1.	Course title	Advanced programming
2.	Course code	
3.	Study program	Computer Science and Engineering, Professional Informatics Studies
4.	Unit offering the course	**FCSE**
5.	Undergraduate/postgraduate/PhD	**Undergraduate**
6.	Year/semester	7. ECTS: **6**
8.	Teacher(s)	Assoc. Prof. Dejan Gjorgjevikj, Assist. Prof. Ivan Chorbev, Assist. Prof. Boro Jakimovski, Assist. Prof. Ivica Dimitrovski, Assist. Prof. Gjorgji Madjarov
9.	Course prerequisites	Structure programming, Object oriented programming
10.	Goals (competences): The student will attain knowledge of generic programming, abstract data types, creation of template classes and functions. After completing the course, the students will be capable for using generic data collections, maps, iterators and basic design patterns for rapid object oriented software development.	
11.	Course content: Generic programming, abstract data types, generic functions, generic classes, data collections with direct and linear access, maps, refactoring, basic concepts of software design patterns, multithreading and concurrency concepts, integrated development environments.	
12.	Teaching methods: Lectures supported by slide presentations, interactive lectures, trainings (using lab equipment and software packages), team work, case studies, invited guests and lectures, individual practical assignments presentations, seminar paper, e-learning (forums, consultations).	
13.	Total available time	6 ECTS x 30 h = 180 h
14.	Distribution of the available time	30 + 60 + 50 + 40 = 180 h

15.	Teaching activities	15.1.	Lectures	30 hours
		15.2.	Training (labs, problem solving), seminar and team work	60 hours
16.	Other activities	16.1.	Self study	40 hours
		16.2.	Home work	50 hours
17.	Grading			
	17.1.	Tests		70 points

	17.2.	Seminar work/project (written or oral presentation)		20 points
	17.3.	Active participation		10 points

18.	Grading criteria	to 50 points	5 (five) (F)
		from 51 to 60 points	6 (six) (E)
		from 61 to 70 points	7 (seven) (D)
		from 71 to 80 points	8 (eight) (C)
		from 81 to 90 points	9 (nine) (B)
		from 91 to 100 points	10 (ten) (A)
19.	Final exam prerequisites	Successful completion of activities 15 and 16	
20.	Course language	Macedonian and English	
21.	Quality assurance methods	Internal evaluation mechanisms supported by student polls	

		Literature				
22.	22.1.	Compulsory				
		No.	Authors	Title	Publisher	Year
		1.	Savitch, Walter J,	Absolute Java	Addison Wesley, Sydney	2008
		2.	Maurice Naftalin and Philip Wadler	Java Generics and Collections	O'Reilly Media	2007
		3.	Erich Gamma , Richard Helm, Ralph Johnson, John Vlissides	Design Patterns: Elements of Reusable Object-Oriented Software	Addison-Wesley Professional	1994
	22.2.	Mandatory				
		No.	Authors	Title	Publisher	Year
		1.	Eric Freeman and Elisabeth Freeman	Head First Design Patterns	O'Reilly Media	2004
		2.	Andrei Alexandrescu	Modern C++ Design: Generic Programming and Design Patterns Applied	Addison-Wesley Professional; 1 edition	2001
		3.	Nicolai M. Josuttis	The C++ Standard Library: A Tutorial and Reference	Addison Wesley	1999