Course Title	Research Methods in Computer Science					
Course Code	CSC700					
Course Type	Compulsory					
Level	Doctorate (3 <sup>rd</sup> Cycle)					
Year / Semester	1 <sup>st</sup> year, 1 <sup>st</sup> semester					
Teacher's Name	ТВА					
ECTS	10	Lectures / week	3 hours/ 14 weeks	Laboratories / week	N/A	
Course Purpose and Objectives	The aim of the course is to examine in depth the main research methodologies used in Computer Science, Engineering and Sciences, giving opportunities to students to review and study the theoretical and epistemological principles on which the various research approaches are based. At the same time, it aims to engage the participants in a critical reflection on the interpretation and evaluation of published research in the field of Computer Science and Engineering and to develop their skills to design, implement and present empirical research.					
Learning Outcomes	<ul> <li>Upon successful completion of this course students should be able to:</li> <li>Recognize different research methods used in Computer Science. Distinguish between different types of academic writing strategies; write an effective and feasible research proposal; use electronic systems for bibliographic citation.</li> <li>Demonstrate improved written and verbal skills to communicate research results.</li> <li>Use selected computer science databases to study literature of a research topic</li> <li>Locate, document, and critically, conduct a comparative critical analysis and evaluate literature related to a research topic</li> <li>Develop time-management and project management skills.</li> <li>Avoid plagiarism of secondary sources by using a variety of writing strategies.</li> <li>Devise tools and infrastructure for conducting quantitative and qualitative research in computer science</li> <li>Discuss the Legal, Social, Ethical and Professional issues applicable to the computer inductor.</li> </ul>					

Prerequisites	None	Co-requisites	None				
Course Content	Introduction to Scienti Significance of Research	ific Research, Me	eaning, Objectives and				
	Types of research approaches, Quantitative (Descriptive Statistics) and Qualitative research methods for data analysis; use of appropriate software.						
	Descriptive Statistics:						
	Frequency Distributions; Proportions and Percentages; Nomina Ordinal and Interval Data;						
	Cumulative Distributions; Cross-Tabulations; Mode, Median, and Mean; Range, Variance and Standard Deviation; Graphical Representations						
	Probability and the Normal Curve:						
	<ul> <li>Probability and the Normal Curve.</li> <li>Probability; Probability Distributions; Characteristics of the Normal Curve; Random Sampling; Sampling Error; Sampling Distribution of Means; Standard Error; Confidence Intervals; The t Distribution; Proportions; Generalizing From Samples to Populations</li> <li>Decision Making</li> <li>The Null Hypothesis; The Research Hypothesis; Levels of Significance; Standard Error; Two Sample Tests of Proportions; Analysis of Variance; The Sum of Squares; The F Ratio;</li> </ul>						
	Nonparametric Tests; The Chi-Square Test; The Median Test						
	Association Methods						
	Correlation; Strength and Direction of Correlation; Curvilinear Correlation; Correlation Coefficient; Pearson's Correlation Coefficient; The Regression Model; Regression and Pearson's Correlation; Spearman's Rank-Order Correlation Coefficient; Goodman's and Kruskal's Gamma; stration: Goodman's and Kruskal's Gamma.						
	Survey Research, Survey Study Designs, Case Studies						
	Reearch problems, necessity of defining the problem; Recognizing innovative ideas and creating innovative ideas						
	Research methods versus methodology, Research process, Criteria of good research						
	Formulating the Research Problem; Research Proposals						

	Literature Search, Repositories					
	Evaluating Sources					
	Critical Analysis of Technical Literature					
	Comparisons of Approaches/Methods					
	Developing Research Questions					
	Conducting Research					
	Evaluating Research Results					
	Making and Supporting Claims					
	Project planning, tools and techniques for planning					
	Project conduct, time management, risk management, team working					
	Presentation skills, written and oral					
	Communicating Evidence Visually					
	Writing Technical Paper					
	Research Presentations					
	Ethics in research					
	The Art of Scientific and Technical Writing.					
	Program-specific content					
	As this course is taught in a variety of graduate programs offered by the department of Computer Science, the last part of the course will discuss specific research methods for each discipline. The specific topics will be provided by the instructor of the course according to the specific needs of the audience.					
Teaching Methodology	Face-to-face					
Bibliography	C.R.Kothari, Research Methodology Methods & Techniques, Wishwa Prakashan Publishers.					
	Larry B. Christensen, R. Burke Johnson, Lisa A. Turner, Research Methods, Design, and Analysis, 11/E, Pearson.					
	Paul D. Leedy & Jeanne Ellis Ormrod, Practical Research: Planning and Design, 10/E, Pearson					
	Argyrous, G. Statistics for Research: with a guide to SPSS. Los Angeles, CA: Sage.					
	King, R. S. Research Methods for Information Systems, Dallas, TX: Mercury Learning & Information					

	John W. Creswell, Research Design. Qualitative, Quantitative, and Mixed Methods Approaches. SAGE Publication				
	Christian W. Dawson: Projects in Computing and Information Systems (A Student''s Guide). Addison Wesley, 2005. Zobel Justin, Writing for Computer Science, Springer-Verlag (eBook)				
Assessment	Examinations Class Participation and Attendance Project	40% 10% 50% 100%			
Language	English				