UNIVERSIDADE DA CORUÑA

Teaching Guide					
Identifying Data					2019/20
Subject (*)	Software Verification and Validation			Code	614G01225
Study programme	Grao en Enxeñaría Informática				
Descriptors					
Cycle	Period	Year		Type	Credits
Graduate	2nd four-month period	Adaptation Course for Technical Engineers		Obligatory	6
Language	Spanish				
Teaching method	Face-to-face				
Prerequisites					
Department	Computación				
Coordinador			E-mail		
Lecturers			E-mail		
Web	guiadocente.udc.es/guia_docent/index.php?centre=614&ensenyament=614G01&assignatura=614G01053&any_academic=2017_18&am				
General description	This subject is inteded to master the current solutions in Software Engineering for software validation and verification. These include: - knowledge on functional and non-functional testing techniques and tools, applicable to different levels (unit, integration, system); - knowledge on techniques and tools for automatic reasoning; and - knowledge on 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 analyse problems, and design, develop, implement, validate and document software solutions on the basis of a deep and broad knowledge of modern theories, models, and techniques.	A28	B1 B3	C2 C3 C6 C7 C8

Contents	
Topic	Sub-topic

Part I: Software Testing	I.1 Test specification, design, and execution I1.1. Levels and types of tests I1.2. Properties and traceability of requirements 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 proof 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 aspects of the subject are presented.
Laboratory practice	Hands-on student assigment in the lab.
Supervised projects	Student assigments during reduced-group classes.
Objective test	Written test.

Personalized attention	
Methodologies	Description
Guest lecture / keynote speech Laboratory practice Supervised projects Objective test	Questions/answers sessions about theoretical/practical aspects, student assigments, etc. during the office hours of each teacher.

Assessment			
Methodologies	Competencies / Results	Description	**Qualification**
Laboratory practice	A28 B1 B3 C2 C3 C6	Hand in and presentation of student assigments, up to a maximum of 4 points in the final score. These are not compulsory to pass.	40
Supervised projects	A28 B1 B3 C2 C3 C6	Student assigments presented during reduced-group classes, up to a maximum of 2 points in the final score. These are not compulsory to pass.	20
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

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.