

# Course Program ETSN20 Software Testing

2018 HT2, Per Runeson, last updated 2018-10-30 <http://cs.lth.se/etsn20>

**Aim.** The objective of the course is to give basic and advanced knowledge & skills within testing for large-scale development of systems completely or partly based on software. The course gives practical skills in methods and techniques for software testing.

## Course elements

- Seven *lectures* give a theoretical overview and help for private studies.
- One *guest lecture* gives a connection to industry practice
- Four *lab sessions* give practical training in applying different test techniques and relate theory to practice through discussions of problems and solutions.
- One *project* gives practical skills and training in different areas of software testing by literature search, analysis and presentation.
- *Written exam* assesses the individual skills.

## Assessment

- The project is graded fail / G (pass) / VG (pass with distinction), based on project deliverables. Revised projects are graded pass.
- Approved lab sessions and project presentation are mandatory for passing the course.
- The final grade is fail / 3 / 4 / 5, which is based on the written exam and the project grade, where VG gives 5 extra points, for those who passed the 30 pass limit on the exam.

## Literature

### Books

K Naik and P Tripathy, *Software Testing and Quality Assurance: Theory and Practice*, Wiley, ISBN: 978-0-471-78911-6, 2008 (available via [www.lub.lu.se](http://www.lub.lu.se))

N Matloff and P J Salzman, *The Art of Debugging with GDB, DDD, and Eclipse*. No Starch Press, ISBN: 978-1-59327-174-9, 2008, <http://it-ebooks.directory/book-1593271743.html>

### Chapter

E Kit, *Software Testing In The Real World: Improving The Process*, Addison-Wesley, 1995. Ch 13

### Articles

M. V. Mäntylä, B. Adams, F. Khomh, E. Engström, and K. Petersen. On rapid releases and software testing: a case study and a semi-systematic literature review. *Empirical SW Eng.*, 20(5):1384–1425, 2015.

M Beller, A Bacchelli, A Zaidman, and E Juergens, Modern Code Reviews in Open-source Projects: Which Problems Do They Fix?, *Proceedings of the 11th Working Conference on Mining Software Repositories (MSR 2014)*, pp. 202–211, 2014. doi 10.1145/2597073.2597082

L Chen, Continuous Delivery: Huge Benefits, but Challenges Too, *IEEE Software*, 32( 2): 50-54, 2015. doi: 10.1109/MS.2015.27

V Garousi, M V Mäntylä, A systematic literature review of literature reviews in software testing, *Information and Software Technology*, 80: 195-216, 2016, doi 10.1016/j.infsof.2016.09.002

J D Hagar, T L. Wissink, D R Kuhn, R Kacker, Introducing Combinatorial Testing in a Large Organization. *IEEE Computer* 48(4): 64-72, 2015, doi 10.1109/MC.2015.114

L. Jonsson, M. Borg, D. Broman, K. Sandahl, S. Eldh, and P. Runeson. Automated bug assignment: Ensemble-based machine learning in large scale industrial contexts. *Empirical Software Engineering*, 21(4):1579–1585, 2016, doi 10.1007/s10664-015-9401-9

E I Laukkanen and M V Mantyla, Survey Reproduction of Defect Reporting in Industrial Software Development, *International Symposium on Empirical Software Engineering and Measurement*, 2011, pp. 197-206, 2011 doi 10.1109/ESEM.2011.28

H Petersson, T Thelin, P Runeson, C Wohlin, Capture–recapture in software inspections after 10 years research–theory, evaluation and application, *Journal of Systems and Software*, 72(2):249-264, 2004, doi 10.1016/S0164-1212(03)00090-6.

A. Zeller, T. Zimmermann, and C. Bird. Failure is a four-letter word: A parody in empirical research. In Proceedings of the 7th International Conference on Predictive Models in Software Engineering, Promise '11, pages 5:1–5:7, New York, NY, USA, 2011. ACM.  
 J A Whittaker, The 10-Minute Test Plan, IEEE Software, 29(6): 70-77, 2012. doi 10.1109/MS.2012.25

Articles for the project to be found in the LubSearch database ([www.lub.lu.se](http://www.lub.lu.se)).

### Content

Week	Lecture	Lecture area	Literature	Project	Lab	Lab area
1	L1	Introduction, Unit test	Naik 1, 3, Garousi	Form groups + decide subject by Fri		
	L2	White-box test techniques	Naik 4, 5			
2	L3	Black-box test techniques	Naik 6, 9.2-9.6, Hagar		Lab1	White-box testing
3	L4	Debugging, Reviews, Reliability	Matloff 1 Naik 10.1-10.4, 15, Beller, Petersson	Tue: Deliver outline	Lab2	Black-box testing Report lab 1+2
4	L5	Lifecycle, Documentation	Naik 7.1-7.4, 12.1-12.9, Chen, Laukkanen, Whittaker	Meeting w supervisor	Lab3	Debugging No lab report
5	L6	Organization, Tools, Automation	Naik 12.10-12.16, 16.1-16.4 Kit 13, Jonsson		Lab4	Inspection and estimation Lab report
6	L7	Quality, metrics	Naik 13, 17	Fri: Final report		
7	Guest	Testing in practice		Presentation		

### Schedule

	Week	Mo	We	Th	Fr
Nov 5-9	1	L1 10-12 M:E (PR)		L2 8-10 E:1406 (PR)	
Nov 12-16	2	L3 10-12 E:C (PR)		Lab 1 10-12, 13-15, 15-17 E:Saturnus , Elgkalv, Neptunus (AD)	
Nov 19-23	3	L4 10-12 M:E (PR)		Lab 2 10-12, 13-15, 15-17 E:Saturnus , Elgkalv, Neptunus (SR)	
Nov 26-30	4	L5 10-12 M:E (PR)		Lab 3 10-12, 13-15, 15-17 E: E:Saturnus , Elgkalv, Neptunus (SR)	
Dec 3-7	5	L6 10-12 E:C (PR)		Lab 4 10-12, 13-15, 15-17 E:Saturnus , Elgkalv, Neptunus (SR)	
Dec 10-14	6	L7 10-12 E:C (PR)			
Dec 17-21	7	Guest lecture 10-12 E:C			8-12 Project presentations (HM, SR, PR) E:1147; 1149
Jan 14-18	Exam		Exam 8-13: MA 10C-D		

### Personnel

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