ANX-PR/CL/001-01

LEARNING GUIDE

SUBJECT

103000364 - Logic programming

DEGREE PROGRAMME

10AJ - Master Universitario En Inteligencia Artificial

ACADEMIC YEAR & SEMESTER

2018/19 - Semester 1

Index

Learning guide

1. Description

1.1. Subject details

Name of the subject	103000364 - Logic programming
No of credits	5 ECTS
Type	Optional
Academic year ot the programme	First year
Semester of tuition	Semester 1
Tuition period	September-January
Tuition languages	English
Degree programme	10AJ - Master universitario en inteligencia artificial
Centre	10 - Escuela Tecnica Superior de Ingenieros Informaticos
Academic year	2018-19

2. Faculty

2.1. Faculty members with subject teaching role

Name and surname	Office/Room	Email	Tutoring hours *
Manuel De Hermenegildo Salinas (Subject coordinator)	2212	manuel.hermenegildo@upm.es	Sin horario.
Francisco Bueno Carrillo	2206	francisco.bueno@upm.es	Sin horario.
M. Carmen Suarez De Figueroa Baonza	2113	mdelcarmen.suarezdefigueroa@upm.es	Sin horario.

* The tutoring schedule is indicative and subject to possible changes. Please check tutoring times with the faculty member in charge.

3. Skills and learning outcomes *

3.1. Skills to be learned

CEIA10 - Identificación de áreas de aplicación en las que se pueda utilizar las técnicas y métodos de la Inteligencia Artificial.

CEIA6 - Formalización de especificaciones, demostración de propiedades de los programas y diseño de programas con razonamiento o la utilización de la lógica misma como lenguaje de programación

CG18 - Capacidad de trabajar y comunicarse también en contextos internacionales

CG7 - Especificación y realización de tareas informáticas complejas, poco definidas o no familiares.

CGI1 - Adquirir conocimientos científicos avanzados del campo de la informática que le permitan generar nuevas ideas dentro de una línea de investigación.

3.2. Learning outcomes

RA41 - Desarrollar un programa lógico a partir de especificaciones y mejorar la eficiencia del mismo y manejar con soltura sistemas de P y sus extensiones.

RA39 - Identificar áreas de utilización y fronteras de la programación lógica, en especial dentro del campo de la Inteligencia Artificial

RA40 - Identificar características de la programación lógica (PL) y sus extensiones que puedan resultar beneficiosas o perjudiciales para la resolución de un problema.

RA44 - Saber manejar fuentes bibliográficas y valorar su importancia para desarrollar trabajos escritos innovadores o que reflejen el estado del arte en programación ló- gica

RA43 - Diseñar extensiones de la PL de cuño propio para la resolución de ciertos problemas, originando distintas tareas de investigación

RA47 - Ser capaz de manejar los términos y realizar exposiciones en público en lengua inglesa sobre la temática de la materia.

* The Learning Guides should reflect the Skills and Learning Outcomes in the same way as indicated in the Degree Verification Memory. For this reason, they have not been translated into English and appear in Spanish.

4. Brief description of the subject and syllabus

4.1. Brief description of the subject

No hay descripción de la asignatura.

4.2. Syllabus

1. Introduction
   1.1. Problem solving and automated theorem proving
   1.2. What is (C)LP?
2. Pure Logic (relational) Programming
   2.1. Syntax
   2.2. Resolution and Unification
   2.3. Data structures
   2.4. Recursive programming
3. Prolog
   3.1. Syntax
   3.2. Execution model
   3.3. Arithmetic
   3.4. Data structures
   3.5. Basic programming techniques
   3.6. Meta-programming
   3.7. Efficient Prolog programming
4. Theory of LP
   4.1. Review of first-order predicate logic
   4.2. Resolution
   4.3. Fundamental results
   4.4. Semantics of logic programs
5. Introduction to CLP

5.1. Constraint satisfaction

5.2. Basic constraint programming

5. Schedule

5.1. Subject schedule*

Week	Face-to-face classroom activities	Face-to-face laboratory activities	Other face-to-face activities	Assessment activities
1	**1.1 y 1.2** Duration: 02:00 Lecture			**In-class exercises** Individual work Continuous assessment Duration: 02:00
2	**2.1 y 2.2** Duration: 02:00 Lecture			**Work on the assignments** Group work Continuous assessment Duration: 03:00
3	**2.3** Duration: 02:00 Lecture			**Work on the assignments** Group work Continuous assessment Duration: 03:00
4	**2.4** Duration: 02:00 Lecture			**Work on the assignments** Group work Continuous assessment Duration: 03:00
5	**2.5** Duration: 02:00 Lecture			**Work on the assignments** Group work Continuous assessment Duration: 03:00
6	**3.1 y 3.2** Duration: 02:00 Lecture			**Work on the assignments** Group work Continuous assessment Duration: 03:00
7	**3.3 y 3.4** Duration: 02:00 Lecture			**Work on the assignments** Group work Continuous assessment Duration: 03:00
8	**3.5** Duration: 02:00 Lecture			**Assignment presentation** Group presentation Continuous assessment Duration: 02:00
9	**3.6** Duration: 02:00 Lecture			**Work on the assignments** Group work Continuous assessment Duration: 03:00
10	**3.7** Duration: 02:00 Lecture			**Work on the assignments** Group work Continuous assessment Duration: 03:00
11	**3.7** Duration: 02:00 Lecture			**Work on the assignments** Group work Continuous assessment Duration: 03:00

12	**4.1 y 4.2** Duration: 02:00 Lecture			**Assignment presentation** Group presentation Continuous assessment Duration: 02:00
13	**4.3 y 4.4** Duration: 02:00 Lecture			**Work on the assignments** Group work Continuous assessment Duration: 03:00
14	**5.1** Duration: 02:00 Lecture			**Work on the assignments** Group work Continuous assessment Duration: 03:00
15	**5.2** Duration: 02:00 Lecture			**Assignment presentation** Group presentation Continuous assessment Duration: 02:00
16				**Practical examination** Problem-solving test Continuous assessment Duration: 01:00
17				**Final exam** Written test Final examination Duration: 02:00

The independent study hours are training activities during which students should spend time on individual study or individual assignments.

Depending on the programme study plan, total values will be calculated according to the ECTS credit unit as 26/27 hours of student face-to-face contact and independent study time.

* The subject schedule is based on a previous theorical planning of the subject plan and might go to through experience some unexpected changes along throughout the academic year.

6. Activities and assessment criteria

6.1. Assessment activities

6.1.1. Continuous assessment

Week	Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
1	In-class exercises	Individual work	No Presential	02:00	%	5 / 10	
2	Work on the assignments	Group work	No Presential	03:00	%	5 / 10	
3	Work on the assignments	Group work	No Presential	03:00	%	5 / 10	
4	Work on the assignments	Group work	No Presential	03:00	%	5 / 10	
5	Work on the assignments	Group work	No Presential	03:00	%	5 / 10	
6	Work on the assignments	Group work	No Presential	03:00	%	5 / 10	
7	Work on the assignments	Group work	No Presential	03:00	%	5 / 10	
8	Assignment presentation	Group presentation	No Presential	02:00	30%	5 / 10	CG18 CGI1 CEIA6 CG7 CEIA10
9	Work on the assignments	Group work	No Presential	03:00	%	5 / 10	
10	Work on the assignments	Group work	No Presential	03:00	%	5 / 10	
11	Work on the assignments	Group work	No Presential	03:00	%	5 / 10	
12	Assignment presentation	Group presentation	No Presential	02:00	30%	5 / 10	CG18 CGI1 CEIA6 CG7 CEIA10
13	Work on the assignments	Group work	No Presential	03:00	%	5 / 10	
14	Work on the assignments	Group work	No Presential	03:00	%	5 / 10	
15	Assignment presentation	Group presentation	No Presential	02:00	30%	5 / 10	CGI1 CEIA6 CG7 CEIA10
16	Practical examination	Problem-solving test	Face-to-face	01:00	10%	5 / 10	CG18 CGI1 CEIA6 CG7 CEIA10

6.1.2. Final examination

Week	Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
17	Final exam	Written test	Face-to-face	02:00	100%	5 / 10	CG18 CGI1 CEIA6 CG7 CEIA10

6.1.3. Referred (re-sit) examination

No se ha definido la evaluación extraordinaria.

6.2. Assessment criteria

Continuous evaluation:

- Several practical programming tasks will be assigned during the course.
- These assignments have to be completed in groups (the number of people per group will be specified by the instructor).
- The descriptions of the assignments, instructions, information on systems to use, etc. will be sent by email and Moodle.
- Assignments will be turned in via Moodle.
- The final grade for the assignments will be the average of the grades for each assignment.
- Students who do not wish to follow the practical part of the course (the assignments) should apply to the course coordinator for this status within the first 4 weeks. These students will have to take the final exam.

Exams / Grades:

- If the practical part has been passed (average >= 5.0) with "guarantees of authenticity" as well as the individual (short) practical exam, the final grade will be that from the practical part.
- Otherwise it is necessary to take the (longer) final exam and the final grade will be the one obtained in that exam.

Extraordinary evaluation (taking later exams):

- There will be no practical assignments, just a final exam.

Evaluación contínua:

- Se realizarán varias prácticas durante el curso.
- Dichas prácticas se realizarán en grupos (el número de integrantes lo determinará el profesor).
- Los enunciados, instrucciones, información sobre los sistemas a utilizar, etc., se enviarán por correo electrónico y Moodle.
- La entrega de las prácticas se hará utilizando Moodle.
- La nota final de prácticas será la media de todas las prácticas.
- Los estudiantes que no quieran realizar la evaluación continua deberán solicitarlo al coordinador de la asignatura en las primeras 4 semanas de clase.

Exámenes / Calificación:

- Si se han aprobado las prácticas (media >=5.0) con garantía de autenticidad y el examen de prácticas individual (corto), la nota final será la de prácticas.
- En caso contrario, es necesario presentarse al examen ordinario (largo) y la nota final será la obtenida en dicho examen.

Evaluación extraordinaria:

- Sólo se puede aprobar por examen final.

7. Teaching resources

7.1. Teaching resources for the subject

Name	Type	Notes
``The Art of Prolog'' (Second edition), Sterling & Shapiro, MIT Press, 1994.	Bibliography	
``From Logic Programming to Prolog'', K. Apt, Prentice-Hall, 1997.	Bibliography	

``Prolog Programming for Artificial Intelligence'', I. Bratko, Addison-Wesley Ltd. 1990 (2nd edition); 2000 (3rd edition).	Bibliography	
``Programming in Prolog'', Clocksin & Mellish, 1981, Springer-Verlag.	Bibliography	
``Programming with Constraints: An Introduction'', Marriott & Stuckey, MIT Press, 1998.	Bibliography	
``Essentials of Logic Programming'', C. Hogger, 1990, Clarendon Press, Oxford.	Bibliography	
Página web de la asignatura (http://www.clip.dia.fi.upm.es/prode)	Web resource	
Sitio Moodle de la asignatura	Web resource	
Aula	Equipment	
Sala de trabajo en grupo	Equipment	
Laboratorio: Centro de Cálculo	Equipment	