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The Oenology Department of the Engineering School of Changins

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Abstract: The Engineering School of Changins, as part of the University of Applied Sciences of Western Switzerland (HES-SO), is the only one In Switzerland to provide an Oenology Department. The course lasts six semesters with an additional semester for the dissertation. The Engineering School of Changins has developed an applied research activity, supporting small and middle-size enterprises (SME) of the oenology sector. The goal is to improve the quality of wine in Switzerland. The Engineering School of Changins has always worked to serve the wine-making industry with advice and assistance, performing expert evaluations and analyses.

Keywords: Analysis · Applied research · Oenology · Services · Studies

The Engineering School of Changins, which is one of the partners of the HES-SO (*Haute Ecole Spécialisée de Suisse Occidentale* – Specialist Higher Education Institute of Western Switzerland), has been offering studies in oenology up to HES level since 1998. It is the only school in Switzerland to offer this course.

1. The Oenology Department

HES Oenologists have a high level of professional knowledge of viticulture, good quality grape production, vinification techniques, care of wine and the management skills necessary to run a business within the viticulture and oenology industry.

HES Oenologists go on in their professional life to:

- participate in research and other projects related to efficient grape production and vinification techniques;
- make use of their technical and economic knowledge in the fields of viticulture and oenology;
- advise and provide support to other professionals within the fields of viticulture and oenology, including in terms of management and planning.

Career Opportunities

HES Oenologists specialised in viticulture and oenology will often find work with:

- grape and wine producers,
- commercial companies,
- advisory agencies,
- professional organisations,
- research centres,
- state services and administrative authorities,
- and in education and awareness-raising.

2. The Course

The oenology course lasts for three years and is based on the gradual and progressive acquisition of relevant knowledge, know-how, and skills.

Some students will have begun to learn about the wine industry before beginning the course, either through work experience or after a year of work experience placements in the sector.

During the first year of study, work focuses on perfecting previous knowledge in the following subjects: maths, French, English, German, biology, physics, and chemistry. New subjects are also introduced: geology, pedology, law, economics, ecology, and statistics.

During the second year of study, students are taught the basic skills of the oenologist *via* theoretical study, demonstrations, practical training, visits, and seminars.

During the third year of study, students are able to perfect their theoretical and

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practical knowledge of production techniques and aspects of oenology.

The topics studied are:

Viticulture, soil science, grape phytopathology and parasitology, the mechanisation of viticulture.

Vinification techniques, wine microbiology, wine analysis, cellar technology, tasting and sensory analysis, distillation, wine microbiology and practical cellar and laboratory work, selected areas within viticulture and oenology, case analyses, and exercises.

One-week seminars are also organised enabling students to gain greater knowledge of individual subjects such as IT, ecology, grape-picking, management, sensory analysis, viticulture, viticulture in German-speaking Switzerland (courtesy of the Wädenswil Engineering School), separation techniques (courtesy of the Valaisanne Higher Education Institute in Sion), soils, setting up a business, and cellar management.

During the *seventh semester*, the students are required to write a *dissertation* on a topic proposed by a teacher, researcher or professional within the sector. This topic must relate in some way to the problems of the industry.

3. Applied Research at the Changins Engineering School

As we know, universities devote a lot of their time to basic research. The HES schools, on the other hand, have been entrusted with developing applied research projects in close co-operation with the country's businesses, above all small and middle-size enterprises (SME), which often do not have sufficient funds to run their own research and development projects.

The following are examples of current research projects:

- Development of a colorimeter/nephelometer for use in oenology. The Geneva (electronics) and Changins Engineering Schools have pooled their skills and resources to design a measuring instrument for use in oenology that will assist oenologists in making decisions during the vinification process. The patented meter is the first to combine the functions necessary both for nephelometry and colorimetry measurements.
- Study into the potential of *pediococcus* in terms of the malolactic fermentation of wine. The Engineering Schools of Changins and Valais and the RAC (*Recherche Agronomique de Changins* – Changins Agronomic Research Group) are working together to select varieties of *pediococcus* that would be suitable for use in practice.
- Automated alcoholic fermentation management. The Engineering Schools of Changins, Yverdon (microtechnology) and Geneva (electronics) are working together to perfect a system of IT control for the alcoholic fermentation process that would enable the oenologist to manage different types of alcoholic fermentation. The basis for this work is the development of a simple and reliable density sensor.
- The 'Casks' project involves the study both of our wine-growing and forest soils to achieve an optimum end product, *i.e.* Swiss wine stored in Swiss oak casks. This project is based on a partnership between the Engineering Schools of Changins and Valais, the Wood Sciences Department of the ETH Zürich, the forestry authorities of different cantons as well as various Swiss cooperages and wine cellars. The aims of the project are: 1) to determine the influence of the origin and variety of oak planted on the quality of the wood used to make the casks by measuring different morphological, physical and chemical parameters; 2) to assess the effect of the merrain drying process and the cask heating process on the flavours provided by the oak wood; 3) to measure the amounts of these ingredients in wines stored in casks; 4) to optimise the conditions under to which wines are stored in casks, in particular in terms of the best matches of wood and variety of grape; and 5) to introduce an oak traceability concept from tree to cooperage.

4. Serving the Industry

The Changins Engineering School has always worked to serve the wine-making industry. Oenologists working for small and large wine cellars alike, cork manufacturers, and wine traders all know that they can rely on the support of the Changins Engineering School for advice and assistance. In particular, the School solves vinification problems, supports these professionals in their work and carries out expert evaluations related to all of the aspects of oenology and wine technology and microbiology.

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