



Overview of Graduate Program: 2016-2017

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Introduction

All of Efrei's 2-year master's programs contain the following three primary components: scientific and technical training, interdisciplinary training and projects, and general education.

Scientific and Technical Training (STT)

The scientific and technical training curriculum addresses the purely scientific and technical competencies that future IT engineers need. These competencies are divided into six separate majors at Efrei. In addition, 6 scientific options are available at Efrei for students to choose from.

Efrei's six majors:

1. Information System Architecture and Cloud Computing
2. Business Intelligence (in English)
3. Software Engineering (in English)
4. Imaging et Virtual Reality
5. IT for Finance
6. Security

Efrei's six scientific options:

1. Big Data
2. IT Security: Authentication and Access Control
3. Multimedia Applications and 3D
4. Design and Conception
5. Creativity and Entrepreneurship
6. Innovation in Healthcare

Interdisciplinary training and projects make up a portion of the programs' scientific and technical curriculum. All of the courses and activities in this component are obligatory for all students regardless of their major and include a methodology project, the final-year project, and the electives that focus on different areas of activity.

General Education

The general education component includes non-scientific and non-technical training that students need to successfully intergrate into the professional world as interculturally competent and comminicatively skilled IT ingeneers. Courses in this component cover such topics as management, culture, communnication and languages. The e-Novation seminars and academic round tables also fall under this section.

First Year of Graduate Program*			
EFREI & ESIGETEL 2016-2017			
SEMESTER 7		SEMESTER 8	
16 weeks - 5 Blocks - 358 hrs. - 30 ECTS		11 weeks - 5 Blocks - 276.5 hrs. - 30 ECTS	
Scientific and Technical Training	Majors 2 Blocks - 183.75 hrs. - 15 ECTS (5 courses of 35 hrs. + final exam) 6 Majors <i>Information System Architecture and Cloud Computing</i> <i>Business Intelligence (English)</i> <i>Software Engineering (English)</i> <i>Imaging and Virtual Reality</i> <i>IT for Finance (English)</i> <i>Security</i>		Scientific and Technical Training
	IT & Areas of Activity 1 Block - 59.5 hrs. - 6 ECTS (2 electives of 28 hrs. + exam) <i>attributions based on academic record</i>		
	Methodology Project 1 Block - 43.75 hrs. - 3 ECTS 3 courses: 38.5 hrs. Coaching: Methodology Project 3x1.45 hrs. = 5.25 hrs.		
	IT & Areas of Activity 1 Block - 38.5 hrs. - 2 ECTS (2 electives of 17.5 hrs. + exam) <i>attributions based on academic record</i>		
General Education (1 Block - 71 hrs. - 6 ECTS)	Management (IT Careers) 1 19.25 hrs. (electives)		General Education
	IT Law and Ethic 19.25 hrs.		
	Conferences 10.5 hrs.		
	Participation in Student Life (PAVE)		
	Culture and Communication 17.5 hrs. Seminar: Effectively Chairing Meetings		
	English/FLE 17.5 hrs. FLE (35 hrs.)		
	Management (IT Careers) 2 & 3 2 courses: 17.5 hrs. + exam (electives)		
	English 21 hrs.		
	Academic Conferences 7 hrs.		
	Participation in Student Life (PAVE)		
Technical Internship (1 Block - 10 ECTS) 16 weeks minimum		Professional Training	

*Program may be subject to changes.

Second Year of Graduate Program*				
EFREI & ESIGETEL 2016-2017				
SEMESTER 9a		SEMESTER 9b		
14 weeks - 5 Blocks - 313.25 hrs. - 24 ECTS		5 weeks - 2 Blocks - 82.25 hrs. - 6 ECTS		
Scientific and Technical Training	Majors 3 Blocks - 220.5 hrs. - 18 ECTS (4 courses of 35 hrs. + final exam) 6 Majors (35 hrs. + exam) <i>Information System Architecture and Cloud Computing</i> <i>Business Intelligence (English)</i> <i>Software Engineering (English)</i> <i>Imaging and Virtual Reality</i> <i>IT for Finance (English)</i> <i>Security and Networks</i> <i>and</i> <i>6 Scientific Options (electives): Big Data, IT Security, Authentication and Access Control, Multimedia Applications and 3D, Design and Conception, Creativity and Entrepreneurship, Innovation in Healthcare</i>		Methodology Project 1 Block - 5.25 hrs. - 2 ECTS Coaching: Methodology Project + defense	
			Economy and Areas of Activity 21 hrs. + exam (1 elective)	Project
			Management (IT Careers): Seminars 3 17.5 hrs. + exam (1 elective)	
			e-Novation: Seminars 17.5 hrs. + exam (1 elective)	
		Seminars: Human and Social Sciences 17.5 hrs. + exam (1 elective)		
		Conferences (optional)	Gen. Edu. (4 Blocks - 77 hrs. - 4 ECTS)	
		SEMESTER 10		
		24+ weeks - 1 Block - 30 ECTS		
Gen. Edu. (1 Block - 56 hrs. - 4 ECTS)	Management (IT Careers): Seminars 1 & 2 38,5 hrs. 2 courses (17.5 + exam) (elective seminars)		Professional Training	
	Culture and Communication 17,5 hrs. (electives)			
	English (optional) 17,5 hrs.			
	Conferences (optional)			
		Final-year Internship (1 Block - 30 ECTS) 24 weeks minimum		

*Program may be subject to changes.

I. Scientific and Technical Training

Major: Information System Architecture & Cloud Computing

Coordinator: Benoît Charroux (benoit.charroux@efrei.fr)

This major is not available for first-year graduate students in the 2016-2017 academic year.

Program Description

The Information System Architecture and Cloud Computing major aims to produce engineers who are able to intervene in a company's information system regardless of its sector of activity. Being at the heart of a company, information systems contain all of the IT applications necessary for employees and collaborators to successfully carry out their professional responsibilities. Information system engineers know how to analyze an existing system, understand it, offer solutions to improve it and manage the implementation of these solutions. Furthermore, they will put in place these solutions in a manner that is attuned to their client's profession and the current advances in technology, such as cloud computing. These engineers will work closely with the upper management to best put in place the technological aspects of their strategy. In a large-scale project, information system engineers are typically tasked with managing the project. They are, consequently, in direct contact with the company, its management, its partners and collaborators, and the general contractor initially engaged to put in place solutions to help the company successfully carry out its strategy.

Learning Objectives

By the end of this program, students will be able to design an information system, guaranteeing the organization of its components in a coherent and harmonious manner; integrate different components into an architecture and design components that are both modular and reusable; bring network and system infrastructure up to standard, guaranteeing a quality of service; establish key performance indicators and ensure that the data generated by different constituents are analyzed and organized for the effective development of organizational strategies.

Professions

General Contractor (IS); Project Manager; Information System Architect; Information Systems Security Consultant

Keywords

information systems; corporate computing; Business Process Management (BPM); Computerized Business Operations (CBO); cloud computing; Information System Security

Program Details: Information System Architecture & Cloud Computing

SEMESTER 7	Code	NC*	ECTS†
Fundamentals	Block 71ASI		9
Web Services	ST2WBS	35	3
Information System Technologies	ST2TSI	35	3
Information System Modelling	ST2MOD	35	3
Applications	Block 73ASI		9
Enterprise Risk Management	ST2GRE	35	3
Advanced Databases	ST2BDA	35	3

SEMESTER 8	Code	NC	ECTS
Fundamentals	Block 81ASI		6
Knowledge Management and Semantic Web	ST2KM	35	3
Data Warehousing	ST2DWH	35	3
Applications	Block 83ASI		6
Collaborative Tools	ST2OC	35	3
Enterprise Resource Planning	ST2ERP	35	3

SEMESTER 9a	Code	NC	ECTS
Fundamentals	Block 91ASI		6
Business Process Management	ST2BPM	35	3
Information System Security	ST2SSI	35	3
Applications	Block 93ASI		6
Cloud Computing: SaaS, PaaS et IaaS	ST2CCO	35	3
From Distributed Systems to Cloud Computing	ST2IDC	35	3
Electives and Scientific Options	Block 95ASI		6
Information System Architecture and Governance	ST2ARC	35	3
Scientific Option		35	3

*Number of Classes (including exams and evaluations). Each class (including exams and evaluations) are broken up into 1 hour and 45 minute sessions.

†Number of ECTS credits per module and in total for each block.

Major: Business Intelligence

Coordinator: Layth Slimane (layth.slimane@efrei.fr)

Program Description

The Business Intelligence major aims to produce engineers who are able to design and put into place the means, tools and methods to collect, consolidate, model and reproduce a company's data so that they can assist in forecasting, decision making, and defining a company's strategy. In sum, business intelligence is an IT toolbox at the service of the decision-makers in a company. Consequently, business intelligence is a technological component of a company that is much larger than the information system itself.

All courses in this program are taught in English.

Learning Objectives

By the end of this program, students will be able to design, configure and put into place decision aid systems and knowledge management systems. They will be able to effectively exploit a company's data. They will be able to offer innovative decision solutions.

Professions

Data Scientist; Data Analyst; Business Intelligence Consultant; Project Manager for Decision Aid Systems; Doctorial Studies

Keywords

Data Scientist; Data Analyst; Business Intelligence Consultant; Project Manager for Decision Aid Systems; Doctorial Studies

Program Details: Business Intelligence

SEMESTER 7	Code	NC	ECTS
Fundamentals	Block 71BI		9
Web Services	ST2WBS	35	3
Information System Technologies	ST2TSI	35	3
Information System Modelling	ST2MOD	35	3
Applications	Block 73BI		6
Enterprise Risk Management	ST2GRE	35	3
Advanced Databases	ST2BDA	35	3

SEMESTER 8	Code	NC	ECTS
Fundamentals	Block 81BI		6
Knowledge Management and Semantic Web	ST2KM	35	3
Data Warehouse	ST2DWH	35	3
Applications	Block 83BI		6
Collaborative Tools	ST2OC	35	3
Enterprise Resource Planning	ST2ERP	35	3

SEMESTER 9a	Code	NC	ECTS
Fundamentals	Block 91BI		6
Predictive Analytics	ST2PAN	35	3
Big Data	ST2BIG	35	3
Applications	Block 93BI		6
Artificial Intelligence for Knowledge Discovery	ST2AIK	35	3
Big Data Processing and Visualization: Tools and Platforms	ST2BDPV	35	3
Electives and Scientific Options	Block 95BI		6
Data Mining	ST2DMI	35	3
Scientific Option		35	3

Major: Software Engineering

Coordination: Nicolas Sicard (nicolas.sicard@efrei.fr)

Program Description

Generally speaking, software engineering takes into account the overall benefits inherent in integrating software components and specialized applications within a larger comprehensive project. This process includes the design, development, implementation and maintenance of these components, which may be part of a company's online information system (with its individual strategic needs) or applications destined for the general public, such as websites or web portals, e-commerce and so forth.

Software engineers are currently the major players in the technological shift of industries toward digitization (automobile, aeronautic, defense, banking, telecommunications, etc.). Highly computer literate, software engineers are able to analyze a client's needs, develop practical IT solutions and put them in place. Due to ever-increasing security and reliability concerns, these steps must be rigorously carried out in a tried and true methodological framework.

All courses in this program are taught in English.

Program Objectives

By the end of this program, students will be able to display a deep understanding of the fundamentals of computing. They will be able to display a deep and versatile understanding of the necessary competencies. They will be able to display an understanding and mastery of the standardized models and techniques. They will be able to display the ability to work in a team and to plan and manage projects.

Professions

Software Designer; App Designer; Software Development Engineer; System Architect; specialist in the Internet of Things, data management, real-time or software quality assurance; Doctoral Studies; Project Manager

Software Engineers have the following professional responsibilities:

1. analyzing and specifying the needs and demands involved in the development of a piece of software or software system;
2. designing software using specifications based on the client's needs while, at the same time, guaranteeing public satisfaction;
3. developing new software or systems based on already existing software while following the appropriate technical standards;
4. ensuring through adequate testing that the software conforms to the stated specifications;
5. if necessary, ensuring the certification of software.

Key Words

systems and applications designs, information systems architecture, specifications, modelling, development, algorithms, security, real-time, the internet of things

Program Details: Software Engineering

SEMESTER 7	Code	NC	ECTS
Fundamentals	Block 711L		9
Network and System Programming	ST2PSY	35	3
Java Enterprise Edition	ST2JEE	35	3
Software Engineering and Project Management	ST2SEPM	35	3
Technologies	Block 731L		6
Application Interoperability with Web Services	ST2AIWS	35	3
C# and .NET Environment	ST2CSH	35	3

SEMESTER 8	Code	NC	ECTS
Real-time and Mobility	Block 811L		6
Real-time Systems	ST2IN7	35	3
Mobile Development	ST2MOB	35	3
Architecture and Design	Block 831L		6
Specification, Design, Verification	ST2SCV	35	3
Advanced Databases	ST2SI05	35	3

SEMESTER 9a	Code	NC	ECTS
Fundamentals	Block 931L		6
Software Engineering for the Cloud	ST2SCL	35	3
Distributed Systems	ST2SYR	35	3
Software Quality	Block 911L		6
Software Reliability and Quality	ST2SRQ	35	3
Testing	ST2TST	35	3
Electives and Scientific Options	Block 951L		6
Event-driven Asynchronous Programming	ST2EAP	35	3
Scientific Option		35	3

Major: Imaging and Virtual Reality

Coordinator: Nicolas Flasque (nicolas.flasque@efrei.fr)

Program Description

The major Virtual Reality is aimed at training IT engineers who are able to work with complex systems based around digital images, who know how to carry out various processes on already existing images, create virtual scenes, and combine the real and the virtual to generate an augmented reality.

Students will learn techniques and gain experience working with professional tools used in the fields of numerical simulation and animation. Likewise, they will gain an understanding of and be able to implement immersive digital environments.

Aspects of artificial intelligence, which are not only important in simulation but also in video game development, are presented in this major.

Program Objectives

By the end of this program, students will be able to process and synthesize images. They will be able to work competently with the tools and technologies for 3D. They will be able to display a deep understanding of the field of virtual reality and augmented reality. They will be able to apply the fundamental mathematics related to computer vision and 3D.

Professional Prospects

Project Leader on Tools for 3D Simulation; types of businesses recruiting: Dassault Systemes, Thales, Total Immersion, VSM, General Electric, automobile manufactures, Électricité de France (EDF)

Key Words

Image Processing, Computer Vision, Virtual and Augmented Reality, 3D Graphics, Artificial Intelligence, Real-time Computing (RTC), 3D Animation, Unity 3D, Ogre3D, 3DS Max Coordination

Program Details: Imaging and Virtual Reality

SEMESTER 7	Code	NC	ECTS
Applications	Block 71IRV		9
Introduction to Artificial Intelligence	ST2IN03	35	3
Mathematics for Geometry	ST2RV10	35	3
Introduction to Image Processing	ST2IN05	35	3
Technologies	Block 73IRV		6
Application Interoperability with Web Services	ST2AIWS	35	3
C# and .NET Environment	ST2CSH	35	3

SEMESTER 8	Code	NC	ECTS
Fundamentals	Block 81IRV		6
Advanced Image Processing	ST2TIA	35	3
Pattern Recognition	ST2RDF	35	3
Applications	Block 83IRV		6
Introduction to Virtual Reality	ST2IRV	35	3
3D Graphics	ST2G3D	35	3

SEMESTER 9a	Code	NC	ECTS
Fundamentals	Block 91IRV		6
Computer Vision & Scene Analysis	ST2VAAS	35	3
Applications of Virtual and Augmented Reality	ST2RVA	35	3
Applications	Block 93IRV		6
Virtual Reality and Human-computer Interaction	ST2IHM	35	3
Augmented Reality and 3D Registration	ST2RV14	35	3
Electives and Scientific Options	Block 95IRV		6
Event-driven Asynchrone Programming	ST2EAP	35	3
Scientific Option		35	3

Major: IT for Finance

Coordinator: Imen Rached (imen.rached@groupe-efrei.fr)

Program Description

The major IT for Finance is aimed at training financial engineers who are able to model real systems mathematically, carry out the technological implementation of these models and to make use of the models' results in a manner that both improves them and deepens financial engineers' understanding of the modeled systems. The systems that are investigated in this program are those that are applicable to financial markets. Financial engineers seek to understand how the markets work in an attempt to develop successful investment strategies.

Broadly speaking, students majoring in IT for Finance will learn the mathematical and computer-based methods that allow financial engineers to understand and interact with the complex systems at work within the financial markets. Moreover, students will acquire the skills needed to easily adapt these mathematical models, computer-based methodologies and results to other real systems, such as networks, transportation, energy, civil engineering, etc.

All courses in this program are taught in English.

Program Objectives

By the end of this program, students will be able to display the ability to mathematically model real systems. They will be able to implement these models on a computer (programming and exploiting across different platforms). They will be able to analyze real systems and mathematical models. They will be able to display an ability to apply knowledge of financial markets. They will be able to display the capacity to apply their competencies to other contexts than the financial markets.

Professional Prospects

banks and insurance; quantitative consulting for financial markets; doctoral studies

Key Words

mathematical modelling, optimization, statistics, numerical analysis, market finance, numerical simulation, high performance computing

Program Details: IT for Finance

SEMESTER 7	Code	NC	ECTS
Fundamentals	Block 71IFM		9
Mathematics for Finance 1	ST2IF01E	35	3
Statistics for Finance 1	ST2IF2E	35	3
IT for Finance	ST2IF03E	35	3
Technologies	Block 73IFM		6
Application Interoperability with Web Services	ST2AIWS	35	3
C# and .NET environment	ST2CSH	35	3

SEMESTER 8	Code	NC	ECTS
Fundamentals	Block 81IFM		6
Numerical Analysis Applied to Finance	ST2IF8	35	3
Statistics for Finance 2	ST2IF7E	35	3
Architecture and Design	Block 83IFM		6
Specification, Design, Verification	ST2SCV	35	3
Advanced Databases	ST2SI05	35	3

SEMESTER 9a	Code	NC	ECTS
Fundamentals	Block 91IFM		6
Numerical Optimization Methods	ST2IF12	35	3
Advanced Algorithms for Finance	ST2IF10	35	3
Applications	Block 93IFM		6
Advanced Databases	ST2IF13	35	3
Introduction to High Performance Computing	ST2HPC	35	3
Electives and Scientific Options	Block 95IFM		6
Quantitative Risk Analysis	ST2IF11	35	3
Scientific Option		35	3

Major: Security

Coordinator: Driss Essayed (driss.essayed@efrei.fr)

Program Description

Every time that information technology is used to improve an operation or deliver a service, it becomes susceptible to outside attackers who seek to access, modify or damage confidential data. The cost to a company from such attacks could be devastating and include not only a tarnished image but possibly losing the competitive edge on important R&D projects, or worse, a complete shutting down of its operations. The goal of the Security major is to give students the theoretical and applied knowledge to understand the various issues in this constantly evolving field. This program is aimed at producing engineers who have a complete picture of security and who are capable of designing and putting in place solutions to reduce risks and prevent hostile attacks that seek to compromise confidential data and, consequently, the daily operations of a company.

Program Objectives

By the end of this program, students will be able to display the ability to design, apply and maintain software systems that support a company's security policy. They will be able to display the ability to assess IT security risks that a company encounters and evaluate the tools, human resources and available materials to limit such risks and lessen the effects of a hostile attack whether external or internal. They will be able to manage in a secure manner the development and evolution of an information system.

Professions

IT System Security Developer; IT Security Advisor; IT Security Consultant; IT Security Expert; Computer Security Expert; Information System Security Project Manager; Security and Authorization Architect; Security Auditor; Chief Information Security Officer; Network Engineer; doctoral studies

Program Details: Security

SEMESTER 7	Code	NC	ECTS
Fundamentals	Block 71SEC		9
Advanced Operating Systems	ST2AOS	35	3
Network Services	ST2SER	35	3
Switched and Routed Networks	ST2SRN	35	3
Applications	Block 73SEC		6
IT Security	ST2SEI	35	3
Cloud Computing, Virtualization, Storage Networks	ST2CVR	35	3

SEMESTER 8	Code	NC	ECTS
Fundamentals	Block 81SEC		6
Mathematics and Applied Cryptography	ST2MAC	35	3
Network Security	ST2NSEC	35	3
Applications	Block 83SEC		6
Security of Mobile Applications and IoT, M2M	ST2SMA	35	3
Unified Communication, ToIP and Quality of Service	ST2UTQ	35	3

SEMESTER 9a	Code	NC	ECTS
Fundamentals	Block 91ISEC		6
Information System Security	ST2SEC	35	3
Security Seminar	ST2SEM	35	3
Applications	Block 93SEC		6
Penetration Tests	ST2INT	35	3
Advanced Defenses	ST2DEFA	35	3
Electives and Scientific Options	Block 95SEC		6
Software Vulnerability Analysis	ST2AVL	35	3
Scientific Option		35	3

Scientific Options (Efrei)

Coordinator: Nicolas Sicard (nicolas.sicard@groupe-efrei.fr)

Description

The scientific options are a group of theme-based scientific and technical electives that are offered to all the students, despite their major, during semester 9a. Each theme consists of two classes that explore the primary issues related to the theme. Students choose one theme and take the two associated courses consecutively.

In 2016, all of the below scientific options are open to Efrei students.

Program Details: Scientific Options

SEMESTER 9a	Code	NC	ECTS
Big Data for Companies	OUVBD	35	3
Security Management	OUVMGSEC	35	3
Web and 3D (<i>not offered in 2016-17</i>)	OUVW3D	35	3
Design and Conception	OUVDC	35	3
Innovations in Healthcare	OUVIS	35	3
Creativity and Entrepreneurship	OUVCE	35	3

II. Interdisciplinary Training and Projects

Methodology Project

Coordinator: Benoît Charroux (benoit.charroux@groupe-efrei.fr) / Andreas Topp (andreas.topp@groupe-efrei.fr)

The methodology project is a year-long project in teams that aims at giving students the opportunity to experience the following:

- the entire lifecycle of a project (from the needs analysis to the market and up to the development of a prototype);
- applying a method of project management (Scrum, an agile software development framework);
- preparing a business plan;
- managing a project's human resources;
- applying quality management and testing methods;
- writing documentation related to the project.

This project includes the following three-fold framework:

- assistance from businesses to help project teams to carry out a market study, conceive a product or service and develop a complete business plan (financing, marketing, etc.);
- techniques for project management as well as assistance in developing a prototype;
- coaching workshops to assist teams.

Follow-up and project evaluation:

- regular meetings with faculty and other actors during the project's different steps;
- continuous evaluation throughout the project's lifecycle;
- a contest for the best project of the year is held during the school's annual Innovation Day where selected projects are judged by a jury composed of representatives from the business community.

Program Details: Methodology Project

SEMESTER 7	Code	NC	ECTS
Methodology Project 1	Block 76		2
Methodology and Technical Monitoring (1)	FT2MTD	10,5	1
Creating a Business Plan (1)	FT2BPL	10,5	1
Project Monitoring	FT2PJT	10,5	0
Coaching: Methodology Project	FT2AEQ	5,25	0

SEMESTER 8	Code	NC	ECTS
Methodology Project 2	Block 86		2
Methodology and Technical Monitoring (2)	FT2MT2	7	3
<i>Innovation Day</i>	FT2INO	3,5	0
Creating a Business Plan (2)	FT2BP2	3,5	0
Project Monitoring	FT2PJ2	3,5	0
Coaching: Methodology Project	FT2AE2	5,25	1

Areas of Activity

Coordinator: Isabelle Sirot (isabelle.siro@groupe-efrei.fr)

Program Description

Information and communication technologies are an integral component of the management of a company's activities and are widely applied across various sectors. These electives were developed with the aim of giving students knowledge of the technical, scientific and economic aspects that make up the character of the area of activity under study. These electives are composed of three stages:

Stage 1 consists of the technical knowledge and skills specific to the related professions and state of the art equipment applicable to the area of activity under study.

Stage 2 examines the place of the information technologies vital to the activity of various companies found within the area of activity under study.

Stage 3 explores economic, geopolitical, organizational and administrative environments of the area of activity under study.

In 2016, the courses in the first two stages are only available to Efrei students. Courses in the third stage will be available to both Efrei and Esigetel students.

Program Objectives

By the end of this program, the student will be able to:

- apply fundamental theoretical knowledge and practical techniques pertinent to the area of activity under study.
- display a deep understanding of economic, geopolitical, organizational and administrative environments of the area of activity under study.
- recognize the impact and place of the information technologies essential to the activity of various companies found within the area of activity under study.

Key Words

sustainable development, energy, transportation, new media and video games, telecommunication and the internet, finance and bancassurance

Program Details: Areas of Activity

SEMESTER 7	Code	NC	ECTS
	Block 75		6

SUSTAINABLE DEVELOPMENT			
Introduction to Sustainable Development	SECDD1	28	3
Modes of Production and Consumption	SECDD3	28	3
ENERGY			
Types of Energy and their Development	SECEN2	28	3
Transportation and Distribution	SECEN4	28	3
FINANCE AND BANCASSURANCE			
Introduction to Different Types of Finance	SECFB1	28	3
The Economics of Risk	SECFB4	28	3
NEW MEDIA AND VIDEO GAMES			
Audio Visual Basics	SECMJ1	28	3
Introduction to Web 2.0	SECMJ4	28	3
TELECOMMUNICATIONS AND THE INTERNET			
Information and Communication Theory	SECTI1	28	3
Telecommunications Infrastructure and Equipment	SECTI3	28	3
TRANSPORTATION			
Road, Rail and Air Transportation	SECTR3	28	3
Logistics and Transportation	SECTR4	28	3
HEALTHCARE			
Ethics, Legislation and Terminology	SECSA1	28	3
Biomedical Simulation	SECSA2	28	3

SEMESTER 8	Code	NC	ECTS
IT AND AREAS OF ACTIVITY	Block 85		2

SUSTAINABLE DEVELOPEMENT			
New Sources of Energy	SECDD4	17,5	1
IT and Sustainable Development	SECDD5	17,5	1
ENERGY			
IT and Energy	SECEN5	17,5	1
Life-cycle of the Means of Production	SECEN7	17,5	1
FINANCE AND BANCASSURANCE			
Basics of Insurance	SECFB2	17,5	1
IT and Bancassurance	SECFB5	17,5	1
NEW MEDIA AND VIDEO GAMES			
Digital Cultures	SECMJ7	17,5	1
IT & Video Games	SECMJ5	17,5	1
TELECOMMUNICATION AND INTERNET			
IT and Telecommunications	SECTI5	17,5	1
Introduction to Linguistics	SECTI2	17,5	1
TRANSPORTATION			
Information Systems and Transportation Networks	SECTR7	17,5	1

IT and Transportation	SECTR5	17,5	1
HEALTHCARE			
Hospital Information Systems	SECSA7	17,5	1
eHealth	SECSA5	17,5	1

SEMESTER 9b	Code	NC	ECTS
ECONOMY AND SECTORS (ELECTIVES)	Block 97B		4

SUSTAINABLE DEVELOPEMENT			
CSR (The Economy of Sustainable Development)	SECDD6	21	1
ENERGY			
Economic Aspects of the Energy Industry	SECEN6	21	1
FINANCE AND BANCASSURANCE			
The Economics of Finance and Bancassurance	SECFB6	21	1
NEW MEDIA AND VIDEO GAMES			
New Media and Video Games - Economy of the Sector	SECMJ6	21	1
TELECOMMUNICATION AND THE INTERNET			
Telecommunication & the Internet - Economy of the Sector	SECTI6	21	1
TRANSPORTATION			
Transportation - Economy of the Sector	SECTR6	21	1
HEALTHCARE			
Healthcare - Economy of the Sector	SECSA6	21	1

Final-year Project – Technology Intelligence

Coordinator: Benoît Charroux (benoit.charroux@groupe-efrei.fr)

Description

The final-year project is carried out in the second year of the graduate program. The goal of this project is for students to demonstrate their ability to lead a project conducted by a team of engineers. This project emphasizes two essential components that are common to all types of professional projects: management and technique. The management component includes managing a team, project planning, and monitoring and controlling the project while respecting the various steps and processes. The nature of the technical component depends upon the type of project that students choose to carry out and may include programming, administrative services and comparative research tools. Students can choose to carry out projects related to a variety of professional domains. However, the professional domains must correspond to the content of Efrei's and Esigietel's programs. Besides the project work, the course Managing an R&D Project is a component of the final-year project. This course explores how to finance and develop a project within a company.

Program Objectives

This project aims at developing engineers who will be able to display an ability to characterize an innovation and identify technological barriers, secure financing for a project, and direct a R&D project in defining its phases and the sourcing of teams.

Program Details: Final-year Project – Technology Intelligence

Both Efrei and Esigietel students must complete the final-year project.

SEMESTER 9a	Code	NC	ECTS
Final-year Project – Technology Intelligence (1)	Block 96A		2
Final-year Project – Technology Intelligence (1)	ST2PFE1	14	

SEMESTRE 9B	Code	NC	ECTS
Final-year Project – Technology Intelligence (2)	Block 96B		2
Final-year Project – Technology Intelligence (2)	ST2PFE2	3,5	1

III. General Education

Management (IT Careers)

Coordinator: Agnès Béhar (agnes.behar@groupe-efrei.fr)

Program Description

In a constantly evolving world that is full of dynamic challenges such as the globalization of financial markets and the ever-increasing pace of technological advances, companies are looking for young graduates who are able to understand today's issues, not only through a technical lens, but also on an economic and human level. Therefore, it is essential that Efrei students align their technical expertise with their professional skills.

The management electives allow students to become quickly operational in their professional field and readies them for a career path aimed at gaining positions of responsibility.

Program Objectives

By the end of this program, the student will be able:

- to lead projects in various professional contexts;
- to display an ability to manage difficulties and prioritize
- to synthesize and analyze various types of information;
- to develop a clearly defined outline for the attainment of their career objectives
- to display an ability to be a driving force for creativity

Keywords

Innovation Challenges, Development of a Commercial Offer, Management Simulation, The Basics of Starting Your Own Business, Strategic Auditing, Marketing and Innovation, Risk Management, E-marketing, Financial Risk Management

1. Parcours Ingénieur d'affaires

Students who choose to take courses exploring the career of business engineer will learn how to develop sustainable business relationships with clients and to develop and prepare offers that fit the clients' needs.

Professional Opportunities for Business Engineers

Department Manager; Sales Application Engineer; Client Side Project Manager; Large Account Manager; Market Research Manager

Strong Points of the Business Engineer Curriculum

Active learning: students work on a scope statement provided by one of Efrei's business partners. Student teams present their propositions to the school's business partners who select the best project.

2. Entrepreneur

As the creation of a business is often linked to technological innovation, many students decide to take courses exploring entrepreneurship. The courses offered under this theme allow students to acquire the management competencies specific for an entrepreneur.

Professional Opportunities for Entrepreneurs

Entrepreneur; Profit Center Manager; Business Unit Manager; Subsidiary Manager

Strong Points of the Entrepreneur Curriculum

- Engineering internship can be carried out in a startup.
- Active learning: students work on a scope statement provided by one of Efrei's business partners. Student teams present their propositions to the school's business partners who select the best project.
- There is the possibility for students to earn a double master's degree in entrepreneurship from EM Grenoble.
- Long-term assistance: as the first years of starting a new business are always difficult, Efrei accompanies and assists entrepreneurs after graduation through coaching entrepreneurial alumni, offering Efrei Entrepreneur Scholarships which offers them free space in Efrei's business incubator and through Efrei's partnership with the technology incubator IncubAlliance.

3. International Project Manager

Students who choose to take courses exploring the career of international project managers will become aware of the stakes and consequences of working in a globalized world. They will train to be business developers who are ready to carry out actions on an international and global level.

Professional Opportunities for Entrepreneurs

Profit Center Manager; Business Unit Manager; Subsidiary Manager

Strong Points of the Project Manager Curriculum

- The instructors have experience in advising, managing and coordinating projects and creating subsidiaries at the international level.
- Courses under this theme are taught in English.
- Student diversity: more than 50% of the students exploring the career of an international project manager are international students.

4. Consultant

New information and communication technologies are a company's central nervous system. Due to the continuous evolution of these new technologies, companies must often work with consulting firms in order to stand out from their competitors, adapt to instabilities in the markets and to be able to better anticipate such changes. Students who choose to take courses exploring the career of a consultant will develop the competencies that will allow them to design and put into place organizationally transformative projects which employ a new way of envisioning the flow of information.

Professional Opportunities for Consultants

Consultant; Research Engineer; Methods Engineer

Strong Points of the Consultant Curriculum

Active learning: students work on a scope statement provided by one of Efrei's business partners. Student teams present their propositions to the school's business partners who select the best project.

5. Innovation and Strategy

In a globalized world innovation and research have moved to the heart of companies' growth strategies. Students who choose to take courses exploring the theme of innovation and strategy will learn how to respond to the strategic

challenges that companies are confronted with today and put into place concrete strategies to overcome them. Likewise, students will gain the necessary competencies related to manage innovation processes and a deep knowledge of technology management.

Professional Opportunities for Innovation and Strategy

Innovation Project Manager; New Market Development Manager; Marketing Representative; Business Development Representative; Profit Center Representative

Strong Points of the Innovation and Strategy Curriculum

- Active learning: students work on a scope statement provided by one of Efrei's business partners. Student teams present their propositions to the school's business partners who select the best project.
- There is the possibility for students to earn a double master's degree in technology and innovation management from EM Grenoble.

6. Information System Architect

An information system architect is like a symphony conductor who must coordinate the different specialists taking part in the project while ensuring that the overall information system functions properly. Information system architects are crucial to creating an information system that is both a developmental and strategic tool. Consequently, they must have high degree of expertise and a deep understanding of the different types of job positions within a company. Information system architects typically work in large companies (banks, telecommunications, large retail sector, large state-owned companies and industries) and consulting firms

Strong Points of the Information System Architect Curriculum


Case studies done in teams and led by professionals.

Program Details: Management (IT Careers) and General Education

SEMESTER 7	Code	NC	ECTS
Management (IT Careers) and General Education	Block 75		6

MANAGEMENT: IT CAREERS (ELECTIVES)			
Systems Architect - Modifying Information Systems	METARC1	17,5	1
Consultant - Business Case Study	METCON1	17,5	1
Entrepreneur - The Basics of Starting Your Own Business	METEN1	17,5	1
Expert - Technology Intelligence	METEXP1	17,5	1
Business Engineer - Business Case Study	METIA1	17,5	1
Innovation and Strategy - Marketing and Innovation	METINN1	17,5	1
International Project Manager - International Marketing	METIPM1	17,5	1
Research and Development – Research Methodology	METRD1	17,5	1
LAW AND ETHICS			
Information Society Law	FE2DE1	17,5	1
IT Law and Ethics	FE2DE2	17,5	1

SEMESTER 8	Code	NC	ECTS
Management (IT Careers) and General Education	Block 85		4

MANAGEMENT (IT CAREERS)			
BUSINESS ENGINEER			
Winexpert Management Simulation	METIA2	17,5	1
Development of a Commercial Offer	METIA3	17,5	1
ENTREPRENEUR			
UPSTRAT-INOBIKE Management Simulation	METENT2	17,5	1
Entrepreneur, Business Case Study	METENT3	17,5	1
INTERNATIONAL PROJECT MANAGER 			
Winexpert Business Simulation (English)	METIPM2	17,5	1
International Project Management (English)	METIPM3	17,5	1
CONSULTANT			
USPTRAT-FI Management Simulation	METCO2	17,5	1
Strategic Auditing	METCO3	17,5	1
INNOVATION AND STRATEGY			
Winexpert Business Simulation (English)	METINN2	17,5	1
Managing Innovation	METINN3	17,5	1
INFORMATION SYSTEM ARCHITECT			
USPTRAT-FI Management Simulation	METAR2	17,5	1
Bringing Together Collective Intelligence	METAR3	17,5	1
EXPERT			
USPTRAT-FI Management Simulation	METEXP2	17,5	1
Managing Change	METEXP3	17,5	1
RESEARCH AND DEVELOPMENT			
Business Simulation Winexpert (English)	METRD2	17,5	1
Patents, Norms and Standards: Challenges and Opportunities for Technology Transfer	METRD3	17,5	1

SEMESTER 9a	Code	NC	ECTS
General Education	Block 97A		4

SEMINARS: CAREERS AND COMPETENCIES 1 - ADAPTING TO A GLOBALIZED WORLD (ELECTIVES)			
Geopolitics and Strategy	ME4IA	17,5	1
International Business Strategy	ME4E	17,5	1
Cross-cultural Management	ME4PM	17,5	1
International Entrepreneurial Management	ME4CO	17,5	1
Economic Intelligence and Technology Intelligence	ME4IN	17,5	1
International Financial Markets	ME4MA	17,5	1
SEMINARS: CAREERS AND COMPETENCIES 2 - MANAGING AND CREATING (ELECTIVES)			
Leading Change in a Changing World	ME5IA	17,5	1
Developing a Business Plan	ME5E	17,5	1
Customer Relationship Management	ME5CO	17,5	1
Risk Management	ME5IN	17,5	1
Financial Products	ME5MA	17,5	1
Risks in the Workplace: Prevention and What's at Stake	ME5RTEP	17,5	1

SEMESTER 9b	Code	NC	ECTS
General Education	Block 97B		4

MANAGEMENT (IT CAREERS) 3 - SEMINARS: I.T. AT THE HEART OF MANAGEMENT (ELECTIVES)			
E-Business	ME6IA	17,5	1
Innovation Challenges	ME6E	17,5	1
E-marketing	ME6PM	17,5	1
Digitization Management	ME6CO	17,5	1
Anticipating Technologies and Markets	ME6IN	17,5	1
Financial Risk Management	ME6MA	17,5	1

Department of Culture and Communication

Coordinator: Jean Soma (jean.soma@groupe-efrei.fr)

Program Description

The courses taught by faculty in the Department of Culture and Communication explore in-depth the intersection where the art of communication and the art of management meet. In essence, our focus is the human dimension as it constitutes a more complex aspect of reality than the more tangible technical know-how of an IT engineer's education.

In this sense, the courses at the graduate level have two primary objectives: the first is to raise students' awareness of communication issues that arise in professional contexts; the second is to open students to the world outside of their usual frames of reference through the exploration of philosophy, psychoanalysis, literature, etc.

These two educational objectives rely on various materials, tools and methods which promote the assimilation of both content (e.g. theories) and practice (e.g. behavior).

Therefore, the courses, most notably the seminars (18 hours), are primarily comprised of applied studies, such as simulations, role-plays, case studies, project-based learning, coaching workshops, etc.

Program Objectives

By the end of this program, the students will be able to:

- demonstrate a high level of written and oral communication, strong interpersonal skills;
- exhibit an ability to adapt and integrate;
- work in both a multicultural team and autonomously;
- effectively analyze and synthesize information;
- take the lead on proposals and innovation.

Key Words

Epistemology, Personalized Coaching Workshops on Leading a Team (English and French), Effectively Chairing Meetings (English and French), Challenges of Corporate Communication, Psychoanalysis and Management, International Negotiation (English and French), Communication Tools for Consultants (CapGemini), Communication in Professional Contexts (English and French), Maximizing One's Potential for a Job Interview

Program Details: Department of Culture and Communication

SEMESTER 7	Code	NC	ECTS
General Education	Block 75		6

Seminar: Effectively Leading Meetings	FH2TC3	17,5	1
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SEMESTER 9a	Code	NC	ECTS
General Education	Block 97A		4

CULTURE AND COMMUNICATION (ELECTIVES)			
Rhetoric	FH2RHE	17,5	1
Interpersonal Communication	FG2TC18E	17,5	1
Effective Public Speaking	FH2CIM	17,5	1
Political Philosophy	FH2PHP	17,5	1
Corporate Social Responsibility	FH2CSR	17,5	1
Getting Involved in Your Own Hiring	FH2REC	17,5	1
The Sociology of Organizations	FH2SO	17,5	1
Pitching Your Idea	FH2PIT	17,5	1

SEMESTRE 9b	Code	NC	ECTS
General Education	Block 97B		4

SEMINARS: HUMAN AND SOCIAL SCIENCES (ELECTIVES)			
Psychoanalysis and Management	FG2TC18A	17,5	1
Rhetoric	FH2RHE	17,5	1
Interpersonal Communication	FG2TC18E	17,5	1
Getting Involved in Your Own Hiring	FH2REC	17,5	1
Getting Involved in Your Own Hiring	FG2TC18G	17,5	1
Political Science	FG2TC18H	17,5	1
Tools for a Public Relations Consultant	FG2TC18J	17,5	1
Public Speaking	FG2TC18K	17,5	1
Stress Management	FG2TC18L	17,5	1
Uberization: A Sociopolitical and Economic Approach	FG2TC18U	17,5	1

Department of International Relations and Languages

Coordinator: Christiane Michel (christiane.michel@groupe-efrei.fr)

English

At the master's level, the English program aims at perfecting students' spoken and written communication skills to give them the ability to express themselves in an autonomous and refined manner. Students that have already reached an advanced level of English have the opportunity to choose a thematic seminar where the English language itself is no longer the object of study but the medium of exploration of a topic. The thematic seminars offered include the study of developing countries in Asia, advanced business English, economics and global finance, creativity, the arts and technology, etc. For students who have not yet reached a sufficient level of competence in English, a general English course is offered to help reinforce spoken and written skills and prepare for the TOEIC exam.

Second Foreign Language

The study of a second foreign language (German, Spanish, Chinese or Japanese) is obligatory at the undergraduate level and optional for graduate students. Learning a second language develops students' cultural awareness, allowing them to develop a broader worldview and opening up study and work opportunities for them in non-English speaking countries. To best replicate the processes of acquiring one's native language, second foreign language courses are primarily taught using the target language.

French as a Foreign Language (FLE)

French as a Foreign Language (FLE) is offered to Efrei's international students. Efrei's international studies can be divided into two categories: 1) students who speak French at an advanced level and are doing their studies in French, and 2) students who are doing their studies in English and need to improve their French for both personal and professional reasons. The content of this program is adapted for these two different groups of students. However, in both cases, emphasis is placed on the development of cultural competence to better facilitate academic and professional integration.

Program Details: Department of International Relations and Languages

SEMESTER 7	Code	NC	ECTS
General Education	Block 75		6

ENGLISH - FLE - SECOND LANGUAGES (THEMATIC GROUPS)			
English 7: Asian Cultures and Societies	FG2TC04	17,5	1
English 7: Media Analysis	FG2TC05	17,5	1
English 7: Skills for Advanced Proficiency Certifications (IELTS, TOEFL...)	FG2TC06	17,5	1
English 7: Capacity Building	FG2TC07	17,5	1
English 7: Oral Capacity Building	FG2TC08	17,5	1
English 7: Creativity, Arts and Technology	FG2TC52	17,5	1
English 7: Issues in Economic and Global Finance	FG2TC54	17,5	1
English 7: Advanced Business English	FG2TC56	17,5	1
FLE (Français Langue Étrangère) 1	FG2TC09	17,5	1
FLE (Français Langue Étrangère) 2	FG2TC10	17,5	1
Second Foreign Language (optional)	LV2FAC	17,5	1

SEMESTER 8	Code	NC	ECTS
General Education	Block 85		4

ENGLISH & FLE (THEMATIC GROUPS)			
English 8: South by Southeast Asia	FG2TC11	17,5	1
English 8: Skills for Advanced Proficiency Certifications (IELTS, TOEFL...)	FG2TC13	17,5	1
English 8: Capacity Building	FG2TC14	17,5	1
English 8: Oral Capacity Building	FG2TC15	17,5	1
English 8: Advanced Business English	FG2TC51	17,5	1
English 8: Creativity, Arts and Technology	FG2TC53	17,5	1
English 8: Issues in Economic and Global Finance	FG2TC55	17,5	1
FLE (Français Langue Étrangère) 3	FG2TC16	17,5	1
FLE (Français Langue Étrangère) 4	FG2TC17	17,5	1

SEMESTER 9a	Code	NC	ECTS
General Education	Block 97A		4

ENGLISH (Capacity Building)			
English 9: Capacity Building	FG2TC19	17,5	1
FLE (Capacity Building)			
FLE	FG2TC20	17,5	1
SECOND LANGUAGE (optional)			
Second Foreign Language (optional)	LV2FAC	17,5	1

e-Novation Seminar

Coordinator: Agnès Béhar (agnes.behar@groupe-efrei.fr)

Description

e-Novation seminars look at the impact of digital technologies in companies. The following three themes are explored:

- Online Reputation Management (ORM)
- The Sharing Economy (*Crowdfunding*)
- Aligning IT with your Company's Strategy

Program Details: e-Novation Seminar

SEMESTER 9a	Code	NC	ECTS
General Education	Block 97B		4

E-NOVATION SEMINARS (Electives)			
Digital Strategy	FE2EN1	17,5	1
Online Reputation Management (ORM)	FE2EN2	17,5	1
Digital Strategy	FE2EN3	17,5	1
Communicating via Animation	FE2EN4	17,5	1
The Sharing Economy	FE2EN5	17,5	1
Web Technologies: Trends and Movements	FE2EN6	17,5	1
Digital Nomadism	FE2EN7	17,5	1

Conferences and Academic Round Tables

Coordinator: TBA

The conferences and academic round tables aim at raising students' awareness of current and future issues in digital technologies through debates and the exchange of ideas.

Depending on the student's major, one or several of the following three themes are explored:

- Start-ups and the Digital
- Innovation and Foresight
- Introduction to Research

One to two conference per theme will be organized.

Program Details: Conferences and Academic Round Tables

SEMESTER 7	Code	NC	ECTS
General Education	Block 75		6

CONFERENCES AND ACADEMIC ROUND TABLES			
E-CeTRA	FGCTRA	10,5	0

SEMESTER 8	Code	NC	ECTS
General Education	Block 85		4

CONFERENCES AND ACADEMIC ROUND TABLES			
E-CeTRA	FGCTRA	7	0

Participation in Student Life (PAVE)

Coordinators: Roxane Chevallier (roxane.chevallier@groupe-efrei.fr), Annick Fitoussi (annick.fitoussi@groupe-efrei.fr), Stéphanie Soetemondt (stephanie.soetemondt@groupe-efrei.fr)

Description

Participation in student life, or the PAVE, is an integral part of the curriculum because it helps students expand their worldviews, it allows them to network with companies and to build their professional identities. The PAVE gives students the opportunity to learn and exploit social and professional codes while as enlarging their awareness of the professional options available to them.

Students can use the PAVE to either get involved in the school's public relations, student organizations or the PECD (The Center for Equality and Diversity).

Program Details: Participation in Student Life (PAVE)

SEMESTER 7	Code	NC	ECTS
General Education	Block 75		6

PARTICIPATION IN STUDENT LIFE			
PAVE semester 7	PAVE		1

SEMESTER 8	Code	NC	ECTS
General Education	Block 85		4

PARTICIPATION IN STUDENT LIFE			
PAVE semester 8	PAVE		1

Professional Training

Coordination: Amar Khelaf (amar.khellaf@groupe-efrei.fr)

Description

Professional training consists of the following 2 obligatory internships: 1) the technical internship in semester 8 (a minimum of 16 weeks) and 2) the final-year internship during semester 10 (a minimum of 24 weeks).

Program Details: Professional Training

SEMESTER 8	Code	NC	ECTS
Professional Training	Block 108		10

Technical Internship	ST104		1
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SEMESTER 10	Code	NC	ECTS
Professional Training	Block 109		30

Final-year Internship	ST105		1
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