

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: Intelligent Systems

LEVEL: III

AIM OF THE LEARNING UNIT :

Designs a Multi-Agent System through FIPA reference model for Agent Systems.

CONTENTS:

- I. Agent Fundamentals.
- II. Agent Architectures.
- III. Agent-Oriented Software Engineering.
- IV. Multi-Agent System Development Platforms.

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.

REFERENCES:

- Belligemine, F. Caire, G. Greenwood, D.(2007). *Developing multi-agents Systems with JADE*. USA: John Wiley & Sons, Ltd. ISBN: 9780470057476
- Ciancarini, P. Wooldridge, M.J. (2001). *Agent-Oriented Software Engineering*. Alemania: Springer-Verlang Berlin Heidelberg. ISBN: 978-3-540-41594-7
- Jennings, N.R. Wooldridge, M.J. (2002). *Agent Technology Foundations, Applications and Markets*. Alemania: Springer-Verlaga. ISBN: ISBN 3-540-63591-2
- Weiss, G.(1999). *Multiagent Systems: A Modern Approach to Distributed Artificial Intelligence*. USA: The MIT Press, Pearson Education. ISBN: 978-0-262-73131-7
- Wooldridge, M.(2009). *An Introduction to MultiAgent System*. (Second Edition) UK: John Wiley & Sons Ltd. ISBN: 978-0470519462



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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: Intelligent Systems.

TYPER OF LEARNING UNIT: Theorical – Practical, Optative.

VALIDITY: Agosto 2011

LEVEL: III

CREDITS: 7.5 TEPICT – 4.39 SATCA

ACADEMIC AIM

Furthermore, this program to provide the knowledge to design intelligent systems, being caused the independent learning by means of the use of tools and methods; developing abilities to use different agent architectures and Multi-Agent System Development Platforms for implements multi-agent system. 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 intelligent systems and agent technology. 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 Distributed Systems and Artificial Intelligence as antecedents.

AIM OF THE LEARNING UNIT:

Designs a Multi-Agent System through FIPA reference model for Agent Systems.

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 Garfías
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: Agent Fundamentals			
UNIT OF COMPETENCE							
The student compares Multi-Agent System characteristics through a taxonomy of agents.							
No.	CONTENTS	Teacher led-instruction HOURS		Autonomous Learning HOURS		REFERENCES KEY	
		T	P	T	P		
1.1	Introduction	0.5		1.5		6B, 2C, 5C	
1.1.1	Distributed Artificial Intelligence						
1.1.2	Fundamentos de agencia						
1.1.3	Applications: industries, marketing and medical.						
1.2	Agent Theory	2.5	0.5	3.0	3.5		
12.1	Agents and Objects						
1.2.2	Agents and Expert Systems						
1.2.3	Agents as Intentional Systems						
1.2.4	Abstract Architectures for Intelligent Agents						
1.3	Taxonomies of Agents	2.0	1.0	3.0	3.5		
1.3.1	Reactive Agents						
1.3.2	Deductive Agents						
1.3.3	Hybrid Agents						
	Subtotals:	5.0	1.5	7.5	7.0		
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							
Project Portfolio:							
Report of Practicals		10%					
Tab work		5%					
Concept Map		5%					
Cooperative Presentation		10%					
Project proposal		30%					
Self-Evaluation Rubrics		5%					
Cooperative Evaluation Rubrics		5%					
Writing Learning Evidence		30%					

LEARNING UNIT: Intelligent Systems

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THEMATIC UNIT: II		TITLE: Agent Architectures					
UNIT OF COMPETENCE							
The student compares mainly agent architectural through FIPA reference model.							
No.	CONTENTS	Teacher led- instruction HOURS		Autonomous Learning HOURS		REFERENCES KEY	
		T	P	T	P		
2.1	Architectures	2.5	0.5	2.5	2.0	6B, 2C, 7B, 4C	
2.1.1	Blackboard Architecture						
2.1.2	BDI Architecture						
2.1.3	Multiagent Systems						
2.2	Communications	2.5	0.5	2.5	2.5		
2.2.1	Speech Acts						
2.2.2	Languages: KQML, ACL						
2.2.3	Interaction Protocols: Contract Net						
2.2.4	Ontologies		0.5	2.5	2.5		
2.3	FIPA Reference Model						
2.3.1	Agent Management System (AMS)						
2.3.2	Directory Facilitator (DF)						
2.3.3	Message Transport System (MTS)						
2.3.4	Agent Communication Channel (ACC)						
	Subtotals:	5.0	1.5	7.5	7.0		
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		10%					
Concept Mapping		5%					
Cooperative Presentation		5%					
Advance of the Project		30%					
Self-Evaluation Rubrics		5%					
Cooperative Evaluation Rubrics		5%					
Writing Learning Evidence		40%					



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THEMATIC UNIT: III		TITLE: Agent-Oriented Software Engineering				
UNIT OF COMPETENCE						
The student compares mainly analysis and design agent-based methodologies trough theirs characteristics.						
No.	CONTENTS	Teacher led-instruction HOURS		Autonomous Learning HOURS		REFERENCES KEY
		T	P	T	P	
3.1	Agent-Oriented Software Engineering	0.5		1.0		3B, 7B
3.2	AAII Methodology	0.5		1.0		
3.3	GAIA	1.0		3.0		
3.3.1	a) Agent Model					
3.3.2	b) The Services Model					
3.3.3	c) Interaction Model					
3.3.4	d) Acquaintance Model					
3.4	JADE y JADEX	1.0		1.0		
3.5	TROPOS	0.5		0.5		
3.6	PROMETHEUS	0.5		0.5		
3.7	Agent UML	0.5		1.0		
3.8	Agent Z	0.5		1.0		
	Subtotals:	5.0	0.0	9.0	0.0	
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:						
Concept Mapping		5%				
Tab work		5%				
Advance of the Project		40%				
Self-Evaluation Rubrics		5%				
Cooperative Evaluation Rubrics		5%				
Writing Learning Evidence		40%				



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LEARNING UNIT: Intelligent Systems

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THEMATIC UNIT: IV		TITLE: Multi-Agent System Development Platforms				
UNIT OF COMPETENCE						
The student designs a Multi-Agent System through a FIPA-Based Development Platforms.						
No.	CONTENTS	Teacher led-instruction HOURS		Autonomous Learning HOURS		REFERENCES KEY
		T	P	T	P	
4.1	Multi-Agent System Development Platforms:	3.0	1.5	3.5	3.0	1B, 4C, 7B
4.1.1	AgentBuilder					
4.1.2	JATLite					
4.1.3	Zeus					
4.1.4	JADE and JADEX					
		3.0	1.5	5.5	4.0	
4.2	JADE					
4.2.1	Introduction					
4.2.2	Architecture					
4.2.3	Threaded behaviours					
4.2.4	Interaction protocols					
4.2.5	Ontologies and content languages					
	Subtotals:	6.0	3.0	9.0	7.0	
TEACHING PRINCIPLES						
Techniques of elaboration 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		10%				
Exercise-solving		5%				
Concept Mapping		5%				
Final Project		50%				
Self-Evaluation Rubric		5%				
Cooperative Evaluation Rubrics		5%				
Writing Learning Evidence		20%				



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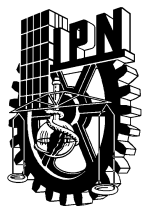


LEARNING UNIT: Intelligent System

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RECORD OF PRACTICALS

No.	NAME OF THE PRACTICAL	THEMATIC UNITS	DURATION	ACCOMPLISHMENT LOCATION
1	Deductive Agents	I	2.5	Computers Labs
2	Reactive Agents	I	3.5	
3	Hybrid Agents	I	2.5	
4	Ontologies	II	2.0	
5	Contract Net	II	3.0	
6	Blackboard Systems	II	3.5	
7	JADE Instalation	IV	2.0	
8	JADE behaviours	IV	2.0	
9	JADE Protocols	IV	3.0	
10	JADE Ontologies and content languages	IV	3.0	
		TOTAL OF HOURS	27.0	
EVALUATION AND PASSING REQUIREMENTS: Report of Practical defines 10% of the calification in the thematic units I, II and IV. Practicals are considered mandatory to pass this unit learning.				



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LEARNING UNIT:

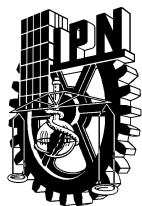
Intelligent Systems

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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	80%
		Written Learning Evidence	20%
<p>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.</p> <p>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.</p>			

KEY	B	C	REFERNCES
1	X		Belligemine, F. Caire, G. Greenwood, D.(2007). <i>Developing multi-agents Systems with JADE</i> . USA: John Wiley & Sons, Ltd. ISBN: 9780470057476
2		X	Bigus, J.P. Bigus, J.(2001). <i>Constructing Intelligent Agents using Java</i> . (Second Edition). USA: Wiley Computer Publishing – John Wiley & Sons Inc. ISBN: 978-0471396017
3	X		Ciancarini, P. Wooldridge, M.J. (2001). <i>Agent-Oriented Software Engineering</i> . Alemania: Springer-Verlang Berlin Heidelberg. ISBN: 978-3-540-41594-7
4		X	Foundation for Intelligent Physical Agents (FIPA). http://www.fipa.org/specifications/index.html
5		X	Jennings, N.R. Wooldridge, M.J. (2002). <i>Agent Technology Foundations, Applications and Markets</i> . Alemania: Springer-Verlaga. ISBN: ISBN 3-540-63591-2
6	X		Weiss, G.(1999). <i>Multiagent Systems: A Modern Approach to Distributed Artificial Intelligence</i> . USA: The MIT Press, Pearson Education. ISBN: 978-0-262-73131-7
7	X		Wooldridge, M.(2009). <i>An Introduction to MultiAgent System</i> . (Second Edition) UK: John Wiley & Sons Ltd. ISBN: 978-0470519462



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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
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ACADEMY: Software Engineering **LEARNING UNIT:** Intelligent Systems .

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

2. AIM THE LEARNING UNIT:

Designs a Multi-Agent System through FIPA reference model for Agent Systems.

3. PROFESSOR EDUCATIONAL PROFILE:

KNOWLEDGE	PROFESSIONAL EXPERIENCE	ABILITIES	APTITUDES
<ul style="list-style-type: none">• Expert System Modeling• Distributed System• Artificial Intelligent Techniques• Knowledge of the Institutional Educational Model• English Language	<ul style="list-style-type: none">• A year designs computational systems• A year experience develop expert systems• Two Years working in groups and work collaborative.• A year experience in the Institutional Educational Model.	<ul style="list-style-type: none">• Analysis and synthesis.• Leadership.• Decision Making.• Problems resolution.• Applications of Institutional Educational Model.• Distinguish FIPA reference model for MutiAgent System.	<ul style="list-style-type: none">• Responsible.• Honest.• Respectful.• Tolerant.• Assertive.• Colaborative.• Participative.

DESIGNED BY

REVISED BY

AUTHORIZED BY

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COORDINATING PROFESSOR

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Subdirector Académico

Ing. Apolinar Francisco Cruz Lázaro
Director

M. en C. Macario Hernández Cruz
M. en C. Rubén Peredo Valderrama
COLLABORATING PROFESSORS

Date: 2011