INSTITUTO POLITÉCNICO NACIONAL

SECRETARÍA ACADÉMICA

DIRECCIÓN DE EDUCACIÓN SUPERIOR

SYNTHESIZED SCHOOL PROGRAM

ACADEMIC UNIT: Escuela Superior de Cómputo

ACADEMIC PROGRAM: Ingeniería en Sistemas Computacionales

LEARNING UNIT: Application Development for Mobile Devices **NIVEL:** III

AIM OF THE LEARNING UNIT:
The student develops programs and applications for different mobile platforms based on the most appropriate technology.

CONTENTS:

I Mobile Devices Oriented Programming
II. Programming Architectures and Mobile Platforms
III. Mobile Programming Languages
IV. Development Tools
V. Mobile Applications

TEACHING PRINCIPLES:
This unit will be addressed from the project-oriented learning strategy and the heuristic method. Will be undertaken of inquiry, analysis and comparison of the different elements that make up the development environment for mobile applications, to clarify the difference between a desktop and a mobile application through the concept mapping, exhibitions, practices, research and the realization of a project team led to their area of training that integrates the general concepts and skills relevant to the use of technologies, environments and features of different mobile devices.
The activities to be implemented in the classroom encourages students to some techniques, such as collaborative, participatory, brainstorming, graphic organizers, inquiry documents, worksheets, presentation of additional topics, facilitated discussion and the realization of a project software.
It is the responsibility of the teacher decide the characteristics of both the project and the programs carried out by fixing the time of preparation and delivery.

EVALUATION AND PASSING REQUIREMENTS
The program will evaluate the students in a continuous formative and summative way, which will lead into the completion of proyect 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:

- Evaluation of acknowledges previously acquired, with base in the issues defined by the academy.
- Official recognition by either another IPN Academic Unit of the IPN or by a national or international external academic institution besides IPN.

REFERENCES:

- Ballard, B. (2009). Designing the Mobile User Experience. England : John Wiley & Sons Ltd. ISBN 9780470033616.
- B'Far, R. (2005). Mobile Computing Principles. México: United Kingdom. Ed. Cambridge University Press. ISBN 9780521817332
- Filing, B. (2009). *Mobile Design and Development*. United States of America: Ed. . O'Reilly . ISBN: 9780596155445.
- Lee, V. (2004). *Mobile Applications.* United States of America: Prentice Hall. ISBN 9780131172638.
- Mehta, N. (2008). Mobile Web Development. United States of America: Packt Publishing ISBN 9781847193438

INSTITUTO POLITÉCNICO NACIONAL

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: Profesional
MODALITY: Presencial

LEARNING UNIT: Application Development for Mobile Devices
TYPE OF LEARNING UNIT: Theorical - Practical, Optative
VALIDITY: 2011
LEVEL: III
CREDITS: 7.5 TEPIC – 4.39 SATCA

ACADEMIC AIM

This learning unit contributes to the profile of graduates of Ingeniería en Sistemas Computacionales, developing the skills of designing and developing applications for mobile devices to know the different platforms, development environments and elements of applications for mobile devices attached to the standards of quality and extent of existing architectures. Generic skills. Likewise, invigorate the powers of creative thinking, assertive communication, collaborative work.

It requires learning units as well as Software Engineering Object Oriented Programming the ability to program solutions in a high-level language, Data Structure, the use of appropriate structures to manipulate data efficiently and Technologies for developing Web applications on the Internet. Work units are consistent Trabajo Terminal I and Trabajo Terminal II.

AIM OF THE LEARNING UNIT:

The student develops programs and applications for different mobile platforms based on the most appropriate technology.

CREDITS HOURS

THEORETICAL CREDITS / WEEK: 3.0

PRACTICAL CREDITS / WEEK: 1.5

THEORETICAL HOURS / SEMESTER: 54

PRACTICAL HOURS / SEMESTER: 27

AUTONOMOUS LEARNING HOURS: 54

CREDITS HOURS / SEMESTER: 81

LEARNING UNIT DESIGNED BY: Academia de Ingeniería de Software

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. 2011

Ing. Rodrigo de Jesús Serrano Domínguez

Secretario Técnico de la Comisión de Programas Académicos

THEMATIC UNIT: I **TITLE:** Mobile Devices Oriented Programming

UNIT OF COMPETENCE

The student compares the difference between conventional programming, structured, object-oriented programming and mobile devices oriented programming based on their characteristics.

No.	CONTENTS	Teacher led-instruction HOURS		Autonomous Learning HOURS		REFERENCES KEY
		T	P	T	P	
1.1	Programming paradigms	0.5		1.0		1C,2B,3B,4C,5C
1.2	Structured programming	0.5				
1.3	Object Oriented Programming	0.5		1.0	1.5	
1.4	Oriented Programming Events	0.5				
1.5	Service Oriented Programming	0.5	0.5		1.0	
1.6	Oriented Programming Mobile Devices	1.5	1.0	2.0	1.5	
1.6.1	Mobility					
1.6.2	Services			1.0	1.0	
1.6.3	Prosecution					
1.6.4	Connecting to Databases					
1.6.5	Interfaces					
	Subtotals:	4.0	1.5	5.0	5.0	

TEACHING PRINCIPLES

This unit will address the strategy from project-oriented learning and heuristics, enabling the consolidation of the following learning techniques: brainstorming, worksheets, inquiry documentary, directed discussion, concept mapping, resolution problems, exposure to additional topics and team work experience.

LEARNING EVALUATION

Diagnostic Test
Proyect Portfolio:

Proposal of project	10%
Charts	5%
Technical data	5%
Exercise-solving	10%
Cooperative Presentation	10%
Report of Practicals	20%
Self-Evaluation Rubrics	5%
Cooperative Evaluation Rubrics	5%
Written Learning Evidence	30%

THEMATIC UNIT: II **TITLE:** Programming Architectures and Mobile Platforms

UNIT OF COMPETENCE

The student classifies the different architectures of a mobile application based on the design of services and applications

No.	CONTENTS	Teacher led-instruction HOURS		Autonomous Learning HOURS		REFERENCES KEY
		T	P	T	P	
2.1	Model N - Layers	0.5	0.5	1.0	1.0	1C,2B,3B,4C,5C
2.2	Architecture and user interface controls	0.5				
2.3	Messaging Architecture	0.5				
2.4	Communications architecture	0.5	0.5	2.0	1.0	
2.5	Storage Architecture	0.5		1.0	1.0	
2.6	SOA Service Architecture	0.5		1.0		
2.7	Platforms	1.0	0.5	2.0	1.0	
2.7.1	PDA					
2.7.2	Pocket PC					
2.7.3	Mobile Phones					
2.7.4	Tablet PC					
2.7.5	MAC Ipack and services					
	Subtotals:	4.0	1.5	7.0	4.0	

TEACHING PRINCIPLES

In this unit will be addressed from the project-oriented learning strategy and huerístic method, enabling the consolidation of the following learning techniques: inquiry document, worksheet, guided discussion, table of comparisons, computer programs, exposure complementary team issues, project proposal and work experience.

LEARNING EVALUATION

Proyect Portfolio:

Advance of project	10%
Charts	5%
Technical data	5%
Computer programs w/report	20%
Cooperative Presentation	10%
Report of Practicals	20%
Self-Evaluation Rubrics	5%
Cooperative Evaluation Rubrics	5%
Written Learning Evidence	20%

THEMATIC UNIT: III **TITLE:** Mobile Programming Languages

UNIT OF COMPETENCE

The student programs mobile applications, based on major programming languages and environments.

No.	CONTENTS	Teacher led-instruction HOURS		Autonomous Learning HOURS		REFERENCES KEY
		T	P	T	P	
3.1	XML	1.0	0.5	2.0	1.0	1C,2B,3B,4C,5C
3.2	C++ for mobiles	1.0		1.5	1.0	
3.3	J2ME	1.0	1.0	2.0	1.0	
3.4	CE.NET	1.0		1.5	1.0	
	Subtotals:	4.0	1.5	7.0	4.0	

TEACHING PRINCIPLES

This unit will be addressed from the project-oriented learning strategy and heuristics, enabling the consolidation of the following learning techniques: inquiry document, worksheet, guided discussion, table of comparisons, computer program, exposure complementary team issues, project implementation and completion practices.

LEARNING EVALUATION

Proyect Portfolio:

Charts	5%
Technical data	5%
Computer programs w/report	20%
Cooperative Presentation	10%
Report of Practicals	20%
Advance of project	30%
Self-Evaluation Rubrics	5%
Cooperative Evaluation Rubrics	5%

THEMATIC UNIT: IV **TITLE:** Development Tools.

UNIT OF COMPETENCE

The student develops mobile applications based on the main development tools and standards set for different platforms.

No.	CONTENTS	Teacher led-instruction HOURS		Autonomous Learning HOURS		REFERENCES KEY
		T	P	T	P	
4.1	Emulators	0.5		1.0	1.0	1C,2B,3B,4C,5C
4.2	Development Environments (IDE)	1.0	0.5	1.0	1.0	
4.3	Development Libraries	0.5		1.5		
4.4	Mobile Programming Security	0.5		1.5	1.0	
4.5	Multimedia	0.5		1.0		
4.6	Communication	1.0	1.0	1.0	1.0	
	Subtotals:	4.0	1.5	7.0	4.0	

TEACHING PRINCIPLES

This unit will be addressed from the project-oriented learning strategy, and heuristics, enabling the consolidation of the following learning techniques: inquiry document, worksheet, guided discussion, table of comparisons, computer program, exposure a team of complementary subjects, project implementation and completion practices.

LEARNING EVALUATION

Proyect Portfolio:

Charts	5%
Technical data	5%
Computer programs w/report	20%
Cooperative Presentation	10%
Report of Practicals	20%
Advance of project	30%
Self-Evaluation Rubrics	5%
Cooperative Evaluation Rubrics	5%

THEMATIC UNIT: V **TITLE:** Mobile Applications

UNIT OF COMPETENCE

The student deploys mobile applications, based on its specific purpose.

No.	CONTENTS	Teacher led-instruction HOURS		Autonomous Learning HOURS		REFERENCES KEY
		T	P	T	P	
5.1	Mobile Agents	1.0	0.5	1.5	2.0	1C,2B,3B,4C,5C
5.2	Communication Applications	1.0	0.5	1.5	1.0	
5.3	Educational Applications	0.5		1.0		
5.4	Electronic Commerce Applications	0.5		1.0		
5.5	Applications Personal Services	0.5		1.0		
5.6	Mobile Security	0.5		2.0		
	Subtotals:	4.0	1.0	8.0	3.0	

TEACHING PRINCIPLES

This unit will be addressed from the project-oriented learning strategy and heuristics, enabling the consolidation of the following learning techniques: inquiry document, worksheet, guided discussion, table of comparisons, computer program, exposure complementary team issues, project implementation and completion practices.

LEARNING EVALUATION

Proyect Portfolio:

Charts	5%
Technical data	5%
Computer programs w/report	20%
Cooperative Presentation	10%
Report of Practicals	20%
Project evaluation	30%
Self-Evaluation Rubrics	5%
Cooperative Evaluation Rubrics	5%

RECORD OF PRACTICALS

No.	NAME OF THE PRACTICAL	THEMATIC UNITS	DURATION	ACCOMPLISHMENT LOCATION
1	Basic Programming Mobile Devices	I	6.5	Computer Labs.
2	Work environments for mobile applications	II	5.5	
3	Creating the Graphic User Interface	III	5.5	
4.	Native applications	IV	5.5	
5	Development of a mobile service	V	4.0	
		TOTAL OF HOURS	27.0	

EVALUATION AND PASSING REQUIREMENTS:

The practicals are considered mandatory to pass this learning unit.
The practicals worth 20% in each thematic unit.

PERIOD	UNIT	EVALUATION TERMS
1	I	Continuous evaluation 70% and written learning evidence 30%
	II	Continuous evaluation 80% and written learning evidence 20%
2	III	Continuous evaluation 100%
3	IV y V	Continuous evaluation 100% The learning unit I and II is 30% worth of the final score The learning unit III is 30% worth of the final score The learning unit IV is 40% worth of the final score Other means to pass this Learning Unit: • Evaluation of acknowledges previously acquired, with base in the issues defined by the academy. • Official recognition by either another IPN Academic Unit of the IPN or by a national or international external academic institution besides IPN. If accredited by Special Assessment or a certificate of proficiency, it will be based on guidelines established by the academy on a previous meeting for this purpose.

KEY	B	C	REFERENCES
1		X	Ballard, B. (2009). Designing the Mobile User Experience. England : John Wiley & Sons Ltd. ISBN 9780470033616.
2	X		B'Far, R. (2005). Mobile Computing Principles. México: United Kingdom. Ed. Cambridge University Press. ISBN 9780521817332
3	X		Filing, B. (2009). *Mobile Design and Development*. United States of America: Ed. . O'Reilly . ISBN: 9780596155445.
4		X	Lee, V. (2004). *Mobile Applications.* United States of America: Prentice Hall. ISBN 9780131172638.
5		X	Mehta, N. (2008). Mobile Web Development. United States of America: Packt Publishing ISBN 9781847193438

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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 Sistemas Computacionales **LEVEL** III

FORMATION AREA:

Institutional	Basic Scientific	Professional	Terminal and Integration
		■	

ACADEMY: Ingeniería de Software **LEARNING UNIT:** Application Development for Mobile Devices

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

2. AIM OF THE LEARNING UNIT:

The student develops programs and applications for different mobile platforms based on the most appropriate technology.

3. PROFFESSOR EDUCATIONAL PROFILE:

KNOWLEDGE	PROFESSIONAL EXPERIENCE	ABILITIES	APTITUDES
• Programming languages. • Web Technologies. • Software Engineering. • Databases • Web Site Administration • English language	• A year in web programming • Actual in educational as facilitator of the knowledge of six months. • Six months in the handling of equipment of calculation. • A year experience in the Institutional Educational Model.	• Analysis and synthesis. • Problems resolution. • Cooperative. • Leadership. • Applications of Institutional Educational Model. • Decision making.	• Responsible. • Tolerant. • Honest. • Respectful. • Collaborative. • Participative. • Interested to learning. • Assertive.

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Date: 2011