

RQ02001: PRINCIPLES OF CROP PRODUCTION

1. General information

- Term: 1
- Credits: **Total credits 2 (Lecture: 1,5 – Practice: 0,5)**
- **Self-study: 6** credits
- Credit hours for teaching and learning activities: 30 hrs.
- Self-study: 90 hrs.
- Department conducting the course:
 - Department of Cultivation Sciences
 - Faculty of Agronomy.
- Kind of the course:

Foundation <input type="checkbox"/>		Fundamental <input checked="" type="checkbox"/>		Option 1 <input type="checkbox"/>		Option 2 <input type="checkbox"/>	
Compulsory <input type="checkbox"/>	Elective <input type="checkbox"/>	Compulsory <input checked="" type="checkbox"/>	Elective <input type="checkbox"/>	Compulsory <input type="checkbox"/>	Elective <input type="checkbox"/>	Compulsory <input type="checkbox"/>	Elective <input type="checkbox"/>

- Prerequisite course(s): Non

2. Course objectives and expected learning outcomes

* *Course objectives:*

- Knowledge: The course provides students with knowledge of crop fundamentals and crop growth and development process, the roles and the effects of climatic factors, soil on crop growth and yield. Based on these knowledges, the principles of cultivation techniques are proposed to optimize the use of natural resources to improve crop yields, productivity and quality in sustainable agriculture.
- Skills: The course provides students with skills in designing crop rotation systems (season, crops, plant varieties) based on the climatic factors, soil, economic and social conditions of production regions as well as the fertilization practices for crops.
- Attitude: Course provides students with attitudes in active learning, accumulating knowledges and practical experiences.

* *Course expected learning outcomes*

Notation	Course expected learning outcomes After successfully completing this course, students are able to	PLO performance criteria
Knowledge		
CELO1	Apply the knowledge about the relationship between crops – climate factors – soil to design cultivation techniques for fruit crops, flower crops and vegetables to meet the market needs	2.1
CELO2	Apply the knowledge about the cultivation techniques for crops in maintaining the landscape design	3.4
Skills		
CELO 3	Select the cultivation methods for cropping systems to transfer techniques for vegetables, fruit crops and flower crops	8.1

CELO 4	Select the cultivation methods for ornamental crops in landscape management	8.2
Attitude		
CELO 5	Accumulating the knowledges and experiences in the production of vegetables, flower crops, fruit crops and ornamental crops in landscape design.	10.2

3. Course description

Brief description of the course: This course includes the following contents: Introduction to crop production (definition, objectives, objects, agricultural resources and changing trends), crop fundamentals, the climate-crop relationship and principles of improving the use efficiency of climatic factors; the soil-crop relationship and principles of improving soil use efficiency, principles of maintenance and improvement of soil fertility; principles of cultivation techniques in crop production.

4. Teaching and learning & assessment methods

CELOs	CELO1	CELO2	CELO3	CELO4	CELO5
Teaching and learning					
Lecturing	x	x	x	x	x
Teaching through practical work			x	x	x
Guiding for discussion	x	x	x	x	x
Assessment					
Rubric 1. Attendance (10%)	x	x	x	x	x
Rubric 2. Practical (15%)			x	x	x
Rubric 3. Midterm exam (15%)	x	x			
Rubric 4. Final exam (60%)	x	x			

5. Student tasks

- Attendance: All students must attend at least 75% of the class hours in the course.
- Preparation for the lecture: All students must read the lecture contents and reference materials before lecture.
- Practical report: All students must attend 100% in the practice class and complete the practice report.
- Mid-term exam: All students must attend a mid-term exam in writing form.
- Final exam: All students must attend the final exam in writing form.

6. Text books and references

*** Text Books/Lecture Notes:**

1. Ha Thi Thanh Binh, Nguyen Tat Canh, Nguyen Ich Tan, Phung Dang Chinh (2002). Fundamentals of crop production, Agricultural Publishing House, Hanoi, Vietnam.
2. Nguyen Huu Thanh, Tran Van Chinh, Cao Viet Ha (2017). *Soil science*. Agricultural Publishing House, Hanoi, Vietnam.
3. Nguyen Nhu Ha (2013). *Principles of fertilization*. Agricultural Publishing House, Hanoi, Vietnam.
4. Nguyen Thu Ha, Nguyen Thi Lan Anh, Nguyen Van Thao & Nguyen Thanh Trung (2019). *Fertilizers and crops analysis*. National University Publishing House, Hanoi, Vietnam.

5. Phung Thi Thu Ha, Nguyen Huu Cuong, Nguyen Thi Hoa (2021). *Botany*. National University Publishing House, Hanoi, Vietnam.

* *Tài liệu tham khảo khác:*

6. Massawe I. P. & Mrema J. (2017) Effects of different phosphorus fertilizers on rice yield components and grain yield. *Asian Journal of Advances in agricultural research* 3(2): 1 – 13;

<https://www.tari.go.tz/assets/uploads/documents/57483154805a2b7ab872b883f36bf9dc.pdf>

7. Naher M.S. & Paul A.K. (2017). Effect of intergrated nutrient management on nutrient uptake and sustainable grain yield in transplanted aman rice. *Journal of agriculture* 15(1): 43 – 53;

https://www.researchgate.net/publication/318764499_Effect_of_integrated_nutrient_management_on_nutrient_uptake_and_sustainable_grain_yield_in_transplanted_aman_rice

8. Nand V., Gupta R.K., Singh K.D., Yadav R.S. & Srivastav A. K. impact of intergrated nutrient management (INM) on growth of Berseem (*Trifoliumalexandrinum* L.) at various cutting stages. International conference on Food security and sustainable agriculture (Thailand on 23 – 26 December, 2018). 254 – 258.

<https://www.phytojournal.com/archives/2018/vol7issue4S/PartF/SP-7-4-54-810.pdf>

9. Wozniak A., Soroka M. (2018). Effect of crop rotation and tillage system on the weed infestation and yield of spring wheat and on soil properties. *Applied ecology and environmental research* 16(3): 3087 – 3096.

https://www.researchgate.net/publication/326172746_Effect_of_crop_rotation_and_tillage_system_on_the_weed_infestation_and_yield_of_spring_wheat_and_on_soil_properties

10. Patrick Pringle (2018). Effects of climate change on 1,5° temperature rise relevant to the pacific island. *Science review*: 189 – 200.

<https://www.sprep.org/attachments/VirLib/Regional/12-1.5-degree-temperature-rise.pdf>

7. Course outline

Week	Content	Course expected learning outcomes
1	Chapter 1: Introduction in crop production	
	A/ Main contents: (2 hours)	CELO 1, 5
	1. Theories: (2 hours)	
	1.1. Definition of crop production 1.2. The objects of crop production 1.3. The objectives of crop production 1.4. Agricultural resources 1.5. The goals in crop production 1.6. Tasks and characteristics of the subject	
	B/ Self-study contents: (6 hours)	
	1.1. The objectives of crop production and the relation between horticulture with other sciences	

1,2	<p>Chapter 2. Crop fundamentals and crop growth and development process</p> <p>A/ Main contents: (4 hours)</p> <p>1. Theories: 4 hours</p> <p>2.1. The harvesting organs of crops and the principles of cultivation techniques</p> <p>2.1.1. Roots</p> <p>2.1.2. Stems</p> <p>2.1.3. Leaves</p> <p>2.1.4. Flowers</p> <p>2.1.5. Fruits</p> <p>2.1.6. Seeds</p> <p>2.2. The growth and development process of crops</p> <p>2.2.1. Definition of growth process and development process</p> <p>2.2.2. The principles of improving the crop yield and quality based on the growth and development process</p> <p>2. Practice: 3 hours</p> <p>Surveying the agronomic characteristics of main annual crops</p> <p>Practicing in seed germination</p> <p>B/ Self-study contents: (12 hours)</p> <p>Crop characteristics and growth and development process of different crops</p>	CELO 1,2, 5
3,4	<p>Chapter 3. Climate factors and the principles of improving use efficiency in crop production</p> <p>A/ Main contents: (6 hours)</p> <p>1. Theories: 6 hours</p> <p>3.1. Effects of light on crops and the principles of improving light use efficiency.</p> <p>3.2. Effects of temperature on crops and the principles of improving temperature use efficiency.</p> <p>3.3. Effects of water on crops and the principles of improving water use efficiency.</p> <p>3.4. Effects of air on crops and the principles of improving air use efficiency.</p> <p>2. Practice: 3 hours</p> <p>Designing the crop rotation for a production area in Red River Delta</p> <p>B/ Self-study contents: (12 hours)</p> <p>The effects of light, temperature, air, water and nutrients on crop growth and yield.</p>	CELO 1,2, 3, 5
5,6	<p>Chapter 4. Soil and principles of maintenance and improving soil fertility</p> <p>A/ Main contents: (6 hours)</p> <p>1. Theories: 6 hours</p> <p>4.1. Definition of soil and soil formation process</p> <p>4.2. Physiological, chemical and biological properties of soil</p>	CELO 1, 2, 4,5

	<p>4.2.1. Soil physiological properties and its effects on crop growth and yield</p> <p>4.2.2. Soil chemical properties and its effects on crop growth and yield</p> <p>4.2.3. Soil biological properties and its effects on crop growth and yield</p> <p>2. Practice: 2 hours</p> <p>Determining the nutrient requirements and fertilization methods on annual crops in crop rotation formula.</p>	
	<p>B/ Self-study contents: (12 hours)</p> <p>The relationship between physiological, chemical and biological properties of soil</p> <p>Effects of soil physiological, chemical and biological properties on crop growth and yield</p>	
6,7	<p>Chapter 5. Principles of cultivation techniques in crop production</p> <p>A/ Main contents: (4 hours)</p> <p>1. Theories: 4 hours</p> <p>5.1. The principles of basis cultivation techniques for crop production</p> <p>5.2. The specific cultivation techniques for crop production</p> <p>5.3. The techniques of using growth regulators</p> <p>5.4. The principles of improving crop yield and quality</p>	CELO 1, 2, 3, 4, 5
	<p>B/ Self-study contents: (12 hours)</p> <p>The principles of cultivation techniques in crop production</p>	