

M2 ITEA – 2012 - 2013

*Master Electronique et Télécommunications
Spécialité Ingénierie des TIC
pour les Eco-Activités
(Parcours Ingénierie des TIC pour le bâtiment)*

ISTIC (UFR INFORMATIQUE – ELECTRONIQUE)
UNIVERSITY OF RENNES1

described by

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Studied Contents

Here below, array reports introduced and studied topics during this education.

« General knowledge »	Building Management
<ul style="list-style-type: none"> • Economic development <ul style="list-style-type: none"> ○ (UE1-CP) Communication ○ (UE1-LV) Languages (English) ○ (UE3-GP) Project Management ○ (UE2-IN) Innovation (Strategy et marketing) ○ (UE2-IN) Industrial Property Protection • Computer sciences <ul style="list-style-type: none"> ○ (UE4-AOC) Canonical Objects Architectures ○ (UE4-GLI) GUI Software Engineering <ul style="list-style-type: none"> • Java / Mobiles applications • API for building protocols ○ (UE5-ADMI) Computers Networks Administration <ul style="list-style-type: none"> ▪ IPv4, IPv6, Architectures (Cisco) 	<ul style="list-style-type: none"> • ICT for building <ul style="list-style-type: none"> ○ (UE5-RB) Building networks : KNX, Bacnet, Lonwork, ModBus, EnOcean, Zigbee... ○ (UE6-IDI) Home and building automation engineering <ul style="list-style-type: none"> ▪ Services definition ▪ (Building management and Centralized Management) ○ (UE7-MAD) ICT for home healthcare • (UE6-THB) Building sciences <ul style="list-style-type: none"> ○ Security and comfort ○ Air quality / pollutants ○ Thermography ○ Lighting ○ Acoustics
(UE2-DD) Sustainable Development	(HE/UE7-EMB-Elec) Electric power
<ul style="list-style-type: none"> • Sustainable development Concept <ul style="list-style-type: none"> ○ Concept, International Conferences and Summit ○ Ecological footprint and physical measurements ○ RIO Statement (27 principles and Agenda 21) ○ Montréal / Kyoto : atmosphere and greenhouse gas • Sustainable development physics <ul style="list-style-type: none"> ○ Greenhouse and ozone layer ○ Heat pumps ○ Solar energy ○ Wind Energy • Energy matters <ul style="list-style-type: none"> ○ Energy measurement unities (J, TEP, W) ○ Primary and secondary energies ○ Energy Mix / Energy Balance ○ Fossil Energies, nuclear and renewables ○ Demographic growth and energy needs 	<ul style="list-style-type: none"> • Grid Structure and voltage fields (C11-001, C15-100, C13-100, C14-100) • Grid organization (Transportation, distribution, connection) • French certification in low voltage electricity (BR & B2V) • Schematizing and equipments • Engine force and coupling • Protections (humans and circuits) • Neutral systems • Installations dimensioning (+EDF ratings)

Professional workshops (external missions)

- **Manufacturers**
 - Siemens, Trend, Sauter, Rexel, Theben, Wago,
 - **SmartCities (WonderWare)**
- **Themes**
 - Management and peak reducing of a large consumer (CHU - Hospital of Rennes)
 - Renewable energies and energy transition
 - Thermal solar energy
 - Building usage Optimization (HEQ)
(introduction by CETE – Centre d'Etudes techniques de l'Équipement)
 - Healthcare sector environment
- **Environment simulations**
 - Matlab + SimBad
 - IZUBA / Pleiades
- **Energy Management in buildings : Research ways**
 - Energy Flexibility [budget, usages, storage, local production]
 - Management strategy [needs, optimization, intelligence]
 - Management Technologies [sensors, actuators, information system, network architectures]
 - Teleservices [costs calculation, appreciation, prices offer, forecast]
- **Energy Transition**
 - **Township Impact**
 - Sharp raise of energy cost
 - Paradigm change (from a commercial purpose to a social and politician way)
 - Public disputation (efficiency, soberness, energy mix, renewables)
 - ADEME, NegaWatt, PCET (Territorial Climatic-Energy Plans)
 - **Renewable Strategy -> being able to discuss with anyone on energy chain.**

Study cases (single or groups)

- **Water and electricity power Synergies**
 - Pumped Storage Units (**STEP** –Energy transfer pumping station)
 - Twinned installations : Cogeneration, Wind/Desalinization, waterfalls and waterways
- **Studies and recommendations for peaks reducing**
 - Objectives
 - Peak reducing strategies
 - NOME/ARENH law and RT2012
 - Usages and Strategies
 - Measurements, information systems and management
- **Conditions for an energy sharing grid**
 - RTE (Réseau de transport d'électricité / french power grid organisation)

Personal Aim

Graduated in 1999 with **Master in Networking and Document Management Systems** (University of Caen) and with **Master of Business Administration** in IAE Business School of Caen in 2009, I worked in a young VoIP specialized startup where I was **Technical Manager** in Customer Services.

Still motivated by communication solutions, in Sept 2012, I moved forward to this education to improve my competencies toward electricity equipments control and efficiency management.

I took advantage of this additional year studying to get a better knowledge of market players for electric asset and sustainable development purposes like energy transition, involved laws, and custom and deontology subjects. (Originally -- DRI – that says home and building automation, this education has been renovated as ITEA in 2011 to include this last subjects and resources management concerns (natural and energy)).

Mainly oriented for building management, Smart Cities and Smart Metering, this development provides knowledge to understand and manipulates energy and environmental issues. Thus, energy production, renewable, energy sharing and Smart Grids are also touched on.

“Studied contents” part presents courses I effectively followed : Sustainable development, Energy knowledge, power grid introduction, connected laws, resources management and renewables.

While consumptions management activities are mainly supported by national and territorial players, I’m also interested by natural resources management and still motivated by international jobs. In the right line of my ToIP experience, I’m **now mostly motivated by Smart Grids subjects : production, storage, and demand response mechanisms, peaks reduction.**

Academic Presentation¹

Targeted trainees

This education is designed as a professional training for people who wish to get competencies according new jobs for green technologies based on electronics and/or computer science and networks. It requires 4 studying years after A-Level or any similar experience in this topics.

Aims and new competences

This formation prepares new engineers with trainee periods for positions to participate into conception, integration and deployment of green technologies.

It’s mainly focused on Information and Communication Technologies to enable energy and functional efficiency of residential and business buildings.

Measure and Control technologies may also be introduced to set up environmental diagnostics and to suggest improvement axes for sustainability.

¹ **Web presentation** : http://sfc.univ-rennes1.fr/technologie/master_ingenierie-TIC-eco-activites.html

Opportunities

After a limited market growth, according to new sustainability issues, home and building automation are now more pushed by designers and large builders. These courses prepare to jobs connected to design and deployment of ICT technologies for buildings.

Graduated students are qualified to stand on

- **Designers:** R&D engineers, **architects, town planners,**
- **Integrators: consulting, engineering**
- **Prescribers:** Social buildings technical managers, **building architects,** maintenance managers, control organization,
- **Project Managers: Bid managers, marketing, business development, sales**
- **Trainers:** Middle managers training for building management.

The 3 main targets of green activities education are

- Home and building automation
- Healthcare
- Environmental diagnostics

Blueprint

Courses

- | | |
|--|---|
| <ul style="list-style-type: none"> ▶ <u>Technologies and sciences</u> <ul style="list-style-type: none"> - Sustainable development, software and embedded systems engineering, heterogeneous network architectures, - Building network engineering ▶ <u>Projects / partnership missions</u> <ul style="list-style-type: none"> - Performed in binomial teams, activity reports, poster making and presentation to examiners ; | <ul style="list-style-type: none"> ▶ <u>Economy and communication</u> <ul style="list-style-type: none"> - Market place knowledge, - Professional conferences, - Innovation expansion processes, - Professional communication, - Languages |
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Periodic Internship