UCLouvain

bcomu2114

2026

CT and digital social networks: architecture, security and functioning

5.00 credits	45.0 h	Q2

Language :	French
Place of the course	Bruxelles Saint-Louis
Learning outcomes	**At the end of this learning unit, the student is able to :** **Competency 2 - Know and orchestrate the technical, creative and marketing aspects of digital projects in organisational communication.** *Learning Outcomes :* 1. Know the main principles of the architecture, operation and security of computer networks and social network technologies of an organisation, as well as the main computer technologies. 3. Know the characteristics, opportunities and constraints of the different digital channels; integrate them in a logical way in a communication plan. 4. Know the techniques and methods for optimising the referencing, reputation and running of online communities. 6. Combine 'online' and 'offline' communication modes in any communication strategy in an optimal manner. **Competency 3 - Develop a digital culture for the organisation which mobilises management, teams and partners in communication strategies and projects.** *Learning Outcomes :* 1. Advise the organisation's decision-making bodies on the challenges and issues at the crossroads of communication and digital innovations (communication objectives and strategies, communication as a managerial lever, the organisation's digital transformation, etc.). **Competency 4 - Mobilise and produce knowledge in communication strategy and digital culture in a substantiated and methodical manner, as part of a critical reflection or research project.** *Learning Outcomes :* 2. Based on multidisciplinary knowledge, develop a critical and substantiated reflection on digital technologies and their human and societal issues. 6. Update one’s knowledge and practices by implementing methods and techniques to monitor communication and digital trends and innovations.

Evaluation methods	• First session: first session grade = 0.75 x written exam grade + 0.25 x project grade
	  • Written exam (75%) covering all the concepts previously communicated and presented in the course material.
	  • Group work assessed based on a project report (25%). Students in the same group receive the same grade.
	• Second session: second session grade = 0.75 x oral exam grade + 0.25 x project grade
	  • Oral exam (75%) covering all the concepts previously communicated and presented in the course material.
	  • If the evaluation of the group work is unsuccessful in the first session, i.e. < 10/20 (otherwise the first session project grade is carried over to the second session, without the possibility of improving it): individual work to be submitted in the form of a written report with a prescribed structure and having the same objectives as the group work carried out during the first session (25%).

Teaching methods	Course : 15 modules of 3 hours Teaching methods include: • Lecture (2 hours): presents the numerous architectural concepts, models and operating principles, technological alternatives/solutions, etc. while encouraging students to have as much interaction as possible. • Practicum (1 hour): alternately, carrying out practical/formative exercises or reading/analyzing specialized articles and group discussions to understand the relationships between the concepts presented and anchor them in concrete terms students. • Project: to be carried out by group in order to mobilize and deepen the course material, practical knowledge and know-how taught during class lectures. The platform provides access to: • the course material (slides); • the various resources (articles, references, case studies, etc.) whose consultation is requested/ recommended; • self-evaluation tests (MCQ type); • and group work/project submissions (presentations and reports).
Content	The course develops four main topics i) computer networks (set of computers connected to each other by wired or wireless links, and transmitting information in the form of digital data) and ii) information systems (set of elements/components participating in the management, storage, processing, transport, exchange and representation of information within an organization) as well as their implementation in the context of iii) digital social networks and iv) distributed artificial intelligence (agentic IA) and its implementation in the context of networks of connected objects (Internet of Things, Smart cities, etc.). The course presents and details these topics in order to provide • the methodological and practical knowledge, supported by exercises, reading of articles and demonstrations, that are necessary for the understanding, the design and the management of an information system. • the essential tools for specifying a communications strategy on digital social networks (private/public company, association, institution, etc.). • the base concepts for writing a technical report in which a critical reasoning is formulated in relation to the adoption/choice of a technology or application in relation to the course. The course is structured as follows **Part 0 : Introduction** • General presentation of information systems, their purposes and roles from the technical and socioeconomic points of views. • Explore the concept of information system, its components and its types in order to analyze more precisely the mechanisms of exchange and transport of information by means of its network component. **Part I : Architecture and operation of computer networks** • Components, functions/reference models (OSI, hour-glass) and main protocols (Ethernet, TCP/IP, HTTP, DNS) • Types of networks: local (data centers, enterprise/industrial, etc.), access (radio/mobile/non-wired, wired access) and global/remote (Internet), and their interconnections (switch, router) • Communication/operation mode: peer-to-peer, client-server (2-tier), gateway (3-tier, n-/multi-tier) • Services and providers: Internet/connectivity, content, web service, cloud service (storage, computing, platform/container, etc.) **Part II : Architecture and operation of information systems** • Main functions: i) secure exchange (collection and distribution/dissemination) of information, ii) storage and processing of information and iii) management and security of information -and- technological solutions/alternatives • Information coding, digital data and main data models : entity-association, entity-relation, graphical • Introduction to big data and data mining (including unsupervised methods) • Architecture of big data systems and platforms (including data storage/hosting and processing) **Part III : Digital social networks** • Foundational and fundamental concepts • Critical presentation of various stakes (socioeconomic, cultural, institutional, security, etc.) • Infrastructure, superstructure and technological solutions • Specification of a communication plan on digital social networks (private/public company, association, institution, etc.) • Concrete examples of developing and putting into practice a communication plan on digital social networks **Part IV: Distributed and Multi-Agent Artificial Intelligence (Agentic AI)** • Fundamental principles and concepts of distributed artificial intelligence

	• Interactions between the physical and digital worlds: sensors and actuators • Infrastructures, superstructure, and technological solutions • Case studies: networks of (inter-)connected objects (Internet of Things), smart cities, etc.
Bibliography	• Une bibliographie complète est intégrée au support de cours sur Moodle. • Une bibliographie spécifique est mise a disposition en début de chaque partie du cours. • A complete bibliography is integrated into the course material available on Moodle. • A specific bibliography is made available at the start of each part of the course.
Faculty or entity in charge	ESPB

Programmes containing this learning unit (UE)

Program title	Acronym	Credits	Prerequisite	Learning outcomes
Master [120] in Communication Strategy and Digital Culture (shift schedule)	COMB2M	5		
Attestation de réussite : accession au niveau A pour les fonctionnaires fédéraux	ACNA7FC	5		