

University: Comenius University Bratislava	
Faculty: Faculty of Management	
Course ID:	Course Title: Business Process Modeling, and Optimization
Educational Activities: 2 hours/practical exercises	
Number of credits: 3	
Recommended semester: Winter Semesters	
Study level: master	
Prerequisites:	
Course requirements: Mandatory participation in seminars with preparing and presentation of a final project, team project (maximum three students).	
Learning outcomes: By the end of this course, students will be able to: • Understand core BPM concepts, lifecycle, and notations • Model and execute workflows using Petriflow (Netgrif) • Compare and use leading BPM systems: Oracle BPM, IBM BPM, and Microsoft Power Automate • Design and analyze executable business processes • Integrate BPM with organizational and IT systems • Evaluate processes for performance, compliance, and optimization	
Class syllabus: This course introduces management students to Business Process Management (BPM) as a discipline to improve organizational effectiveness and innovation. It emphasizes understanding, modeling, analyzing, and optimizing business processes through modern BPM tools and platforms.	
<u>Course Modules</u> 1: Introduction to Business Process Management • What is BPM? Why does it matter? • BPM Lifecycle: Design, Execution, Monitoring, Optimization • Key terms: Process, Task, Actor, Event, Case • Overview of BPMN, EPC, Petri Nets Lab: Hands-on with BPMN 2.0 diagramming (Camunda Modeler, draw.io or similar)	
2: Process Modeling Fundamentals • Process identification and decomposition • Modeling elements: Gateways, Events, Pools, Lanes	

- Good modeling practices
- Intro to model-driven execution

Lab: Model an internal approval process (BPMN)

3: Petri Nets and Workflow Semantics

- Introduction to Petri Nets
- Places, Transitions, Tokens, Firing rules
- Workflow nets and soundness
- From Petri Nets to executable workflow models

Lab: Simulate simple Petri Net processes using Netgrif or WoPeD or PIPE or similar

4: Introduction to Petriflow and Netgrif Platform

- Petriflow language overview (syntax, semantics)
- Process and data modeling in Netgrif
- Dynamic process behavior and case management

Lab: Netgrif platform setup, create your first Petriflow process

5: Modeling Advanced Petriflow Processes

- Dynamic task creation
- Roles and permissions
- Case data modeling
- Event handling and conditions

Lab: Model a multi-step request-approval workflow in Petriflow

6: Business Rules and Exception Handling

- Embedding business rules in BPM systems
- Error, boundary, and escalation events
- Petriflow exception handling mechanisms

Lab: Model a process with rule-based decisions and exception paths

7: BPM Execution Architectures

- BPM engines: Architecture and components
- Workflow execution models (push/pull, polling)
- Persistence, task assignment, auditing

Lab: Explore execution logs and audit trails in Netgrif

8: Oracle BPM Suite

- Oracle BPM platform overview
- Composite applications and SOA integration
- Oracle BPM Studio and Process Composer
- Human and service tasks, business rules, BAM

Lab: Model and deploy a simple Oracle BPM process (demo or cloud instance)

9: IBM Business Automation Workflow

- IBM BPM (BAW) architecture and tools
- Case vs. structured processes

- Process Designer, Integration Designer, Process Portal

Lab: Explore and simulate a basic workflow in IBM BAW (cloud sandbox or video demo)

10: Microsoft Power Automate (Flow)

- Overview of Microsoft Power Platform
- Triggers, connectors, and actions
- Automating workflows across services (e.g., Outlook, SharePoint, Teams)

Lab: Build a leave request workflow using Power Automate

11: BPM in Practice – Real-World Use Cases

- Case studies from healthcare, banking, public sector
- BPM and digital transformation
- Best practices in deployment and governance

Lab: Group brainstorming for course projects

12: Process Analytics and Optimization

- Monitoring and KPI definition
- Process mining (brief introduction)
- Performance bottlenecks and improvements
- Netgrif process monitoring tools

Lab: Analyze and improve a live Petriflow process with metrics

13: Security, Compliance, and BPM Integration

- Authentication, authorization, auditability
- Compliance frameworks (GDPR, ISO 9001)
- BPM integration with ERP, CRM, APIs

Lab: Simulate secure access and role-based tasks in Netgrif

14–15: Final Project Presentation and Evaluation

- Students present implemented BPM solutions
- Peer and instructor feedback

Assessment Structure:

- Lab Exercises and Weekly Assignments – 20%
- Mid-Term Test (written, case-based) – 20%
- Final Project (Group, Petriflow) – 30%
- Final Exam (Written, theory + case analysis) – 30%

Key Deliverables:

- Weekly BPMN and Petriflow process models with short business justifications
- Comparative platform analysis report (Oracle, IBM, Microsoft Power Automate)
- Final project: Process design and implementation in Petriflow, with presentation

- Executive summary linking BPM to organizational improvement strategy

Teaching Methodology:

- Interactive lectures with case-based discussions
- Hands-on labs for process modeling
- Group collaboration for BPM tool comparisons
- Managerial focus on evaluation and decision-making

Recommended literature:

1. Weske, Mathias. Business Process Management: Concepts, Languages, Architectures. Third Edition. vyd. Berlin, Heidelberg: Springer Berlin Heidelberg, 2019. ISBN 978-3-662-59431-5. DOI: 10.1007/978-3-662-59432-2
2. Natalia Kryvinska, Michal Greguš: SOA and its Business Value in Requirements, Features, Practices and Methodologies, Univerzita Komenského v Bratislave, 2014, ISBN 978-80223-3764-9
3. Michal Greguš, Natalia Kryvinska: Service Orientation of Enterprises – Aspects, Dimensions, Technologies, Bratislava: Comenius University, 2015. ISBN: 978-80-223-3978-0
4. Jan vom Brocke and Michael Rosemann. 2014. Handbook on Business Process Management 1: Introduction, Methods, and Information Systems (2nd. ed.). Springer Publishing Company, Incorporated.
5. Practical Process Automation, by Bernd Ruecker , Released March 2021, Publisher(s): O'Reilly Media, Inc., ISBN: 9781492061458
<https://www.oreilly.com/library/view/practical-process-automation/9781492061441/>

Top 10 Books on Business Process Management – 2023:

<https://insights.btoes.com/top-10-books-on-business-process-management>

Recommended Tools & Resources:

- Netgrif Platform: <https://netgrif.com/>
- Oracle BPM Suite Cloud Trial
- IBM Business Automation Workflow (BAW)
- Microsoft Power Automate (Flow)
- Camunda Modeler: BPMN visual modeling tool
- WoPeD, PIPE: Optional Petri Net simulation for modeling understanding

Course Language: English

Notes:

Class Grading:

A	B	C	D	E	FX

Teachers: Oleksii Ilchenko, Natalia Kryvinska
Last change: April 2026
Approved: