Title: Design and Modeling of Software Systems
Lecturer: Ass. prof. N.R. Bukharaev, CSc. in Math.
Term: autumn
Lectures + seminars : 18+18 academic hours
ECTS credits:
FEL www:

Annotation:

The course provides theoretical and practical introduction to fundamentals of designing systems and software applications by using models and Unified Modeling Language (UML). Major attention is paid to understanding problems and solutions of the field by practical involvement of students to team software development.

Syllabus:

Introduction. Software development crisis. Brief review of problems and potential solutions. Problem of scalability and method of modeling, in general. "Programming-in-the large versus programming-in-the-small"; basic notions of team project development. Lifecycle, roles, views and vision. Incremental approach as realistic philosophy of cooperation. Brief review of technologies. Brainstorming on projects.

Structure of UML. Models and diagrams. Notion of use case compared to “black box” and algorithmic functioning. Describing communication in terms of methods calls. Describing collaboration as structure of communication. Finite automata and state chart diagrams. Describing parallelism - activity diagrams compared to flowcharts. Describing objects - class diagrams and relations between classes. Describing interfaces - component and deployment Diagrams Presentation of projects.

References:

1. Grady Booch, James Rumbaugh, Ivar Jacobson. The Unified Modeling Language user guide. Addison Wesley Longman Publishing Co., Inc. Redwood City, CA, USA ©1999 ISBN:0-201-57168-4
2. Martin Fowler. UML Distilled: A Brief Guide to the Standard Object Modeling Language (3rd Edition) Addison-Wesley Professional, 2003. ISBN-10: 0321193687, ISBN-13: 978-0321193681.
3. Craig Larman. Applying UML and Patterns: An Introduction to Object-Oriented Analysis and Design and Iterative Development (3rd Edition) Prentice Hall, 2004. ISBN-13: 978-0131489066
4. Designing systems and software applications by using models. http://pic.dhe.ibm.com/infocenter/rsahelp/v8/index.jsp?topic=%2Fcom.ibm.rsa_base.nav.doc%2Ftopics%2Ftrootdesignwithmodels.html
5. Naille Bukharaev. Introduction to object-oriented analysis and design (in Russian). Kazan University Computer Science Department, 2004.