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: Distributed DataBase. **LEVEL:** III

AIM OF THE LEARNING UNIT :

The student implements Distributed Database Systems through mainly design methodologies and architectural alternatives for distributed database.

CONTENTS:

I. Distributed Systems.
II. Distributed Database System.
III. Distributed Database Architectures.
IV. Design of a Distributed Database.

TEACHING PRINCIPLES:

The professor will apply a Projects-Based learning process, through analogical methods using analysis techniques, technical data, charts, cooperative presentation, exercise solving and the production of the learning evidences. Moreover, an autonomous learning will be encouraged by the development of a final 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 project 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 Learning:

- Evaluation of acknowledges previously acquired, with base in the issues defined by the academy.
- Official recognition by either another IPN Academic Unit or by a National or International external Academic Institution besides IPN.

REFERENCES:

- Elmasri, R. Navathe, S. B. (2007). *Fundamentos de Sistemas de Bases de Datos.* (Quinta Edición). Madrid España: Pearson/Addison Wesley ISBN: 978-84-7829-085-7.
- Stefano, C, Giuseppe, P. (1985). *Distributed Databases Principles & Systems*. Estados Unidos: Mc Graw-Hill Inc. ISBN: 978-0070108295.
- Tamer, M. O., Valduriez P.(1999). *Principles of Distributed Database Systems*. (Second Edition). Estados Unidos: Prentice Hall. ISBN: 978-0136597070.
- Tanenbaum A.S., Van Steen M. (2007). *Sistemas Distribuidos Principios y Paradigmas*. (Segunda Edición). México: Pearson Education –Prentice Hall. ISBN: 978-970-26-1280-3.
- Wujuan, L., Veeravalli, B. (2003). *Object Management in Distributed Database System for Stationary and Mobile Computing Environments: A Competitive Approach*. USA: Kluwer Academic Publishers. ISBN: 978-1-4020-7600-8.

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: Professional

MODALITY: Presence

LEARNING UNIT: Distributed DataBase.

TYPE OF LEARNING UNIT: Theorical – Practical Optative.
VALIDITY: August 2011

LEVEL: III

CREDITS: 7.5 TEPIC – 4.39 SATCA

ACADEMIC AIM

Furthermore, this program to provide the knowledge to design distributed database systems, being caused the independent learning by means of the use of tools and methods; developing abilities to use different algorithms in the partitioning and data allocation for different sites at distributed database. It contributes to the debit profile reinforcing it 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 distributed systems and database topics. It dominates the practical and methodological principles, aspects for the construction of systems. Decision making, solution of problems, assertive communication, and creative, strategic thought. This unit has the units Data Base as antecedents.

AIM OF LEARNING UNIT:

The student implements Distributed Database Systems through mainly design methodologies and architectural alternatives for distributed database.

CREDITS HOURS

THEORETICAL CREDITS/WEEK:3.0

PRACTICAL CREDITS/WEEK:1.5

THEORETICAL HOURS/SEMESTER:54

PRACTICAL HOURS/SEMESTER:27

AUTONOMUS 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:** Distributed Systems

UNIT OF COMPETENCE

The student relates issues of Distributed Systems through its characteristics.

No.	CONTENTS	Teacher led-instruction HOURS		Autonomous Learning HOURS		REFERENCES KEY
		T	P	T	P	
1.1 1.1.1	Introduction to Distributed Systems Definition of a Distributed System.	0.5		1.5		7B
1.2 1.2.1 1.2.2 1.2.3 1.2.4	Issues of Distributed System. Openness. Transparency. Issues for Open System. Scalability	2.5		3.0	1.5	
1.3 1.3.1 1.3.2 1.3.3	Sorts of Distributed Systems. Distributed Computing System. Distributed Information System. Distributed Pervasive System.	2.0		3.0	1.5	
	Subtotals:	5.0	0.0	7.5	3.0	

TEACHING PRINCIPLES

This Thematic Unit must begin with a framing of the course and the formation of teams. Will be Projects-Based learning strategy, trough analogical method, with the techniques of elaboration of charts, concept mapping, exhibition in team, practical and production of learning evidence and the accomplishment of a project proposal.

LEARNING EVALUATION

Diagnostic Test	
Project Portfolio:	
Charts	5%
Concept Mapping	5%
Cooperative Presentation	10%
Proposal of project	20%
Practical w/report	20%
Self-Evaluation Rubrics	5%
Cooperative Evaluation Rubrics	5%
Written Learning Evidence	30%

THEMATIC UNIT: II **TITLE:** Distributed Database System

UNIT OF COMPETENCE

The student compares characteristics of a Distributed Database System through terminology of Distributed Processing.

No.	CONTENTS	Teacher led-instruction HOURS		Autonomous Learning HOURS		REFERENCES KEY
		T	P	T	P	
2.1 2.1.1	Distributed Database Definition.	0.5		1.0		8C,1B, 4C
2.2 2.2.1 2.2.2	Distributed Database Management System Components. Advantages	0.5		1.0	1.0	
2.3	Distributed Processing and Distributed Databases.	0.5	0.5	1.0	1.0	
2.4	Distributed Database Transparency Features.	1.0	0.5	1.0	1.0	
2.5	Data Fragmentation.	1.5	0.5	1.0	1.0	
2.6	Data Replication.	0.5	0.5	1.0	1.0	
2.7	Data Allocation.	0.5		1.0	1.0	
	Subtotals:	5.0	2.0	7.5	6.0	

TEACHING PRINCIPLES

Will be projects-Based learning strategy, trough analogical method, trough analogical method, with the techniques of elaboration of charts, concept mapping, exhibition in team, advance of the project, practical and production of learning evidences.

LEARNING EVALUATION

Project Portfolio:	
Report of Practicals	20%
Concept Mapping	5%
Cooperative Presentation	5%
Advance of the Project	20%
Self-Evaluation Rubrics	5%
Cooperative Evaluation Rubrics	5%
Writing Learning Evidence	40%

THEMATIC UNIT: III **TITLE:** Distributed Database Architectures.

UNIT OF COMPETENCE

The student compares architectural models and architectural alternatives for distributed database through reference a models for distributed database.

No.	CONTENTS	Teacher led-instruction HOURS		Autonomous Learning HOURS		REFERENCES KEY
		T	P	T	P	
3.1	Architectural Model for Distributed Database Management System.	2.0		3.0	1.5	6B, 2C, 3C, 5B
3.1.1	Autonomy					
3.1.2	Distribution					
3.1.3	Heterogeneity					
3.1.3	Architectural Alternatives					
3.2	Distributed Database Management System Architecture	1.0	1.0	3.0	3.0	
3.2.1	Client/Server System					
3.2.2	Distributed Database System					
3.2.3	Multidatabase Architecture					
3.3	Reference architecture for distributed database.	2.0	1.0	3.0	1.5	
3.3.1	Global Conceptual Schema					
3.3.2	Fragmentation Schema					
3.3.3	Allocation Schema					
3.3.4	Characteristics of Reference architecture for distributed database.					
	Subtotals:	5.0	2.0	9.0	6.0	

TEACHING PRINCIPLES

Will be projects-Based learning strategy, trough analogical method, trough analogical method. with the techniques of elaboration of charts, concept mapping, exhibition in team, advance of the project, practical and production of learning evidences.

LEARNING EVALUATION

Project Portfolio:	
Report of Practical	20%
Charts	5%
Concept Mapping	5%
Advance of the Project	20%
Self-Evaluation Rubrics	5%
Cooperative Evaluation Rubrics	5%
Writing Learning Evidence	40%

THEMATIC UNIT: IV **TITLE:** Design of a Distributed Database.

UNIT OF COMPETENCE

The student designs a Distributed Database System through an alternative design strategy.

No.	CONTENTS	Teacher led-instruction HOURS		Autonomous Learning HOURS		REFERENCES KEY
		T	P	T	P	
4.1 4.1.1 4.1.2	Alternative Design Strategies Top-Down Design Process Bottom- Up Design Process	1.0				6B
4.2 4.2.1 4.2.2 4.2.3	Fragmentation. Reasons for Fragmentation. Fragmentation Alternatives. Correctness Rules of Fragmentation.	2.0		2.0		
4.3 4.3.1 4.3.2 4.3.3	Fragmentation Alternatives Horizontal Fragmentation. Vertical Fragmentation. Hybrid Fragmentation.	1.5	1.5	4.0	4.0	
4.4 4.4.1 4.4.2 4.4.3	Allocation Allocation Problem. Information Requirements. Allocation Model.	1.5	0.5	3.0	2.0	
	Subtotals:	6.0	2.0	9.0	6.0	

TEACHING PRINCIPLES

Will be projects-Based learning strategy, trough analogical method, trough analogical method. with the techniques of exercise-solving, cooperative presentation, practical and learning evidence, the production of the learning evidences and the presentation of the final project.

LEARNING EVALUATION

Project Portfolio:	
Report of Practical	20%
Exercise-solving	5%
Concept Mapping	5%
Final Project	20%
Self-Evaluation Rubric	5%
Cooperative Evaluation Rubrics	5%
Writing Learning Evidence	40%

RECORD OF PRACTICALS

No.	NAME OF THE PRACTICAL	THEMATIC UNITS	DURATION	ACCOMPLISHMENT LOCATION
1	Relational Database Management System.	I,II	5.0	Computer Labs
2	Centralized Database Architecture System.	II	6.0	
3	Multidatabase architecture System.	III	8.0	
4	Partitioning Algorithms for distributed database.	IV	8.0	
		TOTAL OF HOURS	27.0	

EVALUATION AND PASSING REQUIREMENTS:

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

PERIOD	UNIT	EVALUATION TERMS
1	I	Continuous evaluation 70% Written Learning Evidence 30%
2	II	Continuous evaluation 60% Written Learning Evidence 40%
	III	Continuous Evaluation 60% Written Learning Evidence 40%
3	IV	Continuous Evaluation 60% Written Learning Evidence 40%
		The learning Unit I is 20% worth of the final score. The learning Unit II is 20% worth of the final score. The learning Unit III is 30% worth of the final score. The learning Unit IV is 30% 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 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**		Elmasri, R. Navathe, S. B. (2007). *Fundamentos de Sistemas de Bases de Datos.* (Quinta Edición). Madrid España: Pearson/Addison Wesley ISBN: 978-84-7829-085-7.
2		**X**	Mannino, M. V. (2007). *Administración de bases de datos, diseño y desarrollo de aplicaciones*. (Tercera Edición). México: Mc Graw Hill Interamericana. ISBN: 978-970-10-6109-1.
3		**X**	Ricardo C. M.(2009). *Bases de Datos*. México D.F.: Mc Graw Hill. ISBN: 978-970-10-7275-2.
4		**X**	Rob, P., Coronel C. (2004). *Sistemas de Bases de Datos*. (Quinta Edición). México DF: Thompson Learning Course Technology. ISBN: 970-686-2862.
5	**X**		Stefano, C, Giuseppe, P. (1985). *Distributed Databases Principles & Systems*. Estados Unidos: Mc Graw-Hill Inc. ISBN: 978-0070108295.
6	**X**		Tamer, M. O., Valduriez P.(1999). *Principles of Distributed Database Systems*. (Second Edition). Estados Unidos: Prentice Hall. ISBN: 978-0136597070.
7	**X**		Tanenbaum A.S., Van Steen M.(2007). *Sistemas Distribuidos Principios y Paradigmas*. (Segunda Edición). México: Pearson Education –Prentice Hall. ISBN :978-970-26-1280-3.

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 **LEVEL** III

FORMATION AREA:

Institutional	Basic Scientific	Professional	Terminal and Integration
		■	

ACADEMY: Ingeniería de Software **LEARNING UNIT:** Distributed DataBase.

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

2. AIM OF THE LEARNING UNIT:

The student implements Distributed Database Systems through mainly design methodologies and architectural alternatives for distributed database.

3. PROFESSOR EDUCATIONAL PROFILE:

KNOWLEDGE	PROFESSIONAL EXPERIENCE	ABILITIES	APTITUDES
• Data Modeling • Distributed System • SQL Standard • Distributed Database Management System Architecture • Knowledge of the Institutional Educational Model • English Language	• A year designs computational systems • A year experience develop database systems • Two Years working in groups and work collaborative. • A year experience in the Institutional Educational Model.	• Analysis and synthesis. • Leadership. • Decision Making. • Problems resolution. • Applications of Institutional Educational Model. • Distinguish architectural models and architectural alternatives for distributed database.	• Responsible. • Honest. • Respectful. • Tolerant. • Assertive. • Colaborative. • Participative.

DESIGNED BY	REVISED BY	AUTHORIZED BY
M. en C. Euler Hernández Contreras COORDINATING PROFESSOR Dra. Lorena Chavarría Báez COLLABORATING PROFESSORS	Dr. Flavio Arturo Sánchez Garfias Subdirector Académico	Ing. Apolinar Francisco Cruz Lázaro Director

Date: 2011