University of St.Gallen

Course and Examination Fact Sheet: Spring Semester 2025

8,046: Business Process Mining and Engineering

ECTS credits: 6

Overview examination/s

(binding regulations see below)
decentral - Written work, Digital, Group work individual grade (55%)
Examination time: Term time
decentral - Written work, Digital, Individual work individual grade (45%)
Examination time: Term time

Attached courses

Timetable -- Language -- Lecturer
8,046,1.00 Business Process Mining and Engineering -- English -- Abbad-Andaloussi Amine , Völzer Hagen

Course information

Course prerequisites

This course is assigned to the profile «Technology Solution Architect » but can also be taken without selecting a specialisation.

You are expected to bring your Laptop to the course and install new software on it. Some programming experience is recommended.

Learning objectives

- Understand basic concepts of business processes, their digital traces, the value of process mining and process engineering and the associated lifecycles
- Being able to use state-of-the-art process- and data mining tools
    - to discover behavioral patterns and induce descriptive process models,
    - to obtain and interpret performance mining results,
    - to obtain and interpret conformance checking results, and
    - to conduct diagnostic analysis for processes
- Understand and being able to use state-of-the-art business process automation technologies as well as languages such as BPMN and DMN to create, run, and analyze process automations
- Understand limitations of state-of-the-art tools
- Understand benefits and limitations of using generative AI for data mining and engineering

Course content

Process Mining is a rapidly growing application area for data science: The market leader *Celonis* is Germany's most valuable startup, valued higher than *BioNTech* and substantially higher than *Zalando*.

Process mining has become popular by effectively demonstrating the benefits of data-driven improvement of business processes. Potential improvements include increased operational efficiency, better management of compliance and risk, and enhanced customer experience.

One of the primary means to implement process improvements is automation. The business automation market where startups such as *Celonis* and *Camunda* challenge incumbents such as SAP, Oracle, and IBM is projected to reach USD 21.15 billion by 2030 (10.10% CAGR).

This course offers hands-on experience with process mining and process engineering. You will explore state-of-the-art tools for process mining and automation, understand their benefits and limitations, and discover strategies to overcome some of these limitations.

Teachers:
Dr. Hagen Völzer's current research focusses on process mining, where he integrates interpretable AI into process mining. Before joining HSG, he was with the IBM Research lab Zurich, where he co-authored the widely adopted BPMN standard, contributed to new features of IBM's business automation products, to several business optimization projects, and to IBM's acquisition of a process mining startup.

Dr. Amine Abbad-Andaloussi's research primarily explores the human and cognitive aspects in software and process engineering, aiming to bridge the gap between technical systems and human factors. His teaching portfolio includes software engineering, business process modeling and -automation, and complex event processing.

Course structure and indications of the learning and teaching design

This course counts 6 credits. Accordingly, the total workload for students is 180 hours. This includes self-study, campus time and all examinations.

The course is divided into two parts. The first part (roughly weeks 1-6) is on process mining and second (weeks 7-12) on automation. The first part teaches and practices data analysis skills, a few of which will be specific for processes whereas most are re-usable in other domains. The second part teaches and practices business automation technologies including web APIs, service- and event orchestration, and event processing. We will also address the use of generative AI for data analysis and business automation.

The course is designed around a weekly 4 hours of contact study on campus. Each 4 hour session interleaves lecture segments with practical exercises.

This will empower you to conduct one case study for each of the two course parts, which are given as assignments. In an individual assignment in the first part of the course, you are asked to analyze a real-life data set of a recorded process. The second assignment is a team project to automate a business process.

Course literature

No required reading apart from the course slides.

Supplementary literature:

- van der Aalst, Wil M. P., Carmona, Josep (eds): Process Mining Handbook, Springer 2022
- Reinkemeyer, Lars (ed): Process Mining in Action, Springer 2020
- Dumas, Marlon et al: Fundamentals of business process management, Springer 2018

Further supplementary literature will be given in the course slides.

Additional course information

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Examination information

Examination sub part/s

1. Examination sub part (1/2)

Examination modalities

Examination type	Written work
Responsible for organisation	decentral
Examination form	Written work
Examination mode	Digital
Time of examination	Term time
Examination execution	Asynchronous
Examination location	Off Campus
Grading type	Group work individual grade
Weighting	55%
Duration	--

Examination languages

Question language: English
Answer language: English

Remark

Team project automation.

Examination-aid rule

Free aids provision

Basically, students are free to choose aids. Any restrictions are defined by the faculty members in charge of the examination under supplementary aids.

Supplementary aids

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2. Examination sub part (2/2)

Examination modalities

Examination type	Written work
Responsible for organisation	decentral
Examination form	Written work
Examination mode	Digital
Time of examination	Term time
Examination execution	Asynchronous
Examination location	Off Campus
Grading type	Individual work individual grade
Weighting	45%
Duration	--

Examination languages

Question language: English
Answer language: English

Remark

Data analysis project.

Examination-aid rule

Free aids provision

Basically, students are free to choose aids. Any restrictions are defined by the faculty members in charge of the examination under supplementary aids.

Supplementary aids

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Examination content

Assignment 1: Closed and open questions regarding the analysis of a given data set on the topics of the first part of the course: Process Mining: Exploratory log analysis, Process Discovery, Performance Analysis, Conformance Checking, Diagnostic Analysis.

Assignment 2: Create a business process automation using construction elements such as user tasks, web services including AI services, data transformations, decision tables, data stores and events.

Examination relevant literature

N/A.

Please note

Please note that only this fact sheet and the examination schedule published at the time of bidding are binding and takes precedence over other information, such as information on StudyNet (Canvas), on lecturers' websites and information in lectures etc.
Any references and links to third-party content within the fact sheet are only of a supplementary, informative nature and lie outside the area of responsibility of the University of St.Gallen.

Documents and materials are only relevant for central examinations if they are available by the end of the lecture period (CW21) at the latest. In the case of centrally organised mid-term examinations, the documents and materials up to CW 13 (Monday, 25 March 2025) are relevant for testing.

Binding nature of the fact sheets:

- Course information as well as examination date (organised centrally/decentrally) and form of examination: from bidding start in CW 04 (Thursday, 23 January 2025);
- Examination information (supplementary aids, examination contents, examination literature) for decentralised examinations: in CW 12 (Monday, 17 March 2025);
- Examination information (supplementary aids, examination contents, examination literature) for centrally organised mid-term examinations: in CW 14 (Monday, 31 March 2025);
- Examination information (regulations on aids, examination contents, examination literature) for centrally organised examinations: two weeks before ending with de-registration period in CW 15 (Monday, 07 April 2025).