

DIGITAL SECURITY AND NETWORKS



OBJECTIVES

The growing cybercrime incidents have a huge impact on companies: economic loss, threat to reputation, bankruptcy, etc. Therefore, securing its information systems and data is a top priority for all organizations.

The main role of the Digital Security and Networks engineer is to deploy a security policy with a level adjusted to the needs and nature of the business of the company. To achieve this goal, the engineer must understand the business

processes and the organization of the services and must master the security standards and mechanisms, as well as the architecture of the underlying networks,

the information system services, and applications. The engineer also ensures a technological watch on new threats so that he can improve and strengthen the security of the company. He/she is involved in raising user awareness of security issues.

JOB PROSPECTS

Cybersecurity Engineer, Network/Infrastructure Architect, Data Protection Engineer, Information systems security Manager, Application Security Engineer, Security Expert, systems Engineer, Information security analyst, Digital Forensic Engineer, IT auditor, Incident Engineer,...



COURSE CONTENT

SEMESTER 1

PROJECT-BASED LEARNING IN WEB DEVELOPMENT

- Database management system : relational and object models, database schema, queries analog filter, power management
- Web architecture : client, server, communication protocolsensor management, bluetooth link
- HMI : ergonomoy, dynamic contents generation, formatting
- Propagation & Antenna, Digital transmission, Link budget

NETWORK FUNDAMENTALS

- Network communication, communication channel
- Layer approach, OSI model, TCP/IP model
- Network devices, Network addressing models

CYBER SECURITY

- Information systems security
- Web application and network security
- Introduction to Cryptography, etc.

JAVA/SOFTWARE ENGINEERING

- Java programming
- Software engineering
- Agile software development methods

DATA SCIENCE FUNDAMENTALS

- Probability theory
- Statistics (descriptive statistics, statistical theory of estimation, hypothesis testing)
- Data science (principal component analysis, linear regression)

ENGLISH, FRENCH AND HUMANITIES COURSES

SEMESTER 2

INFORMATION SYSTEMS ARCHITECTURE

- Hardware and software architecture
- Service-oriented architecture and Rest APIs
- Virtualization and administration of an operating system
- Cloud Computing

ROUTINE PROTOCOLS AND LOCAL NETWORK SWITCHING

- Static & dynamic routing
- Distance-Vector routing protocols
- Link-State routing protocols, Fine-Tuning Routing Protocols
- Access Control List, PTP connections, NAT, DHCP

DATABASES AND BIG DATA

- Advanced querying techniques
- Non-relational databases

NETWORK SECURITY

- Confidentiality, Authenticity, Integrity, Availability, Traceability, Non-repudiation
- Security in the Software Development Life Cycle (SDLC), Security by design
- Evaluation of the effectiveness of software security
- ANSSI rules
- Privacy by Design and personal data processing

ENGLISH, FRENCH AND HUMANITIES COURSES

CHOOSE ONE COURSE AMONG:

INTERNATIONAL BUSINESS INNOVATION PROJECT

- Build real business model in a multicultural team
- Create innovative idea with marketing & business strategies
- Present final business model to professionals

INTRODUCTION TO ARTIFICIAL INTELLIGENCE

- Applications of artificial intelligence to problem solving
- Methods of problem formalization and knowledge representation
- Resolution algorithms associated with these representations

INTRODUCTION TO RESEARCH

- Definition of research: procedures, organization and purposes
- Targeting information (specialized sites, books, open archives, etc.)
- Bibliographic study: synthesis of the research works
- Modeling a scientific problem
- Writing a scientific publication
- Ethics, integrity and scientific rigor

SEMESTER 3

AUDIT AND RISK MANAGEMENT

- Principles of Cybersecurity Governance
- Cybersecurity standards overview
- Security Architecture, Security Audit
- PAM, BCP, Forensic & Incident response, DRP

ROUTING AND ADVANCED ARCHITECTURE

- Core network architectures based on protocols such as MPLS
- Implementation of IPv6 networks, and planning for existing network migrations
- Advanced inter-AS routing protocols (autonomous system)

PROJECT

The project is composed of an advanced case study. The students will be called upon to use the knowledge, design techniques and tools that they learnt through their courses.

ENGLISH, FRENCH AND HUMANITIES COURSES

CHOOSE TWO COURSES AMONG:

BUSINESS ORGANIZATION AND INFORMATION SYSTEMS

- Generic Organization of a firm (architecture, modules)
- Sectoral organization (financial, banking / insurance, government, telecom, education, health,...)
- Developing a strategy and its implementation
- Monitoring the implementation of the strategy
- Integration of different actors in the value chain (B2B, e-commerce, CRM)
- Integrating data (indicators, Business Intelligence, distribution of data)
- Apprehension of the IS environment, competitive intelligence, business intelligence

SOFTWARE SECURITY

- Fundamental notions about computer security & software security
- Malwares and software's low level vulnerabilities
- How to write a secure code (DevSecOps and security in SDLC)?
- Web application vulnerabilities

HIGH-RATE NETWORKS

- Free Space Optics (FSO)
- Optical Networks
- G21, allocation of spectral resources in optical networks
- Wavelength-division multiplexing (WDM)
- Satellite communications

VIRTUALIZED ARCHITECTURES AND CONVERGED SERVICES

- Network orchestration
- Virtualization of network functions (NFV), Open Stack, OpenDaylight
- Software Defined Networks (SDN)
- Systems and protocols for converged services
- Quality of service (QoS) and quality of experience (QoE)

SEMESTER 4

INTERNSHIP

The internship with an international company will enable students to display valuable professional skills and attitudes developed during the three academic semesters. Companies usually give a stipend to the trainees.