UNIVERSIDADE DA CORUÑA

Teaching Guide				
Identifying Data				2016/17
Subject (*)	Software Verification and Validation		Code	614G01053
Study programme	Grao en Enxeñaría Informática			
Descriptors				
Cycle	Period	Year	Type	Credits
Graduate	1st four-month period	Fourth	Obligatoria	6
Language	Spanish			
Teaching method	Face-to-face			
Prerequisites				
Department	Computación			
Coordinador	Castro Souto, Laura Milagros	E-mail	laura.milagros.castro.souto@udc.es	
Lecturers	Cabalar Fernandez, Jose Pedro Castro Souto, Laura Milagros Perez Vega, Gilberto	E-mail	pedro.cabalar@udc.es laura.milagros.castro.souto@udc.es gilberto.pvega@udc.es	
Web	moodle.udc.es			
General description	This subject is intended to master the current solutions in Software Engineering for the validation and verification of software. This includes: - knowledge of functional and non-functional techniques and tools for software validation at all levels (unit, integration, system); - knowledge of techniques and tools for automatic reasoning; and - knowledge of techniques and tools for formal verification.			

Study programme competences / results	
Code	Study programme competences / results
A28	Capacidade de identificar e analizar problemas, e deseñar, desenvolver, implementar, verificar e documentar solucións sóftware sobre a base dun coñecemento adecuado das teorías, modelos e técnicas actuais.
B1	Capacidade de resolución de problemas
B3	Capacidade de análise e síntese
C2	Dominar a expresión e a comprensión de forma oral e escrita dun idioma estranxeiro.
C3	Utilizar as ferramentas básicas das tecnoloxías da información e as comunicacións (TIC) necesarias para o exercicio da súa profesión e para a aprendizaxe ao longo da súa vida.
C6	Valorar criticamente o coñecemento, a tecnoloxía e a información dispoñible para resolver os problemas cos que deben enfrontarse.
C7	Asumir como profesional e cidadán a importancia da aprendizaxe ao longo da vida.
C8	Valorar a importancia que ten a investigación, a innovación e o desenvolvemento tecnolóxico no avance socioeconómico e cultural da sociedade.

Learning outcomes			
Learning outcomes	Study programme competences / results		
Ability to identify and analise problems, and to design, develop, implement, validate and document software solutions on the basis of an deep understanding and knowledge of modern theories, models and techniques.	A28	B1 B3	C2 C3 C6 C7 C8

Contents	
Topic	Sub-topic

Part I: Software Validation	I.1 Test secification, design and execution I1.1. Levels and types of tests I1.2. Properties and traceability of requirements I1.3. Automation I.2 Test management: planning, assessment, metrics and reviews
Part II: Formal methods and automatic reasoning	II.1 Introduction: natural deduction and calculus of sequences II.2 Automatic proofs using PVS II.3 What is a theorem prover and what is it used for? II.4 PVS specification language: types, expressions, theories, subtyping II.5 PVS prover: tactics, recursion, ecuational reasoning
Part III: Model checking	III.1 Introduction to modal temporal logic III.2 Properties specification: deadlocks, safety, liveness, fairness III.3 How a model checker works III.4 Introduction to the use of a model checking tool

Planning				
Methodologies / tests	Competencies / Results	Teaching hours (in-person & virtual)	Student?s personal work hours	Total hours
Guest lecture / keynote speech	B3 C2 C7 C8	21	26.25	47.25
Laboratory practice	A28 B1 B3 C2 C3 C6	14	35	49
Supervised projects	A28 B1 B3 C2 C3 C6	7	7	14
Objective test	B1 B3 C6	3	31.5	34.5
Personalized attention		5.25	0	5.25
(*)The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.				

Methodologies	
Methodologies	Description
Guest lecture / keynote speech	Master class where the theoretical contents of the study programme are presented.
Laboratory practice	Hands-on work sessions in the lab.
Supervised projects	Student assignments to be done during reduced-group classes.
Objective test	Written test.

Personalized attention	
Methodologies	Description
Objective test Supervised projects Guest lecture / keynote speech Laboratory practice	Questions/answers about the theoretical/practical aspects of the subjects, during the corresponding office hours of each teacher. Part-time students should be able to follow this subject without issues, given that attendance is not mandatory nor awarded qualification. However, part-time students are responsible for keeping up-to-date with the materials posted on the Moodle platform, as well as the assigments to be handed in. When the assignments are to be handed in by means other than telematic, they will be set up between part-time students and teachers to the best both their schedules allow.

Assessment			
Methodologies	Competencies / Results	Description	Qualification

Objective test	B1 B3 C6	Written test, up to a maximum of 4 points in the final score. A minimum of 2 points is required to pass.	40
Supervised projects	A28 B1 B3 C2 C3 C6	Presentation and participation in student assignments, performed during reduced-group classes, up to a maximum of 2 points in the final score. These are not compulsory to pass.	20
Laboratory practice	A28 B1 B3 C2 C3 C6	Hand in and presentation of hands-on student assignments, up to a maximum of 4 points in the final score. These are not compulsory to pass.	40

Assessment comments
Those students who do not reach the minimum in the objective test, will be qualified with the qualification they obtain in that objective test. In the second opportunity, the objective test may include a specific evaluation of the laboratory practice. In compliance with the academic rules at UDC that apply to part-time students, physical presence in the classroom/laboratory will not be regarded as qualification element. That is to say, students may officially apply to be dismissed from attending lectures and laboratory practices. All in all, part-time students will still need to comply with deadlines established for supervised projects and laboratory projects.

Sources of information	
Basic	- Mordechai Ben-Ari (2012). Mathematical Logic for Computer Science. Springer - Ron Patton (2001). Software testing. Sams - Peter Farrell-Vinay (2008). Manage software testing. Auerbach - Kent Beck (2002). Test Driven Development (By Example). Addison-Wesley - Gerard J. Holzmann (2003). The SPIN model checker: primer and reference manual. Addison-Wesley - Mordechai Ben-Ari (2001). Mathematical Logic for Computer Science. Springer - Zohar Manna and Amir Pnueli (1991). The Temporal Logic of Reactive and Concurrent Systems. Specification. Springer - Zohar Manna and Amir Pnueli (1995). The Temporal Logic of Reactive and Concurrent Systems. Safety. Springer
Complementary	

Recommendations
Subjects that it is recommended to have taken before
Software Design/614G01015 Concurrency and Parallelism/614G01018 Software Process/614G01019 Software Architecture/614G01221 Requirements Engineering/614G01222 Quality Assurance/614G01223
Subjects that are recommended to be taken simultaneously
Knowledge Representation and Automatic Reasoning/614G01036 Theoretical Computer Science/614G01039 Development Methodologies/614G01051
Subjects that continue the syllabus
Software Development Projects/614G01226
Other comments

(*)The teaching guide is the document in which the URV publishes the information about all its courses. It is a public document and cannot be modified. Only in exceptional cases can it be revised by the competent agent or duly revised so that it is in line with current legislation.