**TEACHING PROGRAM**

**MASTER 1** - **Semester 2**

L : Lecture / Cours magistraux (CM)

T : Tutorials / Travaux dirigés (TD)

PL : Practical Labwork / Travaux pratiques (TP)

**S-U02-4301: HISTORY OF AGRICULTURE**

L 6h

**Teacher:** Fabienne TROLARD (INRAE)

This course will cover the natural selection of chemical elements in the critical zone and the history of agriculture during the last 10 000 years: the main biotechnological, biophysical and socioeconomic drivers of the spatial, organizational and functional dynamics of the soil - water - plant system; Green Revolution; Climate Change; Anthropocene.

**S-U02-4302: PLANT ECOPHYSIOLOGY (Part 1)**

L 18h T 6h

**Teacher**: Laurent URBAN (AU)

This course will introduce the role of carbon budget and stress in yield, quality and defenses. Then, a focus on photosynthesis will be given: role of light, photo-inhibition, photo-oxidative stress, temperature, CO2, climate change. Modeling.

Field tools for measuring photosynthesis, and respiration/translocations – Tutorials test

**S-U02-4303: CONVENTIONAL CONSERVATION AND TRANSFORMATION TECHNIQUES**

L 15h T 5h

**Teachers**: Florence CHARLES (AU), Isabelle SOUCHON (INRAE), Sylvie BUREAU (INRAE), David PAGE (INRAE), Carine LE BOURVELLEC (INRAE), Agnès ROLAAND-SABATE (INRAE), Alexandre LECA (INRAE), Nawel ACHIR (Supagro), Manuel DORMIER (Supagro)

**Conventional conservation techniques**

Postharvest plant physiology and quality deterioration

Conventional storage of fresh fruits and vegetables: from cooling to modified atmospheres

**Conventional transformation techniques**

* Why process fruits and vegetables? Overview of fruit and vegetable processing and challenges for the sector
* Contribution of Near-Infrared and Mid-Infrared spectroscopy to evaluate the variability of raw and processed fruits and vegetables
* Aroma compounds in processed fruits: origin, variability among species, and release from food matrix
* Phenolic compounds in processed fruits: variability among species, agricultural practices and evolution from fruit to food matrix
* Polysaccharides and fibers and their modifications during processing
* Texture of fresh and processed fruits & vegetables: measurements and modeling
* Kinetic modeling of food quality change during processing: focus on chemical and enzymatic reactions affecting sensory and nutritional properties of food
* Membrane technologies for fruit juice processing: Focus on micronutrients

**S-U02-4304: plant food and phytochemicals, BIOAVAIlaBILITY AND HEALTH EFFECTS (Part 1)**

L 15h T 5h

**Teachers**: Olivier DANGLES (AU), Sabine GALINDO (INRAE Montpellier), Claire DUFOUR (INRAE), Agnès VINET (AU), Philippe OBERT (AU)

* Eat 5 fruits and vegetables a day: a scientific approach
* Main classes of dietary plant phenols, dietary abundance, bioaccessibility, activity in the gastro-intestinal tract
* A microbiota approach of plant food
* Intestinal absorption of plant phenols, bacterial and human metabolisms
* Dietary habits and cardiovascular/cardiometabolic disease
* Effects plant foods and micronutrients on cardiovascular risk factors. Events and mortality
* Effects of plant foods and micronutrients on the cardiovascular system

**S-U02-4305: Safety of the production chain of fruits and vegetables (Part 1)**

L 9h T 3h

**Teachers**: Sabine GALINDO (INRAE Montpellier), Thierry ORSIERE (IMBE), Pierre RENAULT (INRAE)

* The mycotoxin hazard in the production chain of fresh and processed vegetables
* The toxicological risks due to crop protection
* The risk of viruses: hazards, contamination routes and principles of control

**S-U02-4306: ETHICS & SCIENTIFIC INTEGRITY**

L 6h

**Teacher**: Fabienne TROLARD (INRAE)

This course will cover all of the rules and values that must govern research in order to ensure its honesty, credibility and scientific rigor.