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: IT Financial Engineering **LEVEL:** III

AIM OF THE LEARNING UNIT :
The student apply quantitative methods and techniques of Financial and Economical Engineering to support the decision-making process in projects related to the Information technologies.

CONTENTS:

I. Introduction to Financial Engineering
II. Risks
III. Replacement analysis
IV. Valuation of Information Technology

TEACHING PRINCIPLES:
The prior learning unit will be approached through case-control strategies and the heuristic method led through each lesson and supported on learning techniques such as cooperative learning, case-control studies, graphic organisers, Information techologies, simulators, discussions and Internet forums comments.

EVALUATION AND PASSING REQUIREMENTS
A Project portfolio will carry the unit evaluation. This one will consist of formative and summative evaluations, self-assessment rubrics and cooperative evaluation.

REFERENCES:

- Hull, John C. (2002). *Introducción a los Mercados de Futuros y Opciones*. México. Pearson Educación. ISBN9786074421002.
- Keen, J. D. et al (2002). *Making Technology Investments Profitable: ROI Roadmap to Better Business Cases.* USA: Wiley. ISBN 9780471227335.
- Neftci, Salih N. (2008). *Ingeniería Financiera*. México: Mc Graw Hill. ISBN 9780471227335.
- Remenyi, D. A.et al (2000). *Effective Measurement and Management of IT Costs and Benefits*, 2nd Edition (Computer Weekly Professional Series). USA: Butterworth-Heinemann. ISBN 0750644206.
- Schniederjans, M. J et al (2004). *Information Technology Investment: Decision-Making Methodology*. USA: World Scientific Publishing Company. ISBN 109812386955.

INSTITUTO POLITÉCNICO NACIONAL

SECRETARÍA ACADÉMICA

DIRECCIÓN DE EDUCACIÓN SUPERIOR

ACADEMIC UNIT: Escuela Superior de Cómputo
ACADEMIC PROGRAM: Computing Systems Engineering
LATERAL OUTPUT: Information techonlogies analist programmer
FORMATION AREA: Professional
MODALITY: Presence

LEARNING UNIT: IT Financial Engineering
TYPE OF LEARNING UNIT: Theoretical-Practical. Optative.
VALIDITY: August 2011
LEVEL: III
CREDITS: 7.5 TEPIC – 4.39 SATCA

ACADEMIC AIM

The current learning unit contributes to the Computing Systems Engineer graduate profile as it sharpens the next competences in the alumni: leadership, assertiveness, cooperative work, critical analysis, development of an enterprising attitude in search for personal and professional growth.

The sharpened professional competences are: to combine financial evaluation techniques for projects, to project models of financial re-engineering, to plan the required elements to value all issues related to information technologies as well as the required elements of the decision-making process.

This learning unit is related to the prior units: Economy, Financial Administration, and to the subsequent one of Enterprise Management.

AIM OF THE LEARNING UNIT

The student apply quantitative methods and techniques of Financial and Economical Engineering to support the decision-making process in projects related to the Information technologies.

CREDIT HOURS

THEORETICAL CREDITS / WEEK:3.0

PRACTICAL CREDITS / WEEK:1.5

THEORETICAL HOURS / SEMESTER: 54

PRACTICALS HOURS /SEMESTER:27

AUTONOMOUS LEARNING HOURS:

CREDIT HOURS / SEMESTER:81

LEARNING UNIT DESIGNED BY: Academia de Proyectos Estratégicos y Toma de Decisiones

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:** Introduction to Financial Engineering

UNIT OF COMPETENCE

The studen demonstrates the operation of the derived financial market in projects related to information technologies based on simulation programs.

No.	CONTENTS	Teacher-Led Instruction HOURS		Autonomous Learning HOURS		REFERENCES KEY
		T	P	T	P	
1.1	Introduction to Financial Engineering.	1.0	0.5	1.0	1.0	
1.1.1	Importance of Financial Engineering	0.5	0.5	0.5		
1.2	Financial Markets	1.0		1.0		
1.2.1	Participants	1.0		1.0		5B, 8B, 1C
1.2.2	The mechanics of the negotiations	1.0		1.0	1.5	
1.3	Market conventions	1.0		1.0		
1.3.1	Financial Instrume	1.0		1.0	2.0	
1.3.2	Financial Positionsnts	1.0		1.0		
	SUBTOTALS:	7.5	1.0	7.5	4.5	

TEACHING PRINCIPLES

Course framing and team arrangement.

The current unit will be approached through the case-control study strategy and the heuristic method, which will allow the consolidation of the next learning techniques: C-Q-A, case-control study, problem solving, English-led reading sessions, team work presentations about additional topics and practicals solving through the use of financial simulators.

LEARNING EVALUATION

DIAGNOSTIC TEST
Project Portfolio:
CQA
Reading reports of English texts:
Summary, Synthesis, and or technical data 30%
Case-control study 20%
Written Learning evidence 30%
Reports of practicals 10%
Self-evaluation rubrics 5%
Cooperative evaluation rubrics 5%

THEMATIC UNIT: II **TITLE:** Risks

UNIT OF COMPETENCE

The student solves risk-related problems in projects of information technologies through quantitative methods.

No.	CONTENTS	Teacher-Led Instruction HOURS		Autonomous Learning HOURS		REFERENCES KEY
		T	P	T	P	
2.1	Types of Risk	1.5		1.0	1.0	5B, 8B, 1C, 7C,6C
2.1.1	Economic risk					
2.1.2	Financial Risk					
2.2	Risk in Financial Institutions	1.5	0.5	1.5	1.0	
2.3	Risk value	1.5		1.5	1.0	
2.3.1	Risk identification tools	1.5				
2.3.2	Value at Risk methodology as a risk	1.0		1.5	1.5	
				1.5		
					2.0	
	Subtotals:	7.0	0.5	7.0	6.5	

TEACHING PRINCIPLES

The current unit will be approached through the case-control study strategy and the heuristic method, which will allow the consolidation or the next learning techniques: case-control study, problem solving, English-led reading, team work presentations about additional topics and practicals solution through financial simulators.

LEARNING EVALUATION

Proyect portfolio:	
Reading reports of English texts: Summary, Synthesis, and or technical data	30%
Case-control study	20%
WrittenLearning evidence	30%
Report of Practicals	10%
Self-evaluation rubrics	5%
Cooperative evaluaction rubrics	5%

THEMATIC UNIT: III **TITLE:** Replacement Analysis

UNIT OF COMPETENCE

The student apply financial resources efficiently through the method of replacement

No.	CONTENTS	Teacher-Led Instruction HOURS		Autonomous Learning HOURS		REFERENCES KEY
		T	P	T	P	
3.1 3.1.1	Factors to use replacement studies Factors determining life fixed assets	1.5		1.5	1.0	11B
3.2 3.2.1	Depreciation methods Linear method	1.0	0.5	1.5	1.0	
3.3 3.2.2	Sum of digits method Hours of production method |	1.0		1.5	1.0	
3.4 3.4.1	Costing Determination of fixed costs	1.0		1.0	1.0	
3.4.2 3.5	Determination of cost variables Costs of fixed assets unused and outdated.	1.0		1.0	1.5	
	Subtotals:	5.5	0.5	6.5	5.5	

TEACHING PRINCIPLES

The current unit will be approached through the learning strategy base don control-case study and the heuristic method, which will allow the consolidation of the next learning techniques: case-control study, problems solving, team work presentations about additional topics, English-led Reading sessions and practicals solving through financial simulators and the learning evidence.

LEARNING EVALUATION

Proyect portfolio: Reading reports of English texts: Summary, Synthesis, and or technical data	30%
Case-control study	20%
Written Learning evidence	30%
Report of Practicals	10%
Self-evaluation rubrics	5%
Cooperative evaluation rubrics	5%

THEMATIC UNIT: IV **TITLE:** Valuation of Information Technology

UNIT OF COMPETENCE

The student Demonstrates the economical-financial and non-financial benefits in projects based on information technologies through techniques and models.

No.	CONTENTS	Teacher-Led Instruction HOURS		Autonomous Learning HOURS		REFERENCES KEY
		T	P	T	P	
4.1	Financial techniques for valuing information technology.	1.0		2.0	2.0	10B, 1C, 2C, 3C, 4C, 9C
4.1.1	Net Present Value (PNV)					
4.1.2	Internal Rate of Return (TRR)					
4.2	Operations Research Techniques.					
4.2.1	Analytic Hierarchy Process	1.0	0.5	2.5	2.0	
4.2.2	Decision Analysis					
4.3	Techniques specifically designed for the valuation of information technology.	1.0		2.0	2.0	
4.3.1	Benchmarking Method					
4.3.2	Bedellís Method					
4.3.3	Bussi´s Method					
4.4	VAL IT Methodology					
4.4.1	VAL IT Basics	1.5		2.0	2.0	
4.4.2	VAIL IT business cases					
4.4.3	VAIL key IT management					
	Subtotals:	4.5	0.5	8.5	8.0	

TEACHING PRINCIPLES

The current unit will be approached through the control-case study strategy and the heuristic method, which will allow the consolidation of the next learning techniques: control-case study, problems solving, English-led Reading, team work presentations about additional topics and practicals solving through financial simulators.

LEARNING EVALUATION

Proyect portfolio:	
Reading reports of English texts: Summary, Synthesis, and or technical data	30%
Case-control study	20%
Written Learning evidence	30%
Report of Practicals	10%
Self-evaluation rubrics	5%
Cooperative evaluation rubrics	5%

RECORD OF PRACTICALS

No.	NAME OF THE PRACTICAL	THEMATIC UNITS	DURATION	ACCOMPLISHMENT LOCATION
1	Simulation of the derivatives market	I	5.5	Laboratorios de la Escuela Superior de Cómputo
2	Cases of forwards, futures and options	II	7.0	
3	Asset replacement analysis of information technology	III	6.0	
4	Project valuation information technology.	IV	8.5	
		TOTAL OF HOURS	27.0	

EVALUATION AND PASSING REQUIREMENTS:

The practicals worth 10% in each thematic unit.

PERIOD	UNIT	EVALUATION TERMS
1	I y II	Continuous evaluation 70% Learning evidence 30%
2	III	Continuous evaluation 70% Learning evidence 30%
3	IV	Continuous evaluation 70% Learning evidence 30%
		The learning unit is 20% worth of the final score The learning unit is 30% worth of the final score The learning unit is 30% worth of the final score The learning unit is 20% worth of the final score The learning unit will be accomplished in any IPN Academic Unit that is dependable of the Physics-Mathematics and Economics-Administrative area as long as it fulfills the minimum 80% of the Thematic Unit contents. If accredited by Special Assessment or a certificate of proficiency, this will include a practical part which contribute 50% of the grade and a theoretical part that will provide the remaining 50%, based on guidelines established by the academy.

KEY	B	C	REFERENCES
1		X	Bacchini, R. D. et al. (2005). *Ingeniería Financiera. Futuros y opciones utilizando Microsoft Excel.* Argentina: Omicrón Editorial. ISBN 9871046499.
2		X	Bannister, F. (2003). *Purchasing and Financial Management of Information Technology: A practical guide* (Computer Weekly Professional). USA: Butterworth-Heinemann. ISBN 1750658541.
3		X	Coombs, P. (2003). *IT Project Estimation: A Practical Guide to the Costing of Software.* UK: Cambridge University Press, ISBN 9780511126406.
4		X	Devaraj, S. K. et al.(2002). *The IT Payoff: Measuring the Business Value of Information Technology Investments*. España. Financial Times - Prentice Hall. ISBN 13:9780130650740.
5	X		Hull, John C. (2002). *Introducción a los Mercados de Futuros y Opciones*. México, 2002: Pearson Educación.ISBN9786074421002.
6		X	Keen, J. D. et al (2002). *Making Technology Investments Profitable: ROI Roadmap toBetter Business Cases.* USA: Wiley. ISBN 9780471227335.
7		X	Mascareñas, J et al. (2004) Opciones reales y valoración de activos. Cómo medir la flexibilidad operativa en la empresa. España. Financial Times – Prentice Hall. ISBN:8420541087.
8	X		Neftci, Salih N. (2008). *Ingeniería Financiera*. México: México. Mc Graw Hill. ISBN 9789701066294.
9		X	Remenyi, D. A.et al (2000). *Effective Measurement and Management of IT Costs and Benefits*, 2nd Edition (Computer Weekly Professional Series). USA: Butterworth-Heinemann. ISBN 0750644206.
10	X		Schniederjans, M. J et al (2004). *Information Technology Investment: Decision-Making Methodology*. USA: World Scientific Publishing Company. ISBN 109812386955.
11	X		Sullivan, W. et al (2004). *Ingeniería Económica De Degarmo***.** **(**12ed.). México: Pearson Educación. ISBN 9702605296.

INSTITUTO POLITÉCNICO NACIONAL

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 **NIVEL** III

FORMATION AREA:

Institutional	Basic Scientific	Professional	Terminal And Integration
		■	

ACADEMY: Estrategical projects and decision-making **LEARNING UNIT:** IT Financial Engineering

Specialty and academic required level: Master Degree or PHD in Finances – Economics

2. AIM OF THE LEARNING UNIT:

The student apply quantitative methods and techniques of Financial and Economical Engineering to support the decision-making process in projects related to the Information technologies.

3. PROFESSOR EDUCATIONAL PROFILE:

KNOWLEDGE	PROFESSIONAL EXPERIENCE	ABILITIES	APTITUDES
• En Finanzas, Economía ó Contabilidad. • Modelo Educativo Institucional (MEI) • Modelo Académico (MAI)	• International financial markets • Financial administration in projects related to information technologies • Experience in invesment funds development • Business managment	• Excellent interpersonal relations, responsable and leadership • Teaching • Communicative: listening, speaking, Reading and writing • Team work • Analysis • Academical Vocation and research • Planning	• Respect • Motivate students • Modesty to deal with people • Flexibility to face problems considering different points of view • Social and Institutional commitment

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Date: 2011