

## Plant Physiology (1<sup>th</sup> Year, 2<sup>th</sup> Semester)

No of transferable credits - 4

### Regime of the discipline

Fundamental discipline (compulsory)

### Titular of the discipline

PH. D. Prof. Doina Carmenica Jităreanu

### The objectives of the discipline (course and practice)

The course aims to make students acquire knowledge on fundamental processes of plant: absorption of minerals and energy and turn them into organic substances own, photosynthesis , respiration, biosynthesis of organic substances , biological processes underlying the formation of the harvest , routing to increase their understanding of agricultural production and transfer processes of substance and energy in the biosphere and mechanisms of resistance of plants to abiotic and biotic environmental conditions .

Practical work aims to make students acquire practical skills for the experimental demonstration of the main manifestations of vital body plant , creating availability of teamwork and acquiring an education information in plant physiology .

### Content (syllabus)

Course (chapters / subchapters)
<b>Introduction to plant physiology:</b> definition and objectives; research methods; connections with other sciences; plant physiology in Romania.
<b>Plant cell physiology:</b> physiological functions of cellular components; physical properties of the cellular material; physiological properties of living matter; exchange of water between the plant cell and the external environment.
<b>Water regime of plants:</b> role of water in plants' life; water states and forms in plants; water absorption by plants; water transport inside the plants; water elimination on plants.
<b>Plant mineral nutrition:</b> research methods for mineral nutrition; mineral absorption by plants; factors influencing the absorption of mineral elements in plants; the physiological role of mineral elements.
<b>Photosynthesis:</b> definition and importance in nature; carbon and light sources; the method of studying photosynthesis; organs and organelles of photosynthesis; photosynthesis mechanism; factors influencing photosynthesis; photosynthesis and production.

<b>The transformation, the circulation and the deposition of organic substances in the plant:</b> the synthesis and the transformation of organic substances in plants; the circulation of organic substances in plants; the deposition of organic substances in plants.
<b>Plant respiration:</b> definition and importance; methods for determining the aerobic respiration; respiratory quotient; the physiological mechanism of respiration; types of fermentation and the mechanism of anaerobic respiration
<b>Plant growth:</b> cell growth stages; growth mechanism; methods of measuring growth; growth regulating substances; correlations, apical dominance, regeneration and polarity; growth movements of plants (tropism and nastic).
<b>Plant development:</b> the characteristics of the development cycle; determinism flowering stages; the influence of external factors on flowering; the influence of the internal factors on flowering; flowering itself; the fructification physiology

Practical works
<b>Physical and physiological phenomena at the cellular level:</b> Absorption and elution; Imbibition; Diffusion; Osmosis; Turgescence and plasmolysis; Cellular osmotic potential; Cellar suction force, Membranes' permeability.
<b>Water regime of plants:</b> Water absorption in plants; Water circulation in plants; Water elimination on plants.
<b>Mineral nutrition of plants:</b> Methods of studying plants mineral nutrition; Particularities of root absorption of mineral elements.
<b>Photosynthesis:</b> Photosynthetic pigments; Methods of studying photosynthesis; The products of photosynthesis.
<b>The transformation and circulation of organic substances in plant:</b> the identification and transformation of carbohydrates; the identification and transformation of lipids; the identification and transformation of proteins; the circulation of the organic substances in the plant.
<b>Aerobic respiration and fermentation:</b> qualitative methods of studying the aerobic respiration; quantitative methods of studying the aerobic respiration; respiration's enzymes; fermentation.
<b>Plant growth:</b> growth areas of vegetal organs; methods for measuring the intensity of growth; the influence of external factors on growth; phenomena of growth (regeneration, polarity); plant movements (tropism and nastic).
<b>Final colloquium for knowledge evaluation</b>

## Bibliography

1. Davies J.P.– *Plant. Hormones and Their Role in Plant. Groweth and Development*, 1987, Dordrecht, Boston, London.
2. Gardner F., Pearce B., Mitchell R. – *Physiology of Crop Plants*, 1985, Iowa State University Press, Amer, U.S.A.
3. Jitareanu Carmenica Doina - *Vegetal Physiology*, 2002, Ion Ionescu de la Brad, Iasi
4. Jitareanu Carmenica Doina - *Plant Physiology*, 2007, Ion Ionescu de la Brad, Iasi
5. Murariu Alexandrina - *Plant Physiology*, vol 1, 2002, Junimea, Iasi
6. Toma Liana Doina, Jitareanu Carmenica Doina - *Plant Physiology*, 2007, Ion Ionescu de la Brad, Iasi
7. Toma Liana Doina, Milica C., Robu T., Jitareanu Carmenica Doina, Slabu Cristina - *Plant Physiology - laboratory guide*, 1999, Ion Ionescu de la Brad, Iasi

## Final evaluation

Type of evaluation	Methods of evaluation	Percentage of the final grade
Examination	Written examination	60%
Assessment of the activity during the semester	Verification tests, oral practice	40%

## Contact person

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