SYLLABUS

1. Information regarding the programme

1.1 Higher education institution	**Babes-Bolyai University**
1.2 Faculty	**Faculty of Mathematics and Computer Science**
1.3 Department	**Department of Computer Science**
1.4 Field of study	**Computer Science**
1.5 Study cycle	**Master**
1.6 Study programme / Qualification	**Distributed Systems in Internet**

2. Information regarding the discipline

2.1 Name of the discipline	**Advanced topics in software testing**						
2.2 Course coordinator	**PhD Associate Professor Vescan Andreea**						
2.3 Seminar coordinator	**PhD Associate Professor Vescan Andreea**						
2.4. Year of study	**2**	2.5 Semester	**3**	2.6. Type of evaluation	**E**	2.7 Type of discipline	**optional**

3. Total estimated time (hours/semester of didactic activities)

3.1 Hours per week	4	Of which: 3.2 course	2	3.3 seminar/laboratory	2
3.4 Total hours in the curriculum	56	Of which: 3.5 course	28	3.6 seminar/laboratory	28

Time allotment:	hours
Learning using manual, course support, bibliography, course notes	84
Additional documentation (in libraries, on electronic platforms, field documentation)	14
Preparation for seminars/labs, homework, papers, portfolios and essays	14
Tutorship	3
Evaluations	4
Other activities:	-

3.7 Total individual study hours	119
3.8 Total hours per semester	175
3.9 Number of ECTS credits	7

4. Prerequisites (if necessary)

4.1. curriculum	
4.2. competencies	Java programming skills

5. Conditions (if necessary)

5.1. for the course	Video projector, Internet access
5.2. for the seminar /lab activities	Laboratory with computers, Eclipse framework

6. Specific competencies acquired

Professional competencies	C2.4 Using proper criteria and methods for evaluation of software applications
Transversal competencies	CT1 Application of organized and efficient work rules, of responsible attitudes towards the didactic and scientific domain, for the creative exploitation of their own potential according to the principles and rules of professional ethics CT2 Efficient conduct of activities organized in an interdisciplinary group and development of empathic capacity of interpersonal communication, networking and collaboration with diverse groups CT3 Use of effective methods and techniques of learning, information, research and development of the capacity to exploit knowledge, to adapt to the requirements of a dynamic society and communication in Romanian language and in a foreign language

7. Objectives of the discipline (outcome of the acquired competencies)

7.1 General objective of the discipline	• Definitions of common concepts and terms in the field • Gain familiarity with a variety of test techniques and compare them • To learn the methods of program verification and validation. • Team work abilities, assuming different execution and leading roles, performing professional tasks with considerable amounts of autonomy and responsibility
7.2 Specific objective of the discipline	• Students will know how to use tools for the management of testing process. • Demonstrate advanced skills to analysis and design test cases • Understand that there are different missions for testing effort (selection of mission depends on contextual factors) • Understand the concept of oracles

8. Content

8.1 Course	Teaching methods	Remarks
Lecture 1. Introduction in Testing and Web Internals • General notions • Web Internals explained • (HTTP) Request Structure • Web System in test (Structure of web application, clients etc) • Application Sample and what we will test • Different Tools and frameworks - awareness on tools on market • Project Lifecycle - Scrum Agile methodologies • System Architecture Analysis - DB	• Interactive exposure • Explanation • Conversation • Didactical demonstration	
Lecture 2. Web GUI Automation - Selenium • Programming languages testing context- C#, Javascript, Java, Ruby • Selenium IDE - WebDriver (1-2)	• Interactive exposure • Explanation • Conversation • Didactical	

• CSS selectors • XPath • Page Object patterns	demonstration	
Lecture 3 – 4. Web GUI Automation - Selenium • Maven Config • Data Driven tests • GUI Automation FWKs - Serenity, Cucumber, Specflow • BDD pros and cons • DB NoSql + Big Decimal • Use of Oracles	• Interactive exposure • Explanation • Conversation • Didactical demonstration	
Lecture 5. JS Unit Tests • Data generation • Coverage - examples • Javascript + unit tests • Leverage between GUI - UNIT - API tests (maybe moved in a web context course)	• Interactive exposure • Explanation • Conversation • Didactical demonstration	
Lecture 6. API Testing - REST, SOAP • What you want to test • Execution types • SOAP and REST • Pros and cons in API testing	• Interactive exposure • Explanation • Conversation • Didactical demonstration	
Lecture 7. API Testing - REST, SOAP • SOAP + JMeter (JAVA + jMeter || jMeter + jar) • Use of APIs for Test Data setup • Test using IMAP, POP3, SMTP, FTP, HTTP Client • Proxy Tools - fiddler etc • Libraries	• Interactive exposure • Explanation • Conversation • Didactical demonstration	
Lecture 8. Performance Testing • Request Analysis - yslow, page speed • Load testing • User experience - practices • Browser tools	• Interactive exposure • Explanation • Conversation • Didactical demonstration	
Lecture 9. Performance Testing • Report analysis • Stress, Volume, Spyke	• Interactive exposure • Explanation • Conversation • Didactical demonstration	
Lecture 10- 11 Security Testing	• Interactive exposure • Explanation • Conversation • Didactical demonstration	
Lecture 12-13 Mobile Testing • Issues • Native + Web + Embedded (hybrid) • API clients	• Interactive exposure • Explanation • Conversation • Didactical	

• Responsiveness • Segmentation • Analytics	demonstration	
Lecture 14. Continuous Integration • Jenkins, TeamCity, Bamboo • Master - Slave Setup • Parallel test execution • Selenium Grid • Continuous Delivery	• Interactive exposure • Explanation • Conversation • Didactical demonstration	

Bibliography

Books

[Eri15] Bayo Erinle, Performance testing with JMeter, 2015
[Eri14] Bayo Erinle, JMeter CookBook, Packt Publishing, 2014
[Ava14] S. Avasarala, SeleniumWebDriver Practical Guide, 2014
[Kov14] Dima Kovalenko, Selenium Design Patterns ad Best Practices, Packt Publishing , 2014
[Bur12] David Burns, Selenium 2 Testing Tools: Beginner's guide, 2012
[Unm12] G. Unmesh, Selenium Testing CookBook, 2012
[Gra12] D. Graham, M. Fewster, Experiences of test automation: Case studies of Software Test Automation, 2012

[Pres10] R. S. Pressman, Software engineering: a practinioner's approach, seventh edition, Higher Education, 2010
[Kan99] C. Kaner, J. Falk, H. Nguyen, Testing Computer Software, 1999

[Crs09] L. Crispin, J. Grecory, Agile testing: a practical guide for testers and agile teams, Addison-Wesley, 2009
[You08] M. Pezzand, M. Young, Software Testing and Analysis: Process, Principles and Techniques, John Wiley & Sons, 2008
[Nai08] K. Naik, P. Tripathy, Software testing and quality assurance. Theory and Practice, A John Wiley & Sons, Inc., 2008
[Pat05] R. Patton, Software Testing, Sams Publishing, 2005
[Mye04] Glenford J. Myers, The Art of Software Testing, John Wiley & Sons, Inc., 2004
[Brn02] I. Brnstein, Practical software testing, Springer, 2002

Articles

[1] Meszaros, G., Smith, S., Andrea, J, The test automation manifesto, LNCS vol 2753, pp. 73-81, 2003

Internet resources

- Serenity, http://thucydides.info/docs/serenity-staging/
- Selenium, http://www.seleniumhq.org/
- CSS Selector, http://www.w3schools.com/cssref/css_selectors.asp
- Selenium tutorial, http://software-testing-tutorials-automation.blogspot.ro/2014/01/selenium-webdriver-tutorials-basic.html

Tutorials

During lectures/seminars/laboratories tutorials will be given for each assignment.

8.2 Seminar / laboratory	Teaching methods	Remarks
Seminar 1: Selenium IDE, CSS Selectors, Webdriver project	Presentation, Conversation,	

setup (Page Object)	Problematizations, Discovery, Other methods – individual study, exercises	
Seminar 2 Webdriver project DDT BDT Page Object Reporting (FWKs) DB NoSql + BigDecimal – Optional (Bonus)	Presentation, Conversation, Problematizations, Discovery, Other methods – individual study, exercises	
Seminar 3 API testing in Java/JMeter	Presentation, Conversation, Problematizations, Discovery, Other methods – individual study, exercises	
Seminar 4 Performance test using JMeter	Presentation, Conversation, Problematizations, Discovery, Other methods – individual study, exercises	
Seminar 5 Security testing	Presentation, Conversation, Problematizations, Discovery, Other methods – individual study, exercises	
Seminar 6 Mobile testing Appium	Presentation, Conversation, Problematizations, Discovery, Other methods – individual study, exercises	
Seminar 7 Jenkins	Presentation, Conversation, Problematizations, Discovery, Other methods – individual study, exercises	
Bibliography See from Course bibliography		

9. Corroborating the content of the discipline with the expectations of the epistemic community, professional associations and representative employers within the field of the program

- The course exists in the studying program of all major universities in Romania and abroad;
- The content of the course is considered the software companies as important for average programming skills.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Share in the grade (%)
10.4 Course	- know the basic principle of the domain;	Written examination	25%
	- apply the course concepts problem solving	Practical examination	25%
10.5 Seminar/lab activities	-be able to implement course concepts - apply techniques for different classes of problems	Project -documentation -design -continous observations	50%
10.6 Minimum performance standards			

Remark .

- Seminar/Laboratory assignments work may not be redone in the retake session.
- Written and practical exams can be taken during the retake session.
- Students from Previous Years to 2018-2019
    - All the above rules apply to students from previous years.
    - Seminar/Laboratory assignments must be redone during didactic activity time (in the 12 weeks before normal session).
- At least grade 5 (from a scale of 1 to 10) at written exam. The final grade computed with the given formula must be at least 5 in order to pass the exam. At least grade 5 (from a scale of 1 to 10) at written and practical exams and laboratory/seminar activity.

Date	Signature of course coordinator	Signature of seminar coordinator
18 April 2018	Ass. Prof. PhD. Andreea Vescan,	Ass. Prof. PhD. Andreea Vescan

Date of approval	Signature of the head of department
.....	Prof. PhD. Anca Andreica