WELCOME TO ISEP!

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Dieudonné Abboud
ISEP General
Managing Director

ISEP is a French engineering graduate school in digital technology, known as a "Grande École d'Ingénieurs". ISEP trains very high-level graduate engineers who receive a thorough training in Electronics, Telecommunications & Networks, Software Engineering, Signal-Image Processing and Humanities, providing them with the required knowledge and skills to meet the needs of businesses. Since 2008, ISEP has been offering an international program taught fully in English which allows international students to obtain the Engineering Master Degree. Thanks to a strong partnership with the companies in related industries, this program includes a professional internship.

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 equipments and improves the competitiveness of companies. France has several worldwide industries in aerospace, in military and space industry, in energy, in rail, in 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 (aricraft, cars, trains...). The competences involved are the design of standardized and reliable functionning hardware and software devices/objects. The acquired knowledges cover the fields of electronics and software engineering at system level design.

JOB PROSPECTS

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

COURSE CONTENT

SEMESTER 1

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 ACQUISITION AND PROCESSING

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

MANAGEMENT TRAINING

- Economics principles, intercultural relations
- Corporate organization, international sales

ENGLISH LANGUAGE COURSE

FRENCH LANGUAGE COURSE

SEMESTER 2

RADIOFREQUENCY SYSTEMS

- Radio wave transmission and propagation
- Design of RF systems
- Advanced topics in RF systems

ELECTRONIC MICROSYSTEMS

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

COMPUTER MICROSYSTEMS

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

ELECTRONICS FOR IoT

- Deepening on microcontroller
- Battery management, low power design, power conversion
- Wireless link, protocoles and capabilities low power
- Green communication design, system implementation

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

FRENCH LANGUAGE COURSE

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

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

FRENCH LANGUAGE COURSE

CHOICE OF 2 ELECTIVE COURSES AMONG:

AUTOMATIC CONTROL/REAL TIME

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

CONNECTED AND AUTONOMOUS VEHICLES

- Connected cars and urban equipment
- Deep learning and automatic car driving
- Sensor, Vehicular Ad-hoc Network, security

MEDICAL ROBOTICS

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

PROGRAMMING LANGUAGES AND COMPILERS/FORMAL APPROACHES

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

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.
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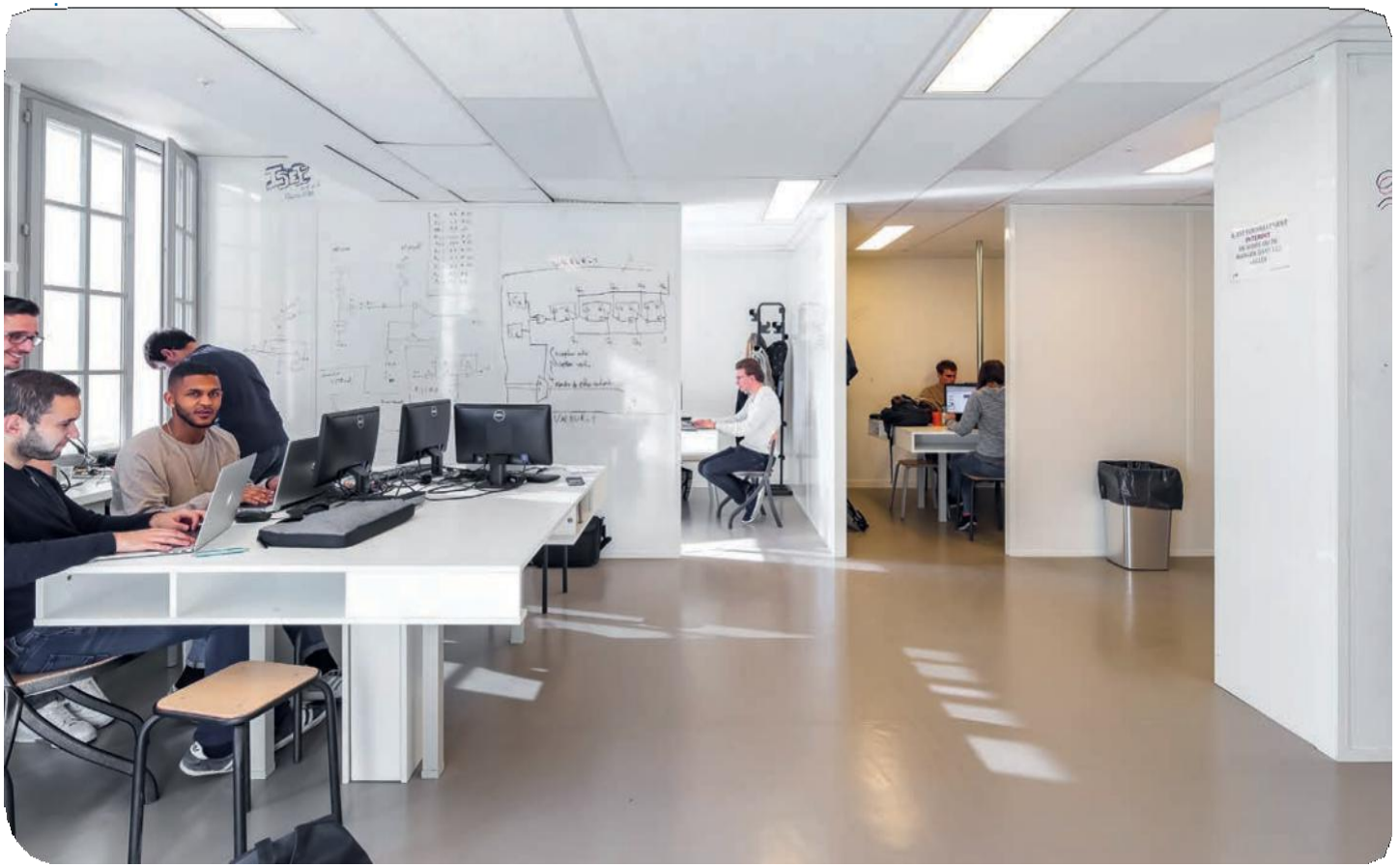
Syllabus: subject to minor modifications

SOFTWARE ENGINEERING



OBJECTIVES

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

The software engineer is an expert who can adapt himself/herself in any environment. He/She is involved in the design, implementation, 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-up, R&D in software industry (IBM, Google, Microsoft…).

COURSE CONTENT

SEMESTER 1

PROJECT-BASED LEARNING IN IT AND IoT

- Database management system: relational and object models, database schema, queries
- WEB architecture: client, server, communication protocols
- HMI: ergonomy, dynamic contents generation, formatting
- Propagation & antenna, digital transmission, link budget

CYBER SECURITY

- Information systems security
- Web application and network security
- Introduction to cryptography

NETWORK FUNDAMENTALS

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ENGLISH LANGUAGE COURSE

FRENCH LANGUAGE COURSE

SEMESTER 2

DATA BASE AND BIG DATA

- Advanced querying techniques
- Non-relationnal databases

ADVANCED ALGORITHMIC AND PROGRAMMING

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

COMPUTER MICROSYSTEMS

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

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

INTERNATIONAL BUSINESS INNOVATION PROJECT

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FRENCH LANGUAGE COURSE

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

PROGRAMMING LANGUAGES AND COMPILERS/FORMAL APPROACHES

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

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FRENCH LANGUAGE COURSE

CHOICE OF 2 ELECTIVE COURSES AMONG:

MOBILE DEVELOPMENT

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

ADVANCED WEB TECHNOLOGIES

- Software infrastructures and Web services
- Enterprise and information systems architecture

AUDIT AND RISK MANAGEMENT

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

MACHINE LEARNING

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

SEMESTER 4

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WIRELESS TELECOMMUNICATION AND IoTSYSTEMS

OBJECTIVES

The Wireless Telecommunication and IoT Systems specialization presents all the necessary building blocks for the design, the planning, the deployment and the 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 the 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

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ELECTRONICS FOR IoT

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MANAGEMENT TRAINING

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- Corporate organization, international sales

ENGLISH LANGUAGE COURSE

FRENCH LANGUAGE COURSE

SEMESTER 2

RADIO COMMUNICATIONS

- Modeling of the transmission chain
- Adaption to the transmission channel: formatting, constellations
- Theory of information and channel coding: error correcting code

IoT NETWORKS

- IoT Networks: requirements, classification, security aspects
- Body area network
- Antonomy and Miniaturisation aspects
- Project on conception and deployment of connected objects

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

CYBER SECURITY

- Information systems security
- Web application and network security
- Introduction to Cryptography

INTERNATIONAL BUSINESS INNOVATION PROJECT

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- Present final business model to professionals

FRENCH LANGUAGE COURSE

SEMESTER 3

CONVERGENT SERVICES AND TECHNOLOGIES

- Voice over IP (signalling, addressing, ...)
- Unified communications, NGN, IMS
- Cloud computing

DATA PROCESSING AND HIGH SPEED COMMUNICATIONS

- Advanced techniques of redundancy
- Compression, cryptography
- Optical & satellite networks

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FRENCH LANGUAGE COURSE

CHOICE OF 2 ELECTIVE COURSES AMONG:

SYSTEM INTEGRATION

- Open-source strategy
- Tools for Integration (BPM, ETL, BI, Spring)
- Test and Validation etc

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)

CONNECTED AND AUTONOMOUS VEHICLES

- Connected cars and urban equipment
- Deep learning and automatic car driving
- Sensor, Vehicular Ad-hoc Network, Security

MOBILE DEVELOPMENT

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

SEMESTER 4

INTERNSHIP

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Great reasons to apply to ISEP in Paris

Starting **salary of €42,250** on average

100% of **students employed** after graduation

About **400 international students** per year

More **than 130 partnerships worldwide** in **43 countries**

150 lecturers coming from within the industry

30 student clubs and organizations

Corporate partnership with more than **500 companies**

Internship (1 semester)

A **dynamic alumni network** (more than **9 000 alumnis**)

www.isep.fr

Engineering Graduate School in the heart of Paris!

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