

Develop the overall curriculum and build the teaching units



Training Engineering :
Efficient training
For skilled graduates

Table of contents

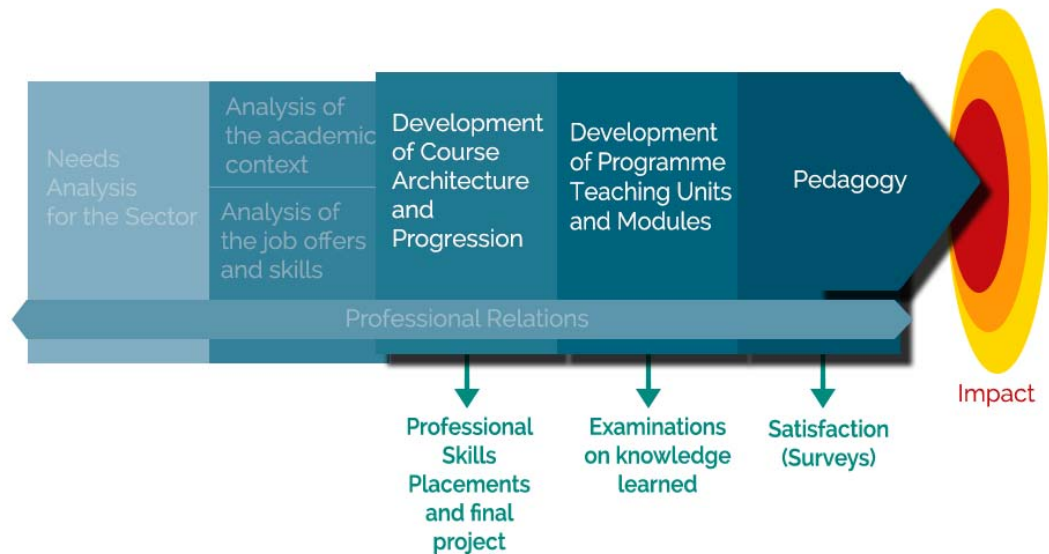
Objectives	5
Introduction	7
I - What does a course programme cover?	11
II - From skills to teaching goals (training course objectives)	13
III - The link between skills, information, knowhow and teaching methods	17
IV - Lesson planning using the teaching guidelines	21
V - Teaching Methods for Professionalising a Course	23
A. Examples:	23
1. Type 1 = acquire the tried and trusted professional skills.....	23
2. Type 2 = Job Finding Techniques.....	27
VI - Checklist for finalising the course programme	31
VII - Organisation of the programme. Recap.	33
VIII - Le manuel de la séquence	35
Conclusion	37

Objectives

On finishing this teaching unit participants will be capable of:

- Naming the elements needed to build a training course programme
- Explaining the organisational aspects necessary to a professionalising training course programme
- Developing teaching objectives to reach training course goals and skill based goals successfully
- Listing the elements needed to compile a complete set of teaching sequences
- Giving examples of teaching styles for professionalised courses

Introduction

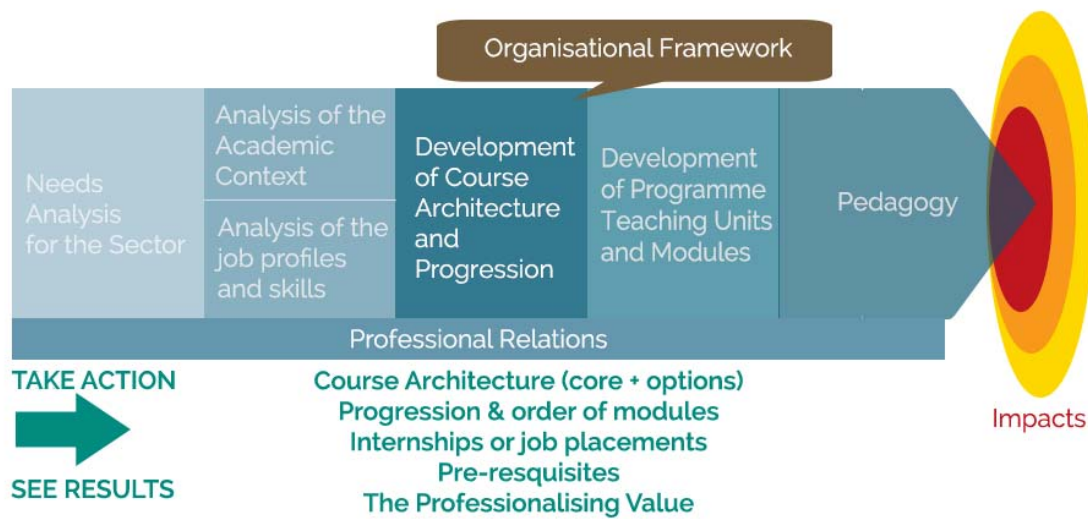


The preceding sequences have shown the work that should be done before opening a training course and notably the links to set up with the professionals. This will ensure the pertinence of the course content which will lead to operational professionals entering the job market.

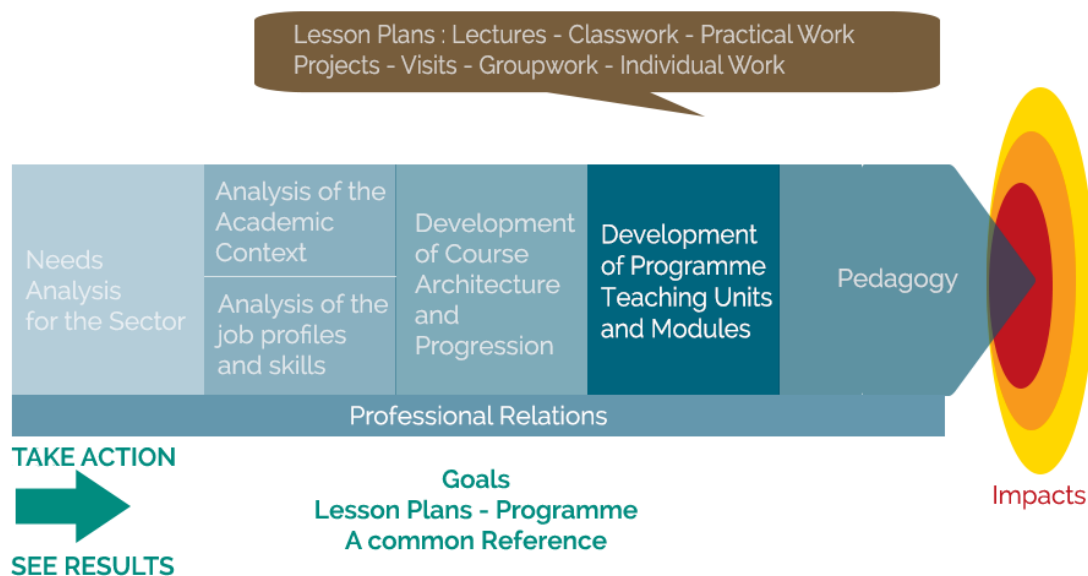
This final sequence will address questions about course development more directly.

Step by step:

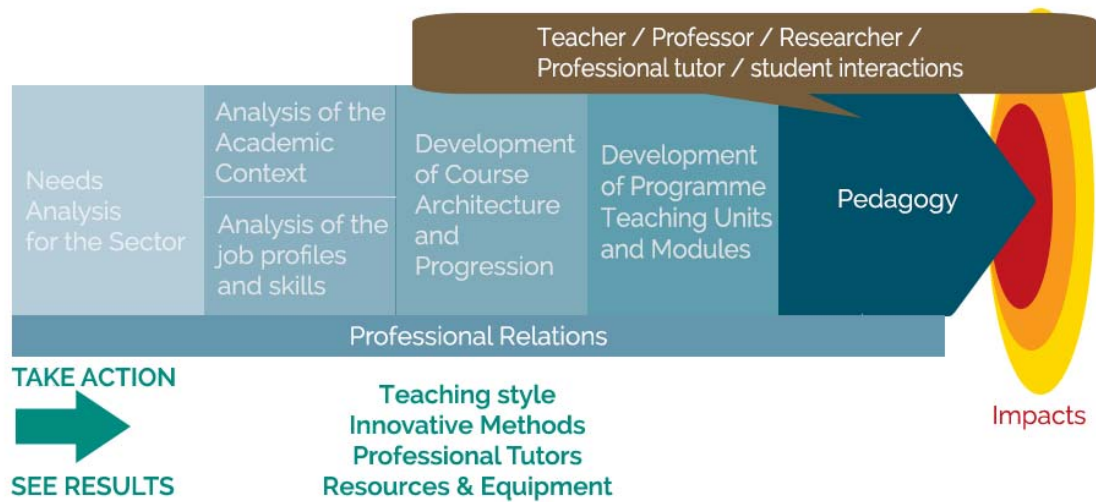
- Course architecture, globally speaking



- Creation of teaching units and sequences



- Implementing the teaching method



The whole process is quite repetitive.

Questions and issues often include:

"How to transfer understanding of the professional world while complying with academic requirements?"

"How to learn a range of professionalising skills and knowhow as well as a specialist subject?"

Hopefully, you will begin to find some key solutions to these issues here.

What does a course programme cover?



Adaptability

« **Course contents and programmes** » are not developed by following one rigid guideline.

Whether you are you creating a teaching sequence or a whole course, the degree of specific detail required while working toward one goal or another and teaching a particular student profile rather than another, means that adaptability is essential.

The documents presenting the programme may be in the form of a leaflet or a student guide booklet or a complete official description with details of every aspect from professional partners to the complete course programme and the type and value of qualification awarded on successfully completing the course which can be used by the teaching staff, educational advisors and certifying authority.



Example : Examples: Look here for examples:

- **Flyer (2p)**: Master en sciences et technologies "Agronomie et agroalimentaire" Spécialité : Systèmes agraires tropicaux et gestion du développement. Parcours : Marchés, organisations, qualité, services dans les agricultures du sud(see)
- **Web presentation**: *Animal Science – Master's programme*¹
- **Student Guide Booklet (28p)**: Ingénieur SAADS. Option Industrie Agroalimentaire au Sud(see)
- **Course Description (53p)**: BTS Sciences et techniques des aliments(see)



Note

In higher education, course description according to skills is becoming more popular for several reasons:

- To equate European course content for international student exchanges
- To compose a list of professional skills acquired while working (Répertoire National des Certifications Professionnelles (RNCP) in France) to obtain a certificate of validation guaranteeing a level of ability. (Validation des Acquis de l'Expérience (VAE) in France)
- To render an establishment more visible to improve notoriety.

1 - <https://student.slu.se/en/studies/courses-and-programmes/masters-programmes/animal-science/>

Communication can be designed to fit demand by highlighting career prospects etc...



Reminder

"The main goal of a programme is to give a description of the course content. It is an explanation of the topics dealt with and how they are organised in the timetable. This document helps coordination between the students and the teaching staff and presents clearly how a teaching sequence fits into the global teaching content. The European Bologna reform framework makes the comparison of university programmes accessible and an increasing number of European universities are making their programmes visible."

Source : <https://pedagogieuniversitaire.wordpress.com/2010/09/28/developper-un-syllabus-de-cours/>²

The constituting elements of a training programme

If we consider the global architecture of a Masters course, for example, it could be defined according to:

1. The targeted career and required professional skills
2. The level of qualification and the number of required ECTS credits
3. The timetable which is often set to fulfil academic requirements: number of hours, distribution of subject matter, practical work, classwork, work placements or internships and personal work.
4. Prerequisites
5. Course content, defined according to:
 - defined goals ;
 - the balance between professionalising and specialising content ;
 - division into teaching modules (which is often suited to life-long learning) or spread over the course
6. Teaching methods: globally, indicate whether the methods are active or passive or a mixture of both, if there is classwork or online work, etc. All these decisions have been made earlier on. We will come back to these points shortly.
7. Practical information: where and when the classes are being held
8. Evaluation

From skills to teaching goals (training course objectives)

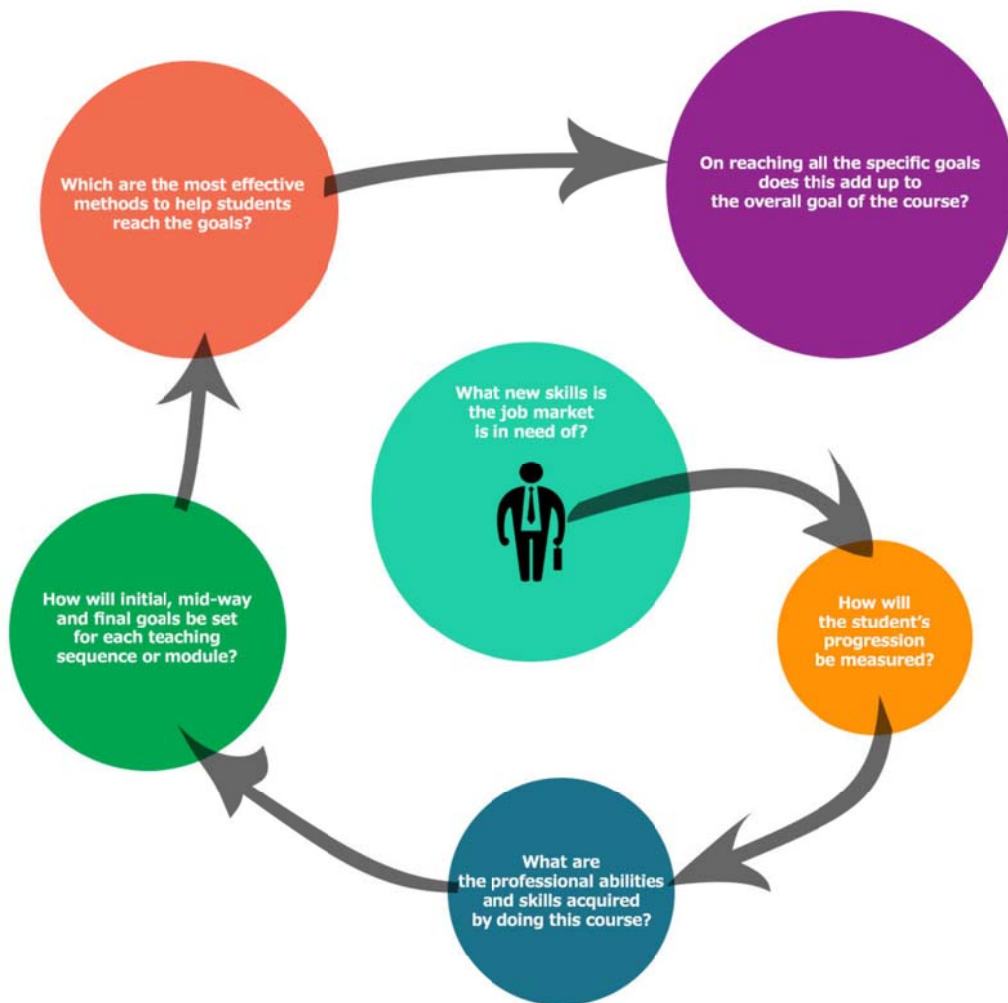


When building a professionalising training course, the reasoning behind each goal for each section of the course needs to fit in with the global coherence. Each goal is like one brick in the wall.

A solid basis must be established first, on which it is possible to build, brick by brick. The style of the wall you are building will change according to external influences you wish to include.



Method : The progression through the building process can be seen follows:



Example : Let's study this example

Amongst the goals of this module in training course engineering there is one that says something like this:

'Be able to explain the place of and the reason for a course programme when engineering a training course'

1. The goal is not to be capable of **developing a programme** but to **explain** why you write a programme and how you use it. Therefore you will not find a case study to work on writing a programme.
2. In order to explain the reasoning behind a programme it is necessary to – show an example document and explain the contents – give examples of how it can help with cohesion – give reasons why using a programme has a positive impact on the quality of the course.

Knowledge must be learned on 'course programmes and their use' and knowhow must be acquired on communication strategies for explaining. We have here a glimpse of all the necessary groundwork that needs to be done to be able to define teaching content.

The link between skills, information, knowhow and teaching methods



Reminder

Implementing a skill means tapping into three sources:



- The cognitive domain = **'to know'** (Knowledge)
- The sensory and motor functions domain = **'knowhow'** (Practical skills)
- The emotional and psychological domain = **'attitude'** (Interaction skills)

To apply these domains to teaching methods, we select the most appropriate response and calibrate according to the challenge at hand:



- The cognitive domain = **'to know'**
 - presentation, lecture, lesson
 - case study
 - finding solutions to issues

Source : Illustration for TIME by Leigh Wells



- The sensory and motor functions domain = **'knowhow'**
 - demonstration
 - practical application
 - practice

Source : Illustration by <http://www.medecinegeek.com>



- The emotional and psychological domain = **'attitude'**
 - study of representation
 - group work, simulations and roleplay
 - real life situations



Complement

Obviously, the choice of teaching method also depends on the budget, materials and equipment available:

"Have the teaching staff been trained to use a range of teaching techniques?"

"Are the budget and available materials sufficient to allow planning field trips, placements or practical work sessions?"

"Can the documentary resources be consulted easily by the students?"

Lesson planning using the teaching guidelines

IV

Lesson plans are used by the teaching staff. It's the programme with a detailed description of sequences, timetables, contents, methods, materials and budget, teaching staff, evaluation methods and criteria.

This teaching tool is used to:

"Set a timescale for the harmonious unfolding of the successive parts of the course."

"Foresee the means and tools necessary for the smooth running of the course and the evaluations' This can help avoid wasting time at the last minute finding the materials, setting up the workspace etc."

"Guide the teaching dynamics: despite all the preparations upstream of the class there is always need for adjustments which must stay within the general framework."

"From one year to the next or one session to another, improvements are made to the programme after observing the successes in class. This means that the course can evolve and new teaching staff can fit in easily."



Example : Examples:

1. Example of a one-day pedagogical scenario - as part of a training for the reception of the public in a professional place (excerpt)(see)
2. Scenario example in Tempus (3 modules)(see)

Teaching Methods for Professionalising a Course



V

Examples:

23

The modalities of professionalization

There are 2 *standpoints* from which we can design a course which improves the employability of the students:

1. Help students to acquire the tried and trusted professional skills through real work situations: by meeting professionals, doing work commissioned by professionals or by doing placements or internships
2. Accompany students in their progression towards 'employability': coach them in job finding techniques etc.

A. Examples:

1. Type 1 = acquire the tried and trusted professional skills



Example : A work placement or a commissioning company's brief

VIDEO

Speech:

"So what exactly is a job placement, or internship?"

Internship are periods **of real training in a real professional context**. Montpellier SupAgro recognizes the importance of internship experience and includes them in all the different study trajectories.

Every agricultural engineering student, during their three year course, has **at least 10 months** dedicated to work placements and these are not merely periods of observation, or discovery of life at work, these are real professional experiences, with responsibility.

Internships must give the student the opportunity to explore activities and missions which consolidate their coursework. In the Agricultural Engineering cursus, internship content shows a real progression between first year and final year, going from manual work to an assistant engineer's post.

In their final year, students carry out a real agricultural engineering mission for a professional. The skills developed are: **project management, implementation of a scientific procedure or production procedure, with results, quality recommendations** and more.

These placements are recognised to be essential for student development. They are the means to consolidate theory learned in class, with '**hands-on' experience**.

Also, while reinforcing their knowhow, students are learning about professional attitude and are building their own professional project, confirming or re-directing their interest to one sector or another, to one job profile or another.

At Montpellier SupAgro, it is possible to choose to do a gap year between second & third year, to find more work placements. They do not have to do this but 70% choose to do this. In this way they are gaining more and more professional experience. They can work on projects that give them a solid basis on which to build their future professional profile and to choose their specialization.



Example : Active Training

Training is organised around the response to a commissioning company's brief using given theory and method with all the constraints of a real work situation.

The double objective being: intensive learning and responding to a professional brief.



Example : Student Engineer Projects

Example of **Student Engineer Projects** at Montpellier SupAgro (video seen in sequence 2)

VIDEO

Speech:

At Montpellier SupAgro, we have over 180 students in Engineering Training. During their curriculum, students are asked to carry out a project sponsored by a Montpellier SupAgro partner. The so-called Engineering Student project or PEI. The project takes over 10 months beginning in the 1st year (Year 3 of BSc level) and ending in the 2nd year (Year 1 of MSc level).

It is a learning activity based on the concept of education through project work which aims at:

- **Giving meaning to the knowledge** acquired during the courses
- Allowing the students to learn, **by and in the action**, to respond to a real project from a sponsor in adopting a professional posture
- Developing new skills in project management

Throughout the duration of their project, the students will go beyond their initial mission to generate ideas, **set goals**, put in place an **organization to overcome** issues and explore **the cross-cutting areas of knowledge** in order to provide **the expected response** to the Sponsor.

The project teams have to be **imaginative, critical, curious** in order to propose **innovative solutions**.

The students work in groups of 4 or 5 and each student plays a part in the team project: project leader, communication manager, treasurer, planning manager, and one student is in charge of the meeting proceedings. And so they learn how to work in a group in the long term, efficiently and autonomously, they also develop their

own skills .

The students are helped throughout their project.

Each team is supervised by a **teacher or tutor connected to the theme** of the study. This teacher keeps an eye on the work in progress , helps the students to keep the scope of the project in mind and in carrying out their bibliographic research and in stimulating their creativity.

A teacher is associated with the student engineer project , making available additional scientific expertise to the sponsor.

As the coordinator of these student engineering projects, I have to find adapted projects. This step requires to contacting **partner's networks** and to having a lot of exchanges with the possible sponsors to be sure that the proposed subjects have the right focus and are achievable within the framework of student engineer project.

The projects correspond generally to feasibility studies, implementation of surveys or proposed-projects. A preliminary work allows to clarify the sponsor's requirements about the evolution of his working structure.

Then I have to find a teacher/tutor for each group, provide the students with the various topics and check the good progress of student engineer project.

The student engineer project includes two major steps. The first major step is the **Supervising Committee meeting** which is 2 to 3 months after the beginning of the project .The students present the specifications of the project to the sponsor, to their tutor and to everyone involved in the project. The second major step is **the project presentation** which takes place at the end of the project. The students present their response to the command and the deliverables.

This activity of learning through project work is a much appreciated exercise by professionals as by students engineers. This year, **92% of the students are satisfied** with this first professional experience that enables them to develop transversal skills essential to their future engineering career; and **100% of the sponsors are satisfied with the work provided by the students and their response to the initial order.**

The sponsors also appreciate the links created with the tutors who enrich their network and who will be part of future engineer training courses.

We are clearly in **a win-win context** for our partners and our students.

Junior Enterprise: A network of higher education student associations offering a service to professionals: a steep learning curve towards employability. Working with Junior Enterprise opens doors for students who are looking for a job.

- *Example of the JEMA Montpellier SupAgro³*

Awards and Competitions: An initiative is an opportunity to reinforce networking with regions, partners and establishments. For example:

- *Concours Graine d'Agro⁴* : organised by Montpellier SupAgro, SupAgro Alumni and INRA in partnership with SupAgro Fondation, Groupama Méditerranée and AgroTIC, this competition aims at encouraging creativity, autonomy, innovation and entrepreneurial spirit. For students with an idea or a project linked with the themes seen in the courses. Three or four prizes are awarded every year with a total value of 10,000€.

3 - <https://www.supagro.fr/wordpress/jema/historique/>

4 - https://www.supagro.fr/fondation/concours_graines_agro.html

- Challenge Innov'Agro (see video):



Source : UE report "Improving the quality of teaching and learning in Europe's higher education institutions" JUNE 2013. Recommendation 10

Prix Isogone :⁵ Created in 1986, le ISOGONE competition is and has always been run by the Food Science students of Agrocampus Ouest, in Rennes. This operates as an association (loi 1901) supporting, encouraging and enhancing innovation by awarding a prize for 'Food Science Innovations' in Brittany, France.



Example

Classwork and case studies based on real work situations

5 - <http://www.isogone.fr/>



Example

Professional tutors, interviews with professionals, visits to businesses, open conferences

2. Type 2 = Job Finding Techniques



Example : Accompanying students searching for work placements or a job

VIDEO

Speech:

"How are students helped in their search for a placement and while they are doing their placement?"

Montpellier SupAgro students find their own internships; this is an integral part of the experience which will teach them how to look for work successfully, later. They are given a number of tools and resources to help them. Two databases are especially helpful; professionals formulate offers which are added to the first one, and students from the previous year leave their reports for consultation, in the second one.

The **professional offers** can be seen using the intranet system. Professionals put the offers there using an interactive platform available on the school website. More than one thousand five hundred offers are collected every year in this way.

In the second database, where students from the previous years leave information, there are contact names, topics, and comments to help formulate letters asking for a placement.

We have seen that this **handing down of experience** from one year to the next is extremely valuable. So to take this idea further there is an event where second years come and meet students in their final year, after their final placement. This helps final year students to express how they have benefitted from their experiences which really inspires the second years.

I am head of the Montpellier SupAgro Internship team. Together, we **coordinate and manage the databases, prepare and debrief the students to help them to express the value of their experiences**. We draft placement contracts translated into various languages, we draft handbooks with advice, and we meet professionals to help match their needs to the needs of the students

While the students are following their internships, an elected professor, lecturer or teacher acts as internship manager and watches over them, giving advice. **One thousand two hundred** placements take place per year, mobilizing the whole teaching community of Montpellier SupAgro.



Example : Accompanying students building a professional project

VIDEO

Speech:

"How is the Professional Project Organised?"

Agricultural Engineering students can be accompanied individually or in groups during practical work sessions.

Our main objective is **to follow their choices, to build their own personalized professional project**. We help by giving information about a range of sectors, a range of job descriptions and the job market. We lead them through the steps, from searching for placements to searching for a job, taking into account their

project and the job offers available.

The practical work classes are programmed at intervals from the arrival of the students to their graduation. I have designed the course content to include tutorials by professionals from outside the school, who I coordinate to supplement the classes I give to the students myself

We have defined goals for each year in the cursus with a progression towards the definition of the individual professional project and job hunting strategy. Teaching methods are dynamic with interaction between students, role plays and correction between peers.

In first year, knowledge is deepened by sector and by career. For example, in sub-groups of 4 or 5, students interview former students from the school, this helps situate the reality of professional responsibilities and different career choices. It is doubly enriching: firstly, the diversity of agricultural engineering careers becomes evident and secondly networking begins here.

For Montpellier SupAgro, this is a means to keep in touch with former students and learn about their promotion and career opportunities. Every year to prepare this assignment we get feedback from eight hundred former students from six different years and invite them to participate.

The information gathered is made available on intranet for students and teaching staff.

In second year, students learn how **to identify** and analyse the skills they have developed during their internships. They learn how to express this in writing for their job applications, and orally **for job interviews**. They are also helped to identify the third year specialization that is best suited to their aspirations.

In the final year, after practical work classes in management and management responsibilities, they update and adapt their job applications and are candidates in professional interview simulations.

One more thing: the Montpellier SupAgro Professional Development team organizes one of the highpoints of the year, The Careers Job. This event attracts professionals, former students and graduating students to discuss concrete professional experiences and career paths. There is also a job fair to discuss job offers with the professionals, around a range of careers.



Example : The placement or internship and job watch

Video seen in sequence 2 and consult the blog: www.supagro.fr/wordpress/veille-emploi/

VIDEO

Speech:

To give the students the best advice and to support them in setting up their professional project, it is important to watch the employment market closely, following the jobs in the different sectors of activity as well as keeping track of the recruitment techniques being used.

It is not possible to see everything but it is essential for us **to follow the employment trends and the evolution of the job market, in real time**.

Before, every member of the career and employability team watched the employment market independently to give updated information to students but little by little this activity has been organised as teamwork. We have created **a blog called 'sector watch, jobs, SupAgro recruitment'**.

The first step was **to collectively define the goals and targets of this watch clearly**. Our objective is to give the students, the teachers and the staff at

Montpellier SupAgro, updated information about the employment market, concerning the jobs in the sectors of activity covered by our training courses, and the evolution of the recruitment techniques.

Our blog is the communication hub of this watch, accessible to all, so please feel free to consult the address that appears on the screen.

> <https://www.supagro.fr/wordpress/veille-emploi/>

For this watch, we have selected 4 sources of useful information:

- Websites dedicated to 'labour market watch', which used to be associations for career management
- Websites dedicated to one or more sectors of activity but offering a watch service with a newsletter, or RSS feeds for example
- The Websites on job hunting and career management
- The educational sites, with student guidance and training courses

In addition to these on-line resources, our work is helped by the analysis of data on the integration of our degree holders in the professional world, but also by the monitoring of job vacancies. A quantitative analysis of job offers gives an overview of the main trends in the employment market; a qualitative analysis allows you to detect the evolution of professions and profiles needed. I suggest you watch the video to see the different types of surveys used.

Also, we have a close relationship with the degree holders at our Institute and with the Association of Former Students 'SupAgro Alumni' and this is a valuable source of information.

The information is collected and then sorted to select only the information responding directly to the objectives of our blog. We determined upstream what type of information is publishable and I have written a charter to guide colleagues who contribute to this watch for our blog. When an article seems interesting, the watcher writes a tagline or a short synthesis, with a link to the full article. The contributions gathered in this way are then validated before being published on our blog and the watcher's name appears with the article. The publications on the blog appear chronologically but are also classified by topic - labour market, professions, recruitment tools and also sectors of activity.

Making your blogs freely accessible will allow your degree holders to consult them when they leave your Institute.

When I first took-on this job, I met with the educational teams to find out about their practices in terms of following-up on degree holders careers and their ways of watching the employment market in their sector. Of course all the departments do this watch, but only at their level without making the information freely available. The educational teams also have strong links with the professionals in their own sectors. So **the challenge today is to create a network sharing their information with a central watch unit** to better inform our students.

So, "How can we make such a network work?"

1. It is necessary to consider this collective watch as a project: The objectives must be defined between the participants and it is essential that everyone understands how they benefit from sharing their own information.
2. Running a team is a factor of success too; we encourage dynamic collaboration by inviting all the participants to an 'experience sharing' workshop. This is the opportunity to wake up the sense of allegiance, giving collective meaning to our watch and to define the objectives of our work together. A watch unit manager should know how to be motivating so that each participant continues to meet his own needs, but contributing to the collective watch.
3. Regular feedback on the progress of collective work is the key to success: a

short synthesis must be published in 'The Watch Network Newsletter' and I must present the results of my work on the follow-up of degree holders. It is necessary that each person involved can see that they are learning from this collective work.



Example

Accompanying the students writing their Professional Profile Sheet, cover letter and preparing an interview



Example : Meeting Professionals

- *The careers forum*⁸
- The AgroTIC café

8 - <https://www.supagro.fr/web/pages/?idl=19&page=1957>

Checklist for finalising the course programme



VI

When you think you have finished your preparations ask yourself these questions:

1. Can you explain the progression?
 - Check coherence and chronology of teaching units and lectures
2. Is the order of teaching modules (over a week or over a month) optimising the appropriation of the content? Or should the lessons be dispersed evenly all through the course, as with language training, for example?
 - Check optimising strategies according to timetable
3. Can the multidisciplinary content be improved?
 - Check that cross-cutting skills are being favoured
4. Have you programmed a wide range of teaching methods? (classwork, practical work, field trips, meetings with professionals etc.)
 - Check that learning dynamics and student interaction are stimulating; avoid dull tasks
5. Is the general rhythm of the course well planned, with time for individual study and extra-curricular activities? Are fulfilment and personal growth encouraged?
6. Have you taken into account the effect the seasons could have on the organisation?
 - Check the growth cycles for agricultural training courses and also availability of professionals who may have an annual busy period not forgetting public holidays and school holidays...

Organisation of the programme. Recap.

VII

VIDEO

Speech:

How is the cursus organised?

This final step provides a definition of the essential key elements needed for the finalisation of a training course cursus and the development of the contents.

'the style' of the training course cursus depends on the academic 'constraints'. This includes the number of ETS credits, the total length of study, the balance between theory and practice and the percentage of time devoted to core studies, specialisation and work placements or internships.

On top of the academic considerations, further care should be taken when developing the contents:

- 1) The continuity and logic of teaching unit content in sequences should lead to better assimilation of the knowledge by the student. For example, it is necessary to check that all basic points have been taught and understood in a previous sequence before making reference to them and going further.
- 2) The division of the teaching content may entail organising the teaching units in one sequence or alternatively, as is often the case with language learning, dividing the teaching content into shorter units taught at intervals over a longer time span.
- 3) The multidisciplinary approach to teaching allows students to prepare for a specific profession where mastering several skills from different domains is necessary. This means establishing the interconnection of these different studies.
- 4) A rich variety of teaching methods will help achieve the level of understanding, knowhow and skills targeted; these methods include practical work, field trips, interviews with professionals, personal study and free time for extra-curricular activities.

How is the cursus organised? Tips on methodology.

Both the creation and the updating of a course are complete projects in their own right. Project management strategies should therefore be brought into play. The project must be directed by a committee of educational advisors made up of teaching staff, education experts, and course managers, for example. Training schemes for the staff may be one of the first needs to satisfy before initiating the course design/update project.

To be efficient the committee of educational advisors should be formed far enough ahead of time for team dynamics to be established, while training for example, before starting the project. A team manager should be elected to coordinate the work schedule with regular meetings, validation of decisions and sharing of

information between all members. The final teaching unit managers should be named rapidly to allow their participation in decision making and to allow them to deepen their understanding of the project.

The expected outcome

Let's move forward from the global course architecture to the details of the content. The reference system describing all of the course content is known as the syllabus or programme. This step precedes the design of each lesson plan.

The course syllabus

The context of the training course defines the way the syllabus is written.

The main considerations are as follows:

- Course objectives and glossary of skills required
- Prerequisites, if any
- Definition of teaching units
- Definition of organisation procedures for the course
- Learning goals and teaching methods (lectures, practical work, classwork etc)
- Satisfaction surveys and definition of methods for measuring understanding of course content

The global procedure in schematic form

To summarise we can say that we started by analysing the sector to build a description of the profession in a job reference. The job reference includes a description of linked professional activities. The analysis of the academic sector and the job reference results in a glossary of professional skills. The glossary of skills is transformed into course objectives and teaching objectives. The final step is the drafting of a document containing the course architecture, the guiding thread and teaching units.

Le manuel de la séquence

VIII

Conclusion



Now you can go back to the homepage:

> *Homepage of the Training Course Engineering Module*⁹

Continue your training by discovering Sequence 7 :

> *Sequence 7: Conclusion*¹⁰

9 - http://www.supagro.fr/ress-tice/asifood/index_en.html

10 - https://www.supagro.fr/ress-tice/asifood/IF_Eng/Sequence7/co/Sequence7_AsiFood_Angl.html