THE UNIVERSITY OF BUCKINGHAM

Sarajevo School of Science and Technology

MODULE SPECIFICATION

Name of Module		**Software Engineering**					
Parent School/Dept		**Computer Science**					

Programme(s) where module is offered		BSc Computer Science with Electrical Engineering;
		BSc Computer Science with Economics;
		BSc Computer Science with Business;
		BSc Computer Science with International Relations;
		BSc Computer Science with Political Science;					

Status (core, option, free choice)		Core		**Pre-Requisite Modules or Qualifications**		CS240 Database Systems	
FHEQ Level	5	**Unit Value**	6 ECTS	**Module Code**	**CS380**	**Module coordinator**	Edin Fazlic
Term taught		Spring		**Applicable From**		2019	

Educational Aims of the Module

The main outline of the module is to address various software engineering problems, and some common solutions on the level of design, architecture, and implementation. This module starts with a general overview of software engineering principles and concepts and puts them in a correspondence with the more comprehensive discipline of systems engineering. Project management aspects of software and systems development are addressed as well. It also focuses on practical projects, where students need to build various software systems. The module then focuses on advanced programming and engineering principles. Various project management issues are covered. New trends in software engineering are discussed as well. The lab hours will be used for researching topics studied in class, advanced programming, conducting projects and assistance.

Within this module we cover ethics and professional responsibility. Software engineering is carried out within a social and legal framework that limits the freedom of people working in that area. As a software engineer, one must accept that his/her job involves wider responsibilities than simply the application of technical skills. They must also behave in an ethical and morally responsible way if they are to be respected as a professional engineer.

Module Outline/Syllabus

1. Introduction to Software Engineering
2. From Beginning to End: An Overview of Systems Analysis and Design
3. Essentials of Analysis and Analysis Discipline
4. Essentials of Design and the Design Discipline
5. Project Planning and Project Management
6. Project structure
7. SCM with Git
8. Advanced OOP
9. Software architecture
10. MVC
11. Patterns
12. Frameworks
13. SOLID programming principles
14. Engineering requirements
15. Agile methods & practical project management
16. Technical documentation
17. Testing
18. Performance and optimiziation
19. Software deployment

20. Web services (SOA)
21. Ethics in software development
22. Implementing a simple, but fully functional application / system
23. Software evolution

Student Engagement Hours			
Type	**Number per Term**	**Duration**	**Total Time**
Lectures	15	2 hours	30 hours
Tutorials	15	2 hours	30 hours
Laboratory sessions	15	2 hours	30 hours
Total Guided/Independent Learning Hours			**60**
Total Contact Hours			**90**
Total Engagement Hours			**150**

Assessment Method Summary				
Type	**Number Required**	**Duration / Length**	**Weighting**	**Timing/Submission Deadline**
Final exam	1	180 minutes	50%	End of semester
Mid-term exam	1	90 minutes	10%	Week 8
Project (Group)	1	2000 words	20%	Week 15
Test	2	90 minutes	10*2=20%	Weeks 5 and 14

Module Outcomes		
Intended Learning Outcomes: 1. Understand core concepts and principles of software engineering 2. Understand and implement state-of-the-art approaches and techniques in software engineering 3. Develop a working application / system	→	**Teaching and Learning Strategy:** 1. Lectures introduce theoretical and conceptual materials from the recommended textbooks (ILO: 1, 2) 2. Tutorials explore the application of theory and concepts (ILO: 3) 3. Laboratory sessions provide exercises to apply the theory and use software tools (ILO: 2, 3) 4. The project enables students to develop team-work skills and apply what they have learnt during the module to a practical problem (ILO: 1-3)
	→	**Assessment Strategy** 1. Test (ILO: 1, 2) 2. Mid-term exam (ILO: 1, 2) 3. Final exam (ILO: 1, 2, 3) 4. Project (ILO: 3)
Practical Skills 1. Conduct software engineering techniques in project meetings and documentation 2. Use Lavarel to develop an application / system	→	**Teaching and Learning Strategy:** 1. Laboratory sessions (PS: 1, 2) 2. Project (PS: 1, 2) 3. Tutorials (PS: 2) 4. Lectures (PS: 1)
	→	**Assessment Strategy** 1. Test (PS: 1) 2. Mid-term exam (PS: 1) 3. Final exam (PS: 1) 4. Project (PS: 1, 2)
Transferable Skills 1. Oral and written presentation: ability to express ideas clearly and precisely 2. Critical thinking 3. Team working skills 4. Data analysis	→	**Teaching and Learning Strategy:** 1. Group project to read, evaluate and present knowledge (TS: 1, 3) 2. Tutorials and laboratory sessions, and application on real life data (TS: 1, 2, 3, 4)
	→	**Assessment Strategy** 1. Project (TS: 1, 2, 3, 4) 2. Mid-term exam (TS: 1, 2, 4) 3. Final exam (TS: 1, 2, 4) 4. Test (TS: 1, 2, 4)

Key Texts and/or other learning materials

Set Text

- Sommerville, Ian, 2015, Software Engineering, 10th edition, Pearson,

Supplementary Materials

- Guckenheimer, Loje, 2012, Agile Software Engineering with Visual Studio: From Concept to Continuous Feedback.
- Fowler, Martin,, 2003,UML Distilled: A Brief Guide to the Standard Object Modelling Language (3rd Edition) Addison-Wesley Professional
- Martin, Robert, 2013, Agile Software Development: Principles, Patterns and Practices, Pearson
- Singa, S., Vats, S., Vyas, A., 2015, Practical Approach to Software Engineering: With UML Diagram,Lambert Academic Publishing
- Tatroe, K., MacIntyre, P., Lerdorf, R., Programming PHP, 3rd Edition, O'Reilly Media

Please note: This specification provides a concise summary of the main features of the module and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. More detailed information on the learning outcomes, content and teaching, learning and assessment methods of each module and programme can be found in the departmental or programme handbook. The accuracy of the information contained in this document is reviewed annually by the University of Buckingham and may be checked by the Quality Assurance Agency.

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