



WIDEN YOUR HORIZONS

**ENGINEERING GRADUATE  
SCHOOL IN PARIS**

# WELCOME TO ISEP!



**Aline Aubertin**  
ISEP General  
Managing Director



ISEP is an engineering graduate school in digital technologies, known as a French “Grande École d'Ingénieurs”. By providing students thorough trainings in Electronics, Telecommunications & Networks, Software Engineering, Signal-Image Processing, Humanities, and soft skills, ISEP trains very high-level graduate engineers with required knowledge, know-how, and skills in order to meet business's expectations. Since 2008, ISEP has been offering an international program fully taught in English, which gives international students the opportunity to obtain the Engineering Master Degree. As a recognized digital technologies expert, ISEP has strong connexions & partnerships with the digital industry. This allows ISEP to offer professional internships and to update continuously programs in order to meet market requirements. At ISEP, we consider diversity and especially multicultural ones, as an asset.

Join ISEP to build a better future, in which digital technologies will serve Humanity !





## WHY CHOOSE ISEP?

ISEP is well known for the excellence of its education. The Engineering Master Degree Program is accredited by the National Engineering Committee (CTI). ISEP is a member of the "Conférence des Grandes Écoles" and also renowned for its research, its international relations and its strong industrial links. Our program is taught in English and it provides students with optimal preparation for the current demands of the job market.

ISEP is ranked 12th out of 75 best engineering graduate schools in France and 1st best private graduate school for the international opening by Usine Nouvelle Magazine 2021.

### RESEARCH

The research at ISEP is organized within a single laboratory LISITE (Laboratory of Computer Science, Signal and Image, Electronics and Telecommunication).

The main research areas of the laboratory are Artificial Intelligence, Resource Management in Multi-User Wireless Systems, Advanced Image Processing and Coding Methods, Energy Harvesting Systems, Micro & Nano Electronic Systems. Research at ISEP finds its applications in several areas:

- Health and Medical Image processing
- Connected environments: Internet of Things, sensor networks, autonomous vehicles, LiFi, 5G, etc.
- Environment and sustainable agriculture
- Education and enhancing human learning.

The laboratory develops close relationships with industrial partners and universities. Finally, the laboratory organizes and participates in the organization of national and international conferences.

### INTERNATIONAL

More than 400 international students per year demonstrates the attractiveness of ISEP. The school has more than 150 university partnerships in 5 continents. ISEP also welcomes many international professors from prestigious universities like Stanford, Berkeley or IISc...

### INDUSTRIAL LINKS

Built around the real needs of the business world, ISEP graduates engineers benefit

from an excellent reputation. They are particularly appreciated by industrial firms for their ability to become quickly operational and efficient. Moreover, 150 lecturers coming from various industries are taking part in the training of our students.

### STUDENT ACTIVITIES

ISEP also has many student clubs ranging from sports to sciences and technology... Among them, the ISEPA student association is in charge of the development of cultural exchanges with international students (please see page 5), the Junior ISEP association offers consulting services and it is one of the best junior companies among graduate schools.

# ISEP ENGINEERING MASTER DEGREE PROGRAM



The ISEP Engineering Master Degree Program is a 4-semester program. This degree is recognized by the French government, and accredited by the national French engineering committee CTI. In addition, it is recognized as an international Master's degree within the European Bologna scheme. As proof of its international excellence, ISEP has received the label EUR-ACE.

## STUDENT CAN CHOOSE ONE OF THE FOLLOWING SPECIALIZATIONS:

- **Embedded Systems .....P6**
- **Software Engineering ..P8**
- **Wireless Telecommunication and IoT Systems .....P10**
- **Data Intelligence .....P12**
- **Digital Security and Networks .....P14**

The program is open to graduates with a Bachelor's degree in Science/Engineering or to students who are in the last year of University in the relevant disciplines e.g. Electrical Engineering, Electronic Engineering, Telecommunications, Computer Science, Computer-Engineering, Information Technology, etc.

## HOW TO APPLY?

**Complete the online application form and upload the following documents:**

- ID photo
- Copy of passport
- Curriculum Vitae
- Statement of purpose
- 2 letters of recommendation
- Copy of transcripts for each university previously attended as well as certified translations into French or English, including a copy of the degree
- TOEFL (minimum score 550PB/213CB/79iBT) or equivalent test (IELTS...)

**APPLICATION DEADLINE: July 15<sup>th</sup>**

**TUITION FEE PAYMENT DEADLINE: August 1<sup>st</sup>**

## USEFUL INFORMATION

### Housing

ISEP helps international students to be housed in a residence hall, a private room or a flat, thanks to our private housing database.

### Pre-arrival Information

We recommend you arrive 2 weeks before the program starts.

During the information day, you will be given the ISEP "Guide for International Students". It will give you practical information about administrative procedures, living expenses, transportation, health insurance, etc. In addition, all ISEP students will receive an "ISIC card". It offers a lot of advantages: discounts on plane or train travel, car rental, hotels, restaurants, leisure activities, etc...

## FOR FURTHER INFORMATION:

**For more information about the ISEP Engineering Master Degree Program, please contact:**

**Phone:** +33 1 4954 5267 or +33 1 4954 5224

**Fax:** +33 1 4954 5201

**E-mail:** [international@isep.fr](mailto:international@isep.fr)

**Website:** <http://en.isep.fr>





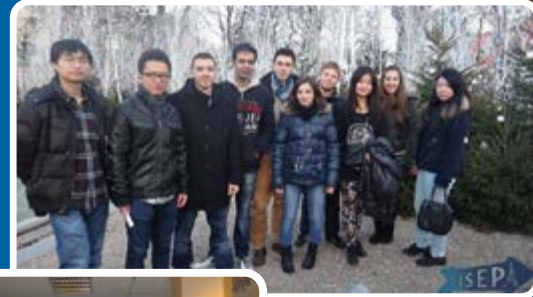
Created in October 2012, ISEPA is run by a dynamic and motivated team willing to help students coming to ISEP from all around the world. In a nutshell, ISEPA's mission is to welcome them and make sure they find their way quickly in Paris.

Throughout the year, the team organizes activities and visits, while trying to erase the cultural and language barriers by creating moments of exchange between the French and international students. Foreign students will discover French culture thanks to the Christmas Day for instance but will also be able to share their culture for the Chinese New Year, Diwali Festival, and other cooking events. ISEPA's particularity is to accompany students in their professional projects (helping them to write a resume and letter of motivation for example). ISEP is truly the place where students can share and cultures can blend.

If you are an international student, ISEPA is the perfect place for you to discover the beautiful French culture and take part in ISEP's exciting student life!

You can easily contact ISEPA on the Facebook group "ISEPA international students" or using the website: [www.isepa.fr](http://www.isepa.fr).

**JOIN US!**



# EMBEDDED SYSTEMS



## OBJECTIVES

The embedded systems are the heart of automatic devices in our daily life. The design of embedded systems represents an economical stake for manufacturers: it increases the value of equipment and improves the competitiveness of companies. France has several worldwide industries in aerospace, military, and space industry, energy, rail, telecommunications, automotive, etc. which have been users of embedded systems for decades: EADS, Thales, Airbus, Renault, etc.

The embedded systems major addresses the design, the implementation and the management of complex systems (aircraft, cars, trains...). The competencies involved are the design of standardized and reliable are the design of standardized and reliable functioning hardware and software devices/objects. The acquired knowledge covers the fields of electronics and software engineering at system-level design.

## JOB PROSPECTS

Equipment manager, system expert, project manager, embedded platform architect, embedded technologies expert/support manager, embedded applications architect, Software Development expert, Qualification/validation Expert, Test expert, integration expert/manager, process & methods/quality/certification expert.

# COURSE CONTENT

## SEMESTER 1

### COMPUTER MICROSYSTEMS

- C language programming: memory allocation, pointer and API
- Operating system description: process/thread/memory/supervision, shell & system programming

### PROJECT-BASED LEARNING IN ELECTRONIC AND SIGNAL

- Analog electronics: signal conditioning, analog filter, power management
- Digital electronics: microcontroller based sensor management, bluetooth link
- Fourier series and transform, sampling, digital filtering

### NETWORK FUNDAMENTALS

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

### DATA SCIENCE FUNDAMENTALS

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

### ELECTRONICS FOR IOT

- Deepening on Microcontroller
- Battery management, low power design, Power conversion
- Wireless link, protocols and capabilities low power
- Green communication design, System implementation

### ENGLISH, FRENCH AND HUMANITIES COURSES

### CYBERSECURITY

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

### ANALOG SYSTEMS

- Power electronics
- Noise and conditioning
- Amplification chain
- Analog to digital converters
- Radiofrequency communications

### ENGLISH, FRENCH AND HUMANITIES COURSES

#### CHOOSE ONE COURSE AMONG:

#### INTRODUCTION TO ARTIFICIAL INTELLIGENCE

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

#### 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 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

### SYSTEM CONSTRAINTS AND IMPLEMENTATION

- Methodology development cycles and systems
- Life cycle of software, of hardware
- System simulation, tools for formal proof
- Real-time UML

### 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:

#### AUTOMATIC CONTROL/REAL TIME

- System model, state space, optimum command theory
- States representation
- Reliability of components & cards

#### SMART CITIES / CONNECTED AND AUTONOMOUS VEHICLES

- Challenges of the smart city
- Instructions for a stronger economic development
- Industry 4.0 market technical
- Smart Transportation
- Aviation market techno-economic analysis

#### MEDICAL ROBOTICS

- Kinematics of medical robots
- Imaging guided medical robots
- Tracking and surgical navigation

#### MACHINE LEARNING

- Linear predictor, convex learning
- Gradient descent, Kernel Methods
- Support vector machine, Decision trees

## SEMESTER 2

### ELECTRONIC MICROSYSTEMS

- Instruction set architecture
- Logic design, computer arithmetic
- CPU design, memory hierarchy
- Multicore and GPU models

### DATA ACQUISITION AND PROCESSING

- Data types: qualitative, quantitative
- Deterministic data processing: Data transforms, filtering, linear prediction
- Random data processing: Distributions, estimation, measure errors; correlation...

## SEMESTER 3

### SAFETY AND RISK ANALYSIS

- Failure trees – failure density, failure rate
- Reliability of components, of boards, of systems, life duration, physical failure analysis – methods and tests
- Redundant systems, serial, parallel, vote, triplication
- Coded systems
- Standards on quality, standards on safety
- Electromagnetic compatibility of systems

## 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.

ISEP will provide you with assistance in your search for an internship. Companies usually give a stipend to the trainees.



# SOFTWARE ENGINEERING



## OBJECTIVES

With the rapid development of computerization and networks in our daily life, software development is unavoidable. Need of talented software engineers with good expertise and capacity for technology monitoring are required to tackle new markets and to innovate in software.

A software engineer is an expert who can adapt himself/herself to any environment. He/She is involved in the design, implementation, and development of software in several industrial domains. He/she has a global view and a large knowledge from hardware to algorithm layers.

## JOB PROSPECTS

IT consultant, IT project manager, expert of development in major industrial groups (Banks, Automotive, Aircraft...) or start-ups, R&D in the software industry (IBM, Google, Microsoft...).



# COURSE CONTENT

## SEMESTER 1

### COMPUTER MICROSYSTEMS

- C language programming: memory allocation, pointer and API
- Operating system description: process/thread/memory/supervision, shell & system programming

### PROJECT-BASED LEARNING IN WEB DEVELOPMENT

- Database management system: relational and object models, database schema, queries
- WEB architecture: client, server, communication protocols
- HMI: ergonomics, 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

### 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

### DATA BASE AND BIG DATA

- Advanced querying techniques
- Non-relational databases

### INFORMATION SYSTEMS ARCHITECTURE

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

### ENGLISH, FRENCH AND HUMANITIES COURSES

#### CHOOSE ONE COURSE AMONG:

### INTRODUCTION TO ARTIFICIAL INTELLIGENCE

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- Methods of problem formalization and knowledge representation
- Resolution algorithms associated with these representations

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- Modeling a scientific problem
- Writing a scientific publication
- Ethics, integrity and scientific rigor

### FORMAL APPROACH, LANGUAGES AND COMPILATION

- Abstract Syntax Trees
- Compilation algorithms
- Proof of program properties, model-checking
- Typed programming languages, lambda calculus

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### ENGLISH, FRENCH AND HUMANITIES COURSES

#### CHOOSE TWO COURSES AMONG:

### MOBILE APPLICATION DEVELOPMENT

- Introduction to the dedicated services for mobiles
- Handsets capabilities and market overview
- Android development basics & tutorials
- Project

### MACHINE LEARNING

- Linear predictors, convex learning
- Gradient descent, kernel methods
- Support vector machine, decision trees

### 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

### 3D AND IMMERSIVE APPLICATIONS USING XR

- State of the art and use cases of XR technologies
- Design principles and associated specificities
- Development pipeline of 3D application with Unity3D.
- Develop an immersive 3D application or experience (in support of VR or AR hardware)

## SEMESTER 2

### WEB TECHNOLOGIES

- Client-side Web application: Java Servlet, Java Server Pages, Cookies, Sessions, JDBC, MVC
- Server-side Web application: WEB development methods and process, HTML, CSS, Javascript, HTML5, CSS3/4, Frameworks and Javascript tools, AJAX

### ADVANCED ALGORITHMIC AND PROGRAMMING

- Graph theory, algorithm design
- Advanced Java: compound design patterns, network programming, functional programming

## SEMESTER 3

### DISTRIBUTED PROGRAMMING AND ARCHITECTURE

- Typology of distributed systems
- Distributed applications properties: interoperability, scalability/elasticity, load balancing, consistency, fault tolerance
- Communication: protocols, topologies
- Concurrent programming
- Distributed algorithms & application patterns

## SEMESTER 4

### INTERNSHIP

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# WIRELESS TELECOMMUNICATION AND IoT SYSTEMS



## OBJECTIVES

The Wireless Telecommunication and IoT Systems specialization presents all the necessary building blocks for the design, planning, deployment, and optimization of mobile wireless communication and connected object networks, as well as digital techniques for transmission and communication.

The Wireless Telecommunication and IoT Systems engineer is an expert that can advise IoT clients on the technologies to choose to inter-connect objects. He/she has the know-how to implement the next generation technologies by operating highly efficient networks.

## JOB PROSPECTS

R&D engineer, Integration Engineer, Validation Engineer, Research Engineer, Telecommunication Support Engineer, Technical Sales Engineer, Telecom Project Manager.

# COURSE CONTENT

## SEMESTER 1

### CYBER SECURITY

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

### ELECTRONICS OF THINGS

- Deepening on Microcontroller
- Battery management, low power design, Power conversion
- Wireless link, protocols and capabilities low power
- Green communication design, System implementation

### PROJECT-BASED LEARNING IN ELECTRONIC AND SIGNAL

- Analog electronics: signal conditioning, analog filter, power management
- Digital electronics: Microcontroller based sensor management, bluetooth link
- Fourier series and transform, sampling, digital filtering

### NETWORK FUNDAMENTALS

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

### 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

### DATABASES AND BIG DATA

- Advanced querying techniques
- Non-relational databases

### DESIGN OF CONNECTED SYSTEMS

- Introduction to the Internet of Things
- Overview on IoT Networks
- Enabling Technologies, Protocols and Applications
- Low Power Wide Area Networks (LPWAN)

### ENGLISH, FRENCH AND HUMANITIES COURSES

#### CHOOSE ONE COURSE AMONG:

### INTRODUCTION TO ARTIFICIAL INTELLIGENCE

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

### INTERNATIONAL BUSINESS INNOVATION PROJECT

- Build real business model in a multicultural team
- Create innovative idea with marketing & business strategies
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### INTRODUCTION TO RESEARCH

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- Bibliographic study: synthesis of the research works
- Modeling a scientific problem
- Writing a scientific publication
- Ethics, integrity and scientific rigor

- Systems and protocols for converged services
- Quality of service (QoS) and quality of experience (QoE)

### 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:

### SMART CITIES / CONNECTED AND AUTONOMOUS VEHICLES

- Challenges of the smart city
- Instructions for a stronger economic development
- Industry 4.0 market technical
- Smart Transportation
- Aviation market techno-economic analysis

### 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)

### AUDIT AND RISK MANAGEMENT

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

### MACHINE LEARNING

- Linear predictors, convex learning
- Gradient descent, kernel methods

## SEMESTER 2

### DATA ACQUISITION AND PROCESSING

- Data type: qualitative, quantitative
- Deterministic data processing: Data transforms, filtering, linear prediction
- Random data processing: Distributions, estimation, measure errors, correlation...

### CELLULAR TECHNOLOGIES AND IOT

- Architecture and Engineering of cellular mobile communications networks
- Characteristics of the radio propagation (noise, interference, protection against the errors)
- Mobility & Security in cellular communications networks
- Multiplexing users

## SEMESTER 3

### 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)

## SEMESTER 4

### INTERNSHIP

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# DATA INTELLIGENCE



## OBJECTIVES

In a competitive and rapidly evolving environment, companies have to monitor frequently their activities and control their business surrounding. For that, the extraction of knowledge is crucial from internal & external sources of data coming from numerous information systems. The Data Intelligence major offers

multidisciplinary engineering training in Computer Science and Statistics in order to masterize the collection, storage, and analysis of big data and provides essential results for decision-making.

## JOB PROSPECTS

Data scientist, data analyst, data Engineer, database administrator, Data Architect, Business Analyst, datawarehouse engineer, decisional engineer, and R&D 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 : ergonomics, 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

### 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

### DATA ANALYSIS

- Univariate to multi-variate statistics
- Data visualization
- Introduction to clustering
- Time series analysis
- Data analysis with Python
- Introduction to classification

### METHODS AND TOOLS FOR BI

- Business Intelligence
- Decision process
- Data warehouse, data mart, data cubes
- ETL: extract transform and load

### DATABASES AND BIG DATA

- Advanced querying techniques
- Non-relational databases

### AI AND OPTIMISATION

- Unconstrained optimization
- Constrained optimization
- Dynamic optimization
- Global optimization
- Optimization for Machine Learning

### ENGLISH, FRENCH AND HUMANITIES COURSES

#### CHOOSE ONE COURSE BETWEEN:

### 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 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

### MACHINE LEARNING

- Linear predictors, convex learning
- Gradient descent, kernel methods
- Support vector machine, decision trees

### SEMANTIC WEB AND KNOWLEDGE MANAGEMENT

- XML, Xquery, Xpath, XSLT
- RDF (Resource Description Framework) and RDFS
- Open Linked data
- SPARQL, Triple stores
- OWL, TF.IDF, ElasticSearch, Solr

### 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:

### AUDIT AND RISK MANAGEMENT

- Data security, Secure Programming
- Main application vulnerabilities (Cross scripting (XSS), SQL injection, ...)

### SMART CITIES

- Challenges of the smart city
- Instructions for a stronger economic development
- Industry 4.0 market technical
- Smart Transportation
- Aviation market techno-economic analysis

### GLOBAL HEALTH SYSTEMS

- Global health systems, comparing and contrasting
- The role of data, information, and knowledge
- Global health challenges
- Health impacts, health outcomes, and the measurable objectives of Health interventions
- Spaces and places for care delivery
- Continuum of care & care coordination

### 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

## SEMESTER 4

### INTERNSHIP

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# 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 protocol sensor management, bluetooth link
- HMI : ergonomics, 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

### 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

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#### 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 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

## 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)

## 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.

# Great reasons to apply to ISEP in Paris

1<sup>st</sup> average salary **€45 046**

**100%** of **students employed** after graduation

About **400 international students** per year

More than **150 partnerships worldwide** in **45 countries**

**150 lecturers from the industry**

**30 student clubs and organizations**

Corporate partnership with more than **400 companies**

**Internship** (6 months)

A **dynamic alumni network** (more than **9 900 alumni**)

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