

Università
della
Svizzera
italiana

Faculty
of
Informatics

Master of Science in Management and Informatics

2017/18



Management and Informatics.
Many companies today have an acute shortage of professionals who can interface both complex information technology (IT) problems and the needs and requirements of a modern organization. This leads to extra costs, the development of less efficient systems, and general misunderstandings between the technical and organizational parts of a company. The purpose of the degree is to offer a solution to this problem by educating professionals who can take responsibility for the interface between these two sides of an organization.

Awarded Degree

Master of Science in Informatics and Economics, Major in Management & Informatics

Application Deadline

April 30th / June 30th depending on the nationality of the applicant.

Tuition fees per semester

Residents CHF 2'000.– / international CHF 4'000.–

Duration

4 semesters (2 years) - 120 ECTS

Scholarships

Fondazione per le Facoltà di Lugano

CHF 4'000.–

10 study grants for Faculty of Informatics, covers first year of tuition, renewable according to grade.

Contacts/information

www.mmi.usi.ch

studyadvisor@usi.ch

Goals and contents

This Master offers a balanced combination of courses that cover the necessary background in management, fundamental aspects of current and evolving IT, as well as specialised topics at the interface between management and informatics, such as enterprise resource planning. Since the programme is taught entirely in English, graduates are well prepared to work in international companies. Moreover, the interdisciplinary approach of this Master provides a general skill to work across traditional areas. This full-time programme stretches over two years. It allows students to personalise their study curricula according to their interests. The first year focuses on the acquisition of foundational knowledge. Students who obtained a Bachelor's degree in informatics or a related field (mathematics, engineering, physics, etc.) enter the programme in the Informatics track and follow a set of courses that provide them with a solid background in management disciplines. In contrast, the Management track targets students with a background in economics or management, and teaches the fundamental principles of informatics. In addition, all students attend mandatory courses that cover the interface between management and informatics. The second year offers specialised courses and electives that students can choose according to their preferences. A mandatory practical field project lets student gain practical consulting experience by working for real clients in small project teams. A substantial master's thesis concludes the programme.

Language

This programme is entirely held in English. Applicants who are not native English speaker or whose first degree was not taught in English, must supply an internationally recognised certificate to demonstrate a C1 level on the Common European Framework of Reference for language learning (CEFR).

Student profile and admission requirements

Bachelor's degree granted by a recognised university in Informatics, Economics, Mathematics, Business, or Engineering. Further information for applicants graduating from a University of Applied Sciences is available online:

www.mmi.usi.ch/admission

Career opportunities

On the one hand, graduates from this Master will have sufficient knowledge in informatics to be able to interact with the IT department of an organization. A profound understanding of the technical issues involved gives graduates the ability to both evaluate technical proposals and articulate possible solutions to the organization or the customer. On the other hand, graduates will also understand the tactical and strategic use of IT to enhance the efficiency of an organization, or how to explain user requirements in terms that can be understood by the IT department or the client. Graduates of the programme will find work in medium to large companies, as well as the public sector, both in Switzerland and abroad. Most companies struggle with integrating IT in their organization, so people who can be the interface between the technical and organizational parts of a company are in great demand. Potential job profiles range from project management to consulting and include areas such as: evaluating the benefits, and managing the introduction, of a new technology into an organization; designing and implementing small and large scale IT systems; and consulting companies and customers regarding requirements and limitations of particular IT systems.

Contacts

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Study programme

First semester	Core Courses 12.0	Enterprise Resource Planning Enterprise Resource Planning Lab Project Management	6.0 3.0 3.0
	Informatics track 18.0	Accounting Corporate Strategy Strategic Marketing	6.0 6.0 6.0
	Management track 18.0	Fundamentals of Informatics Introduction to Programming Probability & Statistics	6.0 6.0 6.0
Second semester	Core Courses 12.0	Business Intelligence and Application Business Process Modeling, Management and Mining Operations Management	6.0 3.0 3.0
	Informatics track 6.0	Decision Making Entrepreneurship: Theory and Practice	3.0 3.0
	Management track 6.0	Databases	6.0
	Electives 12.0	Consumer Behavior (ECO) Entrepreneurship: writing business plans (ECO) Human Resources Management (ECO) Innovation (ECO) International Business (ECO) Mergers and Acquisitions (ECO) Organizational Learning (ECO) Service Marketing (ECO) Data Analytics (INF) Information Security (INF) Physical Computing (INF) Robotics (INF) Software Architecture (INF) Software Quality & Testing (INF)	6.0 3.0 3.0 3.0 3.0 3.0 6.0 3.0 6.0 6.0 6.0 6.0 6.0 6.0
Third semester	Core Courses	Six Sigma	6.0
	Capstone Work	Field Project	12.0
	Electives 12.0	Analytical Thinking (ECO) Business Dynamics (ECO) Digital Marketing (ECO) Organizational Design & Change (ECO) Organizations and Social Networks (ECO) Distributed Systems (INF) Machine Learning (INF) User Experience Design (INF)	3.0 3.0 3.0 3.0 3.0 6.0 6.0 6.0
Fourth semester	Capstone Work 18.0	Master Thesis	18.0
	Electives 12.0	Choose from the electives of the 2nd semester	

Please be aware that slight changes in the study programme may occur.

First semester

Core Courses

Enterprise Resource Planning

The main objective of this course is to provide a functional map of Enterprise Resource Planning (ERP) systems, by distinguishing core and extended functionalities. The course explains how information systems have evolved over time and how ERPs represent the result of a continuous and still ongoing functional integration process. The course starts by reviewing the literature of the information perspective of organisational theory. This literature provides a framework to understand the organisational change caused by ERP projects. Then, the course discusses the core functional areas of ERP systems: accounting&finance, operations, and management&control. Extended ERP functional areas are also explained, including customer relationship management (CRM), supply chain management (SCM), Web Information systems (WIS), work force management systems (WFM), business intelligence (BI), social media, mobile, big data. Numerous case studies are discussed in class. The course will be based on lectures and cases.

Enterprise Resource Planning Lab

The course will present a general methodology for designing and deploying ERP systems. The methodology will cover requirements analysis, sourcing strategies (including outsourcing, cloud and as-a-service solutions), technology-based cost estimation, software and suppliers' selection and management, and related change management issues, including opportunities and issues raised by Enterprise 2.0 developments. Examples and case studies will be discussed in class with the goal of clarifying the methodological guidelines provided during lectures. The evaluation consists of a oral exam and of a project assignment.

Project Management

Why do so many projects fail? Why do so many others fail to produce lasting results? Why do so many projects suffer from cost and time overruns? How can firms identify and design high-leverage policies to improve project performance? Due to high cost and time overruns of most projects, however, many organisations struggle to meet customer needs and market potential. Effective project management can provide managers with the appropriate methods and tools to improve their projects. In this course, we will cover three important aspects of project management:

- The theory, methods and quantitative tools used to effectively plan, organise, and control projects;

- Efficient management methods revealed through practice and research; and
- Hands-on, practical project management knowledge from optimisation and simulation exercises.

Accounting

- The course develops around three main topics:
- Financial accounting and financial statements;
 - Financial statements analysis;
 - Performance management.

The teaching methods include formal lectures as well as discussions of cases. The course provides the theoretical foundations and the main concepts of accounting together with opportunities of applying them to case discussions and exercises.

At the end of the course, students will:

- Master the techniques and main principles of financial accounting;
- Understand and interpret financial statements;
- Know how to design performance measurement and control systems according to strategic and organisational choices;
- Understand the logic and development of profit planning;
- Know the role and relevance of multidimensional performance measurement systems.

Corporate Strategy

This course focuses on business strategy, examining issues central to long and short-term competitive position. We will explore a variety of conceptual frameworks and models to analyse and gain insight into how to achieve or sustain competitive advantage. This journey starts by analysing the impact of the internal context (resources and capabilities) on firm performance and subsequently analysing the external environment influence on a firm's performance. After covering both the external and internal perspectives, we bring these concepts together to discuss firm level competitive advantage. This first part of the course focuses on single business or business unit strategy and will take up the first ten weeks. The final weeks explore corporate or multi-business strategy and international strategy. Some of the central questions for the course are:

- How and why do firms differ?
- Why are some firms more successful than their competitors? Is this advantage sustainable or short-lived and why?
- What makes a particular industry attractive?
- What determines success in corporate diversification?
- What determines success or failure in international competition?

For each of the topics covered, you will get an overview of the current thinking and practice in the application of the concepts. By the end of the course you will be able to assess and successfully analyse ill-structured strategic problems by selecting and

effectively applying the appropriate tools and frameworks. The class uses variety of teaching methods including lecturing, video, group work, games and presentations.

Strategic Marketing

Strategic Marketing seeks to build a strategic framework of integrating business objectives, strategies, positioning and activities necessary for effective marketing implementation. The marketplace is in a constant state of change and it is critical that marketers understand the changes taking place and are able to develop marketing activities to pursue opportunities and minimize threats.

Objectives:

- To provide an overview of strategic marketing while highlighting some of the recent developments and directions;
- To explore the impact of marketing decisions on the economic and financial performance of the company;
- To provide practical application of concepts learned to the circumstances of a marketing strategy using simulation Mark-strat3 and case studies.

Fundamentals of Informatics

The course gives an introduction into the main theoretical topics in Computer Science. The goal of the course is to acquire basic knowledge on the mathematical basis of Informatics, such as Logic and Discrete Mathematics, as well as of the important notions and concepts of Algorithmics, Computability, and Complexity theory.

Introduction to Programming

This course – aimed at students without prior programming experience – gives an introduction to programming with the Java programming language. It explains fundamental approaches to algorithmic problem solving. Students learn about declarative problem specification and procedural problem solving. The course focuses on procedural programming, but introduces also the basic concepts of object-oriented programming. It covers the software development phases of problem specification, software design, programming, testing, and debugging.

Probability & Statistics

The class provides an introduction to probability theory, descriptive statistics (data exploration and graphical inference; measures of central tendency, dispersion, and correlation; simple and multiple linear regression), and inferential statistics (sampling distributions, confidence intervals, significance testing). Theoretical concepts in the course will be illustrated with real-life examples and datasets, which students will analyse using the R software environment.

Second semester

Core Courses

Business Intelligence and Applications

The course develops a working knowledge of the principles, architectures, and tools for Enterprise Information Management and Business Intelligence. It addresses enterprise data integration and knowledge management, data mining and business intelligence. It gives an outlook on emerging data architectures, with focus on social network structures. It also presents agile and model-driven enterprise application development, using OMG's Model Driven Architecture. The notion of model is illustrated with different modeling languages.

Business Process Modeling, Management and Mining

Business Process Management combines knowledge from information technology and management sciences and applies it to the automation, analysis, monitoring and improvement of operational business processes within large and small organizations. Without well-designed and well-defined process models, to be reliably and efficiently executed, organizations are unable to compete and will not survive in modern globalized marketplaces. This lecture will introduce the students with notations and methodologies for modeling business processes and support their simulation, improvement, mining and execution within process-oriented information systems.

Operations Management

This course addresses the management of operations in manufacturing and service organizations. Our objective is to introduce students to concepts and techniques related to the design, planning, control, and improvement of manufacturing and service operations. Managing operations effectively requires both strategic and tactical skills and is one of the most critical aspects of an organization. Effective and efficient utilization of resources by an organization determines its success in the long run and operations management is a means to achieve this end. This is especially true today, when we see that significant competitive advantages accrue to firms that manage their operations effectively. The course covers topics in the areas of process analysis, inventory management, demand forecasting, capacity management, and supply chain management. While the primary objective of this course is to familiarize students with the basic concepts, techniques, methods, and applications of operations management, it will provide students with an understanding of operations and the role that they play within an organization.

Informatics Track

Decision Making

The course provides an introduction to the main issues of managerial decision-making and learning. The aim is that after the course you will (1) Improve your decision making skills and (2) be able to understand the basic concepts and frameworks of decision theory. The course is structured around the following topics: (1) decision making under certainty, (2) limitations to rationality, (3) decision making under risk, (4) decision making under uncertainty, (5) learning, and (6) intuition.

Entrepreneurship: Theory and Practice

This course is addressed to students interested in exploring the challenges of entrepreneurship, both in SMEs and in larger organizations. The course will provide an insight into the entrepreneurial process and in particular:

- The challenges of getting into business;
- The challenges of booshing the business;
- The challenges of deciding whether to re-invest or exit;
- The challenges of keeping the entrepreneurial spirit in large organizations.

The overall objective of this course is to make the students aware of the opportunities offered by an entrepreneurial career, but also of the requirements of such a career, in terms of personal preparation and process orientation.

Management Track

Databases

The course covers all the classical topics related to databases and database management systems (DBMS), starting from the general concepts of information and data, to the specifics of a relational database management system, with SQL and QBE. It also deals with the most general notions of database design, both from a theoretical and practical perspective. No prerequisite knowledge of databases is required, but only a basic understanding of data structures and algorithms. In fact, the course takes a practical approach, aimed at teaching the fundamentals of DBMS and data base design using a large set of examples and applications. As part of this, a database design project will be assigned to students in order to expose them to realistic database applications.

Electives

Consumer Behavior

The starting point for this course is that consumers define themselves by what they buy, and, vice versa, they buy based on how they define themselves. We build on cognitive and social psychology to understand better the processes underlying this conundrum. We do this primarily to influence what consumers buy, so as to make informed decisions as marketers in a business (for profit) context. The emphasis is on linking deep theoretical insight with practical application, and as such the course provides both the tools and the context for exercising these tools.

Entrepreneurship: writing business plans

This course offers participants the opportunity to learn to develop and evaluate business plans. The course is built on the knowledge already acquired by a student of the Master in Management and it simulates an entrepreneurial experience. Students are required to develop business plans for two different start-ups: one for a manufacturing company and the other in a services company. Business plan, business planning, entrepreneurship and strategic management Market analysis and marketing planning Market forecast Competitive analysis Product system design and competitive advantage creation and defence Firm structure design Organisation design Make, Buy and connect decisions Competitive – advantage based alliances Financial simulation How to evaluate the business plan.

Human Resources Management

This course provides student with a basic knowledge of the main HR processes (recruitment, development, compensation, talent management), which affect people management in an organization. Specifically, we illustrate how HR strategy and operational activity are connected to overall organizational business goals, and what role is assigned to line managers in talent development. By the end of the course the students will be able to:

- Evaluate the alignment between business and HR strategy;
- Analyze the major HR practices within an organization;
- Understand the relationship between line management and HR professional roles in people management and talent development;
- Identify the explicit or implicit people strategy adopted by an organization.

Innovation

Today's world is one of rapid change -technological, social, economic and political. Organisations, large or small, must respond to these changes in order to survive. The most successful organisations, however, are those which exploit and even create change. This course aims to expose students to the importance of linking creativity and innovation to strategy. It provides the tools and techniques that enable entry level managers to assist in the development, implementation and management of technology strategy and innovation at the business and corporate levels, in order to meet the competitive challenges of the knowledge-driven world economy.

International Business

This course aims to form students' knowledge in the area of International Business. Specifically students will develop capabilities to identify, frame and understand problems related to the management of international operations. Throughout the course issues are discussed in both theoretical and practical terms to stimulate students to relate models and concepts with practical situations.

By the end of the course the students will be able to:

- Discuss implications of globalization and cultural differences;
- Understand the implications of operating across national borders;
- Compare different internationalization processes;
- Describe how firms operate in different markets;
- Analyze different international strategies and organizational structures;
- Evaluate and criticize different leadership and control models;
- Describe the specificity of different functions and units within the international firm;
- Understand the basis for the competitive advantage of international firms.

Mergers and Acquisitions

The course is centered on the strategic management of M&A. The course will address the following issues:

- Strategic analysis to support M&A decisions and process.
- Structure and management of an M&A deal.
- Strategic challenges of post merger integration process.

Organizational Learning

This course will consist of the presentation of concepts of organizational learning and the discussion of practical cases. It aims at exploring the different ways in which organizations learn from past experiences and change themselves accordingly. Since decisions on important organizational changes can be undertaken successfully only if the organizational members are willing and able to learn from prior experiences, they need to overcome their (quite natural) resistance to change. Therefore several different approaches to organizational learning and change, as well as considerations concerning the management of employees during change processes will be discussed. Also internationalization of companies leads to opportunities for and constraints of organizational learning. The course will therefore also discuss various approaches to the management of subsidiaries in different countries. Finally, learning is also necessary in leadership, i.e. the ability to communicate and motivate organizational members for change needs to be acquired in learning processes. This course will therefore, as a final step, also look at learning steps that successful leaders have to take.

Service Marketing

More than half of the GDP of developed economies originates in the service sectors. Furthermore, most businesses contain elements of service. The production process and the market relationships for services differ in several aspects from those for tangible goods. That poses some specific problems in marketing

and management of services that will be exposed and discussed in this course.

The course revolves around three main themes:

- Peculiarities of service processes;
- Managing service quality and relationships;
- Organisational aspects of marketing in service companies.

Students will be expected to actively participate in discussions of case studies as well as to carry out field work and present the results.

Data Analytics

The course deals with mining very large datasets, analysing them to make some descriptive summary of their content, test hypothesis, and extract valuable knowledge from them. Differently from other data mining courses here we deal with datasets that for their large size, speed of updating, or variety of content cannot be mined with standard techniques. Hence we will deal with topics such as: similarity measures for very large datasets and data streams, link analysis, clustering, recommender systems, Map-Reduce, etc. As part of the course we also learn how to use the R statistical programming language to perform, interpret and visualise results, and diagnose potential problems of your analysis.

Information Security

This class exposes students to the fundamental concepts of cryptography, network security, and computer security. The growing importance of networks and distributed systems, and their use to support safety-critical applications, has made information security a central issue for systems today. The class centers on two main parts: security foundations (which includes security terminology, core cryptographic principles, and secure protocols) and applied security (which discusses network security, computer security, software security, and web security). Students learn to critically assess the security properties of a system and make informed decisions about implementing secure processes. Most classes feature in-class labs where students are asked to implement a cryptographic primitive or secure protocol, or attack a vulnerable system.

Physical Computing

Physical Computing is about integrating the real world with sensing, communication, and computation. It is about rapidly prototyping devices that can react and interact directly with their environment, rather than being accessed through a keyboard and monitor. The class introduces students to the idea of using small, programmable microcomputers to build self-contained, physical systems that help automate everyday tasks. The course exposes students to basic electronics, microcontroller programming, wireless networking (WiFi and Bluetooth), mobile interfaces (smartphones), and embedded sensing. The class centers on Arduino and ESP development boards that allow one to rapidly build reactive and/or interactive everyday items, without the need for attaching a Mac or PC to them.

Robotics

Robotics addresses the design, construction, and automatic control of mechatronical systems. The course provides a general overview of robotics, focusing on autonomous mobile robots: autonomous systems which exist and move in the physical world, can sense their environment using multiple sensors, can reason about it to issue plans, and can act on it to achieve one or multiple goals. The fundamental concepts and models necessary to achieve such a view of a robotic system will be studied: Forward and Inverse Kinematics; Proprio- and Exteroceptive Sensing; Model-based and Model-free State Estimation; Feedback-based Control; Paradigms and Architectures for Robot Control; Localization and Mapping; Motion Planning; Navigation; Coordination and Cooperation in Multi-robots and Swarms. The course includes theory classes, hands-on classes, and homework. Students will learn how to use the ROS and the simulator Gazebo, and will apply the learned concepts through the programming of both simulated and real robots.

Software Architecture

Architecture is not only necessary as the global blueprint to manage the complexity of large software systems, but should also be seen as the focus of the main design decisions influencing the quality attributes (modularity, maintainability, extensibility, portability, interoperability, reuse, performance, scalability, elasticity) of the resulting system. This class teaches the students to structure complex software systems using components and connectors while keeping track of the rationale behind their design decisions.

Software Quality & Testing

Avoiding failures in software systems by construction is impossible. This course is about methodologies, techniques and tools to check the quality of software systems, identify and remove faults before software deployment to reduce the possibility of runtime failures. Students will see the many facets of the problem and will learn methodologies, approaches and techniques to check the quality of complex software systems. Students will see the different approaches to testing and analysis and will understand the interplay of testing and analysis within the software development process.

Third semester

Core Courses

Six Sigma

Six Sigma is a methodology and a collection of useful tools driven by the deep analysis of customers needs and the disciplined use of facts, data, and statistical analysis to improve and reinvent organizational processes. We will learn approach Six Sigma considering also its modern extension called "Lean Six Sigma". A business excellence methodology its huge list of management tools. The goal of this course are:

- To build your understanding of process improvement methods;
- To develop your skills and some initial practice using the Lean Six Sigma tools;
- To discuss and receive an overview on how to use new skills and tools in your working life.

We will dive into core concepts of Lean Six Sigma and principles that guide the planning and delivery of a Lean Six Sigma Project.

Capstone Work

Field Project

The field project is a consultancy study conducted by a team of four to five students on the premises of a company (the "client"). Each year, local companies offer a range of different consultancy projects at the intersection of management and informatics, which student teams can then select from. Each team then meets with the respective company representatives to discuss requirements. During the semester, teams conducts regular meetings with the client to update on their progress, before finally presenting the results to the client at the end of the semester. Students are supervised throughout the field project by a university tutor, yet are otherwise responsible for managing and driving the project. During the semester, regular "research lab"-meetings allow students to exchange their experience with other teams and the tutor, and receive input on methods and presentation skills. The project is evaluated based on the quality of the final report, the feedback from the client, and the overall project results.

Electives

Analytical Thinking

This course aims at bringing students into a position in which they will not take every empirical or statistical result for granted. This will be accomplished (almost completely) without mathematics – just with analytical and logical thinking. Moreover, I will also cover in this course some important topics related to the writing of a Master Thesis. Oftentimes we are confronted with seemingly clear empirical facts that we interpret as obvious causal relations between two or (very rarely) more empirical factors. For example: an increase in revenues of a firm after the change of a CEO will usually be causally related to the CEO-change. The higher rejection rate for women who apply for admission at a university, on the other hand, will usually be interpreted as a discriminatory act of the university. But: is this really the case? Or do we have to look for different causes of these relations? Indeed, there exist many statistical pitfalls and fallacies that we usually tend to overlook, or are even unaware of, in everyday life. Very often these pitfalls exist because we do not take the influence of randomness into account. This course wants to uncover these pitfalls and fallacies and help future managers, not to get misled by seemingly obvious results. This course fully aims at sharpening the analytical capabilities of students which should help them making better decisions in their professional life with the help of several experiments in which the students participate. We will also discuss, the different aspects of an empirical study that need to be taken into account when writing a Master thesis.

Business Dynamics

Business Dynamics helps participants learn to use system dynamics tools and techniques so that they can begin to develop a dynamic view of strategy. Participants are taken through every phase from strategy development to implementation. Teaching will include methods ranging from traditional lectures to workshops and case studies. Frequent group work sessions will offer plenty of opportunities for learning from peers as well. By the end of the course, students will have a better understanding of the complexities of dynamic strategy and will be familiar with the best and latest tools for strategy design and implementation. The course content covers feedback mapping, archetypes, and building and using simulation models. The emphasis will be on developing the skills to create simulation models of business situations to help managers make better decisions when faced with uncertainty. Material will be distributed when needed.

Digital Marketing

This course is designed as an introduction to the rapidly evolving world of marketing in a digital environment. It blends theory with an applied perspective. The course content is structured into three parts starting with paid media, followed by owned, and earned media (i.e. social media). The overall emphasis will be on paid media. The objectives of this lecture will be mainly met through lectures, text readings, practical exercises, and in-class discussions.

Organizational Design and Change

The course consists of two specific, although related, parts: Organizational design and Organizational change. Organizational design involves the conceptual tools that management can rely upon to control and shape organizational activities. Organizational change involves a wide range of tools that management can deploy to attune organization structure to changing resource environments. This course focuses on developing an understanding of the basics of organizational design, how to adopt appropriate organizational design principles to manage innovation and change, and how to keep organizational structures aligned to increasingly complex and competitive environments. We will explore issues of organizational design and change, and examine their impact on the general process of strategy implementation. As such, the course will balance aspects related to organization design and organizational decisions. Despite its emphasis on theory, the course is accessible to students with no previous background in economics and management. The course builds on examples and case studies about real-world companies in a variety of industries, businesses, and countries. The course engages students in a creative effort to apply empirically supported theoretical principles to actual business examples.

Organizations and Social Networks

This course focuses on the conceptual and analytical tools that define the field of social network analysis in organizations. The course starts by introducing the basic theoretical and conceptual background of social network research, the fundamental ideas of a network approach, and discusses its many domains of empirical application. The course then proceeds to examine the basic analytical concepts needed to describe and understand the structure of social networks across various levels of analysis. Some of the main areas discussed include network data collection and visualization, community detection, and statistical testing of network hypotheses. Substantive topics covered include how networks affect attitudes, preferences and behavior of people in organizations. By the end of the course, students will acquire the basic skills needed to map out networks of social, economic and communication relations, diagnose features of networks that might help or hinder individual or team performance, and be able to recognize and describe the main features of network structure.

Distributed Systems

Distributed Systems are ubiquitous in modern computer systems. In general, any computing system composed of interconnected autonomous processors is a distributed system. Therefore, understanding how distributed systems are structured is paramount to master modern computer systems. This course is an introduction to distributed systems. It covers basic principles, architectures, and algorithms of distributed systems. The course surveys various aspects of distributed systems, including distributed systems architectures, networking and internetworking, distributed objects and remote invocation, security, distributed file systems, name services, consistency and replication, fault tolerance, and distributed transactions.

Machine Learning

Introductory Master's Course to Intelligent Systems (IS) or Artificial Intelligence (AI), taught by award-winning experts of the Swiss AI Lab IDSIA, and USI. The focus is on Machine Learning (ML). According to Computer World (2009), expertise in ML is the top skill sought by IT employers. Today ML is everywhere: search engines use it to improve answers to queries, email programmes use it to filter spam, banks use it to predict exchange rates and stock markets, doctors use it to recognize tumors, robots use it to localize themselves and obstacles, video games use it to enhance the player's experience, smartphones use it to recognize objects / faces / gestures / voices / music, etc. After the first few lectures of the basic IS course on ML, IS master students will already know how to train self-learning artificial neural networks to recognize images and handwriting better than any other known method. They will rapidly gain familiarity with state-of-the-art algorithms developed at IDSIA and other AI labs.

User Experience Design

This class aims at familiarising students with both the theory behind the discipline of Human Computer Interaction (HCI) and the practical process of User eXperience (UX) design. Students not only develop an awareness and appreciation of the crucial implications of good interfaces in terms of overall system performance and user satisfaction, but also learn core skills needed in order to identify user requirements, envision interfaces and processes, and evaluate competing design options. Students will work in small teams of 3-5 to drive a design project from start to finish. Core skills are introduced in hands-on classes, interspersed with lectures and discussions about the underlying theory.

Fourth semester

Capstone Work

Master Thesis

The master thesis is an individual project that aims to explore a specific aspect that requires both informatics and economics skills. It can be a conceptual investigation or an experimental work, and shall provide a solid contribution to the field. The master thesis is a unique opportunity to learn how to conduct a thorough investigation and improve individual research as well as presentation skills. The thesis can be started in the third semester as soon as the student has acquired at least 60 ECTS and shall be conducted under the supervision of an advisor, typically a professor of the master programme. Theses may also be conducted in collaboration with external institutions, in which case they may be co-advised by an external advisor.

Electives

See Second semester's electives

Università
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**Faculty
of
Informatics**

**Master of Science
in Management and Informatics**

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