**Process Mining and Big Data Driving Process Management**

The course focuses on managing processes on the basis of analysis of information, which can be obtained as a result of the monitoring of process operations. On the basis of this analysis it is possible to improve the process in deferred mode, to predict further process flow and adjust it in real-time.

This course combines the disciplines of business process modelling, process mining and service-oriented computing to achieve automation with the help of technologies.

Process Mining uses data, that comes in the form of stamps at many points of the process flow timeline. The log-file analysis allows not only to identify any deviations from an planned process, but also to understand the reason for the deviation.

The capabilities of modern equipment and Big Data technologies enable to collect a lot of data about the process and extend the capabilities of process mining. This can be used to optimize processes, enables to use predictive analytics in process control.

The course presents a fundamentals of optimizing the control of technical processes, focusing on collecting and using data for efficient control. The course content includes the discussion of the similarities and differences in the use of information for automation of business processes and production processes. He also examines issues of information integration of resource management systems and production systems.

Students will gain the knowledge and skills to apply state-of-the-art process thinking and techniques to critical business processes for organizational efficiency, effectiveness and adaptability.

Topics include:

* Process-Centric Organization
* Business Processes and Production Processes, processes in Man-Machine Systems
* Control Theory Basics
* Process Data
* Process Modeling, Analysis & Design: Big Data approach
* Process Discovery, Conformance and Enhancement
* Deployment & Change Management
* Business Process Analysis and Improvement
* Process Mining: methods, models, tools
* Business Process Automation
* Business Performance Monitoring Systems
* Simulating business processes
* Optimizing process performance
* Monitoring process performance
* Process measurement instrumentation
* Production process dynamics, control and tuning fundamentals
* Production process analysis and minimizing variability
* Manufacturing Intelligence Architecture
* Real-time process control
* Predictive process control
1. Wil M.P. van der Aalst, Process Mining. Discovery, Conformance and Enhancement of Business Processes Springer-Verlag Berlin Heidelberg 2011
2. Process Analytics
3. Beheshti, S.-M.-R., Benatallah, B., Sakr, S., Grigori, D., Motahari-Nezhad, H.R., Barukh, M.C., Gater, A., Ryu, S.H. Concepts and Techniques for Querying and Analyzing Process Data. - Springer International Publishing -2016
4. Dan Madison. Process Mapping, Process Improvement and Process Management. - Paton Press, 2005.
5. Practical Process Control for Engineers and Technicians. - Elsevier Ltd., 2005
6. Wayne Bequette. Process Control Modeling Design and Simulation Paperback – PH, 2006
7. K. Krishnaswamy. Process Control. - New Age International, 2007
8. Michael Minelli,  Michele Chambers, Ambiga Dhiraj . Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses. Wiley, 1 edition, 2013
9. Eric Siegel, Thomas H. Davenport. Predictive Analytics: The Power to Predict Who Will Click, Buy, Lie, or Die. Wiley; 1 edition, 2013