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PETRI NET-BASED MODELLING FOR THE DESIGN OF COORDINATED UNIVERSITY CURRICULUM

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Abstract

The work discusses the current challenges of university curriculum shaping for pre-service specialists' training and issues of synchronization of courses learning. Elaborating the approach to the building the synchronized curriculum for pre-service specialists' training, we applied the theoretical fundamentals of curriculum design and disciplines structuring, artificial intelligence models of knowledge representation (frames and semantic networks) as well as the theoretical basics of Petri nets which have proper properties and facilities for different processes synchronization. On purpose of solving of the said problems, it is proposed the approach to university curriculum simulation based on Petri nets apparatus. The procedure of the learning elements grouping in frames is elaborated. In particular, the precedence relations of various kinds for the learning elements are determined. Based on these relations, there was built Petri net model of the process of learning elements' mastering. Applying the operations of Petri nets modifications and learning elements' precedence relations of different kinds, it was created a model of curriculum subject mastering as a whole. Obtained Petri nets models allow to simulate the process of the curriculum disciplines learning by trainees. Synchronization of the learning elements mastering is determined by the rules of Petri net modifications and running. In addition, there were elaborated and presented core stages of design of the Petri nets-based software component that allows to simulate the holistic and coordinated curriculum building. Resting on the theoretical framework, made by the holistic educational paradigm and authors' approach to the modelling of holistic and

coordinated curriculum for the specialists' training based on Petri nets apparatus, the software module for the automatization of the said coordinated curriculum modelling and the features of its design are characterized. The software module's structure components are distinguished and the set of requirements in terms of their design are formulated according to the logic of the components work. The groups of the software classes are specified and described. The benefits and practical applications of the depicted approach to the shaping of synchronized curriculum for potential specialists' training are covered and analysed.

Keywords:

Petri Nets, Coordinated Curriculum Simulation, Pre-Service Specialists' Training, University Courses Modeling, Software Component for Modeling