



## COURSE DETAILS

"PRINCIPLES OF GENERAL AND PLANT BIOLOGY (A-H)"

SSD BIO/03

DEGREE PROGRAMME: FOOD TECHNOLOGY

ACADEMIC YEAR 2021-2022

## GENERAL INFORMATION – TEACHER REFERENCES

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## GENERAL INFORMATION ABOUT THE COURSE

INTEGRATED COURSE (IF APPLICABLE):

MODULE (IF APPLICABLE):

CHANNEL (IF APPLICABLE):

YEAR OF THE DEGREE PROGRAMME (I, II, III): I

SEMESTER (I, II): II

CFU: 6

## REQUIRED PRELIMINARY COURSES (IF MENTIONED IN THE COURSE STRUCTURE “ORDINAMENTO”)

None

## PREREQUISITES (IF APPLICABLE)

To have passed the educational debt test

## LEARNING GOALS

The course aims at providing students with basic notions and methods related to biological issues needed for the successful completion of the degree course with specific reference to morpho-functional traits of cells and tissues, and with special emphasis on the anatomical traits of vegetal structures destined to fresh food consumption, storage and processes. The course also aims at providing basic notions on organisms classification and systematics, describing the taxonomy of plants of the main Families related to crop and food production.

## EXPECTED LEARNING OUTCOMES (DUBLIN DESCRIPTORS)

### Knowledge and understanding

The course provides students with knowledge and basic methodological tools needed to analyze: 1) morpho-functional traits of cell and tissues in animals and plants, which are useful for more applied disciplines, 2) the developmental processes of higher plants, main structures and function of plant organs destined to fresh food consumption, storage and processing, 3) methods for plant asexual and sexual reproduction, 4) organisms classification and systematics, taxonomy of plants of the main Families related to crop and food production. Students will have to acquire a technical language and ability to critically summarize course notions.

### Applying knowledge and understanding

The course delivers ability and tools needed to apply knowledge in practice, favoring the ability to use methodological tools to critically apply basic knowledge to the agri-food sector. Students need to show to have acquired a critical and comprehensive vision of biological issues with particular focus on the morpho-functional traits of plant organs and their possible impact on the efficiency of food processing. Students need to show ability to critically analyze how to apply acquired skills to the field of agri-food production.

## COURSE CONTENT/SYLLABUS

Cytology - Structure and function of the main molecules of the animal and plant cell. Prokaryotic and eukaryotic cells. Unicellular and multicellular organisms. Cell membranes including ER and dictyosomes and mechanisms of transport through membranes. Cell wall and plasmodesmata. Extra-cellular matrix and intercellular junctions. Mitochondria and basics of respiration. Plastids and basics of photosynthesis. Nucleus and ribosomes. Cytoplasm and cytoskeleton. Vacuole and osmosis. Mitosis, meiosis and cytokinesis.

Anatomical and functional traits – Animal and plant cell tissues. Anatomy of shoot and root apex. Anatomy of leaf, stem and root. Functional modifications of plant organs as adaptive strategies to environmental factors and applications in food science. Basics of: stomata opening/closure, root water uptake, xylem and phloem flows.

Asexual and sexual reproduction - Asexual reproduction. Sexual reproduction: genetic heritability and biodiversity. Plant life cycles and ontogenetic cycle in Angiosperms. Fruit development and ripening.

Plant systematics – Classification of organisms. Species and cultivars. Taxonomy. Morphology of stem, leaf and root: traits for species classification. Morphology and classification of flowers and fruits. Taxonomy of plants of the main Families related to crop and food production.

Seminars: on specific applied aspects (e.g. food chain, crop and food production in extra-terrestrial environments, plant-animal interactions in pollination and seed dispersal, utilization of botanical guides for species classification, botany applied to crop and food science, etc.).

## READINGS/BIBLIOGRAPHY

Textbooks

Solomon EP, Martin CE, Martin DW, Berg LR. 2017. *Biologia*, Edises, Napoli. ISBN: 978-88-7959-940-5; [www.edises.it](http://www.edises.it)  
Dispense del Docente di Botanica Sistematica

## TEACHING METHODS

Teacher will use: a) lectures for approximately 80% of total hours, b) seminars and laboratories to further elaborate on applied knowledge for approximately 20% of total hours.

## EXAMINATION/EVALUATION CRITERIA

### a) Exam type:

Exam type	
written and oral	
only written	X
only oral	
project discussion	
other	

In case of a written exam, questions refer to: (*)	Multiple choice answers	X
	Open answers	X
	Numerical exercises	

(\*) multiple options are possible

The written exam consists of two parts: the first is made of n.30 questions with multiple choice answers (with 4 options; each correct answer correspond to 1 point), the second made of n. 3 questions with open answers (each corresponding to a maximum of 10 points). Students have to acquire at least 60% of the available points per each of the two parts. Duration of the exam is 1 hour.

### b) Evaluation pattern:

N.a.