II TITLE: Design Process.								
UNIT OF COMPETENCE The student designs interactive systems based on software engineering strategies and usability engineering								
No.	CONTENTS		Teacher Led- instruction HOURS		omous ning JRS	REFERENCES KEY		
		Т	Р	Т	Р			
2.1 2.1.1 2.1.2 2.1.3 2.1.4	Interaction Design Basics. The Process of Design Scenarios Navigation Design Screen Design and Layout	1.5	0.5	2.0	2.0	1B, 3C		
2.1.5 2.2 2.2.1 2.2.2 2.2.2	Iteration and Prototyping Human - Computer Interaction in the Software Process The Software Life Cycle Usability Engineering Iterative Decign and Prototyping	1.5	0.5	2.0	2.0			
2.2.3 2.3 2.3.1 2.3.2 2.3.3 2.3.4	Design Rules Principles to Support Usability Standards and Guidelines Golden Rules and Heuristics Human-Computer Interaction Patterns	1.0	0.5	2.0	2.0			
2.4 2.5 2.6 2.6.1 2.6.2 2.7	Implementation Support Evaluation Techniques Universal Design Universal Design Principles Multi-modal Interaction User Support	1.0 1.0 1.0	0.5	2.0 2.0 2.0 2.0	1.0 1.0 1.0			
	Subtatala	0.0	2.0	14.0	10.0			
Subtotals:         8.0         2.0         14.0         10.0           TEACHING PRINCIPLES           This thematic unit will use a project-based learning strategy, trough heuristic method, with the techniques of brainstorming, documentary research, led discussion, tables of comparisons, problem solving, practical work, project progress and the production of the learning evidences.								
LEARNING EVALUATION								
Project F S F F	Portfolio: Solution Proposals of problems 10% Report of Practicals 20% Project Design 35% Writing Learning Evidence 30%							

Self-Evaluation Rubric 3% Cooperative Evaluation Rubric 2%



## INSTITUTO POLITÉCNICO NACIONAL SECRETARÍA ACADÉMICA

# ESCOM

## DIRECCIÓN DE EDUCACIÓN SUPERIOR

LEARN	ING UNIT: Graphical User Interfaces				PAC	<b>GE:</b> 5	OUT OF 8		
THEMA	THEMATIC UNIT: III TITLE: Models and Theories								
<b>-</b>	UNIT OF CC	MPETER	NCE		• , ,.	.1			
The stud	lent builds interactive graphical interfaces based on t	the huma	an- co	omputer	Interaction	theory.			
No.	CONTENTS	Te	Teacher Led- instruction HOURS		Autonomous Learning HOURS		REFERENCES KEY		
			Т	Р	Т	Р	_		
3.1 3.2 3.3 3.4	Cognitive Models. Socio-organizational issues and stakeholder requirements. Style Guidelines and Design of different Operative Systems Balancing Function and Fashion	1 2 1 0	.0 2.0 .0	0.5 0.5 0.5 0.5	2.0 2.0 2.0	1.0 1.0 1.0 0.5	2B y 3C		
3.5	Principles for User Interface Design	1	0.5	0.5	1.0 2.0	0.5 1.0			
	Subto	otals: 6	5.0	2.5	10.0	5.0			
<b>TEACHING PRINCIPLES</b> This thematic unit will use a project-based learning strategy, trough heuristic method, with the techniques of brainstorming, documentary research, led discussion, tables of comparisons, problem solving, practical work, completed project and the production of the learning evidences									
	LEARNING E	EVALUA	ΓΙΟΝ	I					
Project F	Portfolio:35%Analysis and Project Design35%Project Implementation and Report35%Quality Software Evaluation25%(implementation of the practical work)Self-Evaluation Rubric3%Cooperative Evaluation Rubric2%								



INSTITUTO POLITÉCNICO NACIONAL SECRETARÍA ACADÉMICA



## DIRECCIÓN DE EDUCACIÓN SUPERIOR

LEARNING UNIT:

Graphical User Interfaces

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## **RECORD OF PRACTICALS**

1.       Implementation of a Human Vs. Human       I       3.0       Computer Labs.         2.       Implementation of a Human Vs. Computer Game in two dimensions.       I       4.5       4.5         3.       Interface design and implementation of a system for people with disabilities.       II       12.0         4.       Design and implementation of a graphical interface of a design tool that meets the standards and guidelines for a good interaction.       III       7.5         4.       Design and implementation of a graphical interface of a design tool that meets the standards and guidelines for a good interaction.       III       7.5         4.       Design extrementation of a graphical interface of a design tool that meets the standards and guidelines for a good interaction.       III       7.5         TOTAL OF       27.0       27.0       27.0	No.	NAME OF THE PRACTICAL	THEMATIC UNITS	DURATION	ACCOMPLISHMENT LOCATION
2.       Implementation of a Human Vs. Computer Game in two dimensions.       I       4.5         3.       Interface design and implementation of a system for people with disabilities.       II       12.0         4.       Design and implementation of a graphical interface of a design tool that meets the standards and guidelines for a good interaction.       III       7.5         III       7.5       III       7.5         III       7.5       IIII       7.5	1.	Implementation of a Human Vs. Human Game in two dimensions.	Ι	3.0	Computer Labs.
3.       Interface design and implementation of a system for people with disabilities.       II       12.0         4.       Design and implementation of a graphical interface of a design tool that meets the standards and guidelines for a good interaction.       III       7.5         III       0       0       0       0       0         III       0       0       0       0       0       0         III       0	2.	Implementation of a Human Vs. Computer Game in two dimensions.	Ι	4.5	
4. Design and implementation of a graphical interface of a design tool that meets the standards and guidelines for a good interaction.	3.	Interface design and implementation of a system for people with disabilities.	II	12.0	
TOTAL OF 27.0	4.	Design and implementation of a graphical interface of a design tool that meets the standards and guidelines for a good interaction.	III	7.5	
			TOTAL OF HOURS	27.0	

## **EVALUATION AND PASSING REQUIREMENTS:**

The practical are considered mandatory to pass this unit of learning. The practical worth 20% in the thematic units I and II and 25% for the thematic unit III.



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## DIRECCIÓN DE EDUCACIÓN SUPERIOR

LEARNING UNIT:		Graphical User Interfaces	PAGE:	7	OUT OF	8	
PERIOD	UNIT	EVALUATION TERMS					
1 2 3	    	Continuous evaluation 65% and written learnin Continuous evaluation 70% and written learnin Continuous evaluation 100% The learning unit I is 30% worth of the final gra The learning unit II is 30% worth of the final gr The learning unit III is 40% worth of the final g Other means to pass this Learning Unit: • Official recognition by either another national or international external acad	ng evidence ng evidence ade rade yrade	35% 30% ic Unit of h besides	the IPN or IPN.	by a	

KEY	В	С	REFERENCES
1	x		Dix A., Finlay J.,Abowd G., Russell B. (2004). <i>Human-Computer Interaction</i> (3 <sup>a</sup> Ed.). England: Ed. Pearson Prentice Hall. ISBN: 978-0-13-046109-4.
2	х		Jhonson Jeff (2010). Designing with the Mind in Mind: Simple Guide to Understanding User Interface Design Rules. Morgan Kauffman Publications. Elsevier. ISBN: 978-0-12-375030-3.
3		Х	Sears A., Jacko J. (2008) <i>Human-Computer Interaction Handbook Fundamental Evolving, Technologies and Emerging Applications.</i> (2 <sup>a</sup> Ed.).USA: Taylor and Francis Group. ISBN 13: 978-0-8058-5870-9.
4		х	Sharp H., Rogers Y., Preece J. (2007) Interaction Design: Beyond Human-Computer Interaction. (2 <sup>a</sup> Ed.). John Wiley & Sons. ISBN: 0-470-01866-6
5		х	Shneiderman B., Plaisant C. (2010). <i>Designing the User Interface Strategies for Effective Human-Computer Interaction</i> (5 <sup>a</sup> Ed.). USA: Addison Wesley ISBN 13: 978-0-321-53735-5.



## SECRETARÍA ACADÉMICA



## **DIRECCIÓN DE EDUCACIÓN SUPERIOR**

## **TEACHER EDUCATIONAL PROFILE PER LEARNING UNIT**

#### 1. GENERAL INFORMATION

ACADEMIC UNIT:	Escuela Superior de Cómputo.							
ACADEMIC PROGRAM:	Ingeniería en Siste	emas Computacionales		LEVEL				
FORMATION AREA:	Institutional	Institutional Basic Scientific Professional						
ACADEMIC: Ciencias de	e la Computación	LEARNING UNIT: G	raphical User Interfa	aces.				

SPECIALTY AND ACADEMIC REQUIRED LEVEL: Masters Degree or Doctor in Computer Science.

#### 2. AIM OF THE LEARNING UNIT:

The student evaluates functional and safe systems with high usability based on the human computer interaction concepts.

## 3. PROFESSOR EDUCATIONAL PROFILE:

KNOWLEDGE	PROFESSIONAL EXPERIENCE	ABILITIES	APTITUDES
<ul> <li>Cognitive process of the human being.</li> <li>Principles and rules of design.</li> <li>The Human- Computer Interaction Processes.</li> <li>Software Engineering.</li> <li>Object-Oriented Programming.</li> <li>Knowledge of the Institutional Educational Model.</li> <li>English language.</li> </ul>	<ul> <li>Experience participating in project development.</li> <li>Experience in the analysis and systems design.</li> <li>2 years experience handling groups and collaborative work.</li> <li>2 years experience as superior level professor.</li> <li>A year experience in the Institutional Educational Model.</li> </ul>	<ul> <li>Analysis and synthesis.</li> <li>Leadership.</li> <li>Decision making</li> <li>Problems and conflict resolution.</li> <li>Verbal fluency of ideas.</li> <li>Teaching skills</li> <li>Applications of Institutional Educational Model.</li> </ul>	<ul> <li>Responsible.</li> <li>Tolerant.</li> <li>Honest.</li> <li>Respectful.</li> <li>Collaborative.</li> <li>Participative.</li> <li>Assertive.</li> </ul>

## DESIGNED BY

**REVISED BY** 

#### AUTHORIZED BY

M. en C. José Jaime López Rabadán COORDINATING PROFESOR
M. en C. Idalia Maldonado Castillo.
M. en C. Juan Vicente García Sales.
COLLABORATING PROFESSORS Dr. Flavio Arturo Sánchez Garfias Subdirector Académico Ing. Apolinar Francisco Cruz Lázaro Director