RTU Course "Special Data Processing Technologies"

12308 Programmatūras inženierijas katedra

General data

Code	DIP501
Course title	Special Data Processing Technologies
Course status in the programme	Compulsory/Courses of Limited Choice
Course level	Post-graduate Studies
Course type	Academic
Field of study	Computer Science
Responsible instructor	Novickis Leonīds
Academic staff	Rikure Tatjana Šitikovs Vjačeslavs
Volume of the course: parts and credits points	1 part, 4.0 Credit Points, 6.0 ECTS credits
Language of instruction	LV, RU
Possibility of distance learning	Not planned
Maximum auditorium capacity	80
Maximum number of students per semester	150
Abstract	Theoretical aspects and practical aspects of data processing systems (DPS) development are described. The main attention is paid to distributed DPS design and development.
Goals and objectives of the course in terms of competences and skills	The main goal of the course is to strengthen competence in the field of application of DPT based on the set of mathematical models. To formalise application domain, to form and analyse user information requirements. To advance skills in the development of DPS demonstrators based on mathematical models and in the application of special case tools for mathematical models processing
Structure and tasks of independent studies	To execute practical task in accordance with implementation plan. The main goal is to investigate application of mathematical models to formalise different stages of DPS development. The task consists of : formation and analysis of user information requirements, structural graph model formation, separating keys and attributes,designing the canonical structure.
Recommended literature	1. Managing and Controlling Growing Harbour Terminals. Application of Modern Concepts in the Automated Information Management in Harbours by Using Advanced IT-Solutions/ Edited by Eberhard Bluemel, Society for Computer Simulation International, Ghent, 2000, 308 p. 2. Bluemel E., L.Novickis, E.Ginters, E.Viktorova. Data Processing Systems Design, RTU, 2000, 59 p. 3. Mamikonov A., A. Ashimov, V. Kulba. Optimisation of Data Structures in Automated Control Systems, Moscow, Science, 1997, 255 p. 4. IBM Corporation. Business System Planning. Information System Planning Guide. White Plains, N.Y., 1990. - 130 p.
Course prerequisites	graph and set theory, programming languages, data structures

Course outline

Theme	Hours
1. Extended LIS data processing technology (BSP method and database modelling methodology)	4
2. Data Processing Technology (DPT) basic stages	2
3. User requirements analysis procedure: definition of structural elements	2
4. Adjacency matrices and graphs	2
5.Reachability matrix definition	3
6. Definition of precedence and reachability sets	3
7.Definition of information elements and groups	2
8. Classifying the set of groups into the hierarchy levels	2
9. Determinition of the information elements included in each information group	2
10. Removing the duplicate elements and redundant relationships	3
11. Structural adjacency matrix and corresponding oriented graph	3
12. Separating the keys and the attributes within the data groups	8
13. Designing the canonical structure	8
14.DPT basic stages demonstration samples	8
15. Transformation of data processing cycles into linear structures	4
16. Data processing systems development based on typical process sets	3
17. DPT application samples based on international projects results	3
18. Summary	2

Learning outcomes and assessment

Learning outcomes	Assessment methods
Be able to formalise application domain and to develop user information requirements, to discuss advantages of the application of different mathematical models and to define basic stages of data processing system development	Successfully passed examination (written form)
Be able to apply independently graph models for data structures formalisation	Executed laboratory works
Be able to develop demonstration samples of mathematicaal models applications	Executed laboratory work
To execute practical work in accordance with general implementation plan (step by step)	Successfully executed practical assignment

Study subject structure

Part	CP	ECTS	Hours per Week			Tests		
			Lectures	Practical	Lab.	Test	Exam	Work
1.	4.0	6.0	2.0	0.0	2.0		*	