VIETNAM NATIONAL UNIVERSITY OF AGRICULTURE
FACULTY OF EDUCATION AND FOREIGN LANGUAGES

COURSE SYLLABUS
SNE01010 -English Listening and Speaking 1

Credits: 9 (Lecture: 8 – Practice: 1); Self-Learning: 18
Term: 1
Prerequisite course(s): None

COURSE OBJECTIVES:

This course aims to help students develop and improve their English listening and speaking skills in order to reach B1 level according to CEFR (Common European Framework of Reference for Languages)

COURSE EXPECTED LEARNING OUTCOMES

Notation	Course expected learning outcomes After successfully completing this course, students are able to:	Program expected learning outcomes
Knowledge:		
K1	Apply sentence structures, basic expressions in spoken language and vocabulary related to popular topics in life.	ELO6, ELO8
K2	Distinguish sounds, and apply correct pronunciation to sounds, words, sentences, conversation.	ELO8
K3	Apply knowledge about cultures of English speaking countries to discussions on cultural and social topics.	ELO6, ELO8
Skills:		
K4	Comprehend and identify the main and specific ideas in listening lessons on common topics of life, work and school.	ELO6, ELO8
K5	Communicate effectively and use English to express ideas about common topics of culture and society	ELO6, ELO8
Ethics and Attitude:		
K6	Form self-learning ability and have passion for learning English; be confident in communication; search for and exploit effectively learning resources in English.	ELO12, ELO14

COURSE DESCRIPTION

SNE01010. English Listening and Speaking 1 (09: 8 - 1; 18; 405).

This course consists of 10 units which provide learners with sentence structures, basic expressions in spoken language and vocabulary related to topics of celebrities, occupations, holidays, cities, wildlife, sports, entertainment, tourism, events to help learners consolidate and develop their listening and speaking skills in order to reach B1 level. Also, it helps learners to distinguish sounds, apply correct pronunciation to sounds, words, sentences, conversations and use knowledge of the culture of English speaking countries to solve problems in new situations.
Prerequisite: None

ASSESSMENT

Grading: 10

Weighting:

- Attendance: 10%

- Formative assessment: 30%

- Final exam: 60%

Assessment summary

Rubric	Course expected learning outcomes	Weighting (%)	Week
Attendance		**10**	
Rubric 1 – Class attendance	K1, K2, K3, K4, K5, K6	10	Weeks 1-15
Formative assessment		**30**	
Rubric 2 - Group Presentation	K1, K2, K3, K4, K5, K6	10	Week 10
Rubric 3 – Mid-term exam	K1, K2, K3, K4, K5	20	Week 8
Final assessment		**60**	
Rubric 4 - Final exam	K1, K2, K3, K4, K5	60	Examination schedule

TEXT BOOKS AND REFERENCES

**** Text Books/Lecture Notes:***

Loveday, P., Koop, M., Trowbridge, S., & Scarry, E. (2012). *TakeAway English 2: English for success* (Student's Book with CDs). McGraw-Hill

Loveday, P., Koop, M., Trowbridge, S., & Scarry, E. (2012). *TakeAway English 2: English for success* (Workbook with CDs). McGraw-Hill

Loveday, P., Koop, M., Trowbridge, S., & Scarry, E. (2012). *TakeAway English 2: English for success* (Teacher's book with CDs). McGraw-Hill

**** Additional references:***

University of Cambridge ESOL Examinations (2008). *Cambridge Preliminary English Test 5.* Cambridge University Press

University of Cambridge ESOL Examinations (2010). *Cambridge Preliminary English Test 6.* Cambridge University Press

Andrew, B., Lawrence, M. (2014). *Succeed in Preliminary English Test.* Global IELT

Liz and Soar (2000).*New Headway Pre-intermediate* Oxford University Press

COURSE OUTLINE

Week	Content
1	***Unit 1:*** **It's great job!** ***A/*** **Main contents***: (10 hrs)* **Theory:** *(3 hrs)* **1.1. Start:** Jobs **1.2. Listening**: About my jobs **1.3. Song:** Uncle Bertie's nephew **1.4. Pronunciation**: Intonation in questions **Theoretical practice exercises:** *(4 hrs)* **1.1. Speaking** **1.2. Listening** **Practice/Experiment:** *(2 hrs)* Listening and Speaking: Focus on numbers Practice with numbers Listening for specific information **Seminar/Discussion:** *(1 hr)* Jobs ***B/*****Self-learning contents**: *(20 hrs)* - Exercises in workbook, reference books - Online learning
2	***Unit 1:*** **It's great job! (Cont.)**

	A/* Main contents: (3.5 hrs)* **Theory:** *(2.5 hrs)* **1.5. Conversation Take Away**: Making excuses **1.6. Language Takeaway :** Unit review **Practice/experiment contents:** *(1 hr)* **1.3 Pronunciation**
	***B/*Self- learning contents**: *(7 hrs)* - Exercises in workbook, reference books - Online learning
	***Unit 2:* Great vacation**
	A/* Main contents: (3.5 hrs)* **Theory:** *(2.5 hrs)* **2.1. Start:** Where do you go on vacation? **2.2. Listening:** Favorite vacations **Practice/Experiment:** *(1 hr)* **2.1. Speaking**
	***B/*Self- stusy contents**: *(7 hrs)* - Exercises in workbook, reference books - Online learning
3	***Unit 2:* Great vacation (cont.)**
	A/* Main contents: (9,5 hrs)* **Theory:** *(3 hrs)* **2.3.Culture:** Holidays and vacation days **2.4. Pronunciation:** The / ŋ/ sound **2.5. Conversation Take Away:** Making and responding t suggestions **2.6. Language Takeaway :** Unit review **Theoretical practice exercises** *(4 hrs)* **2.2. Listening** **2.3. Pronunciation** **Practice/Experiment:** *(1,5 hrs)* Listening for general understanding Talk about yourself **Seminar/Discussion:** *(1 hr)* Great vacations
	***B/*Self-learning contents**: *(19 hrs)* - Exercises in workbook, reference books - Online learning

4	***Unit 3:*** **Cities around the world**
	A/ **Main contents***: (9,5 hrs)* **Theory:** *(3 hrs)* **3.1. Start:** What's the city like? **3.2. Listening:** Comparing cities **3.3. Song:** All around the world **Theoretical practice exercises:** *(4 hrs)* **3.4. Pronunciation:** Sentence stress **3.1. Speaking** **3.2. Listening** **Practice/Experiment:** *(1,5 hrs)* Listening to these people spelling and write down what they say Speaking topics: your hobby; one of your close friends **Seminar/Discussion:** *(1 hr)* Cities around the world
	B/**Self-learning contents**: *(19 hrs)* - Exercises in workbook, reference books - Online learning
5	***Unit 3:*** **Cities around the world (cont.)**
	A/ Main contents: *(4,5 hrs)* **Theory:***(2,5 hrs)* **3.5. Conversation Take Away:** Agreeing and disagreeing **3.6. Language Takeaway :** Unit review **Theoretical practice exercises:** *(2 hrs)* **3.3. Pronunciation**
	B/ Self-learning contents: *(9 hrs)* - Exercises in workbook, reference books - Online learning
	Unit 4: **Wildlife**
	A/ Main contents: *: (4,5 hrs)* **Theory:** *(2,5 hrs)* **4.1. Start:** Endangered animals **4.2. Listening:** An endangered bird **Theoretical practice exercises:** *(2 hrs)* **4.1. Speaking**
	B/ Self-learning contents: *(9 hrs)* - Exercises in workbook, reference books - Online learning

6	***Unit 4:*** **Wildlife (cont.)**
	A/ Main contents: *(9,5 hrs)* **Theory:** *(3 hrs)* **4.3. Culture:** Wildlife conservation vacations **4.4. Pronunciation:** The sounds // aɪ / and /ɪ/; **4.5. Conversation Take Away:** Using measurements **4.6. Language Takeaway:** Unit review **Theoretical practice exercises:** *(4 hrs)* **4.2. Listening** **4.3. Pronunciation** **Practice/Experiment:** *(1,5 hrs)* Listening to a long recording and fill in the missing information in the numbered space Speaking topics: your favorite sport; the weather in Vietnam. **Seminar/Discussion:** *(1 hr)* Wildlife
	B/ Self- stusy contents: *(19 hrs)* - Exercises in workbook, reference books - Online learning
7	***Unit 5:*****All about sports**
	A/ Main contents: *(9,5 hrs)* **Theory:** *(3 hrs)* **5.1. Start:** What sports do you play or do? **5.2. Listening:** My favorite sports **5.3. Song:** The game of life **5.4. Pronunciation:** have to/has to **Theoretical practice exercises:** *(4 hrs)* **5.1. Speaking** **5.2. Listening** **Practice/Experiment:** *(1,5 hrs)* Listening: Listen and write down what people say Speaking topics: City and countryside; Your English Class **Seminar/Discussion:** *(1 hr)* All about sports
	B/ Self-learning contents: *(19 hrs)* - Exercises in workbook, reference books - Online learning

8	***Unit 5:*** **All about sports (Cont.)**
	A/ Main contents: *(4,5hrs)* **Theory:***(2,5hrs)* **5.5. Conversation Take Away:** Talking about rules **5.6. Language Takeaway :** Unit review **Theoretical practice exercises:** *(2 hrs)* **5.3. Pronunciation**
	B/ Self-learning contents: *(9 hrs)* - Exercises in workbook, reference books - Online learning
	Unit 6: **Good luck, bad luck**
	A/ Main contents: *(4,5 hrs)* **Theory:** *(2,5 hrs)* **6.1. Start:** Good luck and bad luck customs **6.2. Listening:** A lucky man **Theoretical practice exercises:** *(2 hrs)* **6.1. Speaking**
	B/ Self-learning contents: *(9 hrs)* - Exercises in workbook, reference books - Online learning
9	***Unit 6:*** **Good luck, bad luck**
	A/ Main contents: *(8,5 hrs)* **Theory:** *(3 hrs)* **6.3. Song:** Lotteries around the world **6.4. Pronunciation:** Did + subject **6.5. Conversation Take Away:** Responding to good news and bad news **6.6. Language Takeaway :** Unit review **Theoretical practice exercises:** *(3,5 hrs)* **6.2. Listening** **6.3. Pronunciation** **Practice/Experiment:** *(1 hr)* Listening: Listen to a long recording and fill in the missing information in the numbered space Speaking topics: your job; the importance of leaning English **Seminar/Discussion:** *(1 hr)* Good luck, bad luck
	B/ Self-learning contents: *(17 hrs)* - Exercises in workbook, reference books - Online learning

10	***Unit 7:*** **My favourite things**
	A/ Main contents: *(8,5 hrs)* **Theory:** *(3 hrs)* **7.1. Start:** Things people collect **7.2. Listening:** What do you collect? **7.3. Song:** Do you have a heart? **7.4. Pronunciation:** Sentence stress in the present perfect **Theoretical practice exercises:** *(3,5 hrs)* **7.1. Speaking** **7.2. Listening** **Practice/Experiment:** *(1 hr)* Listening: Listen to a long recording and fill in the missing information in the numbered space Speaking topics: how to keep body fit and healthy; your house/ flat; travelling **Seminar/Discussion:** *(1 hr)* My favorite things
	B/ Self-learning contents: *(17 hrs)* - Exercises in workbook, reference books - Online learning
11	**Unit 7:My favourite things (Cont.)**
	A/ Main contents: *(4,5 hrs)* **Theory:** *(2,5 hrs)* **7.5. Conversation Take Away:** Talking about things you like **7.6. Language Takeaway :** Unit review **Theoretical practice exercises:** *(2 hrs)* **7.3. Pronunciation**
	B/ Self- stusy contents: *(9 hrs)* - Exercises in workbook, reference books - Online learning
	Unit 8: **Memorial experiences**
	A/ Main contents: *(6 hrs)* **Theory:** *(2,5 hrs)* **8.1. Start:** Feelings **8.2. Listening:** A childhood memory **Theoretical practice exercises:** *(3,5 hrs)* **8.1 Speaking**
	B/ Self-learning contents: *(12 hrs)* - Exercises in workbook, reference books - Online learning

12	***Unit 8:*** **Memorial experiences (Cont.)**
	A/ Main contents*: (8,5 hrs)* **Theory:** *(3 hrs)* **8.3. Culture:** Stories and culture **8.4. Pronunciation:** Vowel sounds /aʊ/, /oʊ/,/ɔ:/; **8.5. Conversation Take Away:** Reacting to a story **8.6. Language Takeaway :** Unit review **Theoretical practice exercises:** *(3,5 hrs)* **8.2. Listening** **8.3. Pronunciation** **Practice/Experiment:** *(1 hr)* Listening: Listen to a long recording and fill in the missing information in the numbered space Speaking topic: your house/ flat; travelling **Seminar/Discussion:** *(1 hr)* Memorable experiences
	B/ Self-learning contents: *(17 hrs)* - Exercises in workbook, reference books - Online learning
13	***Unit 9:*** **I love chocolate**
	A/ Main contents: *(8,5 hrs)* **Theory:** *(3 hrs)* **9.1. Start:** Made with chocolate **9.2. Listening:** A dessert recipe **9.3. Song:** I drink coffee, I drink tea **9.4. Pronunciation:** Word stress **Theoretical practice exercises:** *(3,5 hrs)* **9.1 Speaking** **9.2 Listening** **Practice/Experiment:** *(1 hr)* Listening: Listen to a long recording and fill in the missing information in the numbered space Speaking topics: your hometown; travelling **Seminar/Discussion:** *(1 hr)* Chocolate
	B/ Self-learning contents: *(17 hrs)* - Exercises in workbook, reference books - Online learning

14	***Unit 9:*** **I love chocolate**
	A/ Main contents: *(4,5 hrs)* **Theory:** *(2,5 hrs)* **9.5. Conversation Take Away:** Making accepting, and dealing offers **9.6. Language Takeaway :** Unit review **Theoretical practice exercises:** *(2 hrs)* **9.3. Pronunciation**
	B/ Self-learning contents: *(9 hrs)* - Exercises in workbook, reference books - Online learning
	Unit 10: **How can we help?**
	A/ Main contents: *(4,5 hrs)* **Theory:** *(2,5 hrs)* **10.1. Start:** In need of help **10.2. Listening:** A service trip **Theoretical practice exercises:** *(2 hrs)* **10.1 Speaking**
	B/ Self-learning contents: *(9 hrs)* - Exercises in workbook, reference books - Online learning
15	***Unit 10:*** **How can we help?**
	A/ Main contents: *(8,5 hrs)* **Theory:** *(3 hrs)* **10.3. Song/ culture:** Charitable organizations around the world **10.4. Pronunciation:** /ʌ/, /ʊ/ /ɪ/; **10.5. Conversation Take Away:** Making requests and giving excuses **10.6. Test Take Away:** Identify support for an opinion **Theoretical practice exercises:** *(3,5 hrs)* **10.2. Listening** **10.3. Pronunciation** **Practice/Experiment:** *(1 hr)* Listening: Listen to a long recording and fill in the missing information in the numbered space Speaking topics: a TV program, city and countryside **Seminar/Discussion:** *(1 hr)* How can we help?
	B/ Self-learning contents: *(17 hrs)* - Exercises in workbook, reference books - Online learning

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTRUE
FACULTY OF EDUCATION AND FOREIGN LANGUAGES

COURSE SYLLABUS
SNE01011: English Reading & Writing 1

Credits: 8 (Lecture: 8 – Practice: 0); Self-Learning 16
Term: 1
Prerequisite course(s): None

COURSE OBJECTIVES:

This course aims to focus on the following:

- ***On knowledge:*** to teach students how to use English verbs, sentence structures and words and apply flexibly the vocabulary social and environmental topics.

- ***On skills:*** To train students know how to organize and collaborate with team members, present the ideas, texts and discourse in English clearly, coherently, and logically, and write reports on the social, cultural and scientific events/ experiences in English.

- ***On ethics and attitude:*** To perform self-learning ability and be aware of lifelong learning.

COURSE EXPECTED LEARNING OUTCOMES

Notation	**Course expected learning outcomes** After successfully completing this course, students are able to:	**Program expected learning outcomes**
Knowledge:		
K1	Use English verbs, sentence structures and words.	ELO8
K2	Apply flexibly the vocabulary social and environmental topics.	ELO8
Skills:		
K3	Organize and collaborate with team members	ELO6
K4	Present the ideas, texts and discourse in English clearly, coherently, and logically	ELO7
K5	Write reports on the social, cultural and scientific events/ experiences in English.	ELO8
Ethics and attitude:		
K6	Perform self-learning ability and be aware of lifelong learning.	ELO12, ELO14

COURSE DESCRIPTION

SNE01011. Reading & writing 1 (8: 8-0; 16; 360).

This course consists of 10 units about Jobs, Vacations, Cities, Wild life, Sports, Culture, Beliefs; Experiences, Food and Charity.

Prerequisite: None

ASSESSMENT

Grading: 100 points

Weighting:

- Attendance: 10%
- Formative assessment: 30%
- Final exam: 60%

Assessment summary

Rubric	Course expected learning outcome	Weighting (%)	Week
Attendance		**10**	
Rubric 1: Class attendance	K1, K2, K3, K4, K5, K6	5	1- 15
Rubric 2: Group Presentation	K1, K2, K3, K4, K5	5	1,3,4,6,7,10,12,13,15
Formative asessment		**30**	
Rubric 3: Mid-term exam	K1, K2, K3, K4, K5, K6	30	8
Final assessment		**60**	
Rubric 4: Final exam	K1, K2, K3, K4, K5, K6	60	VNUA's exam schedule

TEXT BOOKS AND REFERENCES

**** Text Books/Lecture Notes:***

Loveday, P., Koop, M., Trowbridge, S., & Scarry, E. (2012). *Take Away English 2: English for success*. Student Book

Loveday, P., Koop, M., Trowbridge, S., & Scarry, E. (2012). *Take Away English 2: English for success*. Workbook

**** Additional references:***

Loveday, P., Koop, M., Trowbridge, S., & Scarry, E. (2012). *Take Away English 2: English for success*. Teacher's book.

Malcolm Mann & Steve Taylore Knowles (2009). Destination: Grammar & Vocabulary B1 (with answer key) Macmillan.

Liz and Soar (2000). New Headway Pre-intermediate Oxford University Press

Oxenden.C. et al (1997). New English File Pre-intermediate Oxford University Press

Greenall, S. (1999). Reward – Pre-intermediate (Resource Pack). Oxford: Macmillan

URL: www.voa.com/specialenglish

URL: http://www.esl-lab.com

COURSE OUTLINE

Week	Content
1	***Unit 1:*** **It's great job!**
	A/ Main content*: (8 hrs)* **Theory:** *(4 hrs)* 1.1 Vocabulary: Job description 1.2. Grammar: Review: questions in the simple past 1.3 Reading: Life in space **Exercises:** *(3 hrs)* 1.1 Vocabulary 1.2. Grammar 1.3 Reading **Seminar/Discussion:** *(1hr)* Projects
	B/ **Self- learning contents**: *(16 hrs)* - Read Unit 1 and do exercises in references, online-learning.
2	***Unit 1:*** **It's great job! (Cont.)**
	A/ **Main contents***: (4 hrs)* **Theory:** *(2 hrs)* 1.4 Writing: Writing a job description 1.5 Test takeaway strategy: Reading for the main idea **Exercises:** *(2 hrs)* 1.4 Writing 1.5 Test takeaway strategy
	B/ **Self- study contents**: *(8 hrs)* Read Unit 1 and do exercises in references, online-learning.
	Unit 2: **Great vacation** ***A/*** **Main contents***: (4 hrs)* **Theory:** *(2 hrs)* 2.1 Vocabulary: Vacation activities 2.2 Grammar: Go + gerund **Exercises:** ***(****2 hrs)* 2.1 Vocabulary 2.2 Grammar ***B/*** **Self- learning contents**: *(8 hrs)* Read Unit 2 and do exercises in references, online-learning.
3	***Unit 2:*** **Great vacation**
	A/ **Main contents***: (8 hrs)* **Theory:** *(4 hrs)* 2.3 Reading: A travel blog 2.4 Writing: Writing a travel blog 2.5 Test takeaway: Summarising

	Exercises: *(3 hrs)* 2.3 Reading 2.4 Writing 2.5 Test takeaway **Seminar/Discussion:** *(1 hrs)* Projects
	***B/* Self- learning contents**: *(16 hr)* Read Unit 2 and do exercises in references, online-learning.
4	***Unit 3:*** **Cities around the world**
	A/* Main contents: (8 hrs)* **Theory:***(4 hrs)* 3.1 Vocabulary: Tell me about the city 3.2 Grammar: Comparatives and superlatives 3.3 Reading: A world-class city **Exercises:** *(3 hrs)* 3.1 Vocabulary 3.2 Grammar 3.3 Reading **Seminar/Discussion:** *(1 hr)* Projects
	B/* Self- learning contents: (16 hrs)* Read Unit 3 and do exercises in references, online-learning.
5	***Unit 3:*** **Cities around the world**
	A/* Main contents: (4 hrs)* **Theory:** *(2 hrs)* 3.4 Writing: Writing a comparison essay about two cities 3.5 Test takeaway strategy: Describing a picture **Exercises:** *(2 hrs)* 3.4 Writing 3.5 Test takeaway strategy
	***B/* Self- learning contents:** *(8 hrs)* Read Unit 3 and do exercises in references, online-learning.
	Unit 4: **Wildlife**
	A/* Main contents: (4 hrs)* **Theory:***(2 hrs)* 4.1 Vocabulary: Animal actions 4.2 Grammar: *Can* and *can't* for ability and permission **Exercises:** *(2 hrs)* 4.1 Vocabulary 4.2 Grammar ***B/* Self- learning contents**: *(8 hrs)* Read Unit 4 and do exercises in references, online-learning.
6	***Unit 4:*** **Wildlife**
	A/* Main contents: (8 hrs)* **Theory:** *(4 hrs)* 4.3 Reading: Animal facts

	4.4 Writing: Writing an essay about an endangered animal 4.5 Test takeaway strategy: Making references (drawing conclusions) **Exercises:** *(3 hrs)* 4.3 Reading 4.4 Writing 4.5 Test takeaway strategy **Seminar/Discussion:** *(1 hr)* Projects
	***B/* Self - learning contents**: *(16 hrs)* Read Unit 4 and do exercises in references, online-learning.
7	***Unit 5:* All about sports**
	A/* Main contents: (8 hrs)* **Theory:** *(4 hrs)* 5.1 Vocabulary: Sports actions 5.2 Grammar: *Must* and *have to* 5.3 Reading: A great sporting moment **Exercises:** *(3 hrs)* 5.1 Vocabulary 5.2 Grammar 5.3 Reading **Seminar/Discussion:** *(1 hr)* Projects
	***B/* Self- learning contents**: *(16 hrs)* Read Unit 5 and do exercises in references, online-learning.
8	***Unit 5:* All about sports**
	A/* Main contents: (4 hrs)* **Theory:** *(2 hrs)* 5.4 Writing: Writing a description of a sport 5.5 Test Take Away: Reading for detail **Exercises:** *(2 hrs)* 5.4 Writing 5.5 Test Take Away
	***B/* Self- learning contents**: *(8 hrs)* Read Unit 5 and do exercises in references, online-learning.
	***Unit 6:* Good luck, bad luck**
	A/* Main contents: (4 hrs)* **Theory:** *(2 hrs)* 6.1 Vocabulary: Expressions with *get* 6.2 Grammar: Review: simple past **Exercises:** *(2 hrs)* 6.1 Vocabulary 6.2 Grammar
	***B/* Self - learning contents**: *(8 hrs)* Read Unit 6 and do exercises in references, online-learning.
9	***Unit 6:* Good luck, bad luck**

	A/* Main contents: (8 hrs)* **Theory:** *(4 hrs)* 6.3 Reading: A lucky thief 6.4 Writing: Write a story about luck 6.5 Test takeaway: Understanding sequence **Exercises:** *(3 hrs)* 6.3 Reading 6.4 Writing 6.5 Test takeaway **Seminar/Discussion:** *(1 hr)* Projects
	***B/* Self- learning contents**: *(16 hrs)* Read Unit 6 and do exercises in references, online-learning.
	***Unit 7:* My favourite things**
10	***A/* Main contents***: (8 hrs)* **Theory:** *(4 hrs)* 7.1 Vocabulary: Vocabulary building 7.2 Grammar: Present perfect 7.3 Reading: Enthusiastic collectors **Exercises:** *(3 hrs)* 7.1 Vocabulary 7.2 Grammar 7.3 Reading **Seminar/Discussion:** *(1 hr)* Projects
	***B/* Self- learning contents**: *(16 hrs)* Read Unit 7 and do exercises in references, online-learning.
11	**Unit 7:My favourite things**
	A/* Main contents: (4 hrs)* **Theory:** *(2 hrs)* 7.4 Writing: Write a descriptive essay 7.5 Test takeaway: Text completion questions **Exercises:** *(2 hrs)* 7.4 Writing 7.5 Test takeaway ***B/* Self- learning contents**: *(8 hrs)* Read Unit 7 and do exercises in references, online-learning.
	***Unit 8:* Memorial experiences**
	A/* Main contents: (4 hrs)* **Theory:** *(2 hrs)* 8.1 Vocabulary: Accidents happen! 8.2 Grammar: Past continuous versus simple past **Exercises:** *(2 hrs)* 8.1 Vocabulary 8.2 Grammar ***B/* Self- learning contents**: *(8 hrs)*

	Read Unit 8 and do exercises in references, online-learning.
12	***Unit 8:*** **Memorial experiences**
	A/ **Main contents***: (8 hrs)* **Theory:** *(4 hrs)* 8.3 Reading: Experiences to remember 8.4 Writing: Writing a story a memorable experience 8.5 Test takeaway: Listen for and recognize tone **Exercises:** *(3 hrs)* 8.3 Reading 8.4 Writing 8.5 Test takeaway **Seminar/Discussion:** *(1 hrs)* Projects ***B/*** **Self- learning contents**: *(16 hrs)* Read Unit 8 and do exercises in references, online-learning.
13	***Unit 9:*** **I love chocolate**
	A/ **Main contents***: (8 hrs)* **Theory:** *(4 hrs)* 9.1 Vocabulary: Cooking instructions 9.2 Grammar: The passive voice 9.3 Reading: All about chocolate **Exercises:** *(3 hrs)* 9.1 Vocabulary 9.2 Grammar 9.3 Reading **Seminar/Discussion:** *(1 hrs)* Projects ***B/*** **Self- learning contents**: *(16 hrs)* Read Unit 9 and do exercises in references, online-learning.
14	***Unit 9:*** **I love chocolate**
	A/ **Main contents***: (4 hrs)* **Theory:** *(2 hrs)* 9.4 Writing: Writing an encyclopaedia entry 9.5 Test takeaway: Identifying prons and cons **Exercises:** *(2 hrs)* 9.4 Writing 9.5 Test takeaway ***B/*** **Self- learning contents**: *(8 hrs)* Read Unit 9 and do exercises in references, online-learning.
	Unit 10: **How can we help?**
	A/ **Main contents***: (4 hrs)* **Theory:** *(2 hrs)* 10.1 Vocabulary: Ways to help 10.2 Grammar: Object pronouns **Exercises:** *(2 hrs)* 10.1 Vocabulary

	10.2 Grammar ***B/* Self- study contents**: *(8 hrs)* Read Unit 10 and do exercises in references, online-learning.
15	***Unit 10:* How can we help?**
	A/* Main contents: (8 hrs)* **Theory:** *(4 hrs)* 10.3 Reading: The recycled goats 10.4 Writing: Writing a plan to help others 10.5 Test takeaway: Identifying support for an opinion **Exercises:** *(3 hrs)* 10.3 Reading 10.4 Writing 10.5 Test takeaway **Seminar/ discussion:** *(1 hr)* Projects ***B/* Self- learning contents**: *(16 hrs)* Read Unit 10 and do exercises in references, online-learning.

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTURE
FACULTY OF POLITICAL AND SOCIAL SCIENCE

COURSE SYLLABUS
MLE01001: Basic Principles of Marxism and Leninism 1

Credits: 2 (Lecture: 2 – Practice: 0); Self-Learning: 4
Term: 1
Prerequisite course(s): None

COURSE OBJECTIVES:

- Knowledge: To help students acquire the basic knowledge about the worldview and methodology of Marxist - Leninist philosophy;

- Skill: to help students apply the knowledge into practice;

- Attitude and responsibility: To help student trust in the leadership of the Communist Party and the path to socialism of Vietnam.

COURSE EXPECTED LEARNING OUTCOMES

Notation	**Course expected learning outcomes** After successfully completing this course, students are able to	**Program expected learning outcomes**
Knowledge		
K1	Understand the basic knowledge about the world view and methodology of Marxist - Leninist philosophy.	ELO1
K2	Analyze and evaluate scientific and revolutionary principles, rules, categories of philosophy.	ELO1
K3	Have ability to apply scientific knowledge of Marxist and Leninist philosophy into practical life.	ELO1
Skills		
K4	Coordinate the principles, rules, categories of Marxist and Leninist philosophy in solving practical problems	ELO13
K5	Dialectical thinking formed in awareness and addressing social and political issues at the local and national level.	ELO13
Ethics and Attitude		
K6	Self–learning, accumulating knowledge and experience to supplement and develop Marxist and Leninist.	ELO13

K7	Have ability to apply theoretical knowledge in solving practical problems; apply dialectical thinking in evaluating political, economic and social issues in Viet Nam and all over the world.	ELO13
K8	Have confidence/ belief in the leadership of the Communist Party of Viet Nam and the path to the Socialism of Viet Nam.	ELO13

COURSE DESCRIPTION

MLE01001. Principles of Marxism - Leninism 1 (2: 2-0; 4; 90)

This course consists of 4 chapters which include Introduction to basic principles of Marism and Leninism; Dialectical materialism; Materialist dialectics; Historical materialism.

ASSESSMENT

Grading: 10

Weighting:

- Attendance: 10%

- Formative assessment: 30%

- Final exam: 60%

Assessment summary

Rubric	Course expected learning outcomes	Weighting (%)	Week
Attendance		**10**	
Rubric 1: Class attendance	K1, K2, K3	7	1-10
Formative assessment		**30**	
Rubric 2: Midterm Evaluation	K1, K2, K3, K4, K8	30	5-7
Final exam		**60**	
Rubric 3: Final Exam	K1, K2, K3, K4, K5, K8	60	Examination schedule

TEXT BOOKS AND REFERENCES

**** Text Books/Lecture Notes:***

- Syllabus of the basic principles of Marxism - Leninism (2013). National Political Publishing House, Hanoi.

**** Other materials:***

- Luong Viet Hai (2001). Social modernization - Some theoretical and practical issues, Social Science Publishing House, Hanoi.

- Questions and Answers on Basic Principles of Marxism-Leninism (2010). National Political Publishing House, Hanoi.

- Le Van Luc - Tran Van Phong (2008). Some topics on basic principles of Marxism-Leninism, Volume 1, Political Theory Publishing House, Hanoi.

COURSE OUTLINE

Week	Content
1	***Chapter 1: Introduction to basic principles of Marxism and Leninism***
	A/ Summary of main content in class*: (3 lessons)* **Content of theory:** 1.1 Profile of Marxism – Leninism 1.1.1 Marxism - Leninism and 3 components 1.1.2 The establishment and development of Marxism
	***B/* Content should be self-studied at home**: *(6 lessons)* 1.2 Object, purposes and requirements of learning methods, the study subjects 1.2.1 Object, purpose of study, research 1.2.2 Some basic requirements on methods of learning, research
2,3	***Chapter 2: Dialectical materialism***
	A/ Summary of main content in class*: (6 lessons)* **Content of theory:** 2.1 Materialism and dialectical materialism 2.1.1 The opposition between materialism and idealism in solving basic problem of Philosophy 2.2 Perspective of dialectical materialism materially, consciousness and dialectical relationship between matter and consciousness 2.2.1 Mater 2.2.2 Consciousness 2.2.3 Dialectical relationship between matter and consciousness 2.2.4 Significant methodological
	***B/* Content should be self-studied at home**: *(12 lessons)* 2.1.2 Dialectical materialism – The highest form of development of materialism

	2.2.4 Significant methodological
4,5,6	***Chapter 3: Materialist dialectics***
	A/ Summary of main content in class*: (9 lessons)* **Content of theory:** 3.1 Dialectics and materialist dialectics 3.1.1 Dialectics and the basic form of dialectics 3.1.2 Materialist dialectics 3.2 The principle of common relationship 3.2.2 The principle of the development 3.3 Basic category pairs of materialist dialectics 3.3.1 The particular and the general 3.3.2 Reason and result 3.4 The rule of materialist dialectics 3.4.1 The law of the transformation of quantity into quality and vice versa 3.4.2 Rule struggle between opposites 3.4.3 The law of the negation
	B/ Content should be self-studied at home: *(18 lessons)* 3.3.3 Course and random 3.3.4 Content and form 3.3.5 Essence and phenomenon 3.3.6 Possibility and reality 3.5 Cognitive theory of dialectical materialism 3.5.1 Practical, cognitive and practical role for awareness 3.5.2 Dialectical path of the perception of truth
7,8,9,10	***Chapter 4: Historical materialism***
	A/ Summary of main content in class*: (12 lessons)* **Content of theory:** 4.1 The role of material production and the law of the reactions of production in line with the level of development of the productive forces

	4.1.1 Material production and its role 4.1.2 The law of the reactions of production in line with the level of development of the productive forces 4.2 Dialectic between infrastructure and superstructure 4.2.1 The concept of the infrastructure, superstructure 4.2.2 Dialectical relationship between infrastructure and superstructure 4.3 The decision of the society exists for social consciousness and the relative independence of social consciousness 4.3.1 The decision of the society exists for social consciousness 4.3.2 The relative independence of social consciousness 4.4 Economic forms – social and natural historical process of development of Economic form – social 4.4.1 Economic forms – social 4.1.2 Natural historical process of development of Economic form – social 4.4.3 Scientific value of the theory of Economic forms – social
	B/ Content should be self-studied at home: *(24 lessons)* 4.5 The role of class struggle and social revolution for the movement, social development 4.5.1 Social revolution for the mobilization and social development of class antagonism 4.5.2 The role of class and class struggle for the social development of class antagonism 4.6 The perspective of historical materialism human and creative role in the history of the masses 4.6.1 Human and human nature 4.6.2 The concept of the masses and creative role in the history of the masses.

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTRUE
FACULTY OF EDUCATION AND FOREIGN LANGUAGES

COURSE SYLLABUS
SNE01012: English Listening and Speaking 2

Credits: 7 (Lecture: 6 - Practice: 1); Self-Learning: 14
Term: 2
Preceding course: SNE01010-English Speaking and Listening 1

COURSE OBJECTIVES:

The purpose of the course is to help student develop speaking and listening skills to gain the level equal to B1 after finishing the course.

COURSE EXPECTED LEARNING OUTCOMES:

	Course expected learning outcomes After successfully completing this course, students are able to:	**Program expected learning outcomes**
Knowledge		
K1	Apply knowledge, vocabulary, structure of familiar topics under B1 level	ELO8
K2	Develop the knowledge of pronunciation such as: word stress, sentence stress, suffix sounded, distinguish /ʊ/and /uː/, how to read appreciation	ELO8
Skills		
K3	Implement to listen and summarize the main ideas of normal topics	ELO8
K4	Create conversations in English under daily communication independently, fluently, naturally	ELO8
K5	Combine to work in groups, plan and manage the group.	ELO6
Ethics and Attitude		
K6	Be aware of learning for the whole life, learning nonstop and develop knowledge	ELO14
K7	Practice moral and disciplined spirit	ELO12

COURSE DESCRIPTION

SNE01012. English Listening and Speaking 2 (7: 6-1; 14; 315)

This course consists of 10 units in Takeaway 3 book with contents related to daily life such as fashion, job, entertainment, health, travelling and so on. Besides, this course has 15 hrs for practice under Developing tactics for listening with some topics to enhance students' practice and develop listening and speaking skills.

Preceding course: SNE01010- English Speaking and Listening 1

ASSESSMENT

Grading: 100 points

Weighting:

- Attendance: 10%
- Formative assessment: 30%
- Finalexamination: 60%

Assessment summary:

Rubric	Content/Criteria	Expected learning outcome	Weighting (%)	Time/Week
Attendance				
Rubric 1: Class attendance	- Level of engagement & behaviour - Attendance	K1, K2, K3, K4, K5, K6, K7	10	1-15
Formative assessment				
Rubic 2: Presentation	- Contents - Structure and layout - Delivery ideas and information - Eye contact & body - Response to questions - Participant in team presentation	K1, K2, K3, K4, K5, K6, K7	10	8
Rubric 3: Mid-term exam	- Answer the questions - Speaking about a topic - Answer the questions - Listen for main ideas - Listen for information	K1, K2, K5, K7	20	4 & 12
Final assessment				
Rubric 4: Final exam	- Answer the questions - Speaking about a topic - Answer the questions - Listen for main ideas	K1, K2, K3, K4, K7	60	Exam calendar

	- Listen for information			

TEXT BOOKS AND REFERENCES

**** Text Books/Lecture Notes:***

Loveday, P., Koop, M., Trowbridge, S. & Scarry, E (2012). Take Away English 3 Student Book. New York: McGraw-Hill ELT (Miguel Angel Toledo Castellanos).

Loveday, P., Koop, M., Trowbridge, S. & Scarry, E (2012). Take Away English 3 Workbook. New York: McGraw-Hill ELT (Miguel Angel Toledo Castellanos).

Richards, J.C (2003). Developing Tactics for Listening (2nd ed.). Oxford: Oxford University Press.

**** Additional references:***

Ann, B.(2001). Tree or Three CUP

Badger, I (2012). Collins English for life: Skills – Listening: B1+. Glasgow: Collins

Graham, C. (2004). Let's sing let's chant Oxford University Press.

Susan, B. (2004) Understanding English Pronunciation EUP

Pelteret, C (2012). Collins English for life: Skills – Speaking: B1+. Glasgow: Collins

Richards, J.C (2003). Basic Tactics for Listening (2nd ed.). Oxford: Oxford University Press.

Richards, J.C (2003). Expanding Tactics for Listening (2nd ed.). Oxford: Oxford University Press.

COURSE OUTLINE

Week	Content
1,2	***Unit 1:*** **World languages**
	A/ **Main contents***: (9 hrs)* **Theory: (**5 hrs) 1.1. Start: Understanding languages 1.2. Listening: Learning languages 1.3. Song: My one true love 1.4. Pronunciation: Syllable stress 1.5. Conversation Takeaway: Asking for clarification 1.6. Language Takeaway: Unit review **Theoretical practice exercises:** *(3 hrs)* **Seminar/Discussion:** *(1hr)* **Practice/Experiment:** *(3 hrs)* PET Listening Test 1 PET Speaking Test 1
	B/ **Self- study contents**: *(21 hrs)* Self-read document of unit 1 and do exercises of Unit 1 and do exercises in Takeaway English 3 Workbook

2,3	***Unit 2:*** **Are you fashionable?**
	A/ **Main contents***: (9 hrs)* **Theory*:*** *(5 hrs)* 2.1. Start: Formal and casual clothes 2.2. Listening: What do you wear to work 2.3. Culture: Wedding clothing traditions 2.4. Pronunciation: Reduction of *to* 2.5. Conversation Takeaway: Shopping for clothes 2.6. Language Takeaway: Unit review **Theoretical practice exercises:** *(3 hrs)* **Seminar/Discussion:** *(1 hr)* **Practice/Experiment:** *(3 hrs)* PET Listening Test 2 PET Speaking Test 2
	B/ **Self- study contents**: *(21hrs)* Self-read document of Unit 2 and do exercises of Unit 2 and do exercises in Takeaway English 3 Workbook
4,5	***Unit 3: That's life***
	A/ **Main content:** *(9 hrs)* **Theory:** (5 hrs) 3.1. Start: Tell me about your family 3.2. Listening: How's it going 3.3. Song: My crazy family 3.4. Pronunciation: The sounds /i/ live and /ai/ live 3.5. Conversation Takeaway: Saying goodbye and making plans 3.6. Language Takeaway: Unit review **Theoretical practice exercises:** *(3 hrs)* **Seminar/Discussion:** *(1 hr)* **Practice/Experiment:** *(3 hrs)* PET Listening Test 3 PET Speaking Test 3 **Midterm test 1**
	B/ **Self- study contents**: *(21 hrs)* Self-read document of Unit 3 and do exercises of Unit 3 and do exercises in Takeaway English 3 Workbook
6	***Unit 4:*** **Do you know a good story?**
	A/ **Main content:** *(9 hrs)* **Theory:** *(5 hrs)* 4.1. Start: Classifying animals 4.2. Listening: An African folktale 4.3. Culture: Folktale about the Moon 4.4. Pronunciation: Pronunciation of –ed verb endings 4.5. Conversation Takeaway: Asking for more information about a story

	4.6. Language Takeaway: Unit review **Theoretical practice exercises:** *(3 hrs)* **Seminar/Discussion:** *(1 hr)* **Practice/Experiment:** *(3hrs)* PET Listening Test 4 PET Speaking Test 4
	***B/* self-study contents**: *(21hrs)* Self-read document of Unit 4 and do exercises of Unit 4 and do exercises in Takeaway English 3 Workbook
7,8	***Unit 5:* Home, sweet home**
	***A/* Main content:** *(9 hrs)* **Theory:** *(5 hrs)* 5.1. Start: Apartment for rent 5.2. Listening: I'm calling about the apartment 5.3. Song: Close the door 5.4. Pronunciation: Vowel sounds /ʊ/ wood, /u:/ you 5.5. Conversation Takeaway: Responding to suggestions 5.6. Language Takeaway: Unit review **Theoretical practice exercises:** *(3 hrs)* **Seminar/Discussion:** *(1 hr)* **Practice/Experiment:** *(3hrs)* PET Listening Test 5 PET Speaking Test 5 **Groups' Presentation**
	***B/* self-study content**: *(21 hrs)* Self-read document of Unit 5 and do exercises of Unit 5 and do exercises in Takeaway English 3 Workbook
9	**Unit 6. Doing it for charity**
	***A/* Main content:** *(9 hrs)* **Theory:** *(5 hrs)* 6.1. Start: Charity events 6.2. Listening: A walk for charity 6.3. Culture: Charities around the world 6.4. Pronunciation: Pronouncing contractions 6.5. Conversation Takeaway: showing support and offering help 6.6. Language Takeaway: Unit review **Theoretical practice exercises:** *(3 hrs)* **Seminar/Discussion:** *(1 hr)* **Practice/Experiment:** *(3 hrs)* PET Listening Test 6 PET Speaking Test 6

	***B/* self-study content**: *(21hrs)* Self-read document of Unit 6 and do exercises of Unit 6 and do exercises in Takeaway English 3 Workbook.
10,11	**Unit 7. How do you stay healthy?**
	***A/* Main content:** *(9 hrs)* **Theory:** *(5 hrs)* 7.1. Start: The human body 7.2. Listening: Let's exercise 7.3. Song: What can this be? 7.4. Pronunciation: Sentence stress 7.5. Conversation Takeaway: Seeing the doctor 7.6. Language Takeaway: Unit review **Theoretical practice exercises:** *(3 hrs)* **Seminar/Discussion:** *(1 hr)* **Practice/Experiment:** *(3 hrs)* PET Listening 7 PET Speaking 7
	***B/* Self-study content**: *(21hrs)* Self-read document of Unit 7 and do exercises of Unit 7 and do exercises in Takeaway English 3 Workbook.
11,12	**Unit 8. Space travel** ***A/* Main content:** *(9 hrs)* **Theory:** *(5 hrs)* 8.1. Start: Fly me to the Moon 8.2. Listening: A vacation on the Moon 8.3. Culture: Space food 8.4. Pronunciation: Contracted would 8.5. Conversation Takeaway: Checking into a hotel 8.6. Language Takeaway: Unit review **Theoretical practice exercises:** *(3 hrs)* **Seminar/Discussion:** *(1hr)* **Practice/Experiment:** *(3 hrs)* PET Listening 8 PET Speaking 8 **Midterm Test**
	***B/* Self-study content**: *(21hrs)* Self-read document of Unit 8 and do exercises of Unit 8 and do exercises in Takeaway English 3 Workbook.
13,14	**Unit 9. What have you been doing?**
	***A/* Main content:** *(9 hrs)* **Theory:** *(5 hrs)* 9.1. Start: The average American 9.2. Listening: How long does it take 9.3. Song: Passing the time

	9.4. Pronunciation: Understanding numbers and times 9.5. Conversation Takeaway: Apologizing and accepting an apology 9.6. Language Takeaway: Unit review **Theoretical practice exercises:** *(3 hrs)* **Seminar/Discussion:** *(1 hr)* **Practice/Experiment:** *(3hrs)* PET Listening 9 PET Speaking 9
	***B/* Self-study content**: *(21 hrs)* Self-read document of Unit 9 and do exercises of Unit 9 and do exercises in Takeaway English 3 Workbook.
14,15	**Unit 10. Great Adventures**
	***A/* Main content:** *(9 hrs)* **Theory:** *(5 hrs)* 10.1. Start: Famous expeditions 10.2. Listening: Expedition to Lhasa 10.3. Culture: Excursions and transportation around the world 10.4. Pronunciation: The sound /ər/ 10.5. Conversation Takeaway: Shopping for camping equipment 10.6. Language Takeaway: Unit review **Theoretical practice exercises:** *(3 hrs)* **Seminar/Discussion:** *(1 hr)* **Practice/ Experiment:** *(3 hrs)* PET Listening 10 PET Speaking 10
	***B/* Self-study content**: *(21hrs)* Self-read document of Unit 10 and do exercises of Unit 10 and do exercises in Takeaway English 3 Workbook.

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTRUE
FACULTY OF EDUCATION AND FOREIGN LANGUAGES

COURSE SYLLABUS
SNE01013: English Reading & Writing 2

Credits: 6 (Lecture: 6 – Practice: 0); Self-Learning 12
Term: 2
Preceding course: SNE01011 English Reading and Writing 1

COURSE OBJECTIVES:

This course aims to focus on the following:

- ***On knowledge:*** Read texts that contain clear information on topics related to the discipline and areas of interest and interest; Write simple, linked articles on familiar topics or personal interests by linking single elements into structured articles; Write simple, linked articles on familiar topics or personal interests by linking single elements into structured articles

- ***On skills:*** To train students know how to work independently, to manage time, to organize, allocate tasks efficiently; to master searching documents for scientific research and long-life learning.

- ***On ethics and attitude:*** To form activation, creation, responsibility in study; To create fidelity in providing accounting information for managers in decision making.

COURSE EXPECTED LEARNING OUTCOMES

Notation	Course expected learning outcomes After successfully completing this course, students are able to	Program expected learning outcomes
Knowledge:		
K1	Well use English verbs, sentence structures and words.	ELO8
K2	Flexibly apply the vocabulary about language, fashion, family, animal, habitat, health, tourism and volunteer work.	ELO8
Skills:		
K3	Analyse and explain clearly common topics in English	ELO8
K4	Write paragraphs in appropriate styles, with diversified contents and sharp arguments about everyday life topics.	ELO8

K5	Organize and collaborate with team members.	ELO6
Ethics and Attitude:		
K6	Perform self-learning ability and have lifelong learning sense	ELO12, ELO14

COURSE DESCRIPTION

SNE01013. English Reading and Writing 2 (6: 6 –0; 12; 270)

This course consists of 10 units about World Languages, Fashion, Life, Story, Home, Charity, Health, Space travel, Experiences and Adventures. Main languages items include vocabulary on the mentioned topics. Main grammar structures are tenses (present simple, present continuous, present perfect, past perfect, future, and present perfect continuous), clauses (time, reason, result, comparison and contrast) and aspects (active, passive). Main skills include analyzing questions before doing tasks, comprehending an ad, writing a letter for a certain kind of readers, understanding events and stories based on chronological signals, making plans, scanning for main ideas, listing information in a table/ chart, organizing ideas in a report, and predicting before reading.

Preceding course: SNE01011- English Reading & Writing 1

ASSESSMENT

Grading: 100 points

Weighting:

- Attendance: 10%
- Formative assessment: 30%
- Final exam: 60%

Assessment summary

Rubric	Course expected learning outcome	Weighting (%)	Week
Attendance		**10**	
Rubric 1: Class attendance	K1, K2, K3, K4, K5, K6	5	1- 15
Rubric 2: Group Presentation	K1, K2, K3, K4, K5	5	1,3,4,6,7,10,12,13,15
Formative assessment		**30**	
Rubric 3: Mid-term exam	K1, K2, K3, K4, K5, K6	30	8
Final assessment		**60**	
Rubric 4-:Final exam	K1, K2, K3, K4, K5, K6	60	Exam calendar

TEXT BOOKS AND REFERENCES

**** Text Books/Lecture Notes:***

Loveday, P., Koop, M., Trowbridge, S., &Scarry, E. (2012). *Take Away English 3: English for success*. Student Book

Loveday, P., Koop, M., Trowbridge, S., &Scarry, E. (2012). *Take Away English 3: English for success*. Workbook

**** Additional references***

Capel, A., & Sharp, W. (2012). *Objective first*. Cambridge: Cambridge University Press.

Mann, M., &Taylore-Knowles, S. (2008). *Destination B1: Grammar & vocabulary*. Oxford: Macmillan Education.

Oxenden.C. et al (1997) *New English File Pre-intermediate.* Oxford University Press

COURSE OUTLINE

Week	Content
1	***Unit 1: World languages***
	A/* Main content: (6 hrs)* **Theory:** *(4 hrs)* **1.1. Vocabulary**: How well do you speak the language? **1.2. Grammar**: Simple present & present continuous **1.3. Reading**: The written word; Strategy: Preview the task **Exercises**: (*1 hr*) **Project - Group presentation:** *(1 hr)* World languages
	***B/*Self- learning content**: *(12 hrs)* - Read materials for Unit 1 and do related exercises in Takeaway English 3 Workbook
2	***Unit 1: World languages*** (Cont.)
	A/*Main content: *(3 hrs)* **Theory: (***2 hrs)* **1.4 Writing:** Writing an ad for a language course **1.5 Test takeaway strategy:** Understand tone and language **Exercises: (***1 hr)*
	***B/* Self- learning content**: *(6 hrs)* Read materials for Unit 1 and do related exercises in Takeaway English 3 Workbook
	Unit 2:* Are you fashionable?** ***A/*Main content: *(3 hrs)* **Theory:***(2hrs)* **2.1 Vocabulary:** Different ages, different clothing **2.2 Grammar:** Verb patterns (verb + infinitive or verb-ing) **Exercises:***(1 hr)*
	***B/* Self- learning content**: *(6 hrs)* Read materials for Unit 2 and do related exercises in Takeaway English 3 Workbook

3	***Unit 2:*** **Are you fashionable?**
	A/**Main content***: (6 hrs)* **Theory:***(4 hrs)* **2.3 Reading:** Jeans, jeans, jeans **2.4 Writing:** Writing an email about clothes **2.5 Test takeaway:** Understand cause and effect **Exercises:** *(1 hrs)* **Project - Group presentation:** *(1 hr)* Fashion
	B/ **Self- learning content**: *(12 hrs)* Read materials for Unit 2 and do related exercises in Takeaway English 3 Workbook
4	***Unit 3:*** **That's life**
	A/**Main content***: (6 hrs)* **Theory:***(4 hrs)* **3.1. Vocabulary:** Life events **3.2. Grammar:** Present perfect and past perfect **3.3. Reading:** A special family reunion **Exercises:** *(1 hrs)* **Project - Group presentation:** *(1 hr)* Life events
	B/ **Self- learning content**: *(12 hrs)* Read materials for Unit 3 and do related exercises in Takeaway English 3 Workbook
5	***Unit 3:*** **That's life**
	A/ **Main content***: (3 hrs)* **Theory:***(2 hrs)* **3.4 Writing:** Writing a letter about recent events **3.5 Test takeaway strategy:** Look for the correct form and part of speech of a word **Exercises:** *(1 hr)*
	B/ **Self- learning content**: *(6 hrs)* Read materials for Unit 3 and do related exercises in Takeaway English 3 Workbook
	Unit 4:**Do you know a good story?**
	A/ **Main content***: (3 hrs)* **Theory:***(2 hrs)* **4.1 Vocabulary:** Giving and responding to information **4.2 Grammar:** Simple past and past continuous **Exercises:** *(1 hr)* ***B/*** **Self- learning content**: *(6 hrs)* Read materials for Unit 4 and do related exercises in Takeaway English 3 Workbook
6	***Unit 4:*** **Wildlife**
	A/ **Main content***: (6 hrs)* **Theory:***(4 hrs)* **4.3 Reading:** A folktale from India **4.4 Writing:** Writing a folktale **4.5 Test takeaway strategy:** Short answer questions **Practice/experiment content:** *(1 hrs)*

	Project - Group presentation: *(1 hr)* Wildlife
	***B/* Self- learning content**: *(12 hrs)* Read materials for Unit 4 and do related exercises in Takeaway English 3 Workbook
7	***Unit 5:* Home, sweet home**
	A/* Main content: (6 hrs)* **Theory:***(4 hrs)* **5.1 Vocabulary:** What's in the living room? **5.2 Grammar:** *Should* for advice and the imperative for instructions **5.3 Reading:** Feng Shui **Exercises:** *(1 hrs)* **Project - Group presentation:** *(1 hr)* House
	***B/* Self- learning content**: *(12 hrs)* Read materials for Unit 5 and do related exercises in Takeaway English 3 Workbook
8	***Unit 5:*Home, sweet home**
	A/* Main content: (6 hrs)* **Theory:***(4 hrs)* **5.4 Writing:** Writing an advice letter **5.5 Test Take Away**: Listening comprehension **Exercises:** *(2 hr)*
	***B/* Self- learning content**: *(12 hrs)* Read materials for Unit 5 and do related exercises in Takeaway English 3 Workbook
9	**Unit 6. Doing it for charity**
	A/* Main content: (6 hrs)* **Theory:***(5 hrs)* **6.1 Vocabulary:** What do you do and where do you go to stay in shape? **6.2 Grammar:** Future forms: will, be going to, simple present **6.3 Reading:** A blog about a charity event **6.4. Writing Take Away**: Writing a blog to promote a charity event **6.5. Test Take Away**: Choose the correct verb tense or form **Project - Group presentation:** *(1 hr)*Charity
	***B/* Self- learning content**: *(12 hrs)* Read materials for Unit 6 and do related exercises in Takeaway English 3 Workbook
10	**Unit 7. How do you stay healthy?**
	A/* Main content: (6 hrs)* **Theory:***(4 hrs)* **7.1. Vocabulary:** Where does it hurt? **7.2. Grammar:** Modal verb review **7.3. Reading:** A health advice column **Exercises:** *(1 hr)* **Project - Group presentation***: (1hr)* Health
	***B/* Self- learning content**: *(12 hrs)* Read materials for Unit 7 and do related exercises in Takeaway English 3 Workbook
11	**Unit 7: How do you stay healthy?**
	A/* Main content: (3 hrs)*

	Theory: *(2 hrs)* **7.4 Writing:** Writing an article giving advice **7.5 Test takeaway:** Compare and contrast **Exercises:** *(1 hr)*
	***B/* Self- learning content**: *(6 hrs)* Read materials for Unit 7 and do related exercises in Takeaway English 3 Workbook
	***Unit 8:* Space travel**
	A/* Main content: (3 hrs)* **Theory:** *(1 hr)* **8.1 Vocabulary:** Build your vocabulary! **8.2 Grammar:** *Would* for hypothetical situations **Exercises:** *(2 hrs)*
	***B/* Self- learning content**: *(6 hrs)* Read materials for Unit 8 and do related exercises in Takeaway English 3 Workbook
12	***Unit 8:* Space travel**
	A/*Main content: (6 hrs)* **Theory:** *(4 hrs)* **8.3. Reading**: What about the Moon **8.4. Writing Take Away**: Writing an email to request hotel information **8.5. Test Take Away**: Vocabulary questions **Practice/experiment content:** *(1 hr)* **Exercises:** *(1 hr)* Space travel
	***B/* Self- learning content**: *(12 hrs)* Read materials for Unit 8 and do related exercises in Takeaway English 3 Workbook
13	***Unit 9:* What have you been doing?**
	A/* Main content: (6 hrs)* **Theory:** *(4 hrs)* **9.1. Vocabulary:** Time flies! **9.2. Grammar:** Present perfect continuous **9.3. Reading:** Have you been waiting long? **Exercises:** *(1 hrs)* **Project - Group presentation:***(1 hr)* Time
	***B/* Self- learning content**: *(12 hrs)* Read materials for Unit 9 and do related exercises in Takeaway English 3 Workbook
14	***Unit 9:* What have you been doing?**
	A/* Main content: (3 hrs)* **Theory:** *(2 hr)* **9.4 Writing:** Writing a survey report **9.5 Test takeaway:** Use context clues to answer questions **Exercises:** *(1 hr)*
	***B/* Self- learning content**: *(6 hrs)* Read materials for Unit 9 and do related exercises in Takeaway English 3 Workbook
	***Unit 10:* Great Adventures**
	A/* Main content: (3 hrs)* **Theory:** *(2 hrs)* **10.1. Vocabulary:** Equipment for a camping trip

	10.2. Grammar: Passive voice **Exercises:** *(1 hr)*
	***B/* Self- learning content**: *(6 hrs)* Read materials for Unit 10 and do related exercises in Takeaway English 3 Workbook
15	***Unit 10:* Great Adventures**
	A/* Main content: (6 hrs)* **Theory:** *(3 hrs)* **10.3. Reading:** Adventures in Africa **10.4. Writing Take Away:** Writing a blog about a trip **10.5. Test Take Away:** Vocabulary questions **Exercises:** (*2 hrs)* **Project - Group presentation:** *(1 hr)* Adventures in Africa
	***B/*Self-learning content**: *(12 hrs)* Read materials for Unit 10 and do related exercises in Takeaway English 3 Workbook

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTURE
FACULTY OF POLITICAL AND SOCIAL SCIENCE

COURSE SYLLABUS
MLE01002: Basic Principles of Marxism and Leninism 2

Credits: 3 (Lecture: 3 – Practice: 0); Self-Learning: 6
Term: 2
Prerequisite course(s): Principles of Marxism and Leninism 1

COURSE OBJECTIVES:

- Knowledge: To help student acquire the basic knowledge of political economic and socialist in Marxist-Leninist theory;

- Skills: To help student being able to apply that knowledge into practice;

- Attitude and morality: To student trust in the leadership of the Communist Party and the road to socialism in Vietnam.

COURSE EXPECTED LEARNING OUTCOMES

Notation	**Course expected learning outcomes** After successfully completing this course, students are able to	**Program expected learning outcomes**
Knowledge		
K1	Describe the scientific knowledge system of the basic principles of Marxism-Leninism	ELO1
K2	Understand the scientific knowledge system of the basic principles of Marxism-Leninism	ELO1
K3	Apply scientific knowledge of the principles of Marxism - Leninism in practice.	ELO1
Skills		
K4	Point out the rationale of the Communist Party's policies and guidelines, state policies in different stages of development of the country	ELO13
K5	Predicts a number of economic and social issues that arise in different stages of development of the country	ELO13
K6	Coordination of political economic and Socialism principles in	ELO13

	explaining practical issues arises	
Ethics and Attitude		
K7	Self - study, accumulate knowledge and experience to supplement and develop theories of political economy and scientific socialism	ELO13
K8	Believe in the leadership of the Communist Party and the way towards socialism in Vietnam.	ELO13

COURSE DESCRIPTION

MLE01002. Principles of Marxism – Leninism 2 (3: l 3 - 0; 6; 135)

This course consists of 6 chapters focusing on the laws, economic principles and and normative issues socialist construction.in Marxism - Leninism theory.

Preceding courses: MLE01001- Principles of Marxism and Leninism 1

ASSESSMENT

Grading: 10

Weighting:

- Attendance: 10%

- Formative assessment: 30%

- Final exam: 60%

Assessment summary

Rubric	Course expected learning outcomes	Weighting (%)	Week
Attendance		**10**	
Rubric 1: Class attendance	K1, K2, K3	7	1-10
Formative assessment		**30**	
Rubric 2: Midterm Evaluation	K1, K2, K3, K4, K8	30	5-7
Final exam		**60**	
Rubric 3: Final Exam	K1, K2, K3, K4, K5, K8	60	Examination schedule

TEXT BOOKS AND REFERENCES

**** Text Books:***

+ Syllabus of The basic principles of Marxism-Leninism (2013). Publishing National Politics, Hanoi.

**** Other references:***

+ Syllabus of Scientific Socialism (2007). Publishing National Politics, Hanoi.

+ Syllabus of Marxism - Leninism Political Economy (2007). Publishing National Politics. Hanoi.

COURSE OUTLINE

Week	Content
1,2,3	**Chapter 1: Theory of value**
	A/* Main contents: (8 lessons)* **Theory:** 1.1. Conditions of the establishment, characteristics and advantages of commodity production 1.1.1. Conditions of the establishment and existence of commodity production 1.1.2. Characteristics and advantages of commodity production 1.2. Commodity 1.2.2. Two sides properties of the labor to produce goods 1.2.3. Value and the factors that affect the value of goods 1.3. Monetary 1.3.1. Life history and the nature of the currency 1.3.2. The function of currency 1.4. The law of value 1.4.1. Contents of the law of value 1.4.2. The impact of the law of value
	***B/ B/* Self- study contents**:: *(16 lessons)* 1.2.1. Commodity and two of its properties
3,4,5,6,7	**Chapter 2: Theory of surplus value**
	A/* Main contents: (12 lessons)* **Theory:** 2.1. The transformation of money into capital 2.1.1. The general formula of capital 2.1.2. Contradictions of capitalism's general formula 2.1.3. Commodity of labor 2.2. The process of producing surplus value in capitalist society 2.2.1. The unity between the production value and the use of surplus value production 2.2.2. The nature of capitalism. The division of capitalism into capitalist invariants and variable capital 2.2.3. The ratio of surplus value and surplus value volume 2.2.4. Two methods of producing surplus value and super surplus value

	2.2.5. Production of surplus value (absolute economic laws of capitalism) 2.3. Remuneration in capitalism 2.3.1. The economic nature of the remuneration 2.3.2. Two basic forms of remuneration in capitalism 2.3.3. The nominal remuneration and real remuneration 2.4. The transformation of surplus value into capital (Capital accumulation) 2.4.1. The essence and motivation of capital accumulation 2.4.2. Capital accumulation and centralization of capital 2.4.3. Organic structure of capital 2.5. The circulation process of capital and surplus value 2.5.1. Circulation and rotation of Capital 2.6. Capital forms and other forms of manifestation of surplus value 2.6.1. Costs of capitalist production, profits and profit margin 2.6.2. Average profit and production price 2.6.3. The transformation of values into production price 2.6.4. The division of surplus value between the exploiting classes in capitalism
	***B/* Self- study contents**:: *(24 lessons)* 2.5.2. Reproduction and circulation of social capital 2.5.3. The economic crisis of capitalism
7,8,9,10	**Chapter 3. Theory of capitalism and State monopoly Capitalism**
	A/* Main contents:: (9 lessons)* **Theory:** 3.1. Monopoly capitalism 3.1.1. Cause of transformation of capitalism from free competition to monopoly 3.1.2. The basic economic characteristics of monopoly capitalism 3.1.3. The operation of the law of value and the law of surplus value in monopoly capitalism stage 3.2. State monopoly capitalism 3.2.1. The cause establishment and the nature of state monopoly capitalism 3.2.2. The main manifestations of state monopoly capitalism 3.4. Role, limitations and movement trends of capitalism 3.4.1. The role of capitalism for the development of social production

	3.4.2. Limitations of capitalism 3.4.3. Movement trend of capitalism
	B/* Self- study contents*: *(18 lessons)* 3.3. New features in the development of modern capitalism 3.3.1. The leapfrog development of productive forces 3.3.2. The economy tends to shift from industrial economy to knowledge economy 3.3.3.The adjustment of the relations of production and class relations 3.3.4. Institutional business management within the enterprise with major changes 3.3.5. Macroeconomic regulator of the state increasingly 3.3.6. Transnational companies have an increasingly important role in the economic system of capitalism, the main force to promote economic globalization 3.3.7. Regulation and international coordination are enhanced
10,11,12	**Chapter 4: The Historical mission of the working class and the socialist ıtion**
	A/* Main contents: (6 lessons)* **Theory:** 4.1. Historical mission of the working class 4.1.1. The working class and the historical mission of the working class 4.1.2. Objective conditions stipulated historical mission of the working class 4.1.3. The role of the Communist Party during the implementation of historical mission of the working class 4.2. Socialist revolution 4.2.1. Socialist revolution and its causes 4.2.2. Goals, motivation and contents of the socialist revolution 4.2.3. Unceasing revolutionary theory of Marxism - Leninism 4.2.4. The alliance between the working class and the peasantry and the other labor classes in socialist revolution 4.3. Socio-economic morphology of communism
	B/* Self- study contents*: *(12 lessons)* 4.3.1. Indispensable trend of appearance of communism 4.3.2. The development phase of the communism
12,13,14	**Chapter 5. The social and political issues in the process of socialist revolution**
	A/* Main contents: (6 lessons)* **Theory:**

	5.1. Building democracy and a socialist state 5.1.1. Building the socialist democracy 5.1.2. Building a socialist state 5.2. Building the socialist culture 5.2.3. Content and method of building the socialist culture 5.3. Solve the issues of ethnic and religious 5.3.1. Ethnic issues and the basic principles of Marxism-Leninism in solving ethnic issues 5.3.2. Religion and the basic principles of Marxism Leninism in solving religious issues
	***B/* Self- study contents**: *(12 lessons)* 5.2.1. The concept of socialist culture 5.2.2. The necessity of building a culture of socialism
14,15	**Chapter 6: Socialism - reality and prospects**
	A/* Main contents: (3 lessons)* **Theory:** 6.1. Socialist realism 6.1.1. Russian October Revolution and the first implementations of socialism model in the world 6.1.2. The introduction of socialist state and its achievements 6.2. The crisis, the collapse of the socialist model of Soviet and its causes 6.2.1. The crisis and the collapse of the socialist model of Soviet 6.2.2. Causes of the crisis and collapse of the socialist model of Soviet
	***B/* Self- study contents**: *(6 lessons)* 6.3. Prospects of Socialism 6.3.1. Capitalism - is not the future of human society 6.3.2. Socialism - the future of human society

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTURE
FACULTY OF POLITICAL AND SOCIAL SCIENCE

COURSE SYLLABUS
MLE01004: The details of The Revolutionary guideline of Vietnamese Communist Party

Credits: 3 (Lecture: 3 – Practice: 0); Self-Learning: 6
Term: 2
Prerequisite course(s): None

COURSE OBJECTIVES:

The module aims to help learners gain knowledge about the birth and leadership process of the Communist Party of Vietnam so that they can analyze, apply and combine theory with practice to apply. The Party's approach to solving practical problems of the country, creating the confidence of students with the leadership of the Party today.

COURSE EXPECTED LEARNING OUTCOMES

Notation	Course expected learning outcomes After successfully completing this course, students are able to	Program expected learning outcomes
Knowledge		
K1	Analyze and evaluate the process of birth; The leadership of the Communist Party of Vietnam from 1930 to present.	ELO1
K2	Apply the contents of the Party's lines to the practical issues of the country	ELO1
Skills		
K3	Coordinate the Party's theoretical approach with practice to solve practical problems	ELO1
K4	Apply theoretical thinking to solve political and social issues in localities and across the country	ELO1
Ethics and Attitude		
K5	Self study knowledge and experience to contribute to the Party's leadership.	ELO13, ELO14
K6	Trust in the leadership of the Party and the road to socialism in Vietnam	ELO13, ELO14

COURSE DESCRIPTION

MLE01004. Revolutionary lines of the Communist Party of Vietnam (3: 3 – 0; 6; 135)

This course consists of 9 chapters which include General module on: The birth of the Communist Party of Vietnam and the first political program of the Party; The Way to Fight the Government of 1930-1945; The resistance war against the French colonialists and the American imperialists invaded 1945-1975; Industrialization; The way to build a market economy, socialist orientation; The way to build the political system; The way of building, developing culture and solving social problems; Foreign policy.

ASSESSMENT

Grading: 10

Weighting:

- Attendance: 10%

- Formative assessment: 30%

- Final exam: 60%

Assessment summary

Rubic	Expected course learning outcomes	Weight (%)	Week
Rubic 1: Attendace Assessment	K5	10	1-15
Rubric 2: Mid-term exam	K1, K2, K3, K4, K6	30	10
Rubric 3: Final exam	K1, K2, K3, K5, K6	60	Following University schedule

TEXT BOOKS AND REFERENCES

**** Textbook / Lecture Notes:***

The revolutionary line of the Communist Party of Vietnam (2015), National Political Publishing House, Hanoi.

**** Other references:***

- History of the Communist Party of Vietnam (2006). National Political Publishing House, Hanoi.

- The revolutionary lines of the Communist Party of Vietnam - Materials for teaching and learning political theory courses in universities and colleges (2008) National Economics University Publishing House.

COURSE OUTLINE

Week	Content
1	***Preface: Object, taskandmethodologyoftheCommunist Party of Vietnam***

	revolutionaryapproach
	A / The maincontents in class: (2 hrs) **Content theory:** Subjects Research Methods
	B / Self-studycontents at home: (4 hrs) **Research mission** The meaningoflearningsubject
1,2, 3,4	***Chapter 1: The birthoftheCommunist Party of Vietnam andthefirstpoliticalprogramofthe Party***
	A / Summary ofthemaincontents in theclass: (8 hrs) **Content theory:** 1.1. Pro-Indigenous Protestant Movement 2.2. The conferenceestablishedtheparty'sfirstpoliticalpartyandpoliticalplatform
	B / Self-studycontents at home: (16 hrs) 1.3. The historyoftheCommunist Party of Vietnam 1.4. Historical significanceofthebirthoftheCommunist Party ofVietnam andthemeaningoftheParty'sfirstpoliticalprogram
4,5,6	***Chapter 2: The Way to Fight theGovernmentof 1930-1945***
	A / Summary ofthemaincontents in theclass: (8 hrs) **Content theory:** 2.1. Party policy in theperiod 1930 - 1935 2.2. The policydirectionofstrategicdirection 1939 - 1941
	B / Self-studycontents at home: (16 hrs) 2.3. Party policy in theperiod 1936 - 1939 2.4. Party policy in theperiod 1941 - 1945 2.5. Results, causesofsuccess, historicalsignificanceandlessonslearned
7,8,9,10	***Chapter 3: The Resistance War Against French Colonialismandthe Great American Invasion of 1945-1975***
	A / Summary ofthemaincontents in theclass: (10 hrs) **Content theory:** 3.1. The policyofbuildingandprotectingthegovernmentfrom 1945 to 1946 3.2. Resistance war againstthe French colonialinvasion 1946 - 1954 3.3. American anti-war policyfrom 1954 to 1964 3.4. American anti-war policyfrom 1965 to 1975

	B / Self-studycontents at home: (16 hrs) 3.5. Historical situationofourcountry after the August Revolution 3.6. The result, thecauseofvictory, thehistoricalsignificanceandthelessonsoftheresistance war againstthe French colonialists 3.7. The results, thecauseofvictory, thehistoricalsignificanceandthelessonsofthe anti-American resistance
10, 11	***Chapter 4: Industrialization***
	A / Summary ofthemaincontents in theclass: (4 hrs) **Content theory:** 4.1. Objectives, directionofindustrializationbefore 1986 4.2. Objectives, viewsofindustrializationandmodernization in therenovationperiod
	B / Self-studycontents at home: (8 hrs) 4.3. Evaluation oftheresultsofindustrializationbefore 1986 4.4. The orientationofindustrializationassociatedwiththedevelopmentofknowledgeeconomy 4.5. Evaluation oftheresultsofindustrialization in therenovationperiod
	Chapter 5: The Way to Building a Socialist-oriented Market Economy
11, 12	**A / Summary ofthemaincontents in theclass: (4 hrs)** **Content theory:** 5.1. The formationoftheParty'sthinking on marketeconomy in thepre-reform period 5.2. Objectivesandbasicviewpointsofthesocialistmarketeconomy in therenovationperiod
	B / Self-studycontents at home: (8 hrs) 5.3. Centralizedplanningbureaucracy 5.4. Evaluation oftheimplementationofbureaucraticcentralizedplanning 5.5. A numberofpoliciestocontinuebuildingandperfectingthesocialist-orientedmarketeconomy 5.6. Evaluatingtheresultsofthecurrenttrendofbuilding a marketorientedsocialisteconomy
13	***Chapter 6: The Way toBuild a Political System***
	A / Summary ofthemaincontents in class: (3 hrs) **Content theory:** 6.1. Renewalofthinkingaboutthepoliticalsystemofthedoimoiperiod 1986 topresent 6.2. Objectives, perspectivesandpolicyofbuilding a politicalsystem in therenovationperiod

	B / Self-studycontents at home: (6 hrs) 6.3. Policyofbuildingthepoliticalsystembefore 1986 6.4. Resultsofbuildingthepoliticalsystembefore 1986 6.5. Resultsofthepoliticalsystembuilding 1986 uptonow
14	***Chapter 7: The Way toBuild, DevelopandCopewithSocialIssues***
	A / Summary ofthemaincontents in class: (3 hrs) **Content theory:** **7**.1. Viewpointtodirectculturaldevelopmentfrom 1986 topresent 7.2. Viewpointsolvingsocialproblemsfrom 1986 topresent
	B / Self-studycontents at home: (6 hrs) 7.3. Policiestobuild, developcultureandsolvesocialproblemsbefore 1986 7.4. The resultsofimplementingthepolicyofbuildingcultureandsolvingsocialproblemsbefore 1986 7.5. The resultsofimplementingthepolicyofbuildingcultureandsolvingsocialproblemsfrom 1986 topresent
15	***Chapter 8: ForeignPolicy***
	A / Summary ofthemaincontents in class: (3 hrs) **Content theory:** 8.1. The stagesofformation, developmentofforeignpolicyfrom 1986 topresent 8.2. The goal, missionandideologyguidingforeignpolicyfrom 1986 topresent
	B / Self-studycontents at home: (6 hrs) 8.3. Party policy on foreignaffairsbefore 1986 8.4. Resultsofimplementationofthepolicyofforeignrelationsdevelopmentbefore 1986 8.5. Resultsoftheimplementationofforeigndevelopmentpolicyfrom 1986 topresent

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTRUE
FACULTY OF AGRONOMY

COURSE SYLLABUS
MLE01005: Ho Chi Minh' Ideology (Ho Chi Minh's Thought)

Credits: 2 (Lecture: 2 – Practice: 0); Self-Learning: 4
Term: 2
Prerequisite course(s): None

COURSE OBJECTIVES:

Module to help students achieve political qualities, personal morality, sense of responsibility to society.

COURSE EXPECTED LEARNING OUTCOMES

Notation	Course expected learning outcomes After successfully completing this course, students are able to:	Program expected learning outcomes
Knowledge		
K1	List and describe the knowledge system of Ho Chi Minh's ideology.	ELO1, ELO13
Skills		
K2	Apply knowledge of the system of Ho Chi Minh's ideology in learning and life.	ELO1, ELO13
Ethics and Attitudes		
K3	Be consencious and implement the values of the system of Ho Chi Minh's ideology.	ELO1, ELO13

COURSE DESCRIPTION

MLE01005. Ho Chi Minh's Ideology. (2: 2-0; 4; 90). The module content is Ho Chi Minh's thought on the path of national liberation and construction the new society.

ASSESSMENT

Grading: 10 points

Weighting:

- The diligence mark: 10%
- The mark of the studying process/ Mark of mid-semester test: 30%
- The final test mark of the semester: 60%

Assessment summary

Rubric	Course expected learning outcome	Weighting (%)	Week
Attendance			
Rubric 1: Class attendance	K1, K2, K3	**10**	1-10
Formative assessment			
Rubric 2: Group Presentation	K1, K2, K3	**30**	8-10
Final assessment			
Rubric 3: Final exam	K1, K2, K3	**60**	Following University schedule

TEXT BOOKS AND REFERENCES

**** Textbooks:***

Textbook of Ho Chi Minh's thought (2011), Ministry of Education and Training, National Political Publishing House, Hanoi.

**** Additional references:***

1. Ho Chi Minh's complete work (2011), National Political Publishing House, Hanoi.

2. Central Council supply compiling textbooks of Marxist-Leninism science subjects, Ho Chi Minh's Thought (2014), Textbook of Ho Chi Minh's Thought, National Political Publishing House, Hanoi.

3. Thu Trang (2002), Nguyen Ai Quoc in Paris (1917-1923), National Political Publishing House, Hanoi.

COURSE OUTLINE

Week	Content
2	***The beginning chapter. Object, research methods and significance of learning the subject of Ho Chi Minh's ideology***

	A / The main content in the class: (3 hrs) Theoretical teaching content: Research objects Guide to self-study at home
	B / The content should be self-studying at home: (6 hrs) Research methods The significance of studying the subject for students Prepare for next contents
2	Chapter 1. Basis, the process of formation and development of Ho Chi Minh's ideology
	A / Summary of the main content in the class: (3 hrs) Theoretical teaching content: 1.1.Basis of formation of Ho Chi Minh's ideology 1.1.1.Objective basis 1.1.2.Subjective factors Guide to self-study at home
	B / The content should self-study at home: (6 hrs) 1.2. The process of formation and development of Ho Chi Minh's ideology 1.2.1.The period before 1911: Formation of patriotism and patriotic minded 1.2.2.The period from 1911 to 1920: find the way to save the country, the national liberation 1.2.3.The period from 1920 to 1930: Formation of the basic thought of the revolution in Vietnam 1.2.4.The period from 1930 to 1945: Overcoming challenges, persevere revolutionary stance 1.2.5.The period from 1945 to 1969: Ho Chi Minh's Thought continued development, improvement 1.3. The value of Ho Chi Minh's Thought 1.3.1 Ho Chi Minh's thought of the path of liberation and national development 1.3.2. Ho Chi Minh's Thought for world development Prepare for next contents
3	***Chapter 2. Ho Chi Minh's Thought on the issue of nation and national liberation revolution***
	A / Summary of the main content in the class: (3 hrs) Theoretical teaching content: 2.1. Ho Chi Minh's thought on natoinal issue 2.1.1. Issue of colonial nation 2.2. Ho Chi Minh's Thought on national liberation revolution 2.2.2. National liberation revolution want victory must go the path of proletarian revolution

	2.2.3.National liberation revolution in the new era must be led by the Communist Party Guide studying at home
	B / The contents should be self-studying at home: (6 hrs) 2.1.2. Relation between national issue and class issue 2.2.1. The nature, mission and goal of the national liberation revolution Prepare for next contents
4	**Chapter 2. Ho Chi Minh's Thought on the issue of nation and national liberation revolution**
	A / Summary of the main contents in the class: (6 hrs) Theoretical teaching content: 2.2. Ho Chi Minh's Thought on national liberation revolution 2.2.4. Forces of national liberation revolution includes the entire nation 2.2.5. National liberation revolution should be conducted conducted with the active and creative and have the ability to win before victorious proletarian revolution in the mother country Guide to studying at home
	B / The contents should be self-studying at home: (6 hrs) 2.2.6. National liberation revolution must be carried out by way of revolutionary violence Prepare for next content
5	***Chapter 3: Ho Chi Minh's Thought on socialism and the road of transition to socialism in Vietnam***
	A / Summary of the main contents in the class: (3 hrs) **Theoretical teaching content:** 3.1. Ho Chi Minh's Thought on socialism in Vietnam 3.1.1. The inevitability of socialism in Vietnam 3.1.2. Ho Chi Minh's conception of socialism natural characteristics in Vietnam 3.1.3. Ho Chi Minh's views on the objectives and motivations of socialism in Vietnam 3.2. The road, transitional measures to socialism in Vietnam 3.2.1. Characteristics and tasks of the transitional period to socialism in Vietnam Guide studying at home
	B / The content should be self-studying at home: (6 hrs) 3.2.2. Indications of principles, steps and measures taken in the process of building socialism Prepare for next content
6	***Chapter 4. Ho Chi Minh's Thought of Vietnam communist Party***

	A / Summary of the main contents in the class: (3 hrs) Theoretical teaching content: 4.1. Ho Chi Mnih's view of the role and nature of the Communist Party 4.1.1. About the fomation of the Communist Party 4.1.2. The role of the Communist Party 4.1.3. The nature of the Communist Party
	B / The content should be self-studying at home: (6 hrs) 4.1.4. View of Vietnam Communist Party's ruling 4.2. Ho Chi Minh's Thought on building clean and strong Vietnam Communist Party 4.2.1. Building Party - the law of existence and development of the Party 4.2.2. The content of the work of building Vietnam Communist Party Prepare for next contents
7	***Chapter 5. Ho Chi Minh's Thought on national unity and international unity***
	A / Summary of the main contents in the class: (3 hrs) Theoretical teaching content: 5.1. Ho Chi Minh's ideology of great national unity 5.1.1. The role of great national unity in the revolutionary cause 5.1.2. Forces of great national unity 5.1.3. Organizational forms of the bloc of great national unity Guide self-studying at home
	B / The contents should be self-studying at home: (6 hrs) 5.2. Ho Chi Minh's Thought on international unity 5.2.1. The role of international unity 5.2.2. Forces and forms of international unity 5.2.3. The principle of international unity Prepare for next contents
8	***Chapter 6. Ho Chi Minh's Thought of building a state of the people, by the people, for the people***
	A / Summary of the main content in the class: (3 hrs) Theoretical teaching content: 6.1. Building a state that shows owning of the people 6.1.1. State of the People 6.1.2. State by the people 6.1.3. State for the people 6.3. Building strong legal effect state 6.3.1. Building a legitimate and constitutional state

	6.3.2. State management by the constitution law and attaching special important to put the law into life 6.4. Building clean, strong, effective operation state 6.4.2. Prevent and overcome the negatives in the operations of state Guide self-studying at home
	B / The content should be self-studying at home: (6 hrs) 6.2. Ho Chi Minh's view about the consistency between the nature of the working class with nature of the people and nation of the State 6.2.1. The working class nature of the state 6.2.2. Working class nature united with nature of the people and nation of state 6.4. Building clean, strong, effective operation state 6.4.1. Building staff and civil servants who are moral and talent 6.4.3. Strengthening the strictness of law concurrently with promoting of revolution moral education Prepare for next contents
9	***Chapter 7. Ho Chi Minh's Thought on culture, morality and building new man***
	A / Summary of the main content in the class: (3 hrs) Theoretical teaching content: 7.2. Ho Chi Minh's Thought on morality 7.2.1. Basic content of Ho Chi Minh thought on morality Guide to self-study at home
	B / The content should be self-study at home: (6 hrs) 7.1. Ho Chi Minh's basic views of cultural 7.1.1. Cultural definitions and views on building a new culture 7.1.2. Ho Chi Minh's views on general issues of culture 7.1.3. Ho Chi Minh's views on a number of key areas of culture Prepare for next contents
10	***Chapter 7. (CONTINUED)***
	A / Summary of the main content in the class: (3 hrs) Theoretical teaching content: 7.2.2. Students learn and follow the ideology, moral example of Ho Chi Minh Guide studying at home Summary and remind for end exam of the module
	B / The contents should be self-studying at home: (6 hrs) 7.3. Ho Chi Minh's Thought on construction new man 7.3.1. Ho Chi Minh's view of man

	7.3.2. Ho Chi Minh's view of the role of human and strategy of "plant people"

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTRUE
FACULTY OF INFORMATION TECHNOLOGY

COURSE SYLLABUS
THE01001: Calculus 1

Credits: 3 (Lecture: 3 – Practice: 0); Self-Learning: 6
Term: 3
Prerequisite course(s): None

COURSE OBJECTIVES:

- Knowledge: The course aims to help learners grasp the basic knowledge of mathematical calculations of functions of a single variable, multiple variables.
- Skills: Gradually establish accurate logical thinking for learners when approaching computational problems. Learners are able to understand and apply mathematical knowledge to computational situations encountered in specialized disciplines and in agribusiness realities
- Attitude and responsibility: Learners have a good sense of responsibility at work and professional ethics.

COURSE EXPECTED LEARNING OUTCOMES

Notation	Course expected learning outcomes After successfully completing this course, students are able to	Program expected learning outcomes
Knowledge		
K1	Identify, describe, classify, and present the basic calculus of mathematical analysis.	ELO2
K2	Summarize and generalize knowledge of analysis of functions of single variable.	ELO2
K3	Develop models for simple situations through functional relationships, function of multiple variables.	ELO2
Skills		
K4	Work independently; Accurately solve mathematical calculations with tight arguments.	ELO11
K5	English in expressing mathematical contents.	ELO7
Ethics and Attitude		
K6	Recognize and be aware of the accuracy of computational	ELO13

	issues.	

COURSE DESCRIPTION

THE01001. Calculus 1 (03TC: 3–0; 6; 135)

This course consists of 5 chapters about basic knowledge of continuity, differential calculus and the application of analysis of functions of single variable and multiple variables; Introduction to linear algebra and analytic geometry.

Prerequisite: no

ASSESSMENT

Grading: 10 points

Weighting:

- Attendance: 10 %
- Formative assessment: 30 %
- Final exam: 60 %

Assessment summary

Rubric	Course expected learning outcome	Weighting (%)	Week
Attendance		**10**	**1-15**
Rubric 1: Participant	K6	**10**	
Formative assessment		**30**	
Rubric 2: Homework	K1, K2, K3, K5	6	1-15
Rubric 3: Mid-term exam	K1, K2, K3, K4, K5, K6	24	8
Final assessment		**60**	
Rubric 4: Final exam	K1, K2, K3, K4, K5, K6	60	16

TEXT BOOKS AND REFERENCES

**** Text Books/Lecture Notes:***

- Neyhauser, C. (2010). Calculus for Biology and Medicine (3rd Edition), Pearson, 840 p.
- Stewart, J. (2015). Calculus: Early Transcendentals (8rd Edition), Brooks Cole, 1368 p. https://www.math.ucdavis.edu/~kouba/Math17B.html
- Nguyen, H. T. (2007). Lecture notes and teaching-learning materials for course math 17A, Nông Nghiệp, 618 p.

**** Additional references:***

- Neyhauser, C. (2010). Studyguide for Calculus for Biology and Medicine, Cram101 Incorporated, 144 p.

- Morris, C. C., Robert, M. S. (2015). Fundamental of Calculus, Wiley, 368 p.
- http://www.calculus.org

COURSE OUTLINE

Week	Content
1	**Chapter 0: The preparation knowledge** **A/ Main contents**: (3 hours) **Theory:** 0.1. Functions 0.2. Graph of functions **B/ Self- study contents**: (6 hours) 0.3. Home-work
2 3	**Chapter 1: Limit and continuity of functions** **A/ Main contents**: (6 hours) **Theory:** (6 hours) 1.1.Limit of functions 1.2.Continuity 1.3.Limit at the infinity 1.4Sandwich theorem and some trigonometric limits 1.5. Home-work **B/ Self- study contents**: (12 hours) 1.5. Home-work
4 5 6	**Chapter 2: Differentiation** **A/ Main contents:** (9 hours) **Theory:** (9 hours) 2.1. Definition of derivative 2.2. Rules of derivative 2.3. Derivative of composite function and inverse function 2.4. Implicit function and derivative of implicit function 2.5. Differentiation and higher derivative 2.6. Derivative of basic elementary functions 2.7. Approximation and local linearization 2.8. Home-work

	B/ Self- study contents: (18 hours) 2.8. Home-work
	Chapter 3: Applications of differentiation
7 8 9	**A/ Main contents:** (9 hours) **Theory:** (9 hours) 3.1. Extrema of functions and the mean value theorem 3.2. Monotonicity and convexity of functions 3.3. Analyze a function and graph 3.4. Anti-derivative 3.5. Home-work
	B/ Self- study contents: (18hours) 3.5. Home-work 3.6. Introduction to differential equations, stability (optional)
	Chapter 4: Function of multivariables
10 11 12	**A/ Main content:** (9 hours) **Theory:** (9 hours) 4.1. Function of multivariables and the continuity 4.2. Partial derivatives 4.3. Differentiation of functions of multivariable, tangent plan, linearization 4.4. Home-work
	B/ Self- study contents: (18 hours) 4.4. Home-work 4.5. Application of differentiation of functions of multivariable (optional)
	Chương 5: Linear algebraic and analytic geometry
13 14 15	**A/ Main contents:** (9 hours) **Theory:** (9 hours) 5.1. System of linear equations 5.2. Matrix 5.3. Linear maps, eigenvalue, eigenvector 5.4. Home-work 5.5. Analytic geometry
	B/ Self- study contents: (18 hours) 5.6. Home-work

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTRUE
FACULTY OF INFORATION TECHNOLOGY

COURSE SYLLABUS
THE01003: Principle of Physics 1

Credits: 2 (Lecture: 2 – Practice: 0); Self-Learning 4
Term: 3
Prerequisite course(s): None

COURSE OBJECTIVES:

The course aims to help learners obtain basic knowledge about laws of physics of the nature and phenomena related to mechanical and thermal motion.

The learners who complete this course successfully will be able to understand and apply these rules to explain phenomena in nature and in the real life. The module also helps learners to study basic and major courses and to acquire knowledge in science, to practice self-learning skill, to develop a persistent character and solid viewpoint to self-solve a problem and to develop teamwork skill.

COURSE EXPECTED LEARNING OUTCOMES

Notation	**Course expected learning outcomes** After successfully completing this course, students are able to	**Program expected learning outcomes**
Knowledge		
K1	Apply the system of units of measurement to conversion of units	ELO2
K2	Analyze the mechanical motion and the cause of motion, determine the energy of the moving object	ELO2
K3	Analyze a thermodynamic system its transformation processes, determine the energy of the system and explain the proccess of exchange of energy of that system.	ELO2
Skills		
K4	Solve a problems of mechanical and thermal motion in physics	ELO6
K5	Apply laws of physics into specific problems	ELO6
Ethics and Attitude		
K6	Be conscious about lifelong learning	EL02

COURSE DESCRIPTION

THE01003: Principles of Physics 1 (2: 2 –0; 4; 90).
The course includes: The system of units of measurement and unit conversion, the motion of like-point object, dynamic of motion, motion of a solid, work and energy, gravitaion, fluid mechanic, mechanical vibrations and waves, temperature and heat, thermodynamic.
Prerequisite: None

ASSESSMENT

Grading: 10 points

Weighting:

- Attendance: 10 %
- Formative assessment: 30 %
- Final exam: 60 %

Assessment summary

Rubric of evaluation	Course expected learning outcome	Weight (%)	Week
Attendance			
Rubric 1: Attendance	K1, K2, K3	10	1 to 10
Formative assessment			
Rubric 2: Homework	K2, K4	10	1 to 10
Rubric 3: Mid – term exam	K2, K4, K5	20	7
Final exam			
Rubric 4: Final exam	K2, K3, K4, K5	60	Following the university's schedule

TEXT BOOKS AND REFERENCES

**** Text books/ Lecture Notes:***

Young & Freedman (2015). University Physics 14th Edition, Addison Wesley.

**** Additional references:***

- Alan Giambattista, Betty M. Richardson, Robert C. Richardson (2010). College Physics, 3rd Edition. McGraw-Hill /Irwin Higher Education.

- Raymond A. Serway, John W. Jewett (2013). Physics for Scientists and Engineers with Modern Physics 9th Edition, Brooks Cole.
- Randall D. Knight (2012). Physics for Scientists and Engineers: A Strategic Approach with Modern Physics (3rd Edition), Pearson.

COURSE OUTLINE

Week	Content
1	***Chapter 1: System Units of measurment and unit conversions***
	A/ Main contents during the class*: (3 hours)* **Theory:** 1.1. Measurments 1.2. Units of Measurment 1.3 Unit conversions 1.4 Exercises
	B/ Contents of self – study at home: *(3 hours)* 1.5 The International and Vietnammese System of Units of measurments 1.6 Special Units of measurments 1.7 The CSG System of Units of Measurements (Centimetre - Gram - Second)
1	***Chapter 2: Motion of a like – point object***
	A/ Main contents during the class*: (3 hours)* **Theory:** 2.1 Motion on a traight line 2.2 Motion in two and three dimensions space 2.3 Motion of an object in two and three dimensions space. Examples. 2.4 Exercises
	B/ Contents of self – study at home:
2	***Chapter 3: Dynamics***
	A/ Main contents during the class*: (3 hours)* **Theory:** 3.1 The Newton's first law of motion 3.2 The Newton's second law of motion 3.3 The Newton's third law of motion 3.4 Impulse and momentum 3.5 Law of conservation of momentum 3.6 Exercises
	B/ Contents of self – study at home: *(2 hours)* 3.6 Motion of a rocket, jet engine 3.7 Galilean principle of relativity
3	***Chapter 4: Motion of a solid***
	A/ Main contents during the class*: (3 hours)* **Theory:** *(3 hours)* 4.1 Center of mass 4.2 Motion of a solid 4.3 Rotational motion, Basis equation of rotational motion 4.4 Moment of Inertia 4.5 Angular momentum, law of convervation of angular momentum 4.6 Exercises
	B/ Contents of self – study at home: *(1 hours)* 4.7 Application of law of convervation of angular momentum 4.8 Total kinetic energy of a solid

4	***Chapter 5: Work and Energy***
	A/ Main contents during the class*: (3 hours)* **Theory:** *(3 hours)* 5.1 Concept of mechanical work 5.2 Theorem of mechanical work – kinetic energy, definition kinetic energy 5.3 Work done by gravitational force 5.4 Potential energy 5.5 Mechanical energy 5.6 Power 5.7 Exercises
	B/ Contents of self – study at home: *(1 hours)* 5.8 Collisions problems
5	***Chapter 6: Gravitational Field***
	A/ Main contents during the class*: (3 hours)* **Theory:** *(3 hours)* 6.1 Law of Gravitation 6.2 The role of gravitation 6.3 Consequences and applications 6.4 Potential energy of an object in gravitational field 6.5 Motion in gravitational field 6.6 Exercises
	B/ Contents of self – study at home: *(1 hours)* 6.7 Keppler's laws
6	***Chapter 7: Fluid Mechanic***
	A/ Main contents during the class*: (3 hours)* **Theory:** *(3 hours)* 7.1 Introduction to Fluid 7.1.1 Definition of fluid 7.1.2 The mass density and pressure of a fluid 7.1.3 Dependency of pressure on the altitude 7.2 Pascal's law 7.3 Dynamics of fluid 7.4 Exercises
	B/ Contents of self – study at home: *(1 hours)* 7.5 Viscous fluid: The viscosity, Reynolds number
7	***Chapter 8: Mechanical Viberations and Waves***
	A/ Main contents during the class*: (3 hours)* **Theory:** *(3 hours)* 8.1 Simple harmonic motion 8.2 Mechanical waves 8.3 Sound wave 8.4 Supersonic and applications 8.5 Doppler's Effect 8.6 Exercises
	B/ Contents of self – study at home: *(2 hours)*

	8.7 Damped oscillations 8.8 Driven oscillations, Resonance phenomenon
8	***Chapter 9: Temperature and Heat***
	A/ Main contents during the class*: (3 hours)* **Theory:** *(3 hours)* 9.1 Temperature 9.2 Thermal expansion 9.3 Heat and specific heat capacity 9.4 Phase change, latent heat 9.5 Exercises
	B/ Contents of self – study at home: *(1 section)*
9	***Chapter 10: Thermodynamics***
	A/ Main contents during the class*: (3 hours)* **Theory:** *(3 hours)* 10.1 Ideal gas, ideal gas law 10.2 Kinetic-Molecular Model of an Ideal Gas 10.3 Thermodynamics 10.4 Exercises
	B/ Contents of self – study at home: *(2 hours)* 10.5 Mean free path of molecule 10.6 Entropy, Principle of increase of entropy

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTRUE
FACULTY OF ENVIRONMENT

COURSE SYLLABUS
MTE01001: General Chemistry 1

Credits: 3 (Lecture: 2 – Practice: 1); Self-Learning: 6
Term: 4
Prerequisite course(s): None

COURSE OBJECTIVES:

This course aims to provide student with basic knowledge about general chemistry (part 2: acids and bases, electrochemistry, nuclear chemistry and elements) so that students can interpret the growth and development of plants. Beside, this course provide student with group-working and chemistry practical skills and right attitude toward scientific rules.

COURSE EXPECTED LEARNING OUTCOMES

	Course expected learning outcomes After successfully completing this course you should be able to:	**Program expected learning outcomes**
Knowledge:		
K1	Differentiate and present basic concepts in chemistry	ELO2
K2	Apply chemistry laws and knowledge in solving problems involved matter structure, mass and energy of subtances.	ELO2
K3	Determine the relationship between chemical phenomena to the growth and development of plants	ELO2
Skills		
K4	Proficiency in the use of tools and chemicals in general chemistry experiments. Ability to work in teams	ELO6
Ethics and Attitude		
K5	Conscious lifelong learning	ELO13

COURSE DESCRIPTION

MTE01001. General Chemistry 1 (3: 2 - 1; 6; 135).
This course consists of 6 chapters about stoichiometry, gases, atomic structure, periodic table, chemical bonding equilibrium and 5 lab lessons.

ASSESSMENT

1. Grading: 10

2 . Weighting:

- Attendance: 10%
- Formative assessment: 30%
- Final exam: 60%

3. Assessment summary

Rubric	Course expected learning outcome	Weighting (%)	Week
Attendance		**10**	
Rubric 1: Class attendance	K1	5	1-10
Rubric 2: Exercise	K1, K2, K3	5	1-10
Formative asessment		**30**	
Rubric 3: Group Presentation	K2, K3, K4	5	5-7
Rubric 4: Mid-term	K1, K2	15	8
Rubric 5: Practice and report	K2, K3, K5	10	11-15
Final exam		**60**	
Rubric 6: Final exam	K1, K2	60	Following University schedule

TEXT BOOKS AND REFERENCES

**** Text Books/Lecture Notes:***

Steven S. Zumdahl (2013). Chemistry, 9th edition, Houghton Mifflin Company, Boston, New York, 1056 p.

**** Additional references:***

Brown Bursten LeMay Murphy Woodward (2014). Chemistry, the central science, 13th edition, Prentice Hall.

John Kenkel, (2010). Basic Chemistry Concepts and Exercises,1st Edition, CRC Press.

Nguyen Van Tau (2002). General Chemistry, Vietnam education publishing. (Vietnamese)

Duong Van Dam (2006). Exercise General Chemistry, Vietnam education publishing. (Vietnamese)

COURSE OUTLINE

Week	Content

1	**Chapter 1: Chemical Foundation**
	A/* Main contents: (3 hours)* **Theory:** 2 hours 1.1. Significant figures 1.2. Atoms, Molecules and Ions 1.3. Gases and gas laws 1.4. Liqids and solids **Practice:** *(1 hours)* Calculation for gases
	***B/* Self- study contents**: *(6 hours)* Chapter1 exercises
2	**Chapter 2: Chemical reactions and stoichiometry**
	A/* Main contents: (3 hours)* **Theory: *(2.5 hours)*** 2.1. Ion exchange and redox reactions 2.2. Percent composition of compounds 2.3. Stoichiometric calculations 2.4. Calculations Involving a Limiting Reactant **Exercises:** *(0.5 hours)* Stoichiometric calculations
	***B/* Self- study contents**: *(6 hours)* Chapter 2 exercises
3	**Chapter 3: Atomic structure and periodic table**
	A/* Main contents: (4 hours)* **Theory*:*** *(3 hours)* 3.1. Quantum theory on atomic structure 3.2. Quantum numbers 3.3. Periodic table 3.4. Periodic trends in atomic properties **Seminar/Discussion:** *(1 hours)* Periodic trends in atomic properties
	***B/* Self- study contents** *(8 hours)* Chapter 3 exercises
4, 5	**Chapter 4: Chemical bonding**
	***A/* Main content:** *(5 hours)* **Theory:** *(4 hours)* 4.1. Ionic bonding

	4.2. Covalent bonding 4.3. Molecular orbital theory 4.4. Molecular interactions **Discussion:** *(1 hours)* Liên kết trong chuỗi xoắn kép của ADN
	B/* Self- study contents *(10 hours) **Chapter 4 exercises**
6-7	**Chapter 5: Thermal Chemistry**
	A/* Main contents: (5 hours)* **Theory:** *(3 hours)* 5.1. The nature of Energy 5.2. Enthalpy and Calorimetry 5.3. Hess's Law **Exercise:** *(1 hours)* Tính toán nhiệt các phản ứng hoá học **Discussion:** *(1 hours)* New sourses of enery.
	***B/* Self- stusy contents**: *(10 hours)* Chapter 5 exercises
7, 8	***Chapter 6: 16 Spontaneity, Entropy, and Free Energy***
	***A/* Main contents:** *(4 hours)* **Theory:** *(2 hours)* 6.1. Spontaneous processes 6.2. Entropy and Second law 6.3. Entropy Changes in Chemical Reactions 6.4. Free energy **Exercise:** *(1 hours)* Determining the direction of chemical reations. **Mid-test** *(1 hours)*
	***B/* Self- study contents**: Chapter 6 exercises (8 hours)
9	***Chapter 7: Chemical kinetics***
	***A/* Main contents:** *(3 hours)* **Theory:** *(2 hours)* 7.1. Reaction rate

	7.2. Rate laws 7.3. A model of chemical kinetics 7.4. Reaction mechanism 7.5. Catalysts **Nội dung bài tập:** *(0.5 hours)* Determining order and mechanism of chemical reactions. **Discussion:** *(0.5 hours)* Role of clorophyl in phytosynthesis.
	***B/* Self- study contents**: Chapter 7 exercise (6 hours)
10	***Chapter 8: Chemical equilibrium***
	***A/* Main contents:** *(3 hours)* **Theory:** *(2 hours)* 8.1. The equilibrium condition 8.2. The equilibrium constant 8.3. Heterogeneous Equilibria 8.4. Applications of the Equilibrium Constant 8.5. Le Châtelier's Principle **Excercise:** *(1 hours)* Solving Equilibrium Problems
	***B/* Self- study contents**: Chapter 8 exercise (6 hours)
11	***Practice 1*** **Content:** *(6 hours)* Gases
12	***Practice 2*** **Content:** *(6 hours)* Thermal chemistry
13	***Practice 3*** **Content:** *(6 hours)* Entropy and spontaneity
14	***Practice 4*** **Content:** *(6 hours)* Reaction rate
15	***Practice 5*** **Content:** *(6 hours)* Equilibrium

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTRUE
FACULTY OF ENVIRONMENT

COURSE SYLLABUS
MTE01003: Organic chemistry I

Credits: 3 (Theory: 2 – Practical: 1); Self-Learning: 6
Term: 3
Preceding courses: None

COURSE OBJECTIVES:

The aim of the course is to provide general knownledge of organic chemistry including composition, structure and the rule of naming of organic compounds. This course introduces deep knowledge about specific structure, physical and chemical properties, natural states, preparations, exploitations, roles and applications of hydrocarbon compounds and halogen derivatives.
The course also aims to develop group-working and discussion skills as well as self-working for students.

COURSE EXPECTED LEARNING OUTCOMES:

Notation	**Course expected learning outcomes** After successfully completing this course, students are able to	**Program expected learning outcomes**
Knowledge		
K1	Explain chemical and bio-chemical phenomena related to organic compounds	ELO2
K2	Analyze chemical and bio-chemical phenomena related to applications of hydrocarbon and halogen	ELO2
Skills		
K3	Work independently; Develop skills to work in group through sharing and distributing tasks among members.	ELO6
Ethics and Attitude		
K4	Be aware of lifelong learning	ELO12

COURSE DESCRIPTION

MTE01003. Organic Chemistry 1 (3: 2 - 1; 6; 135).

This course consists of six chapters, including: General, Alkane, Alkene, Alkyne, Arene and halides. The contents of general of organic chemistry are linkage, isomer, dividing of organic compounds. The content of chapters about introducing of hydrocarbon groups (saturated, unsaturated, aromatic) and halogen derivatives are characteristic of structure, properties, natural state, preparations and applications.

ASSESSMENT

1. Grading: 10 score scale

2. Weighting:

- Attendance: 10 %
- Formative assessment/mid-term assessment: 30 %
- Final exam: 60 %

3. Assessment summary

Rubric	Course expected learning outcome	Weighting (%)	Week
Attendance			
Rubric 1: Attendance in lectures	K1, K3, K4	5	1-15
Rubric 1: Attendance in exercise sessions	K3	5	2,5,7,10,12,15
Formative asessment			
Rubric 2: Exercise	K1, K2, K4	10	2,5,7,10,12,15
Rubric 3: Practical exercise	K2, K3, K4	10	4,6,9,11,14
Rubric 4: Mid-term exam	K1, K2	10	10, 15
Final exam			
Rubric 5: Final exam assessment	K1, K2	60	Following University schedule

TEXT BOOKS AND REFERENCES

1. **** Text Books/Lecture Notes:***
2. *Organic Chemistry*, 8th edition (2014) or 9th edition (2015), by McMurry
3. **** Additional references:***
4. *Organic Chemistry, Structure, Mechanism, and Synthesis* (2014) by Robert J. Ouellette and J. David Rawn, ISBN: 978-0-12-800780-8.

5. *Theory of Organic chemistry 1*, Thai Doan Tinh, *Science and Technics Publishing House*, 2003.
6. *Organic Chemistry*, Dinh Van Hung, Hanoi University of Agriculture Publisher, 2007.
7. Timothy D. Schowalter, (2006). Insect Ecology – An Ecosystem Approach. Second edition. AP Academic Press is an inprint of Elsevier, 572p.
8. Van Driesch R., Mark Hoddle and Ted Center, (2008). Control of pests and weeds by natural enemies: *An Introduction to Biological Control*. Blackwell publishing Ltd. Australia, 473p.

COURSE OUTLINE

Week	Contents
1, 2	***Chapter1:*** General ***A/* The main contents in the class***:* **Theory:** *(4 hours)* 1.1 The development of Organic Chemistry 1.2 The characteristics of the Carbon atom 1.3 Chemical bonding in organic chemistry 1.4 Inductive effect 1.5 Classification of organic compounds 1.6 Classification of organic reactions 1.7 Isomerism in organic chemistry **Exercise:** *1.5 hours.* Problem 1.3; 1.4; 1.5; 1.6; 1.10; 1.11; 1.12; 1.13; 1.16; 1.30; 1.31; 1.36-52 and 2.32-45. ***B/* The contents of self-study at home**: *(19.5 hours)* Revise the studied-theory: chracteristics of carbon atom (valency, hybrid state, carbon order); δ linkage, π linkage, polarization of linkage, induction effect, structural isomer, geometric isomer, optical isomer. 1. Doing exercise of chapter 1
2, 3, 4, 11	***Chapter 2:*** Alkanes and cycloankanes ***A/* The main contents in the class***:* **Theory:** *(3 hours)* 2.1 Alkanes in nature 2.2 Homologous series 2.3 Isomerism 2.4 Nomenclature 2.5 Laboratory preparation 2.6 Physical properties

Week	Contents
	2.7 Chemical reactions 2.8 Applications **Practice:** *(3 hours)* **Exercise**: *1.5 hours* Problem 3.4-3.14; 3.20; 3.25; 3.38-41; 5.27-29.
	***B/* Self-study at home**: *(22.5 hours)* Revise studied-theory: Alkane in nature, structural properties, characteristics of alkene, applications and preparations of alkane. Preparation of practice: study about the content of practices, operation and predict the result 1. Doing exercise of chapter 2.
4, 5, 12	***Chapter 3:*** Alkenes
	A/* The main contents in the class:* **Theory:** *(3 hours)* 3.1 Nomenclature 3.2 Isomersm 3.3 Preperation 3.4 Physical properties 3.5 Chemical reactions 3.6 Conjugated diens **Practice:** *(3 hours)* 1. **Exercise:** *1.5 hours* 6.4-6.40; 7.1-7.17; 7.24-7.36 ; 7.59-60.
	***B/* Self-study at home**: *(22.5 hours)* Revive studied-theory: Alkene in nature, structural properties, characteristics of alkene, applications and preparations of alkene. Preparation of practice: study about the content of practices, operation and predict the result 1. Doing exercise of chapter 3.
6, 7, 13	***Chapter 4: Alkynes***
	A/* The main contents in the class:* **Theory:** *(3 hours)* 4.1 Nomenclature 4.2 Preparation of Alkynes 4.3 Structure 4.4 Physical Properties 4.5 Chemical Reactivity **Practice:** *(3 hours)*

Week	Contents
	1. **Exercise:** *1.5 hours* 8.1-8.42
	***B/* Self-study at home**: *(22.5 hours)* Revive studied-theory: Alkyne in nature, structural properties, characteristics of alkyne, applications and preparations of alkyne. Preparation of practice: study about the content of practices, operation and predict the result 1. Doing exercise of chapter 4.

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTRUE
FACULTY OF BIOTECHNOLOGY

COURSE SYLLABUS
NHE01001: Introductory Biology

Credits: 3 (Lecture: 3 - Practice: 0); Self-Learning: 6
Term: 3
Prerequisite course(s): None

COURSE OBJECTIVES: This course aims to:

-Knowlegde:

+ Understand the structure and functions of cells (prokaryocytes, eukaryotic cells); Specific cellular biological processes (cell division, cellular respiration, photosynthesis, ...); Structure of genetic material in prokaryotic cells, eukaryotic, bacterial, viral; Some basic genetic techniques are being used nowadays as a basis for self-study and self-study.

+ Explain the mechanism of some processes occurring in the living organism..

-Skills:

+ Proficiency in team work: discussion, assignment of tasks in the group, helping group members to complete the content of the given seminar by lecturers, independent working skills

- Ethics and Attitude:

+ Active, creative; eager to learn; conscious accumulation of knowledge and self-learning throughout life

+ Humble, honest and have a good working attitude, high responsibility.

COURSE EXPECTED LEARNING OUTCOMES

	Course expected learning outcomes After successfully completing this course, student are able to:	**Program expected learning outcomes**
Knowledge:		
K1	Explain typical biological processes that take place in cells, in organisms: cell division, mutation, mutation, respiration, photosynthesis, …	ELO1
K2	Apply basic genetic techniques in experimental practice and scientific research	ELO2

Skills		
K3	Work in group and manage group working effectively	ELO6
Ethics and Attitude		
K4	Actively learning to improve capacity and qualifications; Creatively accumulate knowledge and a sense of self-learning throughout life.	ELO12
K5	Build a sense of humility, honesty, good working style, high responsibility	ELO13

COURSE DESCRIPTION

NHE01001. Introductory Biology (3TC: 3-0; 6; 135). The course consists of 12 theoretical chapters: General Introduction to Biology and the Discovering of Life; Constructing prokaryotic cells and eukaryotic cells; Cell cycle and process of cell division, infection reduction; Linkage between cells in the living organism; Cellular respiration; Photosynthesis; Molecular basis of genetics; Gene expression; Genetics in bacteria and viruses; Genetic information and genomes of eukaryotic cells; ADN technology and some basic genetic techniques.

Prerequisite course(s): None
Preceding course(s): None

ASSESSMENT

***Grading:* 10 points**

Weighting:

- Attendance: 10% (includes: attendance (50%) and preparation (50%))

- Process score: 15% (a group working point)

- Midterm test scores: 15%

- Final examination score: 60%

Assessment summary

Rubric	Course expected learning outcome	Weighting (%)	Week
Attendance		**10**	
Rubric 1: Class attendance	K4, K5	10	1-10
Processing asessment			
Rubric 2: Group working	K3	**15**	5-9
Rubric 3: Midterm exam	K1, K2	**15**	5-7
Final assessment		**60**	
Rubric 4: Final exam	K1, K2		Following University

			schedule

TEXT BOOKS AND REFERENCES

**** Text Books/Lecture Notes:***

-Reece, J, B., Urry, L.S., Cain, M.L., Wasserman, S.A., Minorsky, P.V., Jackson, R.B. (2014). **Biology**. *Publisher: Benjamin Cummings*

**** Additional references:***

-B. Alberts, A. Johnson, J. Lewis, M. Raff, K. Roberts, P. Walter (2015). **Molecular Biology of the Cell**, 6th ed., by Garland Science (New York)
-Harvey Lodish, Arnold Berk, Lawrence S. Zipursky, Paul Matsudaira, David Baltimore, James Darnell (2008). **Molecular Cell Biology**. 6th Edition. New York. USA.
-Randy Wayne (2010). ***Plant cell biology.*** *ISBN: 978-0-12-374233-9.*

COURSE OUTLINE

Week	Content
1	**Chapter 1: Introduction; Exploring Life**
	A/* Main contents: (2.5 hours)* **Theory:** 1.1. overview 1.2. Size of biological organization 1.3. Biological system 1.4. Diversity in biology 1.5. Evolution and diversity 1.6. Methods in biological research **Discussion:** *(0.5 hours)* Questions following chapter content given by lecturer
	***B/* Self- study contents**: *(6 hours)* Main content of the chapter
2	**Chapter 2: The Cell**
	A/* Main contents: (2.5 hours)* **Theory:** 2.1. The importance of the cell 2.2. Microscopy and biochemistry in cell research 2.3. Membrane system inside the cell and their function 2.4. The role of the nucleus and the ribosome in the functioning and function of the cell

	2.5. Membrane system inside the cell and metabolism regulation of the cell 2.6. Mitochondria and chloroplasts during energy metabolism 2.7. Cellular support frame: structure and operation 2.8. Extracellular components and coordination of cell activity **Discussion:** *(0.5 hours)* Questions following chapter content given by lecturer
	***B/* Self- study contents**: *(6 hours)* Main content of the chapter
3	**Chapter 3: The Cell Cycle**
	A/* Main contents: (2.5 hours)* **Theory:** 3.1. The role of cell division 3.2. The result of cell division 3.3. Process of infection 3.4. System of cell cycle control **Discussion:** *(0.5 hours)* Questions following chapter content given by lecturer
	***B/* Self- study contents**: *(6 hours)* Main content of the chapter
4-5	**Chapter 4: Meiosis**
	A/* Main contents*: (6 hours) **Seminar/Discussion content:** 4.1. Genetics: similarities and differences 4.2. Genetic inheritance through chromosome inheritance 4.3. TGiamr feces and fertilization in sexual reproduction 4.4. Results and role of fecal decomposition 4.5. The role of genetic variation in sexual reproduction with evolution
	***B/* Self- study contents**: *(12 hours)* Main content of the chapter
6-7	**Chapter 5: Cell Communication**
	A/* Main contents*: (6 hours) **Seminar/Discussion content:** 5.1. Cellular link network 5.2. Signal system and cell responses 5.3. Reception: The combination of signaling molecules and protein receptors 5.4. Transmission: the interaction between the transmitting molecules

	5.5. Response: regulation of cytoplasmic activity or transcription
	***B/* Self- study contents**: *(12 hours)* Main content of the chapter
8	**Chapter 6: Respiration**
	A/* Main contents: (2.5 hours)* **Theory:** 6.1. Respiration of cells and life 6.2. Hydrogenation and the process of generating energy from organic materials 6.3. Section 6.4. Citric acid cycle 6.5. Infiltration and ATP synthesis 6.6. Fermentation 6.7. Relationship between sugar, citric acid cycle and other metabolic processes **Discussion:** *(0.5 hours)* Questions following chapter content given by lecturer
	***B/* Self- study contents**: *(6 hours)* Main content of the chapter
9	**Chapter 7: Photosynthesis**
	A/* Main contents: (2.5 hours)* **Theory:** 7.1. General photosynthesis 7.2. Photosynthesis: Transforming light energy into energy in organic compounds 7.3. Blend of photosynthesis 7.4. Calvin cycle 7.5. Other carbon fixation cycles **Discussion:** *(0.5 hours)* Questions following chapter content given by lecturer
	***B/* Self- study contents**: *(6 hours)* Main content of the chapter
	Chapter 8: Molecular Basis of Inheritance
	A/* Main contents*: (6 hours) **Seminar/Discussion content:**

10-11	8.1. Molecular basis of life 8.2. DNA: genetic material 8.3. Involvement of proteins in the process of copying and repairing DNA
	***B/* Self- study contents**: *(12 hours)* Main content of the chapter
12	**Chapter 9: From Gene to Protein**
	A/* Main contents: (2.5 hours)* **Theory:** 9.1. Genetic information flow 9.2. Genes regulate proteins through transcription and translation 9.3. Transcription process 9.4. Pre-RNA molecular transformation in eukaryotic cells 9.5. Translation process 9.6. Comparison of gene expression in prokaryotes and eukaryotic cells 9.7. Mutations in the structure and function of proteins **Discussion:** *(0.5 hours)* Questions following chapter content given by lecturer
	***B/* Self- study contents**: *(6 hours)* Main content of the chapter
13	**Chapter 10: Bacterial and Viral Genetics**
	A/* Main contents: (2.5 hours)* **Theory:** 10.1. Modeling system of microorganisms 10.2. The virus contains the genome but can only reproduce in the host cell 10.3. Viruses, viroids and prions are dangerous pathogens for animals and plants 10.4. Rapid reproduction, mutation and recombination contribute to the genetic diversity of bacteria 10.5. Bacterial response to environmental change through gene expression **Discussion:** *(0.5 hours)* Questions following chapter content given by lecturer
	***B/* Self- study contents**: *(6 hours)* Main content of the chapter
	Chapter 11: Eukaryotic Genetics and genome
	A/* Main contents: (2.5 hours)* **Theory:**

14	11.1. Expression and Evolution of the Eukaryotic Genome Genome 11.2. The degree of torsion of DNA and the structure of chromatin 11.3. Regulation of gene expression through stages and transcription 11.4. Eukaryotic genome and non-coding genes 11.5. Loop fragmentation, rearrangement and mutation of DNA with genome evolution **Discussion:** *(0.5 hours)* Questions following chapter content given by lecturer
	***B/* Self- study contents**: *(6 hours)* Main content of the chapter
15	**Chapter 12: DNA Technology and Genomics**
	A/* Main contents: (2.5 hours)* **Theory:** 12.1. Gene manipulation processes 12.2. Duplication of DNA allows the creation of copies of a gene or segments of DNA 12.3. Enzyme limits and their activity 12.4. Mapping the genome at the DNA level 12.5. Genome sequence and related issues 12.6. The application of DNA technology in practice **Discussion:** *(0.5 hours)* Questions following chapter content given by lecturer
	***B/* Self- study contents**: *(6 hours)* Main content of the chapter

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTURE
FACULTY OF BIOTECHNOLOGY

COURSE SYLLABUS
SHE01003-INTRODUCTORY OF BIOLOGY 2

Credits: 03 (Lecture: 03 – Practice: 0); Self-Learning: 06
Term: 03
Prerequisite course(s): None

COURSE OBJECTIVES:

This course aims to provide to students the fundamental knowledge in Zoology. The students who complete this course successfully should be able to distinguish the wild animals based on their typical characteristics, be aware the value of sustainability and balance in the development of animal population.
In addition, the students also can gain the essential science skills that enable them to obtain more related scientific knowledge when working either independently or in team.

COURSE EXPECTED LEARNING OUTCOMES

Notation	**Course expected learning outcomes** After successfully completing this course, students are able to:	**Program expected learning outcomes**
Knowledge		
K1	List and explain the views on classification systems of animals	ELO2, ELO3
K2	Explain, discuss and compare the levels of animal classification. Sum up and generalize common and different characteristics between classification systems.	ELO2, ELO3
K3	Apply knowledge of Zoology to recognize distinction and discover general and specific characteristics of wild animals over time.	ELO2, ELO3
K4	Describe distinction and make prediction of species by comparing, classifying, explaning changes in adaptive traits and anatomy.	ELO2, ELO3
K5	Evaluate the role of animals in the relationship to environment	ELO3

	as well as select appropriate approaches to maintain this relationships	
K6	Propose some solutions to improve sustainability and achieve balance between the development of animals, environment and society.	ELO5
Skills		
K7	Be activate and cooperate in team work effectively	ELO6
K8	Communicate effectively	ELO7
K9	Use English effectively	ELO7
K10	Implement scientific research	ELO10, ELO11
Ethics and Attitude		
K11	Be independent and have proactive learning attitude to improve personal capabilities	ELO12
K12	Discuss and present ideas	ELO12
K13	Understand how to compare and organize information from different sources (books, Internet...)	ELO12
K14	Be modest, truthful and get engaged in career as well as possess work ethics and have a high sense of responsibility	ELO14

COURSE DESCRIPTION

SHE01003. Introductory of Biology 2 (03:03-0; 06; 135).

This course consists of 05 chapters about Introduction to Living Animals; Continuity and Evolution of Animal Life; Diversity of Animal Life; Activity of Life; Animals and Their Environments

ASSESSMENT

1. Grading: 10

2. Weighting:

- Attendance: 10%
- Formative assessment: 30%
- Final exam: 60%

Assessment summary

Rubric	Course expected learning outcome	Weighting (%)	Week
Attendance		**10**	
Rubric 1: Attendance	K1, K2, K3, K4, K5, K6, K7, K8, K9		1-15

Formative asessment		**30**	
Rubric 2: Mid-term exam	K1, K2, K3, K4, K5, K6, K7, K8, K9		7-8
Final assessment		**60**	
Rubric 3: Final exam	K1, K2, K3, K4, K5, K6, K7, K8, K9		18

TEXT BOOKS AND REFERENCES

**** Text Books/Lecture Notes:***

Cleverland P. Hickman Jr. *et al.* (2008). Intergrated Principles of Zoology, McGraw-Hill.

COURSE OUTLINE

Week	Content
	Chapter 1. Introduction to Living Animals
	A/* Main contents: (05 hrs)* **Theory:** 1.1. Life: Biological Principles and the Science of Zoology 1.2. The Origin and Chemistry of Life 1.3. Cells as Units of Life 1.4. Cellular Metabolism
	***B/* Self-study contents**: *(10 hrs)* Reading text book and information concerning chapter.
	Chapter 2. Continuity and Evolution of Animal Life
	A/* Main contents: (10 hrs)* **Theory:** 2.1. Genetics: A Review 2.2. Organic Evolution 2.3. The Reproductive Process 2.4. Principles of Development
	***B/* Self-study contents**: *(20 hrs)* Reading text book and information concerning chapter.
	Chapter 3. Diversity of Animal Life
	A/* Main contents: (15 hrs)* **Theory:** 3.1. Architectural Pattern of an Animal 3.2. Taxonomy and Phylogeny of Animals 3.3. Protozoan Groups 3.4. Sponges and Placozoans 3.5. Radiate Animals

	3.6. Flatworms, Mesozoans, and Ribbon Worms 3.7. Gnathiferans and Smaller Lophotrochozoans 3.8. Molluscs 3.9. Annelids and Allied Taxa 3.10. Smaller Ecdysozoans 3.11. Trilobites, Chelicerates, and Myriapods 3.12. Crustaceans 3.13. Hexapods 3.14. Chaetognaths, Echinoderms, and Hemichordates 3.15. Chordates 3.16. Fishes 3.17. Early Tetrapods and Modern Amphibians 3.18. Amniote Origins and Nonavian Reptiles 3.19. Birds 3.20. Mammals
	***B/* Self-study contents**: *(30 hrs)* Reading text book and information concerning chapter.
	Chapter 4. Activity of Life
	A/* Main contents: (10 hrs)* **Theory:** 4.1. Support, Protection, and Movement 4.2. Homeostasis: Osmotic Regulation, Excretion, and Temperature 4.3. Regulation 4.4. Internal Fluids and Respiration 4.5. Digestion and Nutrition 4.6. Nervous Coordination: Nervous System and Sense Organs 4.7. Chemical Coordination: Endocrine System 4.8. Immunity 4.9. Animal Behavior
	***B/* Self-study contents**: *(20 hrs)* Reading text book and information concerning chapter.
	Chapter 5. Animals and Their Environments
	A/* Main contents: (05 hrs)* **Theory:** 5.1. The Biosphere and Animal Distribution 5.2. Animal Ecology
	***B/* Self-study contents**: *(10 hrs)* Reading text book and information concerning chapter.

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTRUE
FACULTY OF INFORMATION TECHNOLOGY

COURSE SYLLABUS
THE01002: Calculus 2

Credits: 3 (Lecture: 3 – Practice: 0); Self-Learning: 6
Term: 3
Prerequisite course(s): None

COURSE OBJECTIVES:

The course aims to help learners grasp the basic knowledge of mathematical calculations (continuing the course Calculus 1 on functions, differentiation of functions); gradually establish logical thinking for learners when approaching computational problems.

Learners are able to understand and apply mathematical knowledge to computational situations encountered in specialized disciplines and in agribusiness realities, and to form a sense of responsibility at work and professional ethics.

COURSE EXPECTED LEARNING OUTCOMES

Notation	Course expected learning outcomes After successfully completing this course, students are able to	Program expected learning outcomes
Knowledge		
K1	Identify, describe, classify, and present the basic calculus of mathematical analysis.	ELO2
K2	Summarize and generalize knowledge of analysis of functions of single variable.	ELO2
K3	Develop models for simple situations through functional relationships, function of multiple variables.	ELO2
Skills		
K4	Work independently; Accurately solve mathematical calculations with tight arguments.	ELO11
K5	English in expressing mathematical contents.	ELO7
Ethics and Attitude		
K6	Recognize and be aware of the accuracy of computational	ELO13

	issues.	

COURSE DESCRIPTION

THE01002. Calculus 2 (03: 3–0; 6; 135)

This course consists of the basics knowledge of mathematical calculus for a single variable (continuing the course Calculus 1) with the contents of integration, techniques and application of integration, the introduction on differential equations and system of differential equations.

ASSESSMENT

Grading: 10 points

Weighting:

- Attendance: 10 %
- Formative assessment: 30 %
- Final exam: 60 %

Assessment summary

Rubric	Course expected learning outcome	Weighting (%)	Week
Attendance		**10**	**1-15**
Rubric 1: Participant	K6	**10**	
Formative asessment		**30**	
Rubric 2: Homework	K1, K2, K3, K5	6	1-15
Rubric 3: Mid-term exam	K1, K2, K3, K4, K5, K6	24	8
Final assessment		**60**	
Rubric 4: Final exam	K1, K2, K3, K4, K5, K6	60	16

TEXT BOOKS AND REFERENCES

**** Text Books/Lecture Notes:***

- Neyhauser, C. (2010). Calculus for Biology and Medicine (3rd Edition), Pearson, 840 p.
- Stewart, J. (2015). Calculus: Early Transcendentals (8rd Edition), Brooks Cole, 1368 p. https://www.math.ucdavis.edu/~kouba/Math17B.html
- Nguyen, H. T. (2007). Lecture notes and teaching-learning materials for course math 17A, Nông Nghiệp, 618 p.

**** Additional references:***

- Neyhauser, C. (2010). Studyguide for Calculus for Biology and Medicine, Cram101 Incorporated, 144 p.

- Morris, C. C., Robert, M. S. (2015). Fundamental of Calculus, Wiley, 368 p.
- http://www.calculus.org

COURSE OUTLINE

Week	Content
1 2 3 4	**Chapter 1: Integration**
	A/ Main contents: (12 hours) **Theory:** (12 hours) 1.1. Definition of the definite integral 1.2. Anti-derivative and indefinite integral 1.3. Relationship between anti-derivative and definite integral 1.4. Application of definite integral 1.5. Home-work
	B/ Self- study contents: (24 hours) 1.5. Home-work (do-it-yourself)
5 6 7 8	**Chapter 2: Techniques of integration and Calculation method**
	A/ Main contents: (12 hours) **Theory:** (12 hours) 2.1. Substitution rule 2.2. Integration by part 2.3. Integral of rational functions 2.4. Improper integrals 2.5. Applied exercises
	B/ Self- study contents: (24 hours) 2.5. Home-work
9 10 11 12	**Chapter 3: Differential equations**
	A/ Main contents: (12 hours) **Theory:** (12 hours) 3.1. Definition of differential equations 3.2. Method for separable differential equations 3.3. Application of differential equations in the population growth model 3.4. Equilibria and Stability of differential equations 3.5. Home-work
	B/ Self- study contents: (24 hours) 3.5. Home-work
	Chapter 4: System of differential equations
	A/ Main contents: (9 hours) **Nội dung GD lý thuyết:** (9 hours)

13 14 15	4.1. System of differential equations: theory 4.2. System of differential equations: application 4.3. Non-linear self-control: theory 4.4. Non-linear self-control: application 4.5. Home-work
	B/ Self- study contents: (18 hours) 4.5. Home-work

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTRUE
FACULTY OF INFORATION TECHNOLOGY

COURSE SYLLABUS
THE01004: Principle of Physics 2

Credits: 2 (Lecture: 2 – Practice: 0); Self-Learning 4
Term: 4
Preceding course: THE01003 – Principle of Physics 1

COURSE OBJECTIVES:

The course aims to help learners of crop science to obtain basic knowledge about laws of physics of the nature and phenomena related to electromagnetic motions and law of modern physics.

The learners who complete this course successfully will be able to understand and apply these rules to explain phenomena in nature and real life. The module also help learners to study basic subjects and major courses and to participate into research and to practice self-learning skill, to develop a persistent character and solid viewpoint to self-solve a problem and to develop teamwork skill.

COURSE EXPECTED LEARNING OUTCOMES

Notation	**Course expected learning outcomes** After successfully completing this course, students are able to	**Program expected learning outcomes**
Knowledge		
K1	Explain phenomena related to electric and magnetic fields	ELO2
K2	Explain the System of Maxwell's equations describing the electromagnetic waves and the characteristics of electromagnetic waves	ELO2
K3	Explain the phenomena of interference, diffraction and polarization of light	ELO2
K4	Describe the relative motions, dynamics, the phenomenon of length contraction and of time elongation of objects in the special theory of relativity	ELO2
K5	Interprete the photo-electri effect and light scattering phenomena, describe the quantum theory of matter, define matter waves	ELO2
K6	Explain the structure of the atom and the formation of spectral lines of the atom	ELO2
K7	Interprete the structure of a nucleus and the nuclear	ELO2

	radioactivity and nuclear decay laws	
Skills		
K8	Solving the problems of modern physics	ELO6
Ethics and Attitude		
K9	Be conscious about lifelong learning	EL02

COURSE DESCRIPTION

THE01004. Principles of Physics 2 (2: 2 –0; 4; 90)

This course consists of 9 units, including Electrostatic field, Magnetic field, Electromagnetic field and wave, Light wave, Special Relativity theory, Quantum Physics, Atomic Physics and Nuclear Physics.

Prerequisite: THE01003 – Principles of Physics 1.

ASSESSMENT

Grading: 10 points

Weighting:

- Attendance: 10 %
- Formative assessment: 30 %
- Final exam: 60 %

Assessment summary

Rubric of evaluation	Course expected learning outcome	Weight (%)	Week
Attendance			
Rubric 1: Attendance	K1, K2, K3, K4, K5, K6, K7	10	1 to 10
Formative assessment			
Rubric 2: Homework	K1, K2, K3, K4	10	1 to 10
Rubric 3: Mid – term exam	K1, K2, K3, K4, K8	20	7
Final exam			
Rubric 4: Final exam	K4, K5, K6, K7, K8	60	Following the university's schedule

TEXT BOOKS AND REFERENCES

**** Text books/ Lecture Notes:***

Young & Freedman (2015). University Physics 14th Edition, Addison Wesley.

**** Additional references:***

- Alan Giambattista, Betty M. Richardson, Robert C. Richardson (2010). College Physics, 3rd Edition. McGraw-Hill /Irwin Higher Education.

- Raymond A. Serway, John W. Jewett (2013). Physics for Scientists and Engineers with Modern Physics 9th Edition, Brooks Cole.
- Randall D. Knight (2012). Physics for Scientists and Engineers: A Strategic Approach with Modern Physics (3rd Edition), Pearson.

COURSE OUTLINE

Week	Content
1, 2	**Chapter 1: Electrostatic field**
	A/ Main contents during the class: (3 hrs) **Theory:** 1.1 Electric charge 1.2 Electrostatic interaction, Coulomb's Law 1.3 Principle of superposition of electrostatic interaction 1.4 Electric field 1.5 Electrical Flux, Gauss's law 1.6 Capacitors 1.7 Electric field energy 1.8 Exercises
	B/ Contents of self – study at home: (1 hr) 1.9 Types of capacitors 1.10 Conductor and dielectric 1.11 Types of electric currents
3	**Chapter 2: Magnetic field**
	A/ Main contents during the class: (3 hrs) **Theory:** 2.1 Concept of magnetic field 2.2 Magnetic force 2.3 Gauss's law for magnetic field 2.4 Ampere's law 2.5 Electromagnetic induction 2.6 Exercises
	B/ Contents of self – study at home: (1 hr) 2.7 Hall's effect 2.8 Inductance coefficient 2.9 Magnetic field energy
4	**Chapter 3: Electromagnetic field and electromagnetic waves**
	A/ Main contents during the class: (3 hrs) **Theory:** 3.1 The concept of displacement current, the general Ampere's law

	3.2 Maxwell's equations 3.3 Solution of Maxwell's equations, electromagnetic waves in vacuum 3.4 Energy and momentum of electromagnetic waves 3.5 Classification of electromagnetic wave 3.6 Exercises
	B/ Contents of self – study at home: (1 hr) 3.7 The principle of electromagnetic transceiver
5	**Chapter 4:** Wave optics
	A/ Main contents during the class: (3 hrs) **Theory:** (3 hrs) 4.1 The wave nature of light 4.2 Interference of light 4.3 Diffraction of light 4.4 Polarization of light 4.5 Exercises
	B/ Contents of self – study at home:
6	**Chapter 5: Special Relativity**
	A/ Main contents during the class: (3 hrs) **Theory:** (3 hrs) 5.1 The postulates of Einstein 5.2 Special relativity 5.3 The dilation of time 5.4 The contraction of length 5.5 Lorentz's transformation 5.6 Relativity dynamics 5.7 Exercises
	B/ Contents of self – study at home:
7, 8	**Chapter 6: Quantum Physics**
	A/ Main contents during the class: (3 hrs) **Theory:** (3 hrs) 6.1 Physical phenomena that can not be explained by light wave theory 6.2 The birth of quantum theory, the quantum theory of light 6.3 Thermal radiation, Planck's formula 6.4 The consequences of the Planck formula 6.5 Wave-particle duality of matter 6.6 De Broglie's material wave hypothesis 6.7 Schrodinger's equation 6.8 Heisenberg uncertainty principle 6.9 Examples 6.10 Exercises
	B/ Contents of self – study at home: (1 hr)

	6.11 Photoelectric effect 6.12 Compton scaterring
9	**Chapter 7: Atomic Physics**
	A/ Main contents during the class: (3 hrs) **Theory:** (3 hrs) 7.1 Classical atomic models 7.2 Atomic structure, Bohr's atomic planetary model 7.3 Hydrogen atom 7.4 Alkali metal atoms 7.5 Exercises
	B/ Contents of self – study at home: (1 hr) 7.6 Zeeman's effect 7.7 Electron's spin
10	**Chapter 8: Nuclear Physics**
	A/ Main contents during the class: (3 hrs) **Theory:** (3 hrs) 8.1 Nuclear structure 8.2 Deficiency of mass, nuclear binding energy 8.3 Nuclear radioactive 8.4 Nuclear reaction 8.5 Exercises
	B/ Contents of self – study at home: (1 hr) 8.6 Artificial nuclear reactions 8.7 Fission and fusion reactions

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTRUE
FACULTY OF ENVIRONMENT

COURSE SYLLABUS
MTE01002: General Chemistry 2

Credits: 3 (Theory: 2 – Practical: 1); Self-Learning: 6
Term: 4

Preceding courses: MTE01001 – General chemistry 1

COURSE OBJECTIVES:

This course aims to provide student with basic knowledge about general chemistry (part 2: acids and bases, electrochemistry, nuclear chemistry and elements) so that students can interpret the growth and development of plants. Beside, this course provide student with group-working and chemistry practical skills and right attitude toward scientific rules.

COURSE EXPECTED LEARNING OUTCOMES:

	Course expected learning outcomes After successfully completing this course you should be able to:	**Program expected learning outcomes**
Knowledge:		ELO2
K1	Differentiate and present basic concepts in chemistry	
K2	Apply chemistry laws and knowledge in solving problems involved matter structure, mass and energy of subtances.	
K3	Determine the relationship between chemical phenomena to the growth and development of plants	
Skills		ELO6, ELO10
K4	Proficiency in the use of tools and chemicals in general chemistry experiments. Ability to work in teams	
Ethics and Attitude		ELO13
K5	Conscious lifelong learning	

COURSE DESCRIPTION

MTE01002. General Chemistry 1 (3: 2 - 1; 6; 135).
This course consists of 6 chapters about acids and bases, equilibrium in solution, electrochemistry, nuclear chemistry and elements and 5 lab lessons.

Preceding courses: MTE01001 – General chemistry 1

ASSESSMENT

1. Grading: 10 score scale

2. Weighting:

- Attendance: 10%

- Formative assessment: 30%

- Final exam: 60%

3. Assessment summary

Rubric	Course expected learning outcome	Weighting (%)	Week
Attendance		**10**	
Rubric 1 – Participant	K1	5	1-10
Rubric 2 - Exercise	K1, K2, K3	5	1-10
Formative asessment		**30**	
Rubric 3 – Group Presentation	K2, K3, K4	5	5-7
Rubric 4 - Mid-term	K1, K2	15	8
Rubric 5 - Practice and report	K2, K3, K5	10	11-15
Final exam		**60**	
Rubric 6-Final exam	K1, K2	60	Following University schedule

TEXT BOOKS AND REFERENCES

**** Text Books/Lecture Notes:***

Steven S. Zumdahl (2013). Chemistry, 9th edition, Houghton Mifflin Company, Boston, New York, 1056 p.

**** Additional references:***

Brown Bursten LeMay Murphy Woodward (2014). Chemistry, the central science, 13th edition, Prentice Hall.

John Kenkel, (2010). Basic Chemistry Concepts and Exercises,1st Edition, CRC Press.

Nguyen Van Tau (2002). General Chemistry, Vietnam education publishing. (Vietnamese)

Duong Van Dam (2006). Exercise General Chemistry, Vietnam education publishing. (Vietnamese)

COURSE OUTLINE

Week	Content
1, 2	***Chapter 9: Acids and bases***
	A/* Main contents: *(6 hours)* **Theory:** *(4 hours)* 9.1. Acid and base concept 9.2. The pH scale 9.3. Calculating the pH of acidic and basic solutions 9.4. Salt hydrolysis 9.5. Buffer solutions **Discussion:** *(2 hours)* Calculating the pH of some fertilizer solutions
	***B/* Self-study contents** 2. Exercise Chapter 9 (12 hours)
3, 4	***Chapter 10:* Equilibrium in aquaous soluon**
	A/*Main contents: *(6 hours)* **Theory:** *(5 hours)* 10.1. Acid-base equilibria 10.2. Solubility equilibria 10.3. Complex ion equilibria **Exercise:** *(1 hours)* Calculating the equilibrium in solutions
	***B/* Self-study contents**: 2. Exercise Chapter 10 (12 hours)
5	***Chapter 11: Electrochemistry***
	***A/* Main contents:** *(6 hours)* **Theory:** *(4 hours)* 11.1. Balance the redox reactions 11.2. Reduction potentials 11.3. Galvanic cell 11.4. Concentration cell 11.5. Electrolysis 11.6. Corrosion

Week	Content
	Exercise: *(1 hours)* Calculating the cell potentials **Discussion:** *(1 hours)* 2. Metal protection
	***B/* Self-study contents:** 2. Exercise Chapter 11 (6 hours)
6	***Chapter 12: Nuclear chemistry***
	***A/* Main contents:** *(3 hours)* **Theory:** *(2 hours)* 12.1. Radio active nuclei and radiations 12.2. The Kinetics of Radioactive Decay 12.3. Nuclear reactions 12.4. Energy in nuclear reactions **Discussion:** *(1 hours)* 2. Effects of radiations
	B/ Self-study contents: 2. Exercise Chapter 12 (6 hours)

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTRUE
FACULTY OF ENVIRONMENT

COURSE SYLLABUS
MTE01004: Organic Chemistry 2

Credits: 2 (Lecture: 1.5 – Practice: 0.5); Self-Learning: 4
Term: 4
Prerequisite course(s): None

COURSE OBJECTIVES:

The course aims to provide to students a basic knowledge about organic chemistry (part 2) so that students can interpret the growth and development of plants.

COURSE EXPECTED LEARNING OUTCOMES

Notation	Course expected learning outcomes After successfully completing this course, students are able to	Program expected learning outcomes
Knowledge		
K1	Present of basic concepts in organic chemistry	ELO2
K2	Apply the laws and knowledge of organic chemistry explains the mechanism of gravitation, the stages of plant development, the chemical processes that occur in the environment	ELO2
Skills		
K3	Be proficient in use of tools and chemicals in organic chemistry experiments. Work effectively in teams	ELO6
Ethics and Attitude		
K4	Be conscious about lifelong learning	ELO12

COURSE DESCRIPTION

MTE01004. Organic chemistry (2: 1.5- 0.5; 4; 90).
This course consists of 7 chapters about Alcohol, Carbonyl compounds, carboxylic acid, amine, Carbohydarte, Lipid, amino acid and 3 practices
Previous course: MTE01003 – Organic chemistry 1

ASSESSMENT

1. Grading: 10

2 . Weighting:

- Attendance: 10%
- Formative assessment: 30%
- Final exam: 60%

3. Assessment summary

Rubric	Course expected learning outcome	Weighting (%)	Week
Attendance		**10**	
Rubric 1 – **Class attendance**	K1, K4	10	1-7
Formative asessment		**30**	
Rubric 2. Exercise	K1, K2, K3, K4	5	1-7
Rubric 3. Mid-test	K1, K2, K3, K4	20	6
Rubric 4 : Practice and report	K1, K2, K3, K4	5	5-10
Final exam		**60**	
Rubric 5: Final exam	K1, K2, K3, K4	60	15

TEXT BOOKS AND REFERENCES

**** Text Books/Lecture Notes:***

- J. McMurry (2015). Organic Chemistry, 9th Ed., Cengage Learning.

**** Additional references:***

- Francis A. Carey, Robert M. Giuliano (2017), Organic Chemistry
- Leroy G. Wade, Jan William Simek (2017) Organic Chemistry
- Đinh Van Hung, University of Agriculture Publisher, 2007

COURSE OUTLINE

Week	Content
1-2	**Chapter 1: Alcohols**
	A/* Main contents: *(3hours)* **Theory:** *(2.5.hours)* 1.1. Nonmenclature 1.2. Prepare 1.3. Reactions **Discussion:** *(0.5 hours)* Exercise chapter 1
	***B/* Self- study contents**: *(6 hours)* Exercise chapter 1
2-3	**Chapter 2: Carbonyl compounds**

	A/* Main contents: (5.5 hours)* **Theory:** *(2.5 hours)* 2.1. Nonmenclature 2.2. Prepare. 2.3. Reactions **Practice:** *(2.5hours)* Practice 1: Alcohols and carbonyl compounds **Discussion:** *(0.5 hours)* Exercise chapter 2
	***B/* Self- study contents**: *(11hours)* Exercise chapter 2
4	**Chapter 3: Carboxylic acids**
	A/* Main contents: (3 hours)* **Theory:** *(2.5 hours)* 3.1. Nonmenclature 3.2. Prepare. 3.3. Reactions **Discussion:** *(0.5 hours)* Exercise chapter 3
	***B/* Self- study contents**: *(6hours)* Exercise chapter 3
5-6	**Chapter 4: amines**
	A/* Main contents: (5.5hours)* **Theory:** *(2.5 hours)* 4.1. Nonmenclature 4.2. Prepare. 4.3. Reactions **Practice:** *(2.5hours)* Practice 2: Carboxylic acids, amines **Discussion:** *(0.5 hours)* Exercise chapter 4
	***B/* Self- stusy contents**: *(11hours)* Exercise chapter 4
7-8	**Chapter 5: Carbohydrates**
	A/* Main contents: (4 hours)* **Theory:** *(2.5 hours)* 5.1. Momosacharide 5.2. Disaccharide 5.3. Polysachride **Discussion:** *(0.5 hours)* Exercise chapter 5

	Mid-test: 1hours
	***B/* Self- stusy contents**: *(8hours)* Exercise chapter 5
9	**Chapter 6: Lipids**
	A/* Main contents: (3hours)* **Theory:** *(2.5 hours)* 6.1. Concept. 6.2. Classification 6.3. Reaction **Discussion:** *(0.5 hours)* Exercise chapter 6
	***B/* Self- stusy contents**: *(6hours)* Exercise chapter 6
10	**Chapter 7: Amino acids**
	A/* Main contents: (6hours)* **Theory:** *(2.5 hours)* 7.1. Concept. 7.2. Isomer 7.3. Zwitterion 7.4. Prapare 7.5. Reactions **Practice:** *(3 hours)* Practice 3: Carbohydrats, Lipids, amino acids **Discussion:** *(0.5 hours)* Exercise chapter 7
	***B/* Self- stusy contents**: *(12hours)* Exercise chapter 7

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTRUE
FACULTY OF AGRONOMY

COURSE SYLLABUS
NHE01002: Introductory Biology 3

Credits: 3 (Lecture: 2 – Practice: 1); Self-Learning: 6
Term: 4
Preceding course: NHE01001 Introductory Biology 1

COURSE OBJECTIVES:

The purpose of the course is to help student:

- Distinguish the location and the role of organs in the plant body
- Understand the process of forming, producing organs in the plant body, understanding the phases of plant growth and development, and the factors that affect the growth and development of plants.
- Understand the classification position of the plant kingdom, distinguishable from the other ones.
- Understand the role of the genes in plant organs development; Know the applications of plant biotechnology has been studied in the world.

COURSE EXPECTED LEARNING OUTCOMES

Notation	**Course expected learning outcomes** After successfully completing this course you should be able to:	**Program expected learning outcomes**
Knowledge:		
K1	Apply basic scientific knowledge to explain plant growth and development	ELO2
K2	Analyze relationships between biological, genetic, physiological and environmental factors impacting on crops	ELO3
Skills		
K3	Apply critical thinking in analysis, evaluation and solving problems in professional fields	ELO11
Ethics and Attitude		
K4	Be awareness of lifelong learning	ELO12
K5	Possess responsibility and professional ethics	ELO13

COURSE DESCRIPTION

NHE01002: Introductory Biology 3 (3: 2 - 1; 6; 135).

This course consists of 13 chapters chapters with content on: Plant cell and tissues; Root, stem and leaf; Transportation in plant; The growth and development of plant; Approaches to classifying organism; Protista; Fungi; Land plant; Genetic control of flowering; Plant biotechnology.

This course also consists of 5 practice sessions with content on: Observation of plant cells; Observation organisms in a drop of water; Growth and development of monocots, Growth and development of dicots; Evolution in the plant kingdom.

Preceding course: NHE01001 Introductory Biology 1

ASSESSMENT

Grading: 10 points

Weighting:

- Attendance: Class attendance + Discussion: 10 %
- Formative assessment: practical report + midterm exam: 30%
- Final exam: 60 %

Assessment summary

Rubric	Course expected learning outcome	Weighting (%)	Week
Attendance		**10**	
Rubric 1 – Class attendance	K4	7	1-10
Rubric 2 – Group discussion	K1, K2, K3, K4, K5	3	1-10
Formative assessment		**30**	
Rubric 3 – Practice and report	K1, K2, K3, K4	15	Following arrangement between class members and teacher
Rubric 4 – Midterm exam	K1, K2	15	5-7
Final assessment		**60**	
Rubric 5- Final exam	K1, K2	60	Following University

			schedule

TEXT BOOKS AND REFERENCES

**** Text Books/Lecture Notes:***

1. Bidlack J., Jansky S., Stern K. (2013). Stern's Introductory Plant Biology 13th edition. Publisher: McGraw-Hill Education, 640 p.
2. Lecture notes

**** Additional references:***

1. Mauseth, J.D. (2012) Botany: An Introduction to Plant Biology 5th Edition. Publisher: Jones & Bartlett Learning; 696 p.

2. George Acquaah (2009). Horticulture: Principles and Practices, fourth edition. Peason Prentice Hall, USA.

3. Jules Janick (2012). Horticultural Reviews, Volume 39, Edited by USA: Wiley-Blackwell

4. Jane B. Reece, Lisa A. Urry...[et al] (2011). Biology. USA: Pearson,

COURSE OUTLINE

Week	Content
1	**Chapter 1: Plant cell and tissues**
	A/* Main contents: *(2 hrs)* **Theory:** *(1.7 hrs)* 1.1. The role of plants 1.2. Types of plant cell 1.3. Types of plant tissue **Practice/ experiment contents:** *(6 hours)* Observation of plant cells **Semina/Discussion:** *(0.3 hours)* The role of plants in human life. Compare animal and plant cells, compare tissue groups, plant cells.
	***B/* Self- study contents**: *(2 hours)* 1.4. Learn about the role of plants in human life, cell types and plant tissues. Compare animal and plant cells.
1 and 2	**Chapter 2: Root**

	A/* Main contents: (2 hours)* **Theory:** *(1.7 hours)* 2.1. Function 2.2. Classification of root 2.3. Zone of root 2.4. Anatomy of root **Semina/Discussion:** *(0.3 hours)* Function of root
	***B/* Self- study contents**: *(4 hours)* 2.5. The function of root, external and internal characteristics of plant roots
2	**Chapter 3: Stem**
	A/* Main contents: (2 hours)* **Theory:** *(1.7 hours)* 3.1. Function 3.2. Classification of stem 3.3. Anatomy of stem **Seminar/Discussion:** *(0.3 hours)* Function of stem
	***B/* Self- study contents**: *(4 hours)* 3.4. Classification of stem, external and internal characteristics of plant stems
3	**Chapter 4: Leaf**
	A/* Main contents: (2 hours)* **Theory:** *(1.7 hours)* 4.1. Function 4.2. Classification of leaf 4.3. Anatomy of leaf **Seminar/Discussion:** *(0.3 hours)* Function of leaf
	***B/* Self- study contents**: *(4 hours)* 4.4. Classification of leaves, external and internal characteristics of plant leaves
3 and 4	**Chapter 5: Transportation in plant**
	A/* Main contents: (2 hours)* **Theory:** *(1.7 hours)* 5.1. Transport of water in plants 5.2. Transport of organic matter in plants **Seminar/Discussion:** *(0.3 hours)* The process of transporting substances in plants

	***B/* Self- study contents**: *(4 hours)* 5.3. The process of transporting substances in plants
4	**Chapter 6: Growth and development of plants**
	A/* Main contents: (2 hours)* **Theory:** *(1.7 hours)* 6.1. Primary growth 6.2. Secondary growth 6.3. Factors effect on growth and development of plant **Practice/Experiment:** *(12 hours)* The growth and development of monocots. The growth and development of monocots. **Seminar/Discussion:** *(0.3 hours)* Comparison of Primary and Secondary Growth, The Role of Internal and External Factors to Plant Growth and Development
	***B/* Self- study contents**: *(16 hours)* 6.4. Primary and secondary growth in plants, factors affecting the growth and development of plants
5	**Chapter 7: Approaches to classifying organism**
	A/* Main contents: (1 hours)* **Theory:** *(1 hours)* 7.1. The concepts of classifing organism 7.2. The principle of scientific names of plants
	***B/* Self- study contents**: *(2 hours)* 7.3. The concepts of classifying organism 7.4. The principle of scientific names of plants
5	**Chapter 8: Prokaryote**
	A/* Main contents: (2 hours)* **Theory:** *(1.7 hours)* 8.1. Commont characteristics 8.2. Classification of prokaryote 8.3. Role of prokaryote **Seminar/Discussion:** *(0.3 hours)* Characteristics, Classification and role of prokaryote
	***B/* Self- study contents**: *(8 hours)* 8.4. Characteristics, Classification and role of prokaryote
6	**Chapter 9: Fungi**
	A/* Main contents: (2 hours)* **Theory:** *(1.7 hours)* 9.1. Commont characteristics 9.2. Classification of Fungi

	9.3. Role of Fungi **Seminar/Discussion:** *(0.3 hours)* Characteristics, Classification and role of fungi
	***B/* Self- study contents**: *(8 hours)* 9.4. Characteristics, Classification and role of fungi
6 and 7	**Chapter 10: Protista**
	A/* Main contents: (2 hours)* **Theory:** *(1.7 hours)* 10.1. Commont characteristics 10.2. Classification of Protista 10.3. Role of Protista **Practice/ experiment contents:** *(6 hours)* Observation organism in a drop of water **Seminar/Discussion:** *(0.3 hours)* Characteristics, Classification and role of Protista
	***B/* Self- study contents**: *(10 hours)* 10.4. Characteristics, Classification and role of Protista
7, 8 and 9	**Chapter 11: Land plant**
	A/* Main contents: (2 hours)* **Theory:** *(1.7 hours)* 11.1. Original of land plant 11.2. Gymnosperm 11.3. Angiosperm 11.4. Ecosystem **Practice/ experiment contents:** *(6 hours)* Evolution in the plant kingdom **Seminar/Discussion:** *(0.3 hours)* The evolutionary trend of terrestrial plants. Comparison of angiosperms and gymnosperm
	***B/* Self- study contents**: *(10 hours)* 11.5. Learn about the origin, evolutionary of terrestrial plants. Characteristics of terrestrial plant, ecosystems, and relationships in ecosystem
9 and 10	**Chapter 12: Gene relates to flower formation**
	A/* Main contents: (2 hours)* **Theory:** *(1.7 hours)* 12.1. Gene models relates to flower formation 12.2. Other factors relate to flower formation Analysis of flower formation in mutant plants **Seminar/Discussion:** *(0.3 hours)*

	Analysis of flower formation in mutant plants
	***B/* Self- study contents**: *(8 hours)* 12.3. Factors relate to flower formation
10	**Chapter 13: Plant Biotechnology**
	A/* Main contents: (2 hours)* **Theory:** *(1.7 hours)* 13.1. The role of plant Biotechnology 13.2. Achievements of Plant Biotechnology **Seminar/Discussion:** *(0.3 hours)* Advantages, disadvantages of plant biotechnology
	***B/* Self- study contents**: *(8 hours)* 13.3. Learn about plant biotechnology, roles and applications in Vietnam and in the world

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTRUE
FACULTY OF LAND MANAGEMENT

COURSE SYLLABUS
QLE02001: Principle of Soil Science

Credits: 03 **(Lecture: 02 – Project: 01); Self-Learning: 06**
Term: 4
Preceding course: MTE01001- General chemistry 1; MTE01003 - Organic Chemistry 1; THE01003 - Principles of Physics 1

COURSE OBJECTIVES:

This course aims to help learners gain basic knowledge of soil science. In this module, students need to understand the concepts of soil, soil formation factors, soil formation processes, some of the major physical, chemical and biological properties of soil in a relationship with plants. Some soil classification systems on over the world as well as of Vietnam are also introduced. Students perform a description of the soil profile, soil fertility and can work independently and in groups.

COURSE EXPECTED LEARNING OUTCOMES

Notation	**Course expected learning outcomes** After successfully completing this course, students are able to	**Program expected learning outcomes**
Knowledge:		
K1	Explain the process of soil formation, the basic properties of soil in relation to plants.	ELO3
K2	Describe a number of soil characteristic and nutrient requirements for different crops	ELO5
Skills		
K3	Perform a description of the soil profile, report for practicing in lab.	ELO8
K4	Work independently and in groups; Share the tasks and monitor each other among team members	ELO6
K5	Recite and summarize the English documents about soil science	ELO8
Ethics and Attitude		
K6	Be proactive in searching for information and references on soil science	ELO12

COURSE DESCRIPTION

QLE02001. Principle of Soil Science (3: 2–1: 6; 135)

This course consists of 4 chapters introducing concepts of soil; Factors and processes of soil formation; The physical, chemical, biological properties as well as chemical and nutrient composition of soil; The soil classification systems in the world and in Vietnam. Four practice exercises concern analyzing some physical and chemical properties of soil; and dig, describe the soil profile and observe the effects of soil formation factors on morphology and soil properties.

Preceding course: MTE01001- General chemistry 1; MTE01003 - Organic Chemistry 1; THE01003 - Principles of Physics 1

ASSESSMENT

Grading: 10

Weighting:

-Attendance: 10%
- Formative assessment: 30%
- Final exam: 60%

Assessment summary

Rubric	Course expected learning outcome	Weighting (%)	Week
Attendance		**10**	
Rubric 1: Class attendance	K4, K5, K6	10	1-10
Formative asessment (project asessment)		**30**	
Rubric 2: Group oral presentation	K1, K2, K3, K4, K5, K6	10	15
Rubic 3: Practice and report	K1, K3, K4	15	12-14
Rubic 4: Field trip, digging and describing soil frofile	K1, K2, K3, K4, K5, K6	5	11
Final assessment		**60**	
Rubric 5: Final exam	K1, K2, K4, K5, K6	60	16-18

TEXT BOOKS AND REFERENCES

**** Text Books/Lecture Notes:***

1. Nyle C. Brady and Ray R. Weil (2012). The Nature and Properties of Soils – 14th Edition revised. Pearson, 975p.

**** Additional references:***

1. Daniel G. Strawn et al. (2015). Soil chemistry (4th edition). Wiley – Blackwell.
2. FAO (2006), World reference base for soil resources 2006

COURSE OUTLINE

Week	Contents
1 – 3 and 11	**Chapter 1: Soil and soil forming processes**
	A/ Main contents **Theory**: (6.0 hrs) 1.1. Definition of soil 1.1.1. General definition of soil 1.1.2. Components of soil 1.2. Soil forming factors 1.2.1. Parent rock 1.2.1. Climate 1.2.3. Topography 1.2.4. Orgarisms 1.2.5. Time 1.2.6. Man 1.3. Soil forming processes 1.3.1. Weathering 1.3.2. Accumulation of Organic matter 1.3.3. Other processes 1.4. Morphological properties of soil 1.4.1. Soil profile 1.4.2. Soil horizons 1.4.3. Soil colour 1.4.4. Substances produced and entered in soils **Semina/discussion:** (3.0 hrs) 1.5. Role of Man on soil forming process 1.6. Functions of soil **Project: (**3.0 hrs) Going to field trip, digging and observing soil profile
	B/Self- study contents: (18 hrs) Practical documents and the contents of 1.2.6 and 1.8 (Semina and discussion)
	Chapter 2:Some typical characteristics of soils
4-6 and 12-13.	**A/ Main contents** **Theory**: (9.0 hrs) 2.1. Some soil physical properties 2.1.1. Soil texture 2.2.2. Soil structure 2.1.3.Bulk density,particla density and porosity

	2.2. Some soil chemical properties 2.2.1.Soil pH 2.2.2. CEC 2.2.3. Soil buffering property 2.2.4. Soil redox reactions 2.3. Soil organisms 2.3.1. Soil animals 2.3.2. Soil plant 2.3.3. Soil microorganisms **Project:** (6.0 hrs) Practice in lab to analyze some soil properties Unit 1. Determinebulk density, particle density and porosity of soil Unit2. Determine soil pH and organic matter
	B/Self- stusy contents: (30 hrs) Practical documents and the contents of soil properties, methods to soil analysis
7-8 and 14-15	**Chapter3:** Soil chemical components
	A/ Main contents **Theory**: (6.0 hrs) 3.1. General chemical components of soil 3.2. Main nutrition elements in soil 3.2.1. Soil NitrogenandN cycle on argicultural soil 3.2.2. Soil Phosphrus and Pcycle on argicultural soil 3.2.3. Soil Potassium and Kcycle on argicultural soil 3.2.4. Các chất dinh dưỡng khác trong đất **Project:** (6.0 hrs) - Practice in lab to analyze some soil properties: Unit3. Determinecontent of available Phosphorusand Potassium - Preparing report and presentation for the report of project
	B/Self- stusy contents:(24.0 hrs) Read document about nutrient demand of plants, method to soil analysis, soil fertility
9 - 10	**Chapter 4:** Soil classification

	A/ Main contents **Theory**: (6.0 hrs) 4.1. Goal, reqiures ofsoil classification 4.2. Soil classification on over the world 4.2.1. Russia soil classification 4.2.2. USA soil classification 4.2.3. Soil classificationaccording to WRB 4.3. Vietnamese soil classification 4.3.1. Vietnamese soil classification system 4.3.2. Characteristisc of some main soil types in Vietnam 4.3.2.1. Some soil types at highland area 4.3.2.2. Some soil types at plane and coastal area
	B/Self- stusy contents: (12.0 hrs) Read document about WRB soil classification system

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTRUE
FACULTY OF INFORMATION TECHNOLOGY

COURSE SYLLABUS
THE02001: Application of Computers in Agriculture

Credits: 3 (Lecture: 1 – Practice: 2); Self-Learning: 6
Term: 4
Prerequisite course(s): None

COURSE OBJECTIVES:

The purpose of the course is to study the principles and applications of information technologies in agriculture. The course objective is to develop and refine skills of using Microsoft Office to create documents and solve a wide range of problems using computer. Students will be able to use Microsoft Word, Excel, Access and Powerpoint to meet most technical needs for producing professional documents, manipulating numeric data, and preparing presentation required during their coursework and career in agriculture. The student will also gain competence in organizing information in an easily understood and useful format. The students will gain responsibility, professional ethics and practical experiences for life long learning.

COURSE EXPECTED LEARNING OUTCOMES

Notation	Course expected learning outcomes After successfully completing this course, students are able to	Program expected learning outcomes
Knowledge:		
K1	Describe components of computer, functionalities of operating system, application software, files and folder.	ELO12
K2	Explain the internet services for certain needs	ELO10, ELO12
Skills:		
K3	Manage files and folders in computer	ELO12
K4	Use Word processing software for studying other courses and other professional skills	ELO10, ELO12
K5	Create a simple website	ELO10, ELO12
K6	Perform search for information on the Internet	ELO10, ELO12
K7	Create, design, manipulate, analys and manage data in MS. Excel	ELO9, ELO10, ELO12
K8	Apply and exploit spreadsheet for studying other knowledge and skills	ELO9, ELO10, ELO12
K9	Design, input and manage data in MS. Access	ELO9, ELO10,

		ELO12
K10	Search for specified data in database	ELO9, ELO10, ELO12
K11	Develop professional skills in preparing slides for presentation	ELO10, ELO12
K12	Design and prepare slides with music, picture and video	ELO10, ELO12
Ethics and Attitude:		
K13	Be active and creative	ELO12, ELO13
K14	Accumulate experiences for lifelong learning	ELO12, ELO13

COURSE DESCRIPTION

THE02001. Application of Computer in Agriculture (03: 2-1; 6; 135)

This course consists of 6 chapters: Introduction to computer and information processing; Internet service and information searching; Word processing, making report and printing; Design and manipulating data in a spreadsheet with MS. Excel; Preparing a presentation with MS. PowerPoint; Database management, querying and making report with MS. Access.

Prerequisite: None.

ASSESSMENT

Grading: 10 points

Weighting:

- Attendance: 10%
- Midterm exam: 30%
- Final exam: 60%

Assessment summary

Rubric	Course expected learning outcome	Weighting (%)	Week
Attendance		**10**	
Rubric 1: Participant	K1-K14	7	1-10
Formative asessment		**30**	
Rubric 2: Midterm exam	K1-K6	30	8
Final exam		**60**	
Rubric 3: Final exam	K1-K12	60	15

TEXT BOOKS AND REFERENCES

**** Text Books/Lecture Notes:***

- Phạm Quang Dũng và cs (2015). Giáo trình Tin học đại cương, NXB Nông nghiệp.
- Microsoft Office (2013), Microsoft Official Academic Course, ©2014

**** Additional references:***

- Joan Lambert and Curtis Frye, Microsoft Office (2016) Step by Step, Microsoft press, 2015
- Microsoft Office (2013), Microsoft Official Academic Course, December 2013, ©2014
- IIG Việt Nam, Microsoft OFFICE (2010), NXB Tổng Hợp TP.HCM

COURSE OUTLINE

Week	Content
1-2	**Chapter 1: Introduction to computer and information processing**
	A/* Main contents: (3 hours)* **Theory:** 1.1. Overview 1.2. Operating system 1.3. Files anf folders 1.4. Application software and tools **Practice/Experiment: (***8 hours)* Operating system Managing Files anf folders
	***B/* Self- study contents**: *(6 hours)* 1.6. Open source operating system 1.7. Utility and antivirus
3-4	***Chapter 2:* Internet Service**
	A/* Main contents: (3 hours)* **Theory:** 2.1. Internet and WWW 2.2. Internet as a search engine 2.3. Creating a simple website **Practice/Experiment:** *(8 hours)* Searching for information and learning materials from the Internet Creating a simple website using html
	***B/* Self- study contents**: *(10 hours)* Searching for learning materials (reference) for this course Searching for information in some topics

	Create a website
5-6-7	***Chapter 3:*** **Word Processing**
	A/ **Main contents:** *(2 hours)* **Theory:** 3.1. Introduction to MS. Office 3.2. Design, create and edit a document **Practice/ experiment contents:** *(12 hours)* - Create and edit documents - Layout, format - Create tables - Templates - Header/Footer and Table of content - Print
	B/ **Self- study contents**: *(10 hours)* Practice
8-9-10	***Chapter 4:*** **MS. Excel**
	A/ **Main contents:** *(2 hours)* **Theory:** *(...hours)* 4.1. Introduction 4.2. Create and input to a spreadsheet 4.3. Formula and functions 4.4. Chart 4.5. Table of data 4.6. Sort and filter data 4.7. Working with multiple sheets **Practice/ experiment contents:** *(12 hours)* 4.2. Introduction 4.2. Create and input to a spreadsheet 4.3. Formula and functions 4.4. Chart 4.5. Table of data 4.6. Sort and filter data 4.7. Working with multiple sheets
	B/ **Self- study contents**: *(10 hours)* Practice working with Excel

11-12	***Chapter 5:*** **Powerpoint**
	A/ **Main contents:** *(2 hours)* **Theory:** *(2 hours)* 5.1. Create a Powerpoint presentation 5.2. Create a report with table and chart 5.3. Creat a presentation with media **Practice/Experiment:** *(8 hours)* - Create a Powerpoint presentation 5.2. Create a report with table and chart 5.3. Creat a presentation with media
	B/ **Self- study contents**:: *(8 hours)* Practice
13-14-15	***Chương 6:*** **MS. Access**
	A **Main contents:** *(3 hours)* **Theory:** *(3 hours)* 6.1. Database and objects in MS. Access 6.2. Working with tables and queries 6.3. Working with form 6.4. Report **Practice/ experiment contents:** *(12 hours)* 6.1. Working with tables and queries 6.3. Working with form 6.4. Report
	B/ **Self- study contents**:: *(12 hours)* Practice

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTRUE
FACULTY OF FOOD SCIENCE AND TECHNOLOGY

COURSE SYLLABUS
CPE02001: General Biochemistry

Credits: 2 (Lecture: 22 hours – Practice: 8 hours); Self-Learning 60 hours
Term: 5
Preceding course: MTE01004 – Organic chemistry 2

COURSE OBJECTIVES:

In this course, students will be provided:
- Knowledge: Students understand properly basic knowledge about the structure, properties and functions of substances in cell (amino acids, proteins, enzymes, vitamins, nucleic acids, carbohydrates, lipids), biosynthesis and degradation of these substances in cell and bioenergetics, explain the relationship among metabolism pathways in cell;
- Skills: Students have argumentative thinking to analyze substances in the living organism, principles of metabolism pathway in each living organism; have the capacity to independently conduct qualitative and quantitative analyses, and compare some basic nutritional compounds in agricultural products and food.
- Ethics and Attitudes: always be active, creative, conscious to accumulate practical experience and self-learning throughout life.

COURSE EXPECTED LEARNING OUTCOMES

Notation	**Course expected learning outcomes** After successfully completing this course, students are able to	**Program expected learning outcomes**
Knowledge:		
K1	Present and analyse properly about structure, properties and functions of substances in cell (amino acids, proteins, enzymes, vitamins, nucleic acids, carbohydrates, lipids), biosynthesis and degradation of these substances in cell and energy formation as well, explain the relationship between metabolism pathways in cell	EOL3
K2	Explain and analyse properly methods of qualitative, quantitative analysis, and compare some basic nutritional compounds in agricultural products and food: amino acid, protein, reducing sugars, total sugars, vitamin C, total organic acids	EOL3

Skills:		
K3	Apply creatively the knowledge learned in qualitative, quantitative analysis and comparison of some basic nutritional compound in agricultural products and foodstuffs.	ELO7
K4	Develop skills for self-organizing and teamwork	ELO6
K5	Perform critical thinking to analyze substances in the living organism, principle of metabolism pathway in each living organism	ELO11
Ethics and Attitude:		
K6	Have self-learning throughout life, self-control in research, self-responsibility for their work	ELO11

COURSE DESCRIPTION

CPE02001. General Biochemistry (2: 1.5 – 0.5; 4; 90)

This course consists of two parts: theory part and practical part: The theory course consists of 07 chapters with contents as follows: structure, properties and functions of amino acid, protein, enzyme, vitamin, nucleic acid, carbohydrate, lipid in living cell; Metabolism pathways and Bioenergetics in cells: carbohydrate, lipid, amino acid and protein metabolism.

The practical part consists 03 lessons with contents as follows: quantitative reactions used to determine the present of amino acid, protein, vitamin, reducing sugars; Quantitative determination of protein, reducing sugars, total sugars, vitamin C, total organic acid in Agricultural products and food stuffs.

Preceding course: MTE01004- organic chemistry 2

ASSESSMENT

Grading: 10

Weighting:

- Attendance: 10%
- Formative assessment: 30%
- Final exam: 60%

Assessment summary

Rubric	Course expected learning outcome	Weighting (%)	Week
Attendance		**10**	
Rubric 1: Class attendance	K1, K4, K5, K6	10	1 - 8
Formative assessment		**30**	
Rubric 2: Mid semester exam	K1, K5	15	5

Practical assessment			
Rubric 3: Practice and report	K2, K3, K4, K5, K6	15	2,3,4
Final assessment		**60**	
Rubric 4: Final exam asessment	K1	60	Following University schedule

TEXT BOOKS AND REFERENCES

**** Text Books/Lecture Notes:*** Lecture notes prepared by lecturer

**** English book:***

- Nelson, D.L and Cox, M.M (2004). Lehninger Principles of Biochemistry, 4th edn.
- Cambell, M.K và Farrell, S.O (2009). Biochemistry. 6th edn Thomson Brooks.

**** Vietnamese book:***

- Ngô Xuân Mạnh, Lại Thị Ngọc Hà, Đặng Thái Hải, Nguyễn Văn Kiệm (2010). Giáo trình Hoá sinh đại cương. Nhà xuất bản Nông Nghiệp

**** Additional references:***

COURSE OUTLINE

Week	Content
1	**Chapter 1: Introduction and Amino acid and protein** Introductory chapter Chapter 1. protein (3 hours) **Theory:** 1.1. Introduction 1.1..1 Difinition of proteins 1.1.2. Biological function of proteins 1.2. Chemical composition of proteins 1.2.1. Elements in proteins 1.2.2. Amino acids 1.2.3. Peptides and polypeptides 1.2.4. The four orders of protein structure - Primary structure - Secondary structure - Tertiary structure

Week	Content
	- Quaternary Structures 1.2.5. Characteristics of proteins 1.2.6. Classification of proteins **Practice/Experiment:***6 hours* **Lesson 1: Acid amins and proteins** 1. Ninhydrin reaction 2. Xanthoprotein reaction 3. Biure reaction 4. Quantatitive determination of proteins in some agricultural food products by Biure method
	***B/* Self- study contents**: *(18 hours)* - Structure, properties and functions of amino acid and protein in cell - Methods of qualitative, quantitative analysis of protein (12 hours)
2	**Chapter 2: Vitamin**
	A/* Main contents: (3 hours)* **Theory:** 2.1. Introduction 2.2.1. Difinition 2.2.2. General function 2.2. Vitamin classification 2.2.1. Structure and Function of the Water- Soluble vitamins 2.2.2. Structure and Function of the Lipid- Soluble vitamins **Practice/ experiment contents:** *(5 hours)* 1. Reaction of vitamin C with Iodine 2.Quantatative determination of vitamin C in some agricultural food products by Iodine titration 3.Quantatative determination of total organic acids in some agricultural food products by sodium hydroxide titration
	***B/* Self- stusy contents**: *(16 hours)* - Structure, properties and functions of vitamin (6 hours) - Methods of qualitative, quantitative analysis of vitamin C (10 hours)
3	**Chapter 3: Enzyme**
	A/* Main contents: (3 hours)* **Theory:** 3.1. Introduction 3.1.1. Difinition

Week	Content
	3.1.2. Similarities and differences between enzymes and inorganic catalysts 3.2. Structural parts of enzymes 3.2.1. Protein part of enzymes (Appoenzyme) 3.2.2. Non-protein part of enzyme (Prosthetic- Coenzyme) 3.3. Mechanisms of Action 3.4. Enzyme specificity 3.5. Factors affect to Enzyme activity 3.5.1. Temperature 3.5.2. pH 3.5.3. Substrate concentration 3.5.4. Activator and Inhibitor 3.6.. Classification and Nomenclature of Enzymes
	***B/* Self- stusy contents**: *(6 hours)* Structure, properties and functions of vitamin
4	**Chapter 4: Nucleic acid**
	A/* Main contents: (2 hours)* **Theory: 2 hours** 4.1. Introduction 4.1.1. Degradation cycle of nucleic acids 4.1.2. Types of nucleic acids in cells 4.2. Chemical components 4.2.1. Pentose 4.2.2. Base nito 4.2.3. Nucleosides 4.2.4. Nucleotides 4.3. Structures and functions of nucleic acids 4.3.1. Diestephosphoric linkage 4.3.2. Primary structure and function of nucleic acids 4.3.3. Secondary structure and function of nucleic acids 4.4. Biosynthesis and degradation of nucleic acids 4.4.1. DNA replication 4.4.2. RNA Synthesis, processing, and Modification 4.4.3. Degradation of nucleic acids

Week	Content
	***B/* Self- stusy contents**: *(4 hours)* Structure, properties and functions of nucleic acid, Biosynthesis and degradation of nucleic acids

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTRUE
FACULTY OF AGRONOMY

COURSE SYLLABUS
NHE02002: Plant Morphology and Anatomy

Credits: 3 (Lecture: 2 – Practice: 1); Self-Learning: 6
Term: 5
Previous course: NHE01002 – Introductory Biology 3

COURSE OBJECTIVES:

The purpose of the course is to help student:

- Distinguish vegetative organs and reproductive organs of flowering plants
- Understand position, the role, morphological and anatomical characteristics of those organs
- Distinguish monocots and dicots plant base on morphological and anatomical characteristics
- Understand reproductive methods, double fertilization in angiosperm, seed dispersal in accordance with structure of fruit and seed

COURSE EXPECTED LEARNING OUTCOMES

Notation	Course expected learning outcomes After successfully completing this course, students are able to:	Program expected learning outcomes
Knowledge:		
K1	Apply basic scientific knowledge to explain plant growth and development	ELO2
K2	Analyze relationships between biological, genetic, physiological and environmental factors impacting on crops	ELO3
Skills		
K3	Effectively lead and cooperate in working groups	ELO6
K4	Use English effectively in study, communication and research of crop science	ELO8
Ethics and Attitude		
K5	Be awareness of lifelong learning	ELO12
K6	Possess responsibility and professional ethics	ELO13

COURSE DESCRIPTION

NHE02002: Plant Morphology and Anatomy (3: 2 - 1; 6; 135)

This course consists of 9 chapters about Plant cell, Plant tissue, Morphology and Anatomy of Root, Morphology and Anatomy of Stem, Morphology and Anatomy of Leaf, Flower ans sexual reproduction in Flowering plants, Fruit and Seed.

This course also consist of 5 practices: Types of plant tissue, Anatomy of Root, Stem and Leaf in Monocots, Anatomy of Root, Stem and Leaf in Dicots, Morphology of Root, Stem and Leaf, Morphology of Flower, Fruit and Seed.

Prerequisite: NHE01002 - Introductory Biology 3

ASSESSMENT

Grading: 10 points

Weighting:

- Attendance: Class attendance + Discussion: 10 %
- Formative assessment: practical report + midterm exam: 30%
- Final exam: 60 %

Assessment summary

Rubric	Course expected learning outcome	Weighting (%)	Week
Attendance		**10**	
Rubric 1: Class attendance	K5, K6	7	1-10
Rubric 2: Group discussion	K1, K2, K3, K4, K5, K6	3	1-10
Formative assessment		**30**	
Rubric 3: Practice and report	K1, K2, K3, K4, K5, K6	15	3-7
Rubric 4: Midterm exam	K1, K2, K3, K4, K5, K6	15	5-7
Final assessment		**60**	
Rubric 5**:** Final exam	K1, K2, K3, K4, K5, K6	60	Following University schedule

TEXT BOOKS AND REFERENCES

**** Text Books/Lecture Notes:***

2. Bidlack J., Jansky S., Stern K. (2013). Stern's Introductory Plant Biology 13th edition. Publisher: McGraw-Hill Education, 640 p.

2. Lecture notes

**** Additional references:***

1. Mauseth, J.D. (2012) Botany: An Introduction to Plant Biology 5th Edition. Publisher: Jones & Bartlett Learning; 696 p.

2. Jack ingels (2004). Ornamental horticulture: Science, operations, and managerment, third Edition. Dermal, Thomson Learning, Inc, USA.
3. George Acquaah (2009). Horticulture: Principles and Practices, fourth edition. Peason Prentice Hall, USA.

COURSE OUTLINE

Week	Content
1	**Chapter 1: Plant cell**
	A/* Main contents: (1 hr)* **Theory:** *(1 hr)* 1.1. Cell wall 1.2. Cell membrane 1.3. Cytoplasm 1.4. Cytoskeleton 1.5. Organelle 1.6. Nuclear 1.7. Vacuole
	B/* Self- study contents: (2 hrs)* 1.8. Plant cell structure, location, function of organelles
1 and 2	**Chapter 2: Plant tissues**
	A/* Main contents: (3 hrs)* **Theory:** *(2.7 hrs)* 2.1. Meristem tissues 2.2. Dermal tissue 2.3. Ground tissue 2.3.1. Parenchyma 2.3.2. Collenchyma

	2.3.3. Sclerenchyma 2.4. Vascular tissue 2.5. Secretory tissue **Practice/ experiment contents:** *(6 hrs)* Type of plant tissues **Discussion:** *(0.3 hrs)* Distingush types of plant cell and tissue
	***B/* Self- study contents**: *(12 hrs)* 2.6. Type of plant tissues, characteristics and function
2 and 3	**Chapter 3: Morphology and Anatomy of root**
	A/* Main contents: (3 hrs)* **Theory:** *(2.7 hrs)* 3.1. Location and function of root 3.2. Morphology of root and root modification 3.2.1. Morphology of root 3.2.2. Root modification 3.3. Anatomy of root 3.3.1. Primary structure of root 3.3.2. Secondary structure of root **Practice/Experiment:** *(6 hrs)* Root Anatomy of monocots and dicots Morphology of root **Discussion:** *(0.3 hrs)* Analyzing anatomy and morphology of root in the correlation with function
	***B/* Self- study contents**: *(12 hrs)* 3.4. Comparing morphology and anatomy of monocots and dicots root
3 and 4	**Chapter 4: Morphology and Anatomy of stem**
	A/* Main contents: (3 hrs)* **Theory:** *(2.7 hrs)* 4.1. Location and function of stem 4.2. Morphology of stem and stem modification 4.2.1. Morphology of stem 4.2.2. Stem modification 3.3. Anatomy of stem 3.3.1. Primary structure of stem 3.3.2. Secondary structure of stem **Practice/Experiment:** *(6 hrs)* Stem anatomy of monocots and dicots Morphology of stem

	Seminar/Discussion: *(0.3 hrs)* Analyzing anatomy and morphology of stem in the correlation with function
	***B/* Self- study contents**: *(12 hrs)* 4.4. Comparing morphology and anatomy of monocots and dicots stem
4 and 5	**Chapter 5: Morphology and Anatomy of leaf**
	A/* Main contents: (4 hrs)* **Theory:** *(3.5 hrs)* 5.1. Location and function of leaf 5.2. Morphology of leaf and leaf modification 5.2.1. Morphology of leaf 5.2.2. Leaf modification 5.3. Anatomy of leaf 5.3.1. Anatomy of monocots leaf 5.3.2. Anatomy of dicots leaf **Practice/Experiment:** *(6 hrs)* Leaf anatomy of monocots and dicots Morphology of leaf **Discussion:** *(0.5 hrs)* Analyzing anatomy and morphology of leaf in the correlation with function
	***B/* Self- study contents**: *(14 hrs)* 5.4. Comparing morphology and anatomy of monocots and dicots leaf
5, 6, 7 and 8	**Chapter 6: Flower and sexual reproduction of flowering plants**
	A/* Main contents: (9 hrs)* **Theory:** *(8 hrs)* 6.1. Parts of flower 6.2. Types of estivation 6.3. Structure of androecium and gynoecium; Types of placentation 6.4. Floral formula and floral diagram 6.5. Types of inflorescences 6.6. Sexual reproduction in flowering plants **Practice/Experiment:** *(2 hrs)* Morphology of flowers **Discussion:** *(1 hrs)* The difference between monocots and dicots in morphology and anatomy of root, stem, leaf
	***B/* Self- study contents**: *(20 hrs)* 6.7. Comparing morphology monocots and dicots flower 6.8. Structure of flower 6.9. How to name for inflorescens

8 and 9	**Chapter 7: Fruit and seed**
	A/* Main contents: (3 hrs)* **Theory:** *(2 hrs)* 7.1. Classification of fruit 7.2. Morphology and anatomy of seed 7.3. Fruit and seed dispersal **Practice/Experiment:** *(4 hrs)* Morphology of fruit and seed **Discussion:** *(1 hrs)* The difference between monocots and dicots in flower and seed
	***B/* Self- study contents**: *(10 hrs)* 7.4. Comparing monocots and dicots seeds 7.5. How to classify fruit
9 and 10	**Chapter 8: Growth and development of plants**
	A/* Main contents: (4 hrs)* **Theory:** *(3.4 hrs)* 8.1. The growth and development of monocots 8.2. The growth and development of dicots 8.3. Factors effect on growth and development of plants 8.4. Evolutionary trend in flowering plants **Discussion:** *(0.6 hrs)* Factors effect on growth and development of plants
	***B/* Self- study contents**: *(8 hrs)* 8.5. Comparing the growth and development of monocots and dicots

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTRUE
FACULTY OF AGRONOMY

COURSE SYLLABUS
NHE02003: Plant Genetics

Credits: 4 (Lecture: 3.5 – Practice: 0.5); Self-Learning 8
Term: 5
Preceding course: MTE01004 – Organic chemistry 2; NHE01001 – Introduction to Biology 1

COURSE OBJECTIVES:

This course aims to provide students with:

- Knowledge in plant genetics: concepts in molecular and cellular genetics, Mendelian inheritance, population and quantitative genetics
- Basic process of gene transmission and expression, gene expression control and genome organization
- Ability to apply knowledge to formulate hypothesis of genetic inheritance and different approaches to test hypothesis
- Use of on-line literature retrieval related to genetics
- Critical thinking in application of genetic principles at individual and population level for improvement in crop production, especially for genetic improvement of agronomic traits.

COURSE EXPECTED LEARNING OUTCOMES

Notation	**Course expected learning outcomes** After successfully completing this course, students are able to	**Program expected learning outcomes**
Knowledge		
K1	Explain terminology of plant genetics in English	ELO8
K2	Explain concepts of molecular genetics, Mendelian genetics, population genetics and quantitative genetics	ELO3
K3	Analyze genetic principles in relationship with biology, plant genetics and breeding	ELO3
Skills		
K4	Effectively collaborate in group working	ELO6, ELO7

K5	Write essays and reports on biology and plant genetics	ELO7, ELO8
K6	Effectively read research articles on biology and genetics, especially about research methodology	ELO8
K7	Use statistics software for quantitative genetics.	ELO10
K8	Critical thinking to analyze and evaluate practical problems in biology, plant genetics and breeding	ELO11
Ethics and Attitude		
K9	Actively make suggestion for problem solutions based on biology and plant genetics information	ELO12
K10	Be aware of literature use and citation of literature	ELO13

COURSE DESCRIPTION

NHE02003. Plant Genetics (4: 3.5–0.5; 8; 180)

This course consists of 4 main chapters and provides concepts in molecular genetics (ADN, replication, translation, transcription, gene expression), cytology (chromosome structure, polyploidy, chromosome structure changes and application in agriculture), Mendelian inheritance (principles, segregation ratio, gene interaction and estimated hybridization results), plant reproduction (cell division, incompatibility), population and quantitative genetics (Hardy-Weinberg equilibrium, evolution, phenotypic and genetic variation, genotype, heritability and selection).

Preceding course: MTE01004 - Organic chemistry 2; NHE01001 - Introduction to Biology 1

ASSESSMENT

Grading: 10

Weighting:

- Attendance: 10%
- Formative assessment: 20-30%
- Final exam: 60-70%

Assessment summary

Rubric	Course expected learning outcomes	Weighting (%)	Week
Attendance			
Rubric 1: Class attendance	K1, K4, K5, K9	10	1-15
Formative assessment			
Rubric 2: Group oral presentation and discussion	K3, K4, K5, K8,k9	10	4, 7, 10, 11,13, 15
Rubric 3: Practice	K2, K4, K5, K8	5	6,7,8,9
Rubric 4: Essay	K2, K4, K5, K6, K10	5	14
Final assessment			

Rubric 5: Midterm exam	K1, K2, K3, K8	20	8
Rubric 6: Final exam	K1, K2, K3, K8	50	University's schedule

TEXT BOOKS AND REFERENCES

**** Text Books/Lecture Notes:***

Snustad, D. P. and Simmons M. J. (2010). Principles of Genetics. 5th Edition, International Student Version. John Wiley and Son's, Inc. 784p.

**** Additional references:***

1. Gardner, EJ, Simmons, MJ and Snustad, DP (1991) Principles of Genetics, 8th edition, Wiley, New York. 649p.
2. Weaver, R. F. and P. W. Hedrick. (1997). Genetics, Third Edition. W. C. Brown Publishers. 624p.
3. Stephen H. Howell (1998). Molecular Genetics of Plant Development. Cambridge University Press. 337p.
4. Hartl, D. L & E. W. Jones (2005). Genetics "Analysis of genes and genomes" 6th Edition
5. Clark, D. P. (2005). Molecular biology: Understanding the Genetic Revolution, Elsevier Academic Press, Burlington, USA. 928p.
6. Anthony JF Griffiths, Jeffrey H Miller, David T Suzuki, Richard C Lewontin, and William M Gelbart. (2005). Introduction to Genetic Analysis.
7. Nguyễn Hồng Minh (1997). Giáo trình Di truyền học, NXB Nông nghiệp

- Journals related to biology and genetics: Theoretical and applied genetics, Euphytica, Heredity, etc.
- Website:
http://passel.unl.edu/communities/pbtn?idsubcollectionmodule=1130274157&idindependentpage=156;
https://books.google.com.vn/books?hl=en&lr=&id=mpQ8nI6QpKwC&oi=fnd&pg=PR13&dq=%E2%80%A2%09Stephen+H.+Howell+(1998).+Molecular+Genetics+of+Plant+Development.&ots=eWRxN5yQum&sig=49Kuwj_ItA3gFga-PFwWRacfimQ&redir_esc=y#v=onepage&q=%E2%80%A2%09Stephen%20H.%20Howell%20(1998).%20Molecular%20Genetics%20of%20Plant%20Development.&f=false
http://cropandsoil.oregonstate.edu/content/lectures-and-notes-0

COURSE OUTLINE

Week	Content
1-4	**Chapter 1: Molecular genetics** **A/ Main contents**: (14hours) **Theory:** (10 hours) 1.1. DNA: The genetic materials 1.1.1. Polynucleotide strand and base pairing 1.1.2. DNA structure: Double helix, antiparallel strands 1.1.3. DNA structure in relation to its function 1.2. DNA replication

Week	Content
	1.2.1. Replication mechanisms/semiconservative replication 1.2.2. Basic steps of DNA replication 1.3. Transcription and translation 1.3.1. Types of RNA polymerases 1.3.2. Transcription mechanism 1.3.3. Translation 1.4. Control of gene expression 1.4.1 Control of gene transcription in prokaryotes 1.4.2. Gen regulation in Operon system 1.4.3. Control of gene transcription in eukaryotes 1.5. Molecular mechanism of mutation 1.5.1. Types of mutation 1.5.2. Molecular basis of mutation **Seminar/Discussion:** (4 hours) Experiments proving DNA as genetic materials Experiments on DNA replication (hypothesis and testing)
	B/ Self-study: (28 hours) - History of DNA discovery - New understandings on replication, transcription and translation (wooble theory) Similarities and differences in gene expression in prokaryotes and eukaryotes
5-7	**Chapter 2: Chromosomes and molecular organization of chromosomes**
	A/ Main contents: (15 hours) **Theory:** (9 hours) 2.1. Genome size and evolutionary complexity 2.2. Chromosome structure 2.2.1. Chromosome structure of bateria 2.2.2. Chromosome structure of eukaryotes 2.3. Nucleotide repeat sequence in eukaryotic genome 2.4. Linkage and recombination of genes 2.4.1. Coupling and repulsion phase 2.4.2. Recombination frequency 2.5. Genetic mapping 2.5.1. Map units and recombination frequencies 2.5.2. Crossing-over 2.5.3. Genetic mapping in three point test cross 2.6. Choromosomal aberrations 2.7. Ploidy variation and application in agriculture **Seminar/discussion:** (6 hours) New development in QTL mapping (1 hours) Seminar (5 hours) DNA marker types and application PCR techniques in genetics and agricultural application **Laboratory practice:** (8 hours)

Week	Content
	Lession 1: Mitosis (4 hours) Lession 2: Meiosis (4 hours)
	B/ Self-study: (38 hours) - Molecular structure of chromosomes related to gene expression - Linkage, crossing-over and chromosome mapping in eukaryotes Variation chromosome number and evolution/breeding
8-10	**Chapter 3: Transmission genetics – Principles of segregation**
	A/ Main contents: (8 hours) **Theory:** (7 hours) 3.1. Monohybrid segregation 3.1.1. Phenotypic ratio in F_2 generation 3.1.2. Principles of segregation 3.2. Dihybrid, trihybrid and multiple gene segregation 3.2.1. Principle of independent assortment 3.2.2. Test cross with unlinked genes 3.2.3. Segregation test by Chi squares 3.3. Deviation from Mendelian segregation – gene interaction **Seminar/Discussion:** (1 hours) Discussion on update information on DNA and genetic engineering Seminar: Genetically modified crops/organisms and agricultural application **Practice/Experiment:** (7 hours) Lesson 3: Investigating chromosomes: number, shape and pairing (3 hours) Lesson 4: Analysis of hybrid progeny (4 hours)
	B/ Self-study: (23 hours) - Chromosomal basis of Mendelian/transmission genetics Effect of genotype: from genotype to phenotype
10-11	**Chapter 4: Reporoduction in plants**
	A/ Main contents: (5 hours) **Theory:** (45 hours) 4.1. Asexual reproduction 4.1.1. Natural asexual reproduction 4.1.2. Artificial asexual reproduction 4.1.3. Mitosis and its significance 4.2. Sexual reproduction 4.2.1. Characteristics of sexual reproduction 4.2.2. Meiosis and its significance 4.2.3 Breeding system 4.2.4. Self-incompatibility **Seminar/Discussion:** (0.5 hours) Discussion on sexual reproduction and recombination as source of genetic variation
	B/ Self-study: (10 hours) - Reproduction/breeding system, advantages, disadvantages of breeding

Week	Content
	systems and population genetic structure Consequences and application of breeding system in crop production and breeding

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTRUE
FACULTY OFAGRONOMY

COURSE SYLLABUS
NHE02004: Plant Physiology

Credits: 3 (Lecture: 2 – Practical: 1); Self-Learning:9
Term: 3
Preceding course: MTE01004 – Organic chemistry 2; NHE01002 – Introductory Biology 3

COURSE OBJECTIVES:

The course is to help students to understand mechanics of the mainly physiological functions in the plants, the effects of the environmental factors on the mainly physiological functions, the relationships between physiological functions and crop yield in order to giving out new techniques for height yield and quality.

COURSE EXPECTED LEARNING OUTCOMES

Notation	**Course expected learning outcomes** After successfully completing this course, students are able to:	**Program expected learning outcomes**
Knowledge		
K1	Explain mechanics of the mainly physiological functions in the plan**ts**	ELO2, ELO5, ELO7, ELO9,
K2	Analyze the effects of the environmental factors on the mainly physiological functions	ELO2,ELO3, ELO5,
K3	Summarize the mechanics of formation of the crop quality and yield	ELO5, ELO2,
K4	Describe possibilities of new techniques for height yield and quality	ELO5, ELO7,
Skills		
K5	Develop the new techniques for height yield and quality of crop production	ELO7, ELO12,
K6	Develop the new techniques for height yield and quality in stress conditions	ELO9, ELO12,
K7	Evaluate and analyze suitable techniques for breeding new varieties tolerant to stress	ELO10, ELO11
Ethics and Attitude		
K8	Be proactive in updating knowledge	ELO12, ELO2,

K9	Be responsible for offered techniques	ELO13, ELO3

COURSE DESCRIPTION

NHE02004. Plant Physiology (3: 2 -1; 6; 135)

This course consists of 5 chapters: chapter 1: cell physiology; chapter 2: water exchange in the plants; chapter 3: photosynthesis of higher plants; chapter4: respiration in the plants; chapter 5: Growth and development of the plants.
Preceding course: MTE01004 – Organic chemistry 2; NHE01002 – Introductory Biology 3

ASSESSMENT

1.Grading: 10

2 .Weighting:

- Asidous score :10 %
- point of midterm and seminar exam 30 %
- point of the final exam : 60%

3. Assessment summary

Rubric	Course expected learning outcome	Weighting (%)	Week
Attendance		**10**	**1-10**
Rubric 1: Participant	K1, K2, K3, K4, K5, K8, K9	7	
Rubric 2: Discusion	K3, K4, K5	3	5
Formative asessment		**30**	
Rubric 3: Presentation	K5, K7	10	6
Rubric 4: Practical and report	K1, K2, K3, K4, K5, K6, K7, K8, K9	10	7
Rubric 5: Mitterm exam	K3, K4, K5	10	5
Final exam		**60**	
Rubric 6: Final exam	K2, K3, K4, K5, K7, K8	60	Following University schedule

TEXT BOOKS AND REFERENCES

*** Books**

Lincoln Taiz.(2010 EDth), Plant Physiology. University of California

*** Reference books**

N.K. Fageria and V.C. Baliga. (2006), Physiology of Crop Production

Hoàng Minh Tấn, Nguyễn Quang Thạch, Vũ Quang Sáng (2006). Giáo trình Sinh lý thựcvật. NXB Nông nghiệp, Hà Nội

COURSE OUTLINE

Week	Contents
1	***Chapter1:*** Cell Physiology ***A/ contents for teaching****: (9 hours)* **Theory contents :** 1.1. Plant cell is living body 1.2. structures and function of the organs in the plant cells 1.2.1. Structures and function of the cell wall 1.2.2.Structures and functions of the membranes 1.2.3.functions of the protoplast 1.2.4. Structures and functions of the vacuole 1.3. Characteristics in chemical of the protoplast 1.4 Characteristics in physicals of the protoplast 1.5. Characteristics in solution of the protoplast 1.6. Mechanic of the water uptake in the root cell 1.7. Mechanic of the mineral nutrient in the root cell **Content for practical part:** *(3 hours)* Deform and antideform of the protoplast
2	***B/*** *Content for homeworks*: *(30.hours)* 1.4 Characteristics in physicals of the protoplast for crop stress resistance 2. Mechanic of the water uptake in the root cell and environmental factors 3. Mechanic of the mineral nutrient in the root cell environmental factors 4 water potential *1.* Transport water and mineral nutrients in the plants
3	***Chapter 2:***Water exchange in the plants ***A/contents for teaching****: (6.hours)* **Theory contents :** 1.1. Functions of the water in the plants 1.2. Water uptake in the plant cell 1.2.1. Effects of the Environmental factor on rate of water uptake 1.2.2. Effects of the Temperature 1.2.3. Effects of the soil solution 1.2.4. Effects of water content the soil 1.2.5. Effects of oxygen content in the soil solution 1.2.6. Suitable watering for crops 1.3. Transport water in the plants 1.3.1. Ways for transport 1.3.2. Forces for transport 1.3.3. Envi. Factors effect on transport water in the plants 1.4. Water transpiration in the leaf system

	1.4.1. Roles ò the transpiration for plants 1.4.2. Mechanic of the transpiration through stomata 1.4.3 Mechanic of closing and opening of stomata 1.4.4. Evir. Factors effect on rate of transpiration 1.5. Water balance in the plants 1.5.1. Plus water balance and method to maintain 1.5.2. Minus water balance and technique to correct 1.6. Technique of watering for **Content for practical** (3 hours) Closing, opening of stomata and determination of the transpiration rate
	***B/** Contents for homework*: *(18 hours)* 1. Envir. Factors effect on water uptake 2. Envir. Factors effect on water transport 3. Envir. Factors effect on water transpiration 4. Functions of water balance in the plants 5. Method to determanate water balance 6. Steps for suiable watering
.4	Chapter 3: Photosynthesis of higher plants
5 6	***A/contents for teaching**: (6.hours)* **Theory contents:** 1.1. Roles of the photosynthesis for human beings and environment 1.2. Definition and chemical formula of the Pho. 1.3. Organs for Photo. 1.3.1.Phomonogy of the leaves 1.3.2. Leaf structure 1.3.3. Morphology and structure of the chloroplasts 1.3.4. Structure of the chloroplast 1.4. Photo. Pigments 1.4.1. Chlorophyll structure 1.4.2. Some physic and chemical characteristics of the chlorophyll 1.4.3. Functions of the chlorophyll in Photo. 1.4.4. Structure and function of the carotenoit in Photo. 1.4.5. Structure and function of the xanthophil in Photo 1.5. Chemical mechanics of the Photo. 1.5.1. Chemical mechanics of the light reactions 1.5.1. Chemical mechanics of the dark reactions 1.5.1.1. Chemical mechanics of the CO_2 reduction of Call Vill Ben Son) 1.5.1.2. Chemical mechanics of Hart Slack cycle) 1.5.1.3. Chemical mechanics of CAM cycle) 1.6. Evir. Factor effect on photo. rate 1.6.1. Rate photo. And crop yield Contents for practical: *(6.hours)* Determination of the chlorophyll content Determination of the photo. Rate

7	***B/*** *Contents for homework*: *(30 hours)* 1.6.2. Relationship between temperature and photo. 1.6.3. Relationship between CO_2 content and photo. 1.6.4. Relationship between water and photo. 1.6.5. Relationship between mineral nutrient and photo. 1.7. Relationship between Photo. And crop yield 1.7.1.Potential for increase yield 1.7.2. Mechanic to increase fresh yield 1.7.3. . Mechanic to increase economic yield 1.8. Artificial photo.
..8...	***Ch***apter 4 : Respiration
	***A/ Contents for teaching*:** *(hours 3)* **Theory contents:** 1.1.Functions of the respiration 1.2. Definition and equation of the respiration 1.3. Organs for respiration 1.3.1. Morphology of the mitochondrial 1.3.2. Structure of the mitr. 1.4. mechanic of the respiration 1.4.1 Mechanic of the first stage of respiration 1.4.2. Mechanic of the Phosphorylation in respiration Contents for practical: *(3.hours)* Determination of the leaf area Determination of the rate 0f respiration **Semina:** *(0.)*
	B/ *Contents for homework*:: *(12.hours)* 1 Criteria for respiration evaluation .2 Rate of respiration (Respiration equation 2. .Respiration- central of the metabolism in the plants 3. Respiration in saving agriculture products ***4.*** Control of the respiration
9	Chapter 5: Growth and development of the plants ***A/ Contents for teaching* :** *(10 hours)* **Theory contents:** 1.1. General definition of the growth and development of the plants 1.1.1. Definition of the growth 1.1.2. Definition of the development 1.1.3. The relationship between growth and development 1.1.4. Theory in plant age 1.2. Regulators in the plants 1.2.1. Natural regulators 1.2.1.1. Stimulator- auxin

10	1.2.1.2. Stimulator - gibberelline 1.2.1.3. Stimulator - xitokinin 1.2.1.4. Inhibitators- axitabsixic 1.2.1.5. Inhibitators - ethylen 1.2.2. Chemical regulators 1.3. Hormone balance in the plants 1.3.1. General hormone balance and control 1.3.2. Single hormone balance in the plants and control ***A/ Contents for teaching*:** *(0)* **Semina/:** *(0.)* **Practical** : (*0)* ***B/* Contents for homework** : *(30.hours)* 1.3.3. Single hormone balance in the plants and control 1.4. Relationship between growth organs 1.5. Movement growth 1.6. Non-movement growth 1.7. Regulations and apply of the regulators in agriculture 1.8. Theory in development of the plants and techniques to flowering control 1.8.1. Theory in function of the low temperature with flowering 1.8.2. Theory in photosynthesis 1.8.3. Theory of the flowering hormone of Tralakhian ***1.8.4.*** Some techniques for flowering control in agriculture

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTRUE
FACULTY OF ECONOMICS AND RURAL DEVELOPMENT

COURSE SYLLABUS
KTE02013: Microeconomics

Credits: 3 (Lecture: 3 – Practice: 0); Self-Learning 6
Term: 5
Preceeding course: THE01002 – Caculus 2

COURSE OBJECTIVES

This course aims to learners master the basic knowledge of the principle of market economy, behavior of producers and consumers when making production decisions to maximize profits.
Skill: Proficiency in writing outlines, reports and presentations of actual research results on microeconomic issues; Ability to work independently, teamwork and group management.

COURSE EXPECTED LEARNING OUTCOMES

Notation	Course expected learning outcomes After successfully completing this course, students are able to	Program expected learning outcomes
Knowledge:		
K1	Analyze the basic theories of modern microeconomics	ELO4
K2	Analytical, critical of microeconomic principles apply in practice	ELO5
K3	Apply microeconomics principles to life through debate on issues, microeconomics that binds the behavior of producers and consumers.	ELO5, ELO6
Skills		
K4	Be proficient in drafting, reporting and presenting research results in microeconomics	ELO7
K5	Work independently and work in teams; Share, assign tasks and monitor team members	ELO6, ELO7
Ethics and Attitude		
K6	Be aware of the economic, social, environmental and occupational needs of the agricultural business administration;	ELO11, ELO12
K7	Have good professional ethics and professional working style;	ELO12
K8	Be aware of fostering professional and interdisciplinary knowledge throughout the career.	ELO13

COURSE DESCRIPTION

KTE02013. Microeconomic (3: 3 – 0; 6; 135)

This course consists of 10 chapters, focusing on Brief description of the content: The module deals with the content of opportunity costs and scarcity; Bridge and supply of goods and services; Elasticity of demand and supply; Consumer choice; Cost and production; Maximum profit; Perfectly competitive market; Exclusive market and monopolistic competition; Market inputs; Market failure, government failure and interference.

Preceeding course: THE01002 – Caculus 2

ASSESSMENT

Grading: 100 points

Weighting

- Attendance: 10%
- Assessment of the assignment in class: 5%
- Group discussion review in class: 5%
- Midterm Exam: 30%
- Final exam: 50%

Assessment summary

Rubric	Course expected learning outcome	Weighting (%)	Week
Attendance		**10**	
Rubric 1: Class attendance	K6, K7, K8	10	All week
Formative assessment		**10**	
Rubric 2: Assessment of the assignment	K1,2,3,4	5	All week
Rubric 3: Group discussion	K1,2,3,4,5,6	5	4,6,14
Exams			
Rubic 4: Midterm Exam	K1,2,3,4,5,6	**30**	7
Final evaluation			
Rubric 5: Final examination	K1,2,3,4,5	**50**	Following University schedule

TEXT BOOKS AND REFERENCES

**** Text Books/Lecture Notes:***

Robert H. Frank and Ben S. Bernanke (2009). Principles of Microeconomics. *Fouth Edition.* McGraw-Hill/Irwin.

Douglas Curtis and Ian Irvine (2014). Microeconomics. Creative Commones License (CC BY-NC-SA), Lyryx Learning. Info@Lyrix.com

Lukasz Wozwy (2016). Lecutrure Notes Microeconomics. The European Union from the European Social Fund.

**** Additional references:***

Frank A. Cowell (2004). Micoeconomics: Principle and Analysis. STICERD and Department of Economics, London School of Economics.

Mankiw (2005). Principles of Microeconomics, 5th Edition.

David L. Deberttin (2012). Applied Microeconomics: Consumption, Production and Market University of Kentucky Lexington, KY.

COURSE OUTLINE

Week	Content
1	**Chapter 1: Opportunity cost and comparative advantages**
	A/* Main contents: *(3 hours)* **Theory:** ***1.1. Opportunity cost*** 1.1.1 Opportunity cost 1.1.2 The production possibilities curve ***1.2 Comparative advantage*** 1.2.1 Comparative advantage and production possibilities 1.2.2 Factors that shift the economy's production possibilities curve 1.2.3 Comparative advantages and international trade
	***B/* Self- study contents**: *(6 hours)* Reading, doing exercise about oppotunity cost
2	**Chapter 2: Demand and supply**
	A/* Main contents: *(3 hours)* ***2. What, how, and for whom?*** ***2.2 Buyers and Sellers in Markets*** 2.2.1 The demand curve 2.2.2 The supply curve ***2.3 Market equilibrium*** ***2.4 Law of demand and supply*** 2.4.1 Allocating a fixed income between two goods 2.4.2 Income and substitution effects revisited

	2.5 Consumer and producer surplus ***2.6 Compensation and equivalent variations*** **Practice/ experiment contents:** *(....hours)*
	***B/* Self- study contents**: *(6 hours)* Reading, doing exercise about demand, supply, factors impact on supply and demand
3 + 4	**Chapter 3: Elasticity**
	A/* Main contents: (6 hours)* ***3.1 Price elasticity of demand*** 3.1.1 Price elasticity defined 3.1.2 Determinants of Price elasticity of Demand 3.1.3 Using Price elasticity of Demand ***3.2 Income Elasticity and Cross-Price elasticity*** ***3.3 The price elasticity of supply*** **Seminar/discussion:** *(3 hours)* Factors impact on elastic of supply and demand
	***B/* Self- study contents**: *(12 hours)* Reading, doing exercise, and preparing prentation about demand, supply, elasticity of supply and demand
5+6	**Chapter 4: Consumer choice**
	A/*Main contents: (6 hours)*** **Theory:** ***4.1 Utility*** 4.1.1 Total Utility 4.1.2 Marginal utility ***4.2 Consumer behavior and willingness to pay*** 4.2.1 Total benefit to consumer 4.2.2 Consumer surplus and total cost to consumer 4.2.3 Willingness to pay 4.2.4 Indifference curves 4.2.5 Budget constraint **Seminar/discussion:** *(3 hours)* Factors impact on elastic of demand
	***B/* Self- stusy contents**: *(12 hours)* Reading, doing exercise about total utility, maginal utility, consumer behavior
7	Chapter 5: **Cost and Production (Week 7)**

	A/Main contents: (3 hours) ***5.1 Production*** 5.1.1 Total product (TP) 5.1.2 Average product (AP) 5.1.3 Marginal product (MP) 5.1.4 Relationship of AP and MP ***5.2 Cost*** 5.2.1 Fixed cost 5.2.2 Variable cost 5.2.3 Total cost 5.2.4 Average costs
	B/ Self- stusy contents: (6 hours) Reading, doing exercise about cost
8	**Chapter 6: Profit maximization (week 8)**
	A/Main contents: (3 hours) Theory: ***6.1 Marginal cost and marginal revenue*** 6.1.1 Marginal cost 6.1.2 Marginal revenue 6.1.3 Firm facing a perfectly elastic demand curve ***6.2 Profit maximization***
	B/ Self- stusy contents: (6 hours) Reading, doing exercise about cost, production cost, maginal costs.
9-10	**Chapter 7: Perfectly Competitive Market (week 9 + week 10)**
	A/Main contents: (3 hours) Theory: 7.1 Individual and Market Supply curve 7.2 Profit –Maximizing Firm in Perfectly Competitive Market 7.2.1 Profit maximization 7.2.2 Production in the Short run 7.2.3 Choosing output to Maximize profit
	B/ Self- stusy contents: (6 hours) Reading, doing exercise about Profit –Maximizing Firm in Perfectly Competitive Market, Profit maximization; Production in the Short run; Choosing output to Maximize profit

11	**Chapter 8: Monolopoly, Oligopoly, and Monopolistic Competition (week 11)**
	A/Main contents: (6 hours) Theory: ***8.1 Imperfect Competition*** 8.1.1 Different Forms of Imperfect Completion 8.1.2 Essential Difference between Perfectly and Imperfectly 8.1.3 Competitive firm ***8.2 Five sources of Market power*** 8.2.1 Exclusive control over Important Inputs 8.2.2 Patents and Copyrights 8.2.3 Government Licenses or Franchises 8.2.4 Economies of Scale and Natural Monopolies 8.2.5 Network Economies ***8.3 Profit maximization for the Monopolist*** 8.3.1 Marginal Revenue for the Monopolist 8.3.2 The Monlpolist's Profit-Mazimizing Decision Rule ***8.4 Why the invisible Hand Breaks Down under Monopoly*** ***8.5 Public policy toward Natural Monopoly*** 8.5.1 State Regulation of Private Monopolies 8.5.2 Exclusive Contracting for Natural Monopoly 8.5.3 Vigorious Enforcement of Antitrust Laws
	B/ Self- stusy contents: (....hours) Reading, doing exercise about Monolopoly, Oligopoly, and Monopolistic Competition.
12	**Chapter 9: Input markets (week 12)**
	A/Main contents: (3 hours) Theory: ***9.1 Labor market*** 9.1.1 Individual labor supply curve 9.1.2 Union and nonunion firms in a perfectly competitive labor market ***9.2 Capital market*** 9.2.1 Capital demand and the interest rate 9.2.2 Present value ***9.3 Land and natural resource markets*** 9.3.1 Land supply curve 9.3.2 Nonrenewable resource

	B/ Self- stusy contents: (6 hours) Reading, doing exercises about land market, labor market, and capital market.
13+14	Chapter 10: **Market failures, government failures and interventions (week 13+14)**
	A/Main contents: (3 hours) Theory: ***10.1 Traditional market failures*** 10.1.1 Public goods *10.1.1.1 The demand curve for a Public Good* *10.1.1.2 Private Provision of Public goods* 10.1.2 Monopoly 10.1.3 Externalities 10.1.4 Misinformation ***10.2 Government failures*** 10.2.1 Taxation 10.2.2 Subsidy 10.2.3 Price control **Seminar/ discussion (3 hours)** Methods, policies elimilate market, and government failures
	B/ Self- stusy contents: (12 hours) Reading, doing exercises about how and what methods to elimilate market ang government failures
15	**Review**
	A/ A / Summary of the main content in the class: (3 hours) Content Theory: (3 hours) Review all the contents, answer the case questions related to the structure introduction, how to do the final exam
	B / Self-study contents at home: (6 hours) Students read the material themselves and answer the review questions, final exercise

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTRUE
FACULTY OF BIOTECHNOLOGY

COURSE SYLLABUS
SHE02007: Introduction to Biotechnology

Credits: 3 (Lecture: 2 – Practical: 1); Self-Learning:9
Term: 6
Preceding course: NHE01001 – Introductory Biology 1; NHE02003-Plant genetics

COURSE OBJECTIVES:

This course aims to gain the knowledge and deely understand the principles, techniques and important applications of plant biotechnologu, gene and genome, DNA replication, some basic genetic engineering, plant tissue culture, genetic transformation, and currently approaches in research and apply biotechnology to increase the quality and improve crops. In addition, students can fluently practice genetic manuplutaion at laboratories. The module enhances the continously study after graduatation to keep update the new innovation about crop sciences; have responsible management and control products of genetically modified crops as prescribed; and have the ability to communicate well in English and integration with the community of scientists.

COURSE EXPECTED LEARNING OUTCOMES

Notation	**Course expected learning outcomes** After successfully completing this course, students are able to	**Program expected learning outcomes (ELO)**
Knowledge:		
K1	Analyze and evaluate the impact of environmental changes on crops, the challenges of new generation plants and offering biotechnological solutions for crop improvement.	ELO3
K2	Manage plans, production and commercial of plant tissue culture and new plant generation.	ELO4
K3	Design experimental models of plant tissue culture and genetic modification in accordance with the regulations on biosafety and ethics.	ELO5
Skills:		
K4	Manage time to actively coordinate with team members; Be independently thinking and creative in completing and presentation.	ELO6

K5	Listento the comments; Develop debating skills	ELO7
K6	Use English fluently; Develop searching skill; Select, read and summary the related publications and represent the results.	ELO8
K7	Analyzenew research achievements and develop critical arguments based on professional and scientific evidence of the prominent themes of plant biotechnology.	ELO11
Ethics and Attitude:		
K8	Have a good learning attitude; Keep updating about technology and new innovations in research on crops and impacts the relationships between plant - environment - human.	ELO12
K9	Be responsible and be aware of professional ethics in the management of risks and threats that may occur for new generation plants.	ELO13
K10	Strictly follow the provisions of the law on the management, production and commercialization of genetically modified products.	ELO14

COURSE DESCRIPTION

SHE02007. Introduction to Biotechnology (**03: 3–0; 6**; **135**)

This course consists of 14 chapters that divided into two parts. Part A deals with basic techniques such as: gene structure, genome, DNA recombinant technology; DNA replication, transcription and translation processes; principles of DNA, RNA, total protein extraction; cloning; polymerase chain reaction; DNA sequencing; electrophoresis; molecular hybridization; molecular markers; plant tissue culturel protein trafficking; transgenic vectors, direct and indirect transgenic methods; regulatory and expression transgenes in plants. Part B consists of some main applications of plant biotechnology such as molecular breeding; transformation to create plants have ability to biotic resistance (pests, diseases and viruses stresses) and abiotic tolerance (pesticide, fungicide, herbicide, cold, drought, salinity and submerged stresses); new plant traits (improve quality, biofuels, bioplastic, biofactor); the requirements and policies for transgenic plants.

Preceding courses: NHE01001 – Introductory Biology 1; NHE02002-Plant genetics

ASSESSMENT

1.Grading: 10 points scale

2 .Weighting:

- Attendance: 10 %
- Formative assessment: 30%
- Final Exam: 60%

3. Assessment summary

Rubric	Course expected learning outcome	Weighting (%)	Week
Attendance			
Rubric 1: Class attendance	K1, K5, K6	10	1-15
Formative assessment			
Rubric 2: Group discussion	K4, K5, K8, K10	10	7,9,13
Rubric 3: Mid-term	K1, K2, K3, K9	10	12
Rubric 4: Group presentation	K5, K6, K7, K9	10	14,15
Final Exam			
Rubric 5: Final exam	K1, K2, K3, K6, K7, K9	60	Following University schedule

TEXT BOOKS AND REFERENCES

**** Text books/ lectures:***

1. Bernard R. Glick, Jack J. Pasternak, Cheryl L. Patten. (2009). Molecular Biotechnology: Principles and Applications of Recombinant DNA. ASM Press Publisher 850 p. ISBN-13: 978-1555814984.

2. James D. Watson, Tania A. Baker, Stephen P. Bell, Alexander A.F. Gann, Michael Levine, Richard M. Losick (2013). Molecular Biology of the Gene (7th Edition). Pearson Publisher, 912 p. ISBN-13: 978-0321762436.

3. Robert N. Trigiano & Dennis J. Gray. (2010). Plant Tissue Culture, Development, and Biotechnology (1st Edition). CRC Press, 608 p. ISBN-13: 978-1420083262.

**** References:***

Agronomy Library for Advance Crop Sciences Program

1. Adrian Slater, Nigel W. Scott, Mark R. Fowler (2008). Plant Biotechnology: The Genetic Manipulation of Plants (2nd Edition). Oxford University Press, 400 p. ISBN-13: 978-0199282616.
2. David W. Mount (2004). Bioinformatics: Sequence and Genome Analysis (2nd Edition). Cold Spring Harbor Laboratory Press , 692 p. ISBN-13: 978-0879697129.
3. Dhan Pal Singh, Arti Singh (2005). Diseases And Insect Resistance In Plants. Science Pub Inc. 417 p. ISBN-13: 978-1578084128.
4. Gabi Nindl Waite & Lee R. Waite (2007). Applied Cell and Molecular Biology for Engineers (1st Edition). McGraw-Hill Education, 326 p. ISBN-13: 978-0071472425.

5. Kirsi-Marja Oksman-Caldentey & Wolfgang H. Barz (2002). Plant Biotechnology and Transgenic Plants (1st Edition). CRC Press, 720 p. ISBN-13: 978-0824707941.
6. Maarten J. Chrispeels & Davis E. Sedara (2002). Plants, Genes and Crop Biotechnology (2nd Edition). Sedara. Jones & Bartlett Learning, 562 p. ISBN-13: 978-0763715861.
7. Neil A. Campbell, Jane B. Reece (2004). Biology (7th Edition). Benjamin Cummings, 1312 p. ISBN-13: 978-0805371468.
8. Robert N. Trigiano & Dennis J. Gray (2004). Plant Development and Biotechnology (1st Edition). CRC Press, 376 p, ISBN-13: 978-0849316142
9. Stephen H. Howell (1998). Molecular Genetics of Plant Development. Cambridge University Press, 384 p. ISBN-13: 978-0521582551.

Luong Dinh Cua Library (VNUA):

1. Arie Altman, Paul Michael Hasegawa . - 1st ed. – Amsterdam (2012). Plant biotechnology and agriculture: prospects for the 21st century. Boston: Academic Press, 586 p., 28 cm. Invididual registration: 2014NV9367.
2. Arthur Germano Fett-Neto, Edited by (2010). Methods in molecular biology: Plant secondary metabolism engineering (Methods and applications). New York: Humana Press, 339 p. ; 27 cm. Invididual registration: 2012NV8272
3. George T. Tzotzos, Graham P. Head, Roger Hull. - 1st ed. – Amsterdam (2009). Genetically modified plants: assessing safety and managing risk. Boston Academic Press/Elsevier, 244 p.; 24 cm. Invididual registration: 2012NV8108
4. Hans P. Blaschek, Thaddeus C. Ezeji, Jurgen Scheffran Edited by (2010). Biofuels from Agricultural Wastes and Byproducts. Wiley-Blackwell, 262 p.; 25cm. Invididual registration: 2012NV8212.
5. P.Vidhyasekaran (2002). Bacterial disease resistance in plants: Molecular biology and biotechnological applications. The Haworth Press, Inc, 452 p.; 25cm. Invididual registration: 2009NN3439

COURSE OUTLINE

Week	Contents
3	***Chapter 1: Overview about biotechnology***
	A/* Main concepts in class: (1 hour)* **Theoritical contents:** 1.1. Briefly history of biotechnology 1.2. Definitions of biotechnology 1.3. Several achievements and developing trend of plant biotechnology
	***B/* Self study**: *(2 hours)* The current trends of developing plant biotechnology
1	***Chapter 2: Gene and genome***
	A/* Main concepts in class: (2 hours)* **Theoritical contents:** 2.1. Definitions of gene 2.2. Gene structure of Prokaryote cell 2.3. Gene structure of Eukaryote 2.4. Definitions of genome 2.5. Plant genomes.

	***B/* Self study**: *(4 hours)* Main structures of Prokaryotic and Eukaryotic cells
2	***Chapter 3: Interner processes expressing gene functions***
	A/* Main concepts in class: (2 hours)* **Theoritical contents:** 3.1. Center Dogmal Theory 3.2. The stability of DNA: Principles of DNA replication 3.3. Genetic information inheritance: transcription RNA 3.4. Genetic codes and translation. 3.5. Protein trafficking in plants
	***B/* Self study**: *(4 hours)* Structures and processes biosynthesizing DNA, RNA and protein.
2	***Chapter 4: The principles and applications of DNA recombinantion technology***
	***A/* Main concepts in class:** *(1 hour)* **Theoritical contents:** 4.1. Definitions of DNA recombinantion 4.2. Principles of DNA recombinantion
	***B/* Self study**: *(2 hours)* Rewiew chemical structure of double helix DNA. The DNA replication
3	***Chương 4: The principles and applications of DNA recombinantion technology (Cont'd)***
	A/ Main concepts in class: *(1 hour)* **Theoritical contents:** 4.3. The potential applications of DNA recombinant technology
	***B/* Self study**: *(2 hours)* The trends of application DANN recombinant technology
3	***Chapter 5: Several essential genetic manipulation techniques***
	***A/* Main concepts in class:** *(2 hours)* **Theoritical contents:** 5.1 Principles of DNA extraction (1 hour) 5.2. Principles of RNA extraction (1 hour)
	***B/* Self study**: *(4 hours)* The structures, features and physical characteristics and functions of DNA, RNA
4	***Chapter 5: Several essential genetic manipulation techniques (cont'd)***
	***A/* Main concepts in class:** *(3 hours)* **Theoritical contents:** 5.3. Principles of protein isolation *(1 hour)*

	5.4. Principles of cloning (*2 hours)*
	***B/* Self study**: *(6 hours)* The structures and functions of proteins. Genetic characteristics of plasmid. Restriction endonuclease.
5	***Chapter 5: Several essential genetic manipulation techniques (cont'd)***
	***A/* Main concepts in class:** *(3 hours)* **Theoritical contents:** 5.5. The principles and applications of polymerase chain reaction PCR *(2 hours)* 5.6. The principles and apllications of DNA sequencing *(1 hour)*
	***B/* Self study**: *(6 hours)* DNA synthesis, definition of primers and different methods of popular DNA sequencing.
6	***Chapter 5: Several essential genetic manipulation techniques (cont'd)***
	***A/* Main concepts in class:** *(3 hours)* **Theoritical contents:** 5.7. The principles and applications of gel electrophoresis on agarose, polyacrylamide *(2 hours)* 5.8. The principles and applications of molecular hybridization *(1 hour)*
	The 15 minute test #1 at class: 20 multiple choice questions
	***B/* Self study**: *(6 hours)* The physical characteristics of DNA, RNA and protein. The main factors affect the results of gel electrophoresis.
7	***Chapter 6: Plant Tissue Culture***
	***A/* Main concepts in class:** *(3 hours)* **Theoritical contents:** 6.1. The definitions and principles of plant tissue culture (PTC) 6.2. The conditions of PTC 6.3. Several types of PTC 6.4. The main steps of PTC
	***B/* Self study**: *(6 hours)* The outstanding applications of PTC. Search and summary at least 01 international paper that related to PTC.
8	***Chapter 7: Plant gene transformation technology***
	***A/* Main concepts in class:** *(3 hours)* **Theoritical contents:** 7.1. The definitions of plant gene transformation (or genetic modified plants)

	7.2. The essentials components of plant gene transformation 7.3. Direct methods of plant gene transformation 7.4. Indirect methods of plant gene transformation
	***B/* Self study**: *(6 hours)* Transgenic vectors. The main factors affects the results of plant gene transformation.
9	***Chapter 7: Plant gene transformation technology (Cont'd)***
	***A/* Main concepts in class:** *(1 hour)* **Theoritical contents:** 7.5. Leaf-disc Agrobacterium –mediated transformation. 7.6. The regulatory and expression of transgene in plants.
	***B/* Self study**: *(2 hours)* Ti-plasmid. The mechainism of transgene regulation
9	***Chapter 8: Molecular markers in plant breeding***
	***A/* Main concepts in class:** *(2 hours)* **Theoritical contents:** 8.1. The definitions of molecular markers 8.2. The definitions of molecular plant breeding 8.3. Several molecular markers in plant breeding 8.4. Applications of molecular markers in rice and tomato breeding.
	***B/* Self study**: *(4 hours)* The different methods of plant breeding.
10	***Chapter 9: Biotic stresses resistant transgenic plants***
	***A/* Main concepts in class:** *(3 hours)* **Theoritical contents:** 9.1. The principles and approaches of disease resistant plants 9.2. The principles and approaches of pests resistant plants
	The 15 minute test #2 at class: 03 short-answer questions
	***B/* Self study**: *(6 hours)* The classifications of plant diseases, pests and insects. The methods to isolate one gene from genome. The achivements of transgenic plants resistance to diseases, pests and insects.
11	***Chapter 10: Virus resistant transgenic plants***
	***A/* Main concepts in class:** *(1 hour)* **Theoritical contents:** 10.1. The effects of virus diseases on plants 10.2. The principles and methods to creat virus resistant transgenic plants.

	***B/* Self study**: *(2 hours)* Several dangerous viruses diseases on plants.
11	***Chapter 11: Abiotic stresses tolerant transgenic plants***
	***A/* Main concepts in class:** *(2 hours)* **Theoritical contents:** 11.1. The principles and methods to creat herbicide tolerant transgenic plants. 11.2. The principles and methods to creat drought tolerant transgenic plants. 11.3. The principles and methods to creat salinity tolerant transgenic plants.
	***B/* Self study**: *(4 hours)* Search, read and summary at least 01 English paper that related to transgenic plants tolerance to abiotic stresses.
12	***Chapter 11: Abiotic stresses tolerant transgenic plants (Cont'd)***
	***A/* Main concepts in class:** *(1 hour)* **Theoritical contents:** 11.4. The principles and methods to creat temperature tolerant transgenic plants. 11.5. The principles and methods to creat submergerd tolerant transgenic plants.
	***B/* Self study**: *(2 hours)* Climate changes and ist effects on agriculture.
12	***Chapter 12: Next generation crops with new traits***
	***A/* Main concepts in class:** *(1 hour)* **Theoritical contents:** 12.1. Improving the quality of fruits 12.2. Biopharmaceuticals plants
	The MIDTERM TEST *(1 hour):* 20 multiple choice questions, 05 short-answer questions and 01 assay no more than 100 words.
	***B/* Self study**: *(4 hours)* Over views about medical plants and some natural second compounds.
13	***Chapter 12: Next generation crops with new traits (Cont'd)***
	***A/* Main concepts in class:** *(1 hour)* **Theoritical contents:** 12.3. Goldren Rice version 1 and version 2
	***B/* Self study**: *(2 hours)* The methods to design transgenic vectors. The successful researches of Vietnam improving the qualities of crops.
13	***Chapter 13: Biofuel and Bioplastic***

	***A/* Main concepts in class:** *(1 hour)* **Theoritical contents:** 13.1. The definitions of biofuel 13.2. Methods to produce biofuel 13.3. The definition of bioplastic 13.4. Methods to produce bioplastic
	***B/* Self study**: *(2 hours)* Evalution the potentions of plants to produce biofuel and bioplastics.
13	***Chapter 14: Biosafety and the regulatories of genetic modificated organism (GMO)***
	***A/* Main concepts in class:** *(1 hour)* **Theoritical contents:** 14.1. The regulations of biosafety 14.2. Several regulations of Vietnam and Internation about GMO 14.3. The future of GMO.
	***B/* Self study**: *(2 hours)* Several laws of production and commercial of GMO
14	***Seminar Presentation (3 hours)*** 05 first groups randomly select the given topic. Each group has maximum 12 minutes for oral presentation and 03 minutes for discussion. And total minimum of presentation is 8 minutes.
	Students actively join in team and independed work to complete the seminar. (6 hours)
15	***Seminar Presentation (3 hours) (Cont'd)*** 05 remaining groups randomly select the given topic. Each group has maximum 12 minutes for oral presentation and 03 minutes for discussion. And total minimum of presentation is 8 minutes.
	Students actively join in team and independed work to complete the seminar. (6 hours)

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTRUE
FACULTY OF ECONOMICS AND RURAL DEVELOPMENT

COURSE SYLLABUS
KTE02014: Macroeconomics

Credits: 03 (Lecture: 03 – Practice: 0); Self-Learning: 06
Term: 6
Peceding course: THE01002 – Caculus 2

COURSE OBJECTIVES:

This course aims to help students understand the concepts and problems in macroeconomics (including total products, employment, growth, inflation, equity, international economics, and macroeconomics policies) then to help them develop the fundamental to analyze, and make decisions in their dailylife as well as in discussion on macroeconomics policies.

COURSE EXPECTED LEARNING OUTCOMES

Notation	**Course expected learning outcomes** After successfully completing this course, students are able to	**Program expected learning outcomes**
Knowledge:		
K1	Analyze the fundemental theories of modern macroeconomics	ELO4
K2	Demonstrate an understanding, analyzing and dicussion on the modern macroeconomics issues and policies	ELO4, ELO5
K3	Apply macroeconomic principles to debates on macroeconomic issues, variables and policies associated with the development of economies.	ELO4, ELO5
Skills		
K4	Make a report and present the research outcome on the matter of macroeconomics issues	ELO6
K5	Work independently and work in teams; Share, assign tasks, and supervise group members to discuss how to write outlines, reports, and present group research reports;	ELO6,ELO7
Ethics and Attitude		
K6	Demonstrate good maner when making an economic activities and concern on macroeconomics trade with partners from	ELO11,12,13

	countries in region or in all over the world.	

COURSE DESCRIPTION

KTE02014. Macroeconomics (3: 3-0; 6; 135).

This course consists of 10 chapters about the fundamental macroeconomics concepts, the economics model to analyze the problems and issues in the daily life: (1) Introduction to economics study and macroeconomics (2) national income (3) Monetary system (4) inflation (5) open economy (6) economics growth (7) economics fluctuations (8) IS – LM (9) government debt and budget deficit (10) stabilize policies.

Prerequisite course: None;

Preceding course: THE01002 – Caculus 2

ASSESSMENT

1.Grading scale: 10 points

2 . Weight of assessment:

- Attendance: 10%
- Process: 30%
- Final exam: 60%

3. Assessment summary

Rubric	Course expected learning outcome	Weighting (%)	Week
Attendance			
Rubric 1: Participation	K1, K3	10	1-10
Process assessment			
Rubric 2: Quizes	K1,3,4,6	15	1-10
Rubric 3: Group discussion	K1,2,3,4,5,6	15	4, 6,14
Final assessment			
Rubric 4: Final exam	K1,2,3,4,5	60	Following University schedule

TEXT BOOKS AND REFERENCES

**** Text Books/Lecture Notes:***

Text book: N. Gregory Mankiw. 2013. Macroeconomics, Harvard University, Worth Publishers, 8th Edition. (Ebook)

Lecture Notes: Download from Elearning sites

**** Additional references:***

Sexton, Robert L 2013. The exploration of macroeconomics. Brazil : Wadsworth/Cengage Learning. (2014NV9385) - TV LĐC

Frank and Bernanke (2009). Principles of Macroeconomics, 4th edition. (2016QTKD6) – TV LĐC

McConnell, Campbell R. 2008. Macroeconomics Principles, Problems, and Policies. Boston: McGraw-Hill Irwin. (2011NV7808) –TV LĐC

COURSE OUTLINE

Week	Content
1	**Chapter 1:** Introduction to economics study and macroeconomics (chapter 1,2 in textbook)
	A/* Main contents: (3 hrs)* **Theory:** 1.1. Introduction to economics study 1.1.1 What do economics study? 1.1.2 Economics model 1.2. Introduction to marcoeconomics 1.2.1 Measuring the total products of an economy (GDP) 1.2.2 Measuring the cost of living (CPI) 1.2.3 Measuring the level of employment
	B/* Self- study contents: (6 hrs)* Review materials and answer questions at the end of chapter 1,2 in texbook
2	**Chapter 2:** National Income (chapter 3 in textbook)
	A/* Main contents: (3 hrs)* **Theory:** 2.1 Factors determines the aggregate products of goods and services 2.2 Income distribution 2.3 Aggregate demand 2.3.1 Consumption

	2.3.2 Investment 2.3.3 Government spendings 2.4 Equilibrium in goods market
	***B/* Self- stusy contents**: *(6 hrs)* - Review materials and answer questions at the end of chapter 3 in texbook
3-4	**Chapter 3:** Monetary system (chapter 4 in textbook)
	A/* Main contents: (6 hrs)* **Theory:** *(3 hrs)* 3.1 Definition of money 3.2 Roles of Banks in the monetary system 3.3 Roles of Central bank in controlling the money supply **Seminar/Discussion:** *(3 hrs)* *Discuss on the* Problems in money control
	***B/* Self- stusy contents**: *(12 hrs)* Review materials and answer questions at the end of chapter 4 in texbook, prepare for the presentation
5-6	**Chapter 4:** Inflation (chapter 5 in textbook)
	A/* Main contents: (6 hrs)* **Theory:** *(3 hrs)* 4.1 The Quantity theory of Money 4.2 Inflation and interest rate 4.3 Nominal interest rate and demand for money 4.4 Inflation cost 4.5 Hyperinflation **Seminar/Discussion:** *(3 hrs)* Cost of printing more money
	***B/* Self- stusy contents**: *(6hrs)* Review materials and answer questions at the end of chapter 5 in texbook,
7	**Chapter 5:** Open economy (chapter 6 in textbook)
	A/* Main contents: (3hrs)* **Theory:** 5.1 Commodity Flows 5.2 Capital Flows 5.3 Savings and investment in a small closed open economy 5.4 Exchange rate

	***B/* Self- stusy contents**: *(6 hrs)* Review materials and answer questions at the end of chapter 6 in texbook,
8	**Chapter 6:** Economics growth (chapter 8,9 in textbook)
	A/* Main contents: (3hrs)* **Theory:** *(3hrs)* 5.1 Commodity Flows 5.2 Capital Flows 5.3 Savings and investment in a small closed open economy 5.4 Exchange rate
	***B/* Self- stusy contents**: *(6 hrs)* Review materials and answer questions at the end of chapter 8,9 in texbook,
9-10	**Chapter 7:** Economics fluctuation in the shortrun (chapter 10 in textbook)
	A/* Main contents: (6 hrs)* **Theory:** *(6 hrs)* 7.1 Business cycles 7.2 Aggregate Demand 7.3 Aggregate Supply 7.4 Shocks form Demand and Supply sides
	***B/* Self- stusy contents**: *(12hrs)* Review materials and answer questions at the end of chapter 10 in texbook,
11	**Chapter 8:** Application of the IS – LM model (chapter 11,12 in textbook)
	A/* Main contents: (3hrs)* **Theory:** *(3hrs)* 8.1 IS curse 8.2 LM curse 8.3 Application of IS – LM model
	***B/* Self- stusy contents**: *(6 hrs)* Review materials and answer questions at the end of chapter 11,12 in texbook,
12	**Chapter 9:** Government Debt and Budget Deficit (chapter 19 in textbook)
	A/* Main contents: (3hrs)* **Theory:** *(3hrs)* 9.1 Government Debt 9.2 Prolems in measuring Government debt

	9.3 Opinions on Government debt
	***B/* Self- stusy contents**: *(6 hrs)* Review materials and answer questions at the end of chapter 19 in texbook
13-14	**Chapter 10:** Stabilize marcoeconomics policies (chapter 18 in textbook)
	A/* Main contents: (6hrs)* **Theory:** *(3hrs)* 10.1 Mechanisum 10.2 Passive or Active policies 10.3 Rules or Discretions policies **Practice/Experiment:** *(0hrs)* **Seminar/Discussion:** *(3hrs)* Disscuss on Unemployment: causes and solutions
	***B/* Self- stusy contents**: *(6 hrs)* Review materials and answer questions at the end of chapter 18 in texbook
2	**REVIEW**
	A/* Main contents: (3hrs)* Review all the contents, answer the case questions related to the structure introduction, how to do the final exam
	***B/* Self- stusy contents**: *(6 hrs)* Review materials and answer questions at the end of all chapters

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V VIETNAM NATIONAL UNIVERSITY OF AGRICULTURE
FACULTY OF EDUCATION AND FOREIGN LANGUAGES

COURSE SYLLABUS
SNE03002: English for Agronomy

Credits: 3 (Lecture: 2 – Practice: 1); Self-Learning 6
Term: 3
Previous course: SNE01012 Listening and Speaking 2; SNE01013-Reading and Writing 2

COURSE OBJECTIVES:

This course aims to help students precisely present some basic definitions about science and plant production; improve reading comprehension with English documents of science and plant production; write scientific reports and present in science seminars about plant production in English.

COURSE EXPECTED LEARNING OUTCOMES

Notation	Course expected learning outcomes After successfully completing this course, students are able to:	Program expected learning outcomes
Knowledge:		
K1	Develop and use English vocabulary in reading comprehension and presenting in science seminars about plant production.	ELO8
Skills		
K2	Discuss, distribute tasks and collaborate with team members	ELO6
K3	Observe, analyze, select words and present ideas clearly, smoothly and logically in oral and written form.	ELO7
K4	Analyze, summarize main ideas from journals, reports and English documents on crop science and plant production; Write scientific reports about crop science and plant production in English.	ELO8
Ethics and Attitude		
K5	Be enthusiastic in searching information from valuable data resources and developing new knowledge.	ELO12

COURSE DESCRIPTION

SNE03002: ESP for crop science (3: 2-1; 6; 135)

This course consists of 10 theoretical lessons: Theory: The parts of a plant and their functions; The life cycle of a plant; Light affect plant growth; Temperature affects plant growth; Water affects plant growth; Nutrition affects plant growth; Manures and Fertilizers; Plant protection; Plant diseases; Drainage and irrigation.
Preceding courses: SNE01012 - Listening and Speaking 2; SNE01013 - Reading and Writing 2

ASSESSMENT

1.Grading: 10

2 . Weighting:

- Attendance: 10%
- Formative assessments: 30%
- Final exam: 60%

3. Assessment summary

Rubrics	Course expected learning outcome	Weighting (%)	Week
Attendance		**10**	
Rubric 1: Class attendance	K1, K2, K3, K4, K5	10	1 – 10
Formative asessment		**30**	
Rubric 2: Group work	K1, K2, K3, K4, K5	10	1 – 10
Rubric 3: Presentation	K1, K2, K3, K4, K5	20	2 – 10
Final assessment		**60**	
Rubric 4: Final exam	K1, K2, K3, K4, K5	60	Follow final exam schedule

TEXT BOOKS AND REFERENCES

**** Text Books/Lecture Notes:*** ESP textbook of Crop science (2009)

**** Additional references:***

- Nguyễn Thị Minh Nguyệt (2007). Tiếng Anh chuyên ngành Thổ nhưỡng và Môi trường đất. NXB Đại học Quốc Gia Hà Nội. Hà Nội.

- Le Thi Thanh Chi (2008). A course of English in Agriculture. Hue University. Hue.
- http://cals.arizona.edu/pubs/garden/mg/botany/plantparts.html
- http://www.botanical-online.com/lasplantasangles.html
- http://www.bbc.co.uk/schools/scienceclips/ages/9_10/life_cycles_fs.html

COURSE OUTLINE

Week	Content
4	**Unit 1: The parts of a plant and their functions**
	A/ Main activites (content) in class: (3 periods) Theory: (50‘) 1.1. Text 1.2. Vocabulary & Grammar 1.3. Reading tasks Practical Exercises: (50‘) 1.4. Exercises Seminar/ discussion: (50‘) Practice in Lab rooms: (1,5 periods) 1. 5 Listening & speaking
	B/ Homework: (6 hours) - Exercises in coursebook, reference books - Online learning
2	**Unit 2: The life cycle of a plant**
	A/ Main activites (content) in class: (3 periods) Presentation (30‘) Theory: (45‘) 2.1. Text 2.2. Vocabulary & Grammar 2.3. Reading tasks Practical Exercises: (45‘) 2.4. Exercises Seminar/ discussion: (30‘) Practice in Lab rooms: (1,5 periods) 2. 5 Listening & speaking B/ Homework: (6 periods) - Exercises in coursebook, reference books - Online learning
3	**Unit 3: Light affects plant growth**
	A/ Main activites (content) in class: (3 periods) Presentation (30‘) Theory: (45‘) 2.1. Text

	2.2. Vocabulary & Grammar 2.3. Reading tasks Practical Exercises: (45‘) 2.4. Exercises Seminar/ discussion: (30‘) Practice in Lab rooms: (1,5 periods) 2. 5 Listening & speaking B/ Homework: (6 periods) - Exercises in coursebook, reference books - Online learning
4	***Unit 4:*** **Temperature affects plant growth**
	A/ Main activites (content) in class: (3 periods) Presentation (30‘) Theory: (45‘) 2.1. Text 2.2. Vocabulary & Grammar 2.3. Reading tasks Practical Exercises: (45‘) 2.4. Exercises Seminar/ discussion: (30‘) Practice in Lab rooms: (1,5 periods) 2. 5 Listening & speaking B/ Homework: (6 periods) - Exercises in coursebook, reference books - Online learning
5	***Unit 5:***Water affects plant growth
	A/ Main activites (content) in class: (3 periods) Presentation (30‘) Theory: (45‘) 2.1. Text 2.2. Vocabulary & Grammar 2.3. Reading tasks Practical Exercises: (45‘) 2.4. Exercises Seminar/ discussion: (30‘) Practice in Lab rooms: (1,5 periods) 2. 5 Listening & speaking B/ Homework: (6 periods) - Exercises in coursebook, reference books - Online learning
6	**Unit 6: Nutrition affects plant growth**
	A/ Main activites (content) in class: (3 periods) Presentation (30‘) Theory: (45‘) 2.1. Text 2.2. Vocabulary & Grammar 2.3. Reading tasks

	Practical Exercises: (45‘) 2.4. Exercises Seminar/ discussion: (30‘) Practice in Lab rooms: (1,5 periods) 2. 5 Listening & speaking B/ Homework: (6 periods) - Exercises in coursebook, reference books - Online learning
7	***Unit 7:*** **Manures and Fertilizers**
	A/ Main activites (content) in class: (3 periods) Presentation (30‘) Theory: (45‘) 2.1. Text 2.2. Vocabulary & Grammar 2.3. Reading tasks Practical Exercises: (45‘) 2.4. Exercises Seminar/ discussion: (30‘) Practice in Lab rooms: (1,5 periods) 2. 5 Listening & speaking B/ Homework: (6 periods) - Exercises in coursebook, reference books - Online learning
8	***Unit 8:*** **Plant protection**
	A/ Main activites (content) in class: (3 periods) Presentation (30‘) Theory: (45‘) 2.1. Text 2.2. Vocabulary & Grammar 2.3. Reading tasks Practical Exercises: (45‘) 2.4. Exercises Seminar/ discussion: (30‘) Practice in Lab rooms: (1,5 periods) 2. 5 Listening & speaking B/ Homework: (6 periods) - Exercises in coursebook, reference books - Online learning
9	***Unit 9:*** **Plant diseases**
	A/ Main activites (content) in class: (3 periods) Presentation (30‘) Theory: (45‘) 2.1. Text 2.2. Vocabulary & Grammar 2.3. Reading tasks Practical Exercises: (45‘)

	2.4. Exercises Seminar/ discussion: (30‘) Practice in Lab rooms: (1,5 periods) 2. 5 Listening & speaking B/ Homework: (6 periods) - Exercises in coursebook, reference books - Online learning
10	***Unit 10:*** **Drainage and Irrigation**
	A/ Main activites (content) in class: (3 periods) Presentation (30‘) Theory: (45‘) 2.1. Text 2.2. Vocabulary & Grammar 2.3. Reading tasks Practical Exercises: (45‘) 2.4. Exercises Seminar/ discussion: (30‘) Practice in Lab rooms: (1,5 periods) 2. 5 Listening & speaking B/ Homework: (6 periods) - Exercises in coursebook, reference books - Online learning

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTRUE
FACULTY OF INFORMATION TECHNOLOGY

COURSE SYLLABUS
THE03001: Applied Statistics in Agricultural Science

Credits: 04 (Lecture: 03 – Practice: 01); Self-Learning 08
Term: 5
Preceding course: THE01002 - Caculus 2; THE02001 - Application of Computers in Agriculture

COURSE OBJECTIVES:

This course aims to help students apply statistical methods to analyse and synthetize the data in crop science. The course aims to help students apply the basic concepts and the statistical methods to explain the phenomena, plant growth and influencing factors; have logical thinking to detect and solve related problems in crop science.

COURSE EXPECTED LEARNING OUTCOMES

Notation	Course expected learning outcomes After successfully completing this course, students are able to	Program expected learning outcomes
Knowledge:		
K1	Describe the distribution of data by graph and by numerical quantities.	ELO2,ELO4
K2	Describe some disrete and continuous distributions.	ELO2, ELO4
K3	Resolve the basic inferential statistic problems.	ELO2, ELO4, ELO8
Skills		
K4	Analyze the results and evaluate the arguments of basic statistical problems.	ELO8, ELO9, ELO10, ELO11
K5	Use competently a statistical software for to analyse and synthetize the data.	ELO8, ELO9, ELO10, ELO11
Ethics and Attitude		
K6	Search information from valuable database resources and build new knowledge.	ELO12

COURSE DESCRIPTION

THE03001. Applied Statistics in Agricultural Science (**4: 3 – 1; 8; 180**)

This course consists of 8 chapters: Descriptive statistics; Population distributions; Sampling distributions; Statistical inference for a population; Statistical inference for two populations; One-way analysis of variance; Two-way analysis of variance; Simple linear regression model.

Preceding course: THE01002 - Caculus 2; THE02001 - Application of Computers in Agriculture

ASSESSMENT

Grading: 10 points

Weighting:

- Attendance: 10%
- Formative assessment: 40%
- Final exam: 50%

Assessment summary

Rubric	Course expected learning outcome	Weighting (%)	Week
Attendance		**10**	
Rubric 1: Class attendance	K6	10	1-20
Formative assessment		**40**	
Rubric 2: Exercise	K1, K2, K3, K4, K6	5	20
Rubric 3: Practice in lab	K4, K5, K6	10	2,4,10,12, 15,17,19
Rubric 4: Midterm exam	K1, K2, K3, K4, K6	25	11
Final assessment		**50**	
Rubric 5: Final exam	K2, K3, K4, K6	50	21

TEXT BOOKS AND REFERENCES

**** Text Books/Lecture Notes:***

- Moore/McCabe/Craig (2012). Introduction to the Practice of Statistics (7th edition). W. H. Freeman and Company, New York, 694p

**** Additional references:***

- S.Geng. (2002). Biometrics in Agricultural Science. Kendall/Hunt Publishing Company, 402p

COURSE OUTLINE

Week	Content
1-2	**Chapter 1: Descriptive statistics**

	A/* Main contents: (6 hrs)*** **Theory:** (3 *hrs*) 1.1. Population and samples 1.2. Graphical Descriptive Techniques 1.2.1 Frequency Distribution 1.2.2 Histogram 1.3. Numerical Descriptive Techniques 1.3.1 Measures of Central Location 1.3.2 Measures of Variability **Exercises:** Guide the students to do exercises *(1 hr)* **Practice in lab:** *(2 hrs)* Introduce and practise basic calculations in statistical software R.
	***B/* Self- study contents**: *(12 hrs)* Students do the exercises corresponding to theory contents in the class.
3-4	**Chapter 2: Population distribution**
	A/* Main contents: (6 hrs)*** **Theory:** (3 hrs) 2.1. Binomial distribution 2.2. Poisson distribution 2.3. Normal distribution **Exercises:** Guide the students to do exercises *(1 hrs)* **Practice in lab:** *(2 hrs)* Calculate descriptive statistics in the statistical software R
	***B/* Self- study contents**: *(12 hrs)* Students do the exercises corresponding to theory contents in the class.
5-6	**Chapter 3: Sampling distribution**
	A/* Main contents: (6 hrs)*** **Theory:** (*4 hrs*) 3.1. Distribution of sample mean 3.2. Distribution of difference of two sample means 3.3. Normal approximation to binomial 3.4 Chi-square distribution 3.5 Student distribution 3.6 Fisher distribution **Exercises:** Guide the students to do exercises *(2 hrs)*
	***B/* Self- study contents**: *(12 hrs)* Students do the exercises corresponding to theory contents in the class.
7-10	**Chapter 4: Statistical inference for a population**

	A/* Main contents: (12 hrs)* **Theory:** *(7 hrs)* 4.1. Overview of statistical inference 4.1.1. Statistical inference for confidence interval 4.1.2. Statistical inference for significance hypothesis testing 4.2. Statistical inference for a population mean 4.2.1. Confidence interval for a population mean 4.2.2. Hypothesis testing about a population mean 4.3. Statistical inference for a population proportion 4.3.1. Confidence interval for a population proportion 4.3.2. Hypothesis testing about a population proportion **Exercises:** Guide the students to do exercises *(2 hrs)* **Practice in lab:** *(3 hrs)* Calculate inferential statistics about a population in the statistical software R
	***B/* Self- stusy contents**: *(24 hrs)* Students do the exercises corresponding to theory contents in the class.
11-12	**Chapter 5: Statistical inference for two populations**
	A/* Main contents: (6 hrs)* **Theory:** *(3 hrs)* 5.1. Comparison of two population means 5.2. Comparison of two population proportions **Exercises:** Guide the students to do exercises *(1 hrs)* **Practice in lab:** *(2 hrs)* Calculate inferential statistics about two populations in the statistical software R
	***B/* Self- stusy contents**: *(12 hrs)* Students do the exercises corresponding to theory contents in the class.
13-15	**Chapter 6: One-way analysis of variance**
	A/* Main contents: (9 hrs)* **Theory:** *(6 hrs)* 6.1. One-way ANOVA data 6.2. One-way ANOVA models 6.3. Inference about one-way ANOVA models **Exercises:** Guide the students to do exercises *(1 period)* **Practice in lab:** *(2 hrs)* Calculate one-way ANOVA analysis in the statistical software R
	***B/* Self- stusy contents**: *(18 hrs)* Students do the exercises corresponding to theory contents in the class.

16-17	**Chapter 7: Two-way analysis of variance**
	A/* Main contents: (6 hrs)* **Theory:** *(3 hrs)* 7.1. Two-way ANOVA models 7.2. Inference about two-way ANOVA models **Exercises:** Guide the students to do exercises *(1 period)* **Practice in lab:** *(2 hrs)* Calculate two-way ANOVA analysis in the statistical software R
	***B/* Self- stusy contents**: *(12 hrs)* Students do the exercises corresponding to theory contents in the class.
18-19	**Chapter 8: Simple linear regression and correlation**
	A/* Main contents: (6 hrs)* **Theory:** *(3 hrs)* 8.1. Models 8.2. Estimating the coefficients 8.3. Determination and correlation coefficients 8.3. Assessing the model **Exercises:** Guide the students to do exercises *(1 hrs)* **Practice in lab:** *(2 hrs)* Calculate regression analysis in the statistical software R
	***B/* Self- stusy contents**: *(12 hrs)* Students do the exercises corresponding to theory contents in the class.
20	**In class: Review** *(3 hrs)* **Self- stusy contents**: *(6 hrs)*

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTRUE
FACULTY OF LAND MANAGEMENT

COURSE SYLLABUS
QLE03001: Plant-Water-Soil Relationships

Credits: 03 (Lecture: 02 – Practice 01);
Term: 6
Prerequisite course: QLE02001- Principle of Soil science
Preceding course: THE01004 - General physisc 2

COURSE OBJECTIVESs:

Learners obtain the basic knowledge of plant – water – soil relationship, the principle of surface water adjustment, and the technique of irrigation methods. Learner can apply knowledge, together with logical thought, and ability of comparison, aggregation in irrigation regime calculation, plan for design and arrange space for irrigation system in the field, install irrigation equipment to operate the irrigation methods as well as in approach when studying the relevant subjects. Therefore, learners improve their level, are self-motivated, active, honest and responsible in scientific research as well as professional activities, socially responsible and disciplined.

COURSE EXPECTED LEARNING OUTCOMES

	Course expected learning outcomes After successfully completing this course you should be able to:	**Program expected learning outcomes**
Knowledge:		
K1	Analyze the relationship and interactions between water and ecological factors	ELO3
K2	Calculation of evapotranspiration, irrigation regime, operation of irrigation systems for efficient and safe crop production	ELO5
Skills:		
K3	Collaborate teamwork, share, assign tasks, express the ability to communicate with team members.	ELO6; ELO7
K4	Using English in social communication, understanding scientific reports, writing, expressing, processing, and presenting ideas related to knowledge of irrigation, drainage and cropping in	ELO8

	English	
K5	Proficient in techniques of moisture determination, evapotranspiration calculation, irrigation regime, irrigation techniques suitable for each plant	ELO10
K6	Apply knowledge creatively in reality to study water regimes, irrigation techniques for plant growth and yield	ELO11
Ethics and Attitude:		
K7	Gather and accumulate practical experiences, take initiative in self-study such as looking for materials, reading books, accumulation of knowledge to improve their professional skills in irrigation, drainage for plants	ELO12
K8	Develop ethical quality, honest and responsible in scientific research. Strictly observe the law provisions on calculation and irrigation operation for plants	ELO3, ELO12

COURSE DESCRIPTION

QLE03001. Plant-Water-Soil Relationships (03:2-1; 6; 135)

This course consists of 6 chapters about Water and water use; Water in the soil; Evaptransipration; Irrigation Scheduling; Irrigation methods; Irrigation system and practices of 05 parts: Determine soil moistrue; Determine ilfiltration; Determine evapotransipration; pratice about Sprinkler and Drip irrigation and filed trip.

Prerequisite course: QLE02001- Principle of Soil science

Preceding course: THE01004 - General physisc 2

ASSESSMENT

1. Grading: 10

2 . Weighting:

- Attendance: 10 %
- Formative assessment:30 %
- Final exam: 60%

3. Assessment summary

Rubric	Course expected learning outcome	Weighting (%)	Week
Attendance		**10**	
Rubric 1: Attendance	K1, K5	10	1-14
Formative asessment		**30**	

Rubric 2: Mid-term exam	K1, K2; K3, K4, K5, K6; K7	06	3-11
Rubric 3: Report	K1, K2; K3, K4, K5, K6; K7	06	5-10
Rubric 4: Presentation and Discussion	K1, K2; K3, K4, K5, K6, K7	06	5-10
Rubric 5: Practice	K3, K4, K5, K6; K7	06	3-13
Rubric 6: Field trip	K3, K4, K5, K6; K7	06	14
Final assessment		**60**	
Rubric 7: Final exam	K1, K2; K3, K4, K5, K6	60	Following University schedule

TEXT BOOK AND REFERENCES

**** Text Books/Lecture Notes:***

1. Abu S.T. and W.B. Malgwi (2012). Effects of irrigation regime and prequency on soil physical quality, water use efficiency, water productivity and economic returns of paddy rice, ARPN Journal of Agricultural and Biological Science, Vol, 7, No,2, February, 2012; ISSN 1990-6145; www.arpnjournals.com
2. Nguyen Van Dung; Ngo Thi Dung; Nguyen Thi Giang; Vu Thi Xuan (2016); Irigation and Drainage

**** Additional references:***

1. Stephen P. Bentley, 2016, Soil properties and their correlations (2nd edition), Wiley
2. Pan Ming Huang, YuncongLi, Malcolm E. Summer (2012), Handbook of Soil science (Properties and processes), CRC Press.
3. Kirkham, M.B, 2005, principles of soil and plant water relations, Copyright@2005, Elsevier Inc.
4. Nguyen Duc Quy, Nguyen Van Dung (2006), Soil moisture and sensible irrigation, Labour and Social Affairs Publisher,

COURSE OUTLINE

Week	Content
1	**Chapter 1:** Water and water use

	A/* Main contents: (03 periods)* **Theory:** 1.1. The role of water 1.2. History of agricultural production 1.2.1. Rain-fed agricultural production 1.2.2. Irrigated agricultural production 1.2.3. Rain fed area with model 1.2.4. Water Resources related issues 1.3. **Desertification and Drought** 1.3.1. Definition 1.3.2. Causes of desertification 1.3.3. Drought 1.3.4. Water Resources Development 1.4. Impact of nature on land use and water management 1.4.1. Land use 1.4.2. Forest 1.4.3. Effects of forest to runoff and erosion
	***B/* Self- study contents**: *(06 periods)* 1.5. Read the material and book chapter, handout related water resources and agricultural productin before the class 1.6. Desertification and Drought; Water Resources Development 1.7. Forest and the role of forests for soil protection
2-5	**Chapter 2:** Water in the soil
	A/* Main contents: (06 periods)* **Theory:** 2.1. Indicator in water use and water management 2.1.1. Definition 2.1.2. Indicator 2.2. Impact of water resources on surroundings 2.2.1. Impact of water recourse on soil environment *2.2.2.* Influence of water recourse to the microclimate conditions 2.2.3. Impact of water recourse on crop yield 2.3. Hydrological cycle 2.3.1. Definition 2.3.2. Water balance 2.3.3. Human Impact on Water Cycle 2.3.4. Human role in adjusting the components of the water cycle 2.4. Water in the soil

	2.4.1. Soil structure 2.4.2. Type of water in soil 2.4.3. Soil-Water potential and soil moisture 2.4.4. Calculating soil water content 2.4.5. Soil moisture 2.5. Soil moisture measuring 2.5.1. Water balance models 2.5.2. Methods and devices of measuring the water content 2.6. Infiltration 2.6.1. Introduction 2.6.2. Equipments 2.6.3. Infiltration in unsaturated soils 2.6.4. Infiltration in paddy rice 2.6.5. Methods of measuring infiltration 2.6.6. Infiltration roles **Practice contents:** *(12 periods)* Practice 1: Soil moisture measuring Practice 2: Infiltration **Semina/Discussion:** *(03.periods)* Water in the soil Soil moisture measuring
	***B/* Self- stusy contents**: *(....periods)* 2.7. Impact of water resources on surroundings 2.8. Hydrological cycle 2.9. Soil moisture measuring 2.10. Infiltration 2.11. Data analysis and reports
6-7	**Chapter 3:** Evapotranpiration
	A/* Main contents: (02 periods)* **Theory:** 3.1. Evapotranspiration 3.1.1. Definition 3.1.2. Why Estimate evapotranspiration 3.2. Soil-plant-water relationship 3.2.1. Evaporation and transpiration 3.2.2. Determine evapotranspiration by experiment methods 3.2.3. Determine evapotranspiration by climate indicators

	3.3. Evapotranspiration Modeling (Cropwat) 3.3.1. Cropwat 8.0 3.3.2. Cropwat for window **Practice/Experiment:** *(04 periods)* Determine evapotraspiration **Seminar/Discussion:** *(01periods)* Evapotranspiration
	***B/* Self- stusy contents**: *(10 periods)* 3.4. Determine evapotraspiration by Cropwat - Data: ET and Eto - Practice the Cropwat model 3.5. Data analysis and reports
8-9	**Chapter 4:** Irrigation regime for crops
	A/* Main contents: (03 periods)* **Theory:** 4.1. Meaning and content 4.1.1. Concept 4.1.2. Meaning and content 4.2. Irrigation scheduling 4.2.1. Factors affecting the time of irrigation 4.2.2. Methods of determing time of Irrigation 4.3. Irrigation standards 4.3.1. Concept 4.3.2. Irrigation standards 4.3.3. Examples 4.3.4. Factors affecting the watering standards 4.4. Frequency of irrigations 4.4.1. Concept 4.4.2. Factors affecting the frequency of irrigations 4.5. Irrigation requirement 4.5.1. Concept 4.5.2. The effective rainfall 4.5.3. Irrigation requirement 4.5.4. Irrigation requirement for saline soil 4.6. Coefficient of irrigation 4.6.1. Objectives of irrigation coefficient calculation 4.6.2. Calculation of irrigation coefficient 4.7. Calculation of irrigation regime

	4.7.1. Calculation of water regime for dry crops 4.7.2. Calculation of water regime for spring rice **Practice/Experiment:** *(02 periods)* Discussion on irrigation regime (calculation of irrigation standards and irrigation requirement for dry and water crops) **Seminar/Discussion: (**01 *periods)* Calculate irrigation standards and irrigation requirement
	***B/* Self- stusy contents**: *(14 periods)* 4.8. Collection of study documents 4.8.1. Determination of the time of irrigation; irrigation standards; irrigation requirement 4.8.2. Calculation of irrigation requirement for dry crop and rice 4.8.3. Preparation for the seminar on the related topics
10-13	**Chapter 5:** Irrigation methods and Techniques
	A/* Main contents: (04 periods)* **Theory:** 5.1. Overview of irrigation methods and irrigation techniques 5.1.1. Definition 5.1.2. Classed irrigation methods 5.1.3. Irrigation methods and their selection 5.2. Irrigation status 5.2.1. Irrigation status in the world 5.2.2. Irrigation status in Vietnam 5.3. Irrigation requirements of cropping systems 5.3.1. General requirements 5.3.2. Field size in rice - dry crop rotation 5.4. Surface irrigation Technique 5.4.1. Introduction 5.4.2. Border irrigation 5.4.3.Furrow irrigation 5.4.4. Land leveling 5.5. Sprinkler Irrigation technique 5.5.1. Concept 5.5.2. Advantages and disadvantages 5.5.3.Components of a Sprinkler system 5.5.4. Sprinkler irrigation technique 5.5.5. Determination of technical indicators 5.5.6. Determination of irrigation requirement 5.6. Drip Irrigation technique 5.6.1. Concept

	5.6.2. Advantages and disadvantages 5.6.3. Equipment and working principle 5.6.4. Drip emitter 5.6.5. Drip irrigation technique 5.6.6. Some equipments used in production **Practice:** *(12 periods)* Laboratory session 4: sprinkler irrigation technique Laboratory session 5: drip irrigation technique **Seminar/Discussion:** *(2 periods)* Irrigation methods
	***B/* Self- stusy contents**: *(24 periods)* 5.7. Read the materials on irrigation methods 5.8. Data processing and writing report on 02 laboratory session (session 4, 5)
14-15	**Chapter 6:** Irrigation system
	A/* Main contents: (02 periods)* **Theory:** 6.1. Overview 6.1.1. Role and function of an irrigation system 6.1.2. Land use coefficient, land occupancy coefficient 6.1.3. Components of an irrigation system 6.2. Source of irrigation water 6.2.1. Sources of irrigation water 6.2.2. Principles of selecting irrigation water source 6.2.3. Preliminary calculation of irrigation water 6.3. Irrigation system 6.3.1. Classification and notation 6.3.2. General principles and forms of irrigation canal layout 6.3.3. Specification of an irrigation system 6.3.4. Wastewater and wastewater treatment for irrigation 6.4. Drainage system 6.4.1. Function of a drainage system 6.4.2. Components of a drainage system 6.4.3. Principles of drainage system layout 6.5. Canal structures 6.5.1. Intakes 6.5.2. Bridge aqueducts 6.5.3. Backwards siphon 6.5.4. Culvert 6.5.5. Fall and drop structures 6.5.6. Overflow bank 6.5.7. Bridge 6.5.8. Flow measurement works 6.6. On farm irrigation system 6.6.1. Structure, tasks and requirements of the system

	6.6.2. Irrigation system for dry field 6.6.3. Irrigation system for paddy rice field **Practice/Experiment:** *(02periods)* Field trip (irrigation system,) **Seminar/Discussion:** *(....periods)* Structure, system operation, irrigation scheduling
	***B/* Self- stusy contents**: *(12 periods)* 6.7. Prepare a report on the field trip in an irrigation system 6.8. Prepare an essay on irrigation scheduling

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTRUE
FACULTY OF AGRONOMY

COURSE SYLLABUS
NHE03002: Plant breeding

Credits: 3 (Lecture: 2 – Practice: 1); Self-Learning: 6
Term: 7
Prerequisite course: NHE02003 - Plant genetics
Preceding course: NHE02002-Plant Morphology and Anatomy

COURSE OBJECTIVES:

The purpose of the course is to introduce:
+ On knowledge: students understand the role of plant varieties in plant life, genetic resources, principles of genetics applied in breeding, basic methods and techniques applied in new plant breeding;
+ On skills: Training students to master the techniques used in breeding and experimenting in selecting plant varieties;
+ On learning attitudes: Develop students in active learning attitudes, able to work in teams.

COURSE EXPECTED LEARNING OUTCOMES

Notation	Course expected learning outcomes After successfully completing this course, students are able to	Program expected learning outcomes
Knowledge:		
K1	Apply decision-making on selection of materials and methods of selection	ELO2
K2	Apply knowledge of genetics and statistics to layout, implement experiment, collect and analyse data, results of experiments in breeding.	ELO3, ELO5
Skills:		
K3	Manage and collaborate effectively in teamwork	ELO6
K4	Communicate effectively by multiple means	ELO7, ELO8
K5	Design and implement scientific research and crop production	ELO10, ELO11
Ethics and Attitude:		
K6	Recognize lifelong learning needs	ELO12
K7	Demonstrate responsibility and understand ethical codes	ELO13, ELO14

COURSE DESCRIPTION

NHE03002. Plant Breeding (3: 2 –1; 6; 135)

This course consists of 12 chapters about analyze and evaluate the historical process of selecting varieties from domestication of plants to the application of modern biotechnologies; Genetic resources and their application in breeding; Reproductive forms of plants; Application of plant propagation principle, quantitative genetics, molecular genetics and selection theory for crop improvement. The objectives of crop improvement, traditional and modern breeding methods are currently applied in plant breeding.

Practice lessons cover hybridization techniques and trait measurements for selecting plant varieties. Students are also required to participate in projects.

Prerequisite course: NHE02003 - Plant genetics;

Preceding course: NHE02002-Plant Morphology and Anatomy

ASSESSMENT

Grading: 10 points

Weighting:

- Attendance: 10%
- Formative assessment: 30%
- Final exam: 60%

Assessment summary

Rubric	Course expected learning outcome	Weighting (%)	Week
Attendance		**10**	
Rubric 1: Class attendance	K1, K3, K4	7	1 -10
Preparing of homework	K1, K3	3	1 - 10
Formative assessment		**30**	
Rubric 2: Individual presentation	K1, K2, K4, K5	5	7
Rubric 3: Group presentation	K1, K2, K4, K5	5	8-9
Rubric 4: Project	K1, K2, K5, K6, K7	5	10
Rubric 5: Practice and report	K1, K2, K3, K4, K5, K6	5	5-8
Rubric 6: Midterm exam	K2, K3, K4, K5	10	6
Final exam		**60**	
Rubric 7: Final exam	K1, K2, K5, K6, K7	60	Following University schedule

TEXT BOOKS AND REFERENCES

**** Text Books/Lecture Notes:***

- Acquaah G. (2007). Principles of plant genetics and breeding. Blackwell Publishing Ltd., 350 Main Street, Malden, M. A., USA.

- Vũ Văn Liết và cộng sự (2015) Nguyên lý chọn giống cây trồng. NXB Đại học Nông nghiệp Hà Nội.

**** Additional references:***

- Agrawal, R. L. (1998) Fundamentals of Plant Breeding and Hybrid Seed Production. Science Publishers, Inc., Enfield, USA,
- Tạp chí Khoa học và Phát triển
- Tạp chí Nông nghiệp và Phát triển Nông thôn

COURSE OUTLINE

Week	Content
1	**Chapter 1: INTRODUCTION**
	A/* Main contents: (1.hours)* **Theory:** 1.1. Definition of plant breeding 1.2. History of plant breeding 1.3. Some keywords in plant breeding 1.4. The role of plant breeding
	***B/*Self- study contents**: *(2 hours)* Some keywords in plant breeding
2	**Chapter 2: VARIATION IN PLANT BREEDING**
	A/* Main contents: (3.hours)* **Theory:** 1. What is variation in plant breeding? 2. Types of variation among plants 2.1.Environmental Variation 2.2. Genetic variation 3. Origins of genetic variability 3.1. Gene recombination 3.2. Ploidy modification 3.3. Mutation 3.4. Transposable elements 3.5. Biotechnology for creating genetic variation

	4. Scale of variation 4.1.Qualitative variation 4.2. Quantitative variation
	***B/*Self- study contents**: *(6 hours)* Variation in plant breeding, give examples.
3	**Chapter 3: *:*** GENE POOLS AND GERMPLASM RESOURCES FOR BREEDING
	A/* Main contents: (3.hours)*** **Theory:** 1. Genetic diversity, germplasm, genetic resource, gene pools 1.1. Genetic Diversity 1.2. Importance of gernplasm 1.3. Source of germplasm for plant breeding 2. Concepts of origin of germplams and geographical distribution of species 2.1. Centers of origin and centers of diversity (Vavilov, 1926) 2.3. The law of a homologous series in genetic variability (Vavilov 1920) 2.4. Concept of gene pools of cultivated crops 3. Sources of genetic variation = Germplasm collections. Conservation of plant genetic resource 3.1. Germplasm collection 3.2. Conservation genetic resource 4. Problems
	***B/*Self- study contents**: *(6 hours)* .- Genetic diversity .- Sources of genetic variation
4	**Chapter 4: *: REPRODUCTION IN HIGHER PLANT, MATING SYSTEM AND MODIFICATION***
	A/* Main contents: (3 hours)*** **Theory:** 1. Importance of understanding Mode or Reproduction in Blant Breeding 2. Overview of Reproductive Oftions in Plants 2.1. Hermaphrodity vs Unisexual 2.2. Self-pollination vs Cross-pollination 2.3. Sexuality vs Asexuality 3. Sexual Reproduction 3.1. Sexual life cycle of a plant (alternation of generations) 3.2. Duration of plant growth cycles 4. Asexual Reproduction 4.1. Vegetative propagation 4.2. Apomixis 4.3. Controlling of sexual biology in plant breeding

	5. Overview of Reproductive Biology 5.1. Pollen Dispersal 5.2. Mechanism promoting cross-pollination 5.3. Mechanism promoting self – pollination 5.4. Additional reproductive factors influence breeding **Practice/Experiment: (***5 hours)* Emasculation technique in plant breeding
	***B/*Self- study contents**: *(6.hours)* Reproductive Biology
5	***Chapter5:*** THE BASIC CYTOGENETICS
	A/* Main contents: (1 hours)* **Theory:** 1. Basic Terminology 2. Changes In Chromosome Numbers 2.1. Autoploidy 2.2. Allopoidy 2.3. Aneuploids 3. Chages Within Chromosomes = Structural Changes 3.1. Type of structural changes 3.2. Sources of changes 3.3. Uses 4. Brief Summary
	***B/*Self- study contents**: *(6 hours)* Type of structural changes in chromosome.
6	***Chapter 6:*** GENETIC VARIABILITY / QUALITATIVE AND QUANTITATIVE TRAITS
	A/* Main contents: (3 hours)* **Theory:** 1. Classification of Genetic Variation 1.1. Phenotype, Genotype and Environment 2. Qualitative (Discrete) characters 3. Quantitative (Metric) Character 4. Brief Summary **Practice/Experiment:** *(5 hours)* Observe quantitative and qualitative traits in the field
	***B/*Self- study contents**: *(6 hours)* Classification of Genetic Variation

7	***Chapter 7:*** GENETIC & ENVIROMENTAL VARIANCE, HERITABILITY AND SELECTION
	A/* Main contents: (3 hours)* **Theory:** 1.Mean, Variance and Heritability 1.1 Values and Mean 1.2. Component of Genetic Variance (V_g) 1.3. Components of Environmental Variance (V_e) 1.4. Heritability 2.Selection Changes Genotype and Allelic Frequencies 2.1. Population under NO selection 2.2. Population subjected to Selection **Practice/Experiment:** *(5 hours)* Observe the layout of field experiments
	***B/*Self- study contents**: *(6 hours)* Mean, Variance and Heritability
8	***Chapter 8:*** FACTORS INVOLVED IN CHOICE OF BREEDING METHODOLOGY
	A/* Main contents: (3 hours)* **Theory:** 1. Overview Of Factors Influencing Breeder's Choice(s) 1.1. Plant (crop) factors 1.2. Traits of interest to improve in breeding program 1.3. Properties of Individual traits of interest 1.4. Type of Cultivar desired from breeding program 1.5. Production of Cultivar 1.6. Other factors involved 2.Classification of types of breeding methods 2.1. Basic of Classification 2.1. Classification of Breeding methods as related to mating system
	***B/*Self- study contents**: *(6 hours)* Classification of types of breeding methods
9	***Chapter 9:*** GENETIC BASIC FOR BREEDING IN SELF-POLLINATED CROPS
	A/* Main contents: (3 hours)* **Theory:** 1.1. Johannsen's Pure line theory 1.2. The genetic basic of homozygous (Pure) lines 1.3. Source of Genetic Variation in homozygous Lines 1.4. Hybridizations and Gene Combinations

	1.5. The genetic composition of any inbred generation for the F2 or later generation
	***B/*Self- study contents**: *(6 hours)* The genetic basic of homozygous (Pure) lines
10	***Chapter 10:***BREEDING METHODS IN SELF-POLLINATED CROPS
	A/* Main contents: (0 hours)*** **Theory:** **Practice/Experiment:** *(0 hours)* **Seminar/Discussion:** *(7 hours)* 1. Mass selection 2. Pure line selection (= Mass selection with Progeny Testing) 3. Pedigree Breeding 4. Bulk Population Breeding 5. Backcross Method
	***B/*Self- study contents**: *(6 hours)* Selection methods of self pollinated crops
11	***Chapter 11:*** GENETIC BASIS FOR BREEDING IN CROSS-POLLINATED CROPS
	A/* Main contents: (3 hours)*** **Theory:** 1.1. Population Genetics of Cross-Pollinated Populations 1.2. Responses to Selection in Cross-Pollinated Populations 1.3. Inbreeding 2.Heterosis and Measuring Performance of Heterozygous Genotypes 2.1. What is heterosis? 2.2. Measuring Heterosis 2.3. Evaluating Heterosis for Hybrid Cultivar Breeding **Practice/Experiment:** *(0 hours)* **Seminar/Discussion:**
	***B/*Self- study contents**: *(6 hours)* Responses to Selection in Cross-Pollinated Populations
12	***Chapter 12:*** BREEDING METHODS IN CROSS-POLLINATED CROPS
	A/* Main contents: (0 hours)*** **Theory:** **Practice/Experiment:** *(0 hours)* **Seminar/Discussion:** *(8 hrs)* 1. Methods of Breeding Cross – Pollinated Crops 1.1. Family selection methods 1.2. Half-Sib selection with a testcross

	1.3. Recurrent Selection 2.Hybrid Cultivar development 2.1. Definitions 2.2. Creating Hybrid Cultivars **Practice/Experiment:** (....*hours)*
	B/*Self- study contents**: *(6 hours)* ***Creating Hybrid Cultivars
	A/* Main contents: (0 hours)* **Theory:** **Paper:** (6 hours) Reading and summarizing of scientific papers (6 *hours*)
	***B/*Self- study contents**: *(18 hours)* Searching scientific papers

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTURE

FACULTY OF AGRONOMY

COURSE SYLLABUS
NHE03003: PLANT PATHOLOGY

Credits: 4 credits (Lecture:2.5 – Practice:1.5); Self-Learning:8

Term: 7

Prerequisite course: none

COURSE OBJECTIVES

This course aims to focus on the following issues:

+ On knowledge: (i) to describe and explain basic knowledge related to pathogenesis, characteristics of groups of plant pathogens, plant disease epidemics, diagnosis and disease control; (ii) to apply learned knowledge in plant disease managements (diagnosis, evaluation of disease development and control)

+ On s*kills*: to use basic techniques in plant pathology research including basic diagnosis (based on symptoms, based on the presence of pathogens) to diagnose some common diseases

+ On attitude and responsibility: To form activation, creation, responsibility in study; to have team working ability.

COURSE EXPECTED LEARNING OUTCOMES

Notation	**Course expected learning outcomes** After successfully completing this course you are able to:	**Program expected learning outcomes**
Knowledge		
K1	Analyze the relationship between biological (plant disease) factors and external factors affecting the crop	ELO3
K2	Design a safe, efficient and sustainable system of plant disease management	ELO5
Skills		
K3	Assess the effectiveness, safety and sustainability of crop production models	ELO9
K4	Carry out scientific studies on plant diseases	ELO10

K5	Utilize argumentative thinking in analyzing, evaluating, and solving plant disease problems	ELO11
Ethics and Attitude		
K6	Have a lifelong learning sense	ELO12
K7	Have a sense of responsibility and professional ethics;	ELO13
K8	To well implement the provisions of the law on crop productio	ELO14

COURSE DESCRIPTION

NHE03003. Plant Pathology (4: 2.5–1.5; 8; 180)

This course consists of 12 chapters, focusing on Basic concepts in plant diseases (plant diseases, plant pathogens, plant disease epidemics, disease control and diagnosis); Common characteristics of the major plant pathogens include fungi, bacteria, viruses, and nematodes; Major diseases of food crops, fruit crops, vegetable crops and industrial crops). Lab works include basic techniques in diagnosis, biological characterization of plant fungi, bacteria, and viruses). Project is survey on disease status and methods of disease management in the field condition.

ASSESSMENT

Grading: 10

Weighting:

+ Participation: 10 %
+ Project: 10 %
+ Lab work: 10 %
+ Midterm Exam: 10%
+ Final exam: 60%

Assessment summary

Rubric	Evaluated content	Course expected learning outcome	Weight (%)	Week
Diligence			**10**	
Rubric 1: Participation (Observation)	Actively participation	K4, K5, K6, K7, K8	10	1-10
Process evaluation			**30**	
Rubric 2: Projects	Know how to collect, analyze data and present the results	K1, K2, K5, K6, K7	10	15

Rubric 3: Lab work	Understand and evaluate the steps and results of the experiment	K1, K2, K5, K6, K7	10	14
Rubric 4: Midterm exam	50% of knowledge learned and practiced	K1, K2, K5, K6, K7	10	5-7
Final examination			**60**	
Rubric 5: Final exam	100% of knowledge learned and practiced	K1, K2, K5, K6, K7	60	Following University schedule

TEXT BOOKS AND REFERENCES

**** Text book/ lecture note***

1. Agrios, G. (2005) Plant Pathology. Elservier. Academic Press.
2. UC David. (2009) Plant Pathology – Lecture Notes (PLP120)

**** Other rreferences***

1. Hà Viết Cường (2008), Bài giảng Bệnh cây Nông nghiệp cho ngành CN Rau – Hoa – Quả Quả và Cảnh quan
2. Vũ Triệu Mân (chủ biên) (2007). Giáo trình Bệnh cây Đại cương. NXBNN
3. Vũ Triệu Mân (chủ biên) (2007). Giáo trình Bệnh cây Chuyên khoa. NXBNN

COURSE OUTLINE

Week	Content
1	1 Chapter 1: Introduction
	A/ Class lecture: (2 hrs) 1.1 History 1.2 Importance 1.3 Study fields 1.4 Definition 1.5 Classification
	B/ Self-study: (4 hrs) All
1-2	2 Chapter 2: The effect of the disease on the physiological functions of the plant

	A/ Class lecture: (2 hrs) 2.1Photosynthesis 2.2Respiratory 2.3Water and nutrient transport 2.4Exit steam 2.5Reproduction 2.6Cell permeability 2.7Symptoms 2.8Signs
	B/ Self-study: (4 hrs) Full
2	3 Chapter 3: Non-transmittable diseases
	A/ Class lecture: (2 hrs) 3.1Disease due to drought 3.2Diseases caused by cold 3.3Diseases caused by pesticide injuries 3.4Diseases due to deficiency / excess nutrition
	B/ Self-study: (4 hrs) Toàn bộ
3	4 Chapter 4: Plant disease epidemiology
	A/ Class lecture: (3 hrs) 4.1Disease Triangle 4.2Cycle of infection (life cycle) 4.3Disease cycle 4.4Plant disease epidemic 4.5Monocyclic and polycyclic diseases
	B/ Self-study: (.6 hrs) (6 hrs)
4	5 Chapter 5: Plant – microbe interaction
	A/ Class lecture: (3 hrs) 5.1How the pathogens attack plants 5.2The response of the plant to the attack of the pathogen 5.3Use of resistant varieties
	B/ Self-study: (6 hrs)
5	6 Chapter 6: Disease Diagnosis

	A/ Class lecture: (3 hrs) 6.1Diagnosis 6.2Koch's Postulate
	B/ Self-study: (6 hrs) Toàn bộ
6-7	7 Chương 7: Phòng chống bệnh cây
	A/ Class lecture: (5 hrs) 7.1Cultivation and physical measures 7.2Chemical measures 9.3 Biological measures
	B/ Self-study: (10 hrs) Toàn bộ
8-9	8 Chapter 8: Fungi and fungal diseases
	A/ Class lecture: (5.5 hrs) 8.1General characteristics of fungal pathogens 8.2Reproduction, classification of plant fungi 8.3Pathogenesis 8.4Diseases caused by fungus-like microorganisms 8.5Diseases caused by ascomycestes fungi 8.6Diseases caused by basidiomycetes fungi 10.7 Mycotoxins
	B/ Self-study: (11 hrs) Toàn bộ
10	9 Chapter 9: Bacteria and Plant Disease
	A/ Class lecture: (3 hrs) 9.1General characteristics of plant bacteria 9.2Reproduction, classification of plant bacteria 9.3Pathogenesis 9.4Diseases caused by gram-negative bacteria 9.5Diseases caused by Gram-positive bacteria 9.6Diseases caused by fastidious bacteria 11.7 Phytoplasma disease
	B/ Self-study: (6 hrs) Toàn bộ
11	10 Chapter 10: Viruses and Plant Viruses

	A/ Class lecture: (3 hrs) 10.1 General characteristics of crop virus 10.2 Reproduction, classification of plant viruses 10.3 Pathogenesis 10.4 Disease caused by DNA viruses 12.5 Diseases caused by RNA viruses
	B/ Self-study: (6 hrs) Toàn bộ
12	11 Chapter 11: Nematodes and nematode diseases
	A/ Class lecture: (3 hrs) 11.1 General characteristics of plant nematodes 11.2 Reproduction, classification of nematodes 11.3 Pathogenesis 11.4 Diseases caused by ectoparasitic nematodes 11.5 Diseases caused Migratory endoparasitic nematodes 13.6 Diseases caused by sedentary endoparasitic parasitic nematodes
	B/ Self-study: (6 hrs) Toàn bộ
13	12 Chapter 12: Sustainable Agriculture and Biotechnology
	A/ Class lecture: (3 hrs) 12.1 Sustainable agriculture 12.2 Biotechnology in plant disease management
	B/ Self-study: (6 hrs) Toàn bộ

B. Lab work (21 hrs)

Week	Content	ELO
14	13 Lab work 1: Fungal disease	
	A/ Lab work: (6 hrs) 13.1 Prepare the culture medium 13.2 Isolation of fungi 13.3 Evaluation of symptoms / signs of fungal disease 13.4 Inoculation 13.5 Evaluation of inoculation results	K1, K6, K7

	B/ Self-study: (12 hrs) Full	K1, K6, K7
14	14 Lab work 2: Bacterial diseases	
	A/ Tóm tắt các nội dung chính phòng thực hành: (5 hrs) 14.1 Prepare the culture medium 14.2 Isolation of bacteria 14.3 Evaluation of symptoms / signs of bacterial disease 14.4 Inoculation 14.5 Evaluation of inoculation results	K1, K6, K7
	B/ Self-study: (10 hrs) full	K1, K6, K7
14	15 Lab work 3: Viral diseases	
	A/ Lab work: (5 hrs) 15.1 Evaluation of symptoms 15.2 Diagnosis by ELISA 15.3 Inoculation 15.4 Evaluation of inoculation results	K1, K6, K7
	B/ Self-study: (10 hrs) Toàn bộ	K1, K6, K7
14	16 Lab work 4: nematode diseases	
	A/ Class lecture: (5 hrs) 16.1 Isolation nematodes from soil and plants 16.2 Evaluation of symptoms and signs	K1, K6, K7
	B/ Self-study: (10 hrs) Toàn bộ	K1, K6, K7

C. Project

Week	Content	ELO
15	17 Internship	
	A/ Internship (24 hrs) 17.1 Survey of field disease 17.2 Survey of disease management 17.3 Analysis of data and writing report that is submitted to teacher for evaluation (Note: at least 2 crops are subjected)	K1, K2, K5, K6, K7

	B/ Self-study: (48 hrs) • Method of investigation • Methods to determine disease intensity (prevalency, disease incidence, disease severity) • Methods of statistical analysis and data presentation	

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTRUE
FACULTY OF AGRONOMY

COURSE SYLLABUS

NHE03004: Entomology and Pest Management

- Credits: 3 (Theory: 2 – Practical: 1); Self-Learning: 6
- Term: 7
- Preceding course:: SHE01003 - Introduction of biology 2

COURSE OBJECTIVES:

This course aims to provide learners:

- Knowledge of the morphological, biological and ecological characteristics of insect classes and the practices of Integrated Pest Management
- Understanding the use of pest prevention measures, especially IPM measures on crops of agro-ecological areas to protect agricultural production, protect ecological environment and increase income for farmers.
- Methods of investigation, collection, identification of pests and natural enemies
- Teamwork skills and presentations

COURSE EXPECTED LEARNING OUTCOMES:

Notation	**Course expected learning outcomes** After successfully completing this course, students are able to	**Program expected learning outcomes**
Knowledge:		
K1	Analyse the relationship between biological, genetic, physiological and extrinsic factors affecting pests and crops.	ELO3
K2	Establish effective and sustainable pest management system	ELO5
Skills:		
K3	Organize and collaborate effectively in team work in learning and experiment	ELO6
K4	Communicate well and effectively when working with external stakeholders	ELO7
K5	Use well English in reading comprehension and communication on issues related to subject content	ELO8

K6	Assess the effectiveness, safety and sustainability of crop pest management models	ELO9
K7	Conduct field surveys on pest management	ELO10
K8	Utilize argumentative thinking in analysing, evaluating, and solving Crop Science issues	ELO11
Ethics and Attitude:		
K9	Form a lifelong learning sense through work practices and professional development.	ELO12
K10	Understand the responsibilities and professional ethics of plant engineers.	ELO13
K11	Apply the rules of the law into the design of the crop management model.	ELO14

COURSE DESCRIPTION

NHE03004. Entomology and Pest Management (3; 2-1; 6; 135)

This course consists of 10 chapters about Morphology, morphological characteristics of the insects orders; Biological and ecological characteristics; Use natural enemies and pathogens for insects to manage pests; Measures to prevent pests, emphasize IPM measures. The module provides students with specialized insect knowledge on pests primarily on agricultural crops.

Preceding course:: SHE01003 - Introduction of biology 2

ASSESSMENT

1. Grading: 10 score scale

2. Weighting:

- Attendance: 10%
- Formative assessment: 30%
- Final exam: 60%

3. Assessment summary

Rubric	Course expected learning outcome	Weighting (%)	Week
Attendance			
Rubric 1: Participant	K1, K2, K5	10	1-10
Formative assessment			
Rubric 2: Evaluation of group discussions	K1, K2, K4, K5, K8, K9	2.5	4,6
Rubric 3: Group work evaluation	K1, K2, K4, K5, K7, K8, K9	2.5	4,6
Rubric 4: Topic reports evaluation	K1, K2, K5, K8, K9, K10	2.5	10
Rubric 5: Evaluation exercise practice	K1, K2, K5, K7, K9	2.5	3-7
Rubric 6: Practical laboratory evaluation	K1, K2, K5, K8, K9	10	8

Rubric 7: Midterm Exam Review	K1, K2, K5, K8, K9	10	5
Final evaluation			
Rubric 8: Final exam evaluation	K1, K2, K5, K8, K9, K10, K11	60	Follow VNUA schedule

TEXT BOOKS AND REFERENCES

**** Textbook / Lectures:***

1. Pedigo, L. P. & M. E. Rice, (2014). *Entomology & Pest Management*, 6th edition. Waveland Press, Inc. 784pp.
2. Dhaliwal, G.S., Ram Singh & Vikas Jindal., (2013). *A textbook of Integrated Pest Management*. Ludhiana: Kalyani Publishers, 617p.
3. David H. Gent, James, D.B., Amy J.D., David G.J., Robert P., Douglas B.W. (2010). Field Guide for Integrated Pest Management in Hops. Second Edition A Cooperative Publication Produced by Oregon State University, University of Idaho, 90p.
4. Hajek Ann,(2004). *Natural Enemies: An Introduction to Biological Control*. Cambridge University Press, Cambridge, UK, 378 pp.
5. Nguyễn Văn Đĩnh (Chủ biên), Đỗ Tấn Dũng, Hà Quang Hùng, Phạm Văn Lầm, Phạm Bình Quyền, Ngô Thị Xuyên, (2007). Giáo trình Biện pháp sinh học bảo vệ thực vật. NXB. Nông nghiệp, Hà Nội, 208p.
6. Nguyễn Viết Tùng, (2006). Giáo trình Côn trùng Đại cương. NXB. Nông nghiệp, Hà Nội, 239p,

**** Other References:***

1. Bộ môn Côn trùng (Chủ biên), (2004). Giáo trình côn trùng chuyên khoa. NXB. Nông nghiệp, Hà Nội, 280p.
2. Timothy D. Schowalter, (2006). Insect Ecology – An Ecosystem Approach. Second edition. AP Academic Press is an inprint of Elsevier, 572p.
3. Van Driesch R., Mark Hoddle and Ted Center, (2008). Control of pests and weeds by natural enemies: *An Introduction to Biological Control*. Blackwell publishing Ltd. Australia, 473p.

COURSE OUTLINE

Week	Content	Course expected learning outcomes
5	***Chapter 1: Introduction***	

	A/* The main content in the class: (1.5 hour)* **Content teaching theory:** 1.1. Introduction 1.2. Classify classes of the arthropod **Content of teaching practice / experiment:***(1.5 hour)* - Differentiate between insect classes and other arthropods - General characteristics of the insect class **Content of seminar / discussion:** *(0 hour)*	K1, K2
	***B/*Content need be self-learning at home**: *(4 hour)* 1.3. Read, understand, remember the position, role, strengths and weaknesses of insects for nature and humans 1.4. Understand the diversity of insect classes. Differentiate between insect classes and other classes in arthropod	K3, K4, K6, K8
1&2	***Chapter 2: Insect's Morphology***	
	A/*The main content in the class: (3 hour)* **Content teaching theory:** 2.1. The general structure of the insect layer 2.2. Detailed structure of insect body **Content of teaching practice / experiment:** *(9hour)* - Detailed construction of each part of the insect layer - Observation, description, and identification specimens of 8 common orders of insect on agricultural crops **Content of seminar / discussion:** *(0 hour)*	K1, K2
	***B/*Content need be self-learning at home**: *(24hour)* 2.3. Understand, remember the morphological characteristics of the insect body; Detailed characteristics of each part of the insect body 2.4. Identify the important morphological characteristics of the eight major order of insect pests on agricultural crops	K3, K4, K6, K8
3	***Chapter 4: Insect's Biology (Life cycle)***	
	***A/* The main content in the class:** *(3 hour)* **Content teaching theory:** 4.1. Insect reproduction 4.2. Insect growth and development 4.3. Insect Metamorphosis types 4.4. General models of the life cycle 4.5. Insect seasonal cycle **Content of teaching practice / experiment:** *(1.5 hour)* - Insect Metamorphosis types - Larvae types, Pupae types of Insect's Holometabola - Insect samples collection in nature **Content of seminar / discussion:** *(0 hour)*	K1, K2
	***B/*Content need be self-learning at home**: *(9 hour)* 4.5. Read, Understand, Remember Insect Reproduction types; Metamorphic forms; Larvae types, Pupae types; Insect diapause characteristics; Identify variations metamorphosis from the larval form	K3, K4, K6, K8

4	***Chapter 5: Insect's Ecology***	
	A/* The main content in the class:** *(3 hour)* **Content teaching theory:(2 hour)* 5.1. The ecological role of insect pests 5.2. Dynamic of insect life system 5.3. Effect of ecological factors on insect development **Content of teaching practice / experiment:** *(0 hour)* **Content of seminar / discussion:** *(1 hour)* - List of ecological factors (abiotic, biotic) - Two-dimensional factors - The relationship between plants and insect pests, between pests and natural enemies	K1, K2
	***B/*Content need be self-learning at home**: *(6 hour)* 5.4. Read, Understand the impact of ecological factors on the development of insect pests and insects natural enemies.	K3, K4, K6, K8
5	***Chapter 6: Pest Management Theory***	
	A/* The main content in the class:** *(1.5 hour)* **Content teaching theory:(1.5 hour)* 6.1. The concept of pest management 6.2. Development of pest management program **Content of teaching practice / experiment:** *(0 hour)* **Content of seminar / discussion:** *(0 hour)*	K1, K2
	***B/*Content need be self-learning at home**: *(3 hour)* 6.3. Read, Understand the scientific basis of crop pest management; Development of pest management programs and practical issues related to plant protection	K3, K4, K6, K8
5	***Chapter 7: Management with Natural enemies and other Biological agents***	
	***A/* The main content in the class:** *(2hour)* **Content teaching theory:** *(2 hour)* 7.1. Brief history of biological control 7.2. Biological control classification 7.3. Agents of biological control 7.4. The practice of biological control **Content of teaching practice / experiment:** *(0 hour)* **Content of seminar / discussion:** *(0 hour)*	K1, K2
	***B/*Content need be self-learning at home**: *(4hour)* 7.5. Types of biological measures; Agents of biological and biological methods in the world and in Vietnam; Practical issues related to plant protection	K3, K4, K6, K8, K10, K11
6	***Chapter 8: Biological Control***	
	A/* The main content in the class:** *(3hour)* **Content teaching theory:(2 hour)* 8.1. How to understand about natural enemies 8.2. History of biological control	K1, K2

	8.3. Biological control 8.3.1. Parasite and Parasioid 8.3.2. Predator 8.3.3. Other Bio-Production **Content of teaching practice / experiment:** *(0hour)* **Content of seminar / discussion:** *(1 hour)* 8.4. Characteristics of parasitic insects 8.5. Characteristics of predators 8.6.Bioproducts are widely used in the world and in Vietnam.	
	***B/*Content need be self-learning at home**: *(6hour)* 8.7.Read, Understand the role of the pest of pests: natural enemies, predator, parasites and parasitoid, commonly used biological products.	K3, K4, K6, K8, K10, K11
7	***Chapter 10: Cultural Controls- Crop Management***	
	A/* The main content in the class:** *(1.5 hour)* **Content teaching theory:(1.5 hour)* 10.1. Sanitation 10.2. Crop rotation 10.3. Destruction or modification of alternate hosts 10.4. Use covering material 10.5. Trap cropping **Content of teaching practice / experiment:** *(0 hour)* **Content of seminar / discussion:** *(0 hour)*	K1, K2
	***B/*Content need be self-learning at home**: *(3 hour)* 10.6. Read, Understand, Understand the contents of technical cultivation practices in crop pest management (field hygiene, crop rotation, use of cover materials, bait use, design Trap cropping).	K3, K4, K6, K8, K9, K10, K11
8	***Chapter 11: Conventional insecticides for Pest Management***	
	A/* The main content in the class:** *(2 hour)* **Content teaching theory:(2 hour)* 11.1. Insecticide nomenclature and chemical formulas 11.2. Common insecticides 11.3. Insecticides toxicity **Content of teaching practice / experiment:** *(0 hour)* **Content of seminar / discussion:** *(0 hour)*	K1, K2
	***B/*Content need be self-learning at home**: *(4 hour)* 11.4. Popular chemical insecticides have been used widely in crops; Chemical pesticides on the basis of the object of prevention, chemical structure, toxicity of drugs and signs of commercial forms. Advantages and disadvantages of chemical methods in pest management	K3, K4, K6, K8, K9, K10, K11
9	***Chapter 12: IPM Concept, Damage Thresholds***	
	A/* Summary of the main content in the class:** *(1.5 hour)* **Content teaching theory:(1.5 hour)* 12.1. Definition 12.2. History of IPM measures development	K1, K2

	12.3. Steps to implement IPM measures 12.4. Advantages, disadvantages of IPM measures **Content of teaching practice / experiment:** *(0 hour)* **Content of seminar / discussion:** *(0 hour)*	
	***B/*Content need be self-learning at home**: *(3 hour)* 12.5. Understand the knowledge of integrated management (IPM); Economic Impact Threshold (EIL); Prevention threshold (ETL); Implementation steps and advantages and disadvantages of IPM measures	K3, K4, K6, K8, K9, K10, K11
10	***Topic: The major Pests and Natural Enemies on agricultural crops***	
	***A/* The main content in the class:** *(3 hour)* Choose any 10 students for PowerPoint presentation in the order they were instructed. Time for a presentation 5-7 minutes, 3-5 minutes for discussion and questions	K1, K2
	***B/*Content need be self-learning at home**: *(6 hour)* Find, Read, and Compose Thematic Subjects as assigned. Specialized writing under the guidelines includes: (1) Common name for insects; Science name; They; Butter. (2) distribution; (3) Symptoms and harm; (4) Morphological characteristics; (5) Biological-ecological characteristics and number of generations / year; (6) Natural enemies and (7) Prevention measures (emphasis on IPM)	K3, K4, K7, K8

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTRUE
FACULTY OF AGRONOMY

COURSE SYLLABUS

NHE03005: Principles of Crop Production in Temperate and Tropical Systems

Credits: 3 (Lecture: 2 – Practice: 1); Self-Learning: 6
Term: 5
Preceding course: QLE02001- Principle of Soil Science

COURSE OBJECTIVES:

This course aim to use agricultural science knowledges to solve the issues of crop production; a good knowledge and proficient practice in technique for each crop group; improve sense of professional responsibitlities and environment.

COURSE EXPECTED LEARNING OUTCOMES

Notation	Course expected learning outcomes After successfully completing this course students are able to	Program expected learning outcomes
Knowledge		
K1	Describlethe general knowledge about crop production, basic knowledge of biology, physiology, ecological requirements and plant nutrition, cultivation techniques some annual and perennial crops in Temperate and Tropical region	ELO2,ELO3, ELO4,ELO5
K2	Explain the relationship and interaction among elements of cropping system, crop and human; and post-harvesting phisyology to construct cropping system; the requirents about cultivation, nutrition and cropping system for each crop group.	ELO3
K3	Apply the cultivation teachniques for some main crops in temprate and tropical regions	ELO5
Skills		
K4	Read documents and collect information to solve the issues of crop production	ELO11
K5	Communicate effectively, use English in reading documents and talking about crop production problems	ELO7, ELO8
K6	Proficient practice in technique for each crop group	ELO10
K7	Work independently and efficiently in teams;	ELO6
Ethics and Attitude		

K8	Be proactive in learning and searching documents about modern science;	ELO12
K9	Be aware of professional ethics, conscious and responsible to agricultural environment	ELO13, ELO14

COURSE DESCRIPTION

NHE03005. Principles of Crop Production in Temperate and Tropical Systems (3: 2.5-0.5; 6; 135)

This course consists of 6 chapters with contents: Overview of Crop Production; Impact of Climatic environment and soil on agricultural production; Crop nutrition; Cropping system and crop establishment; Growth and development; Crop production practices in Temperate and Tropical Systems.

Preceding course: QLE02001- Principle of Soil Science

ASSESSMENT

Grading: 10 points

Weighting:

- Attendance: 5%
- Group discussion: 5%
- Group work: 5%
- Seminar: 10%
- Exercise: 5%
- Practice: 5%
- Mid-term exam: 5%
- Final exam: 60%

Assessment summary

Rubric	Course expected learning outcome	Weighting (%)	Week
Attendance			
Rubric 1: Attendance	K1, K5	5	1-15
Formative assessment			
Rubric 2: Group discussion	K1, K3, K4, K5, K7	5	1-15
Rubric 3: Group work	K1, K3, K4, K5, K7	5	1-15
Rubric 4: Seminar	K1, K3, K4, K5, K6, K7	10	12
Rubric 5: Excercise	K2, K4, K5, K7	5	1-15

Rubic 6: Practice	K2,K3, K4, K5, K6, K7, K8, K9	5	13-15
Rubic 7: Mid-term exam	K2,K3, K4, K5, K7	5	10
Final exam			
Rubric 8: Final exam	K2, K3, K4, K5, K7	60	After 15

TEXT BOOKS AND REFERENCES

**** Text Books/Lecture Notes:***

Reddy SR (2014). Principles of Crop Production. Kalyani Publisher.

**** Other references:***

1. Craig C. Sheaffer and Kristine M. Moncada.(2009). "*Introduction to Agronomy: Food, Crops and Environment*". Published by DelmaCengage Learning NY, USA, 2009.
2. Ricardo M. Latican. (2001). *"The science and practice of crop production".*SEAMEO Searca and UPLB college, Los Banos, Laguna, Philippines, 2001.
3. Jack R. Harlan.(1992). *"Crops and man"*Second Edition.

COURSE OUTLINE

Week	Content
1	Chapter 1. Overview of crop production ***A/* Main contents***: (3 hours)* **Theory***(3 hours)***:** 1.1. History of Agriculture 1.2. Crop production today 1.3. Vietnam's crop production- An overview 1.4. Crop groups and terminologies 1.5. Importance of crops
	B/*Self- study contents(9 hours):*** - History of agricultural production in the world and in Vietnam - Discuss the importance of major crops in Vietnam
2-3	Chapter 2. Climatic environment and soil ***A/* Main contents** *(6 hours):* **Theory***(6 hours)***:** 2.1. Elements of climate 2.2.Elements of environment
	2.3. Areas for crop cultivation 2.4. Culture soil

	B/*Self- study contents(18 hours):* - Analysis of external factors of major rice growing areas in Vietnam - Analyze the properties of alluvial soil in Red River - Analysis of soil properties in the Northern coastal area
4	Chapter3. Crop nutrition ***A/* Main contents** *(3hours):* **Theory***(3 hours)***:** 3.1. Mineral nutrition 3.2. Nutrition disorder
	B/*Self- study contents(9 hours):* - The symptoms of Micronutrient Deficiencies in plants - Symptoms of salt poisoning
5-7	Chapter 4. Cropping system and crop establishmentin temperate and tropical region ***A/* Main contents** *(9 hours):* **Theory***(6 hours)***:** 4.1. Crop rotation, intercroping 4.2. Tillage
	4.3. Weed management 4.4. Crop management
	Practice 1 (2hours):Assessment of some cropping system in the North of Vietnam **Discussion (**1 hour**)**:cropping system in the South of Vietnam
	B/*Self- study contents(18 hours):* - Analysis of crop systems in a particular locality
8-10	Chapter 5. Growth and development ***A/* Main contents** *(9 hours):* **Theory**(6 hours): 5.1. Crop morphology, growth and development in tropical region
	Seminar(3 hours):Basis of selection/construction for cropping system in temperate and tropical regions.
	5.2. Crop morphology, growth and development in temperate region
	B/*Self- study contents(9 hours):* - Morphology, growth and development of rice genotypes in temperate and tropical regions.

11-15	Chapter 6. Crop production practices ***A/* Main contents***: (15 hours)*** **Theory**(6 hours): *6.1. Annual crops* 6.1.1. Land preparation 6.1.2. Planting materials and varieties 6.1.3. Methods of planting 6.1.4. Plant population density 6.1.5. Water management 6.1.6. Soil fertility management 6.1.7. Pest management 6.1.8. Harvesting and postharvesting
	6.2. Fruit trees and industrial crops 6.2.1. Selection criteria and varieties of fruit and plantation crops 6.2.2. Preparation of planting materials and Care of seedlings 6.2.3. Plantation establishment 6.2.4. Soil fertility management 6.2.5. Mangement practices 6.2.6. Harvesting and postharvesting
	Seminar (3 hours): Cultivation techniques for crops in Temperate and Tropical region
	Practice 2 (3 hours): Practice on cultivation techniques for some annual crops such as rice, wheat, sorghum, millet….
	Practice 3 (3 hours): Practice on cultivation techniques for some perennial crops
	***B/*Self- study contents** *(27 hours):* - Plan a production process for a crop in one location - Revise, complete the production process of a crop in a locality after listening to suggestions and discussions in class - Write the process of rice production and vegetable production in the Red River Delta - Learn about organic production, SRI rice cultivation

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTRUE
FACULTY OF AGRONOMY

COURSE SYLLABUS
NHE03006: Plant and society

Credits: 3 (Lecture: 2 – Practice: 0,5 – Seminar: 0,5); Self-Learning: 6
Term: 4
Preceding course: NHE01002 Introductory Biology 3

COURSE OBJECTIVES:

The purpose of the course is to
- ***Knowledge***: To understand the importance of plant for ecology and the civilization of mankind, the connection between food, nutrition and herbivor. To apply the human's knowledge on plant to exploit effectively and sustainably them for serving life.
- ***Skills***: To determinate the roles of plant in ecology, principle relation of creatures in agri-ecology to apply for sustainable agricultural production. To communicate professional knowledge with other connected persons.
- ***Attitude and ethics***: To contribute initiatively, motivate, behave honestly, persuade full responsibly. To be initiative to seek experience and learn all life.

COURSE EXPECTED LEARNING OUTCOMES

Notation	**Course expected learning outcomes** After successfully completing this course, students are able to	**Program expected learning outcomes**
Knowledge		
K1	Explain the roles of plant to creature and human's life	ELO2, ELO3
K2	Describle botanic characteristics, vegetative and generative growth of plant. Then exploite and apply knowledge for cultivating to serve mankind's demands.	ELO2, ELO3
K3	Interpret the natural rules of plant and ecology for sustainable agricultural production and enviromental protection.	ELO3, ELO5
Skills		
K4	Impliment field surveys, write report and communicate in English	ELO9, ELO7
K5	Apply the natural rules of plant and ecology for sustainable agricultural production.	ELO10

K6	Explore and solve major contrains in relation of sustainable agricultural production and development of human's society.	ELO11
K7	Work independently or in group; Plan and impliment tasks with full responsibility and cooperation; Support and develop community spirit.	ELO6
Ethics and Attitude		
K8	Contribute initiatively; motivate; To be initiative to seek experience and learn all life	ELO12
K9	Be have honestly, persuade full responsibly	ELO13

COURSE DESCRIPTION

NHE03006. Plant and Society (3: 2.5 – 0.5; 6; 135)
This course consists of 6 chapters about 12 lessons and practices 3 lessons. This course will educate the imprtance of botany in ecology and mankind's civilization; Based on relation of food, nutrition and creatures in ecology then apply and exploite knowledge for sustainable agricultural production and enviromental protection to serve human's life and society.
Preceeding course: NHE01002 – Introductory Biology 3

ASSESSMENT METHODS

Grading: *10 points.*
Weighting:
- Attendance: Class attendance + Discussion: 10 %
- Formative assessment: practical report + midterm exam: 30%
- Final exam: 60%

Assessment summary

Rubric	Course expected learning outcome	Weighting (%)	Week
Attendance		**10**	
Rubric 1: Participant	K4, K7, K9	10	1-12
Formative assessment		**30**	
Rubric 3: Presentation	K4, K7, K8, K9	10	2-11
Rubric 4: Practice and report	K4, K6, K7, K8, K9	10	7-9
Rubric 5: Mid-term exam	K1, K2, K4, K7, K9	10	6-7
Final assessment		**60**	
Rubric 6: Final exam	K1, K2, K3, K4, K5, K6, K7, K8, K9	60	Following University schedule

TEXT BOOKS AND REFERENCES

**** Text Books/Lecture Notes:***

1. Pham Thi Huong, Vu Thanh Hai, 2014. Lecture of "Plant and Society".

**** Additional references:***

1. Estelle Levetin Karen McMahon (2015). *Plants and Society*. McGraw-Hill Higher Education.
2. Maarten J. Chrispeels and David E. Sadava (2002). *Plants, genes, and crop biotechnology*. Jones & Bartlett Learning.
3. Peter Bellwood (2008). *First Farmers: The Origins of Agricultural Societies*. Wiley-Blackwell.
4. Journal of Science and Development, Vietnam national university of Agriculture.
5. www.mhhe.com/levetin6e

COURSE OUTLINES

Week	Content
1,2	**Chapter 1: The importance of plant to human's life**
	A/* Main contents: (6 hours)* **Theory:** *(5 hours)* 1.1. Introduction of subject 1.2. Plant and human's civilization 1.3. The roles of botany as food of human other creatures. 1.4. The other uses of botany in human's society 1.5. Overview of cultivation on develoment of world and Vietnam 1.6. Introduction of botanic science 1.6.1. Concept of science 1.6.2. Observation, scientific theory and verification of scientific theory relating mankind's civilization 1.6.3. Research on botany and apply knowledge in development of human's society 1.7. Principles of living creature 1.7.1. Growth and reproduction 1.7.2. Reaction 1.7.3. Evolution and adaptation 1.7.4. Metabolism **Seminar/Discussion:** *(1 hour)* Choose a scientific paper and discuss on the significance of plant to humun's life.
	B/* Self- study contents: *(12 hours)* 1.8. Update infomation on area, yield, producvity, import and export value of major crops on the world and Vietnam. 1.9. Find and read scientific documents on plant and human. 1.10. Read paper, prepare for discussion and presentation in group at class
4,5,6	**Chapter 2: Morphology and nutrient value of plant**

	A/* Main contents: (9 hours)* **Theory: (***6 hours***)** 2.1. Morphology and function of plant parts 2.1.1. Root 2.1.2. Stem and branch 2.1.3. Leaf 2.1.4. shoot 2.1.5. Flower 2.1.6. Fruit and seed 2.2. Modification of plant parts and use for human's food. 2.3. Stucture and anatomy of plant tissue 2.3.1. Structure and anatomy of plant cell 2.3.2. Structure and anatomy of plant tissue 2.4. Growth and reproduction of plant 2.4.1. Growth of plant 2.4.2. Seed reproduction of plant 2.4.3. Vegetative and reproduction of plant 2.5. Molecular structure of plant cell 2.5.1. Definition of genotype, phenotype and their connection to environment 2.5.2. Structure of gene 2.5.3. Recombination of gene and its application for breeding new cultivars 2.5.4. Biotechnology (cloning and gene transfering) and its application for breeding new cultivars 2.6. Plant taxonomy **Seminar/Discussion:** *(3 hours)* Choose a scientific paper and discuss on plants and their uses
	***B/* Self- study contents**: *(18 hours)* 2.7. Growth, reproduction and uses of plant 2.8. Read paper, prepare and discuss presentation in group at class
7,8	**Chapter 3: The impact of enviroment to growth and reproduction of plant**
	A/* Main contents: (6 hours)* **Theory:** *(5 hours)* 3.1 Temperature 3.2 Humidity, moisture and water 3.3 Light 3.4 Nutrient elements and soil 3.5 Other invironmental factors 3.6. Growth and reproduction of plant 3.6.1. Photosynthesis and yield 3.6.2. Respiration and yield 3.6.3. Growth and reproduction management of plant **Seminar/Discussion:** *(1 hour)*

	Choose a scientific paper and discuss on the impact of enviroment to growth and reproduction of plant
	***B/* Self- study contents**: *(12 hours)* 3.8. Classification of plant by climate zones 3.9. The impact of enviroment to growth and reproduction of plant 3.10. Read paper, prepare and discuss presentation in group at class
9,10	**Chapter 4: The importance of plant to human's food and nutrition**
	A/* Main contents: (9 hours)* **Theory:** *(5 hours)* 4.1. Relation of food and health 4.2. Major nutrition of human 4.2.1. Carbohydrate 4.2.2. Acid amin 4.2.3. Lipid 4.2.4. Vitamin 4.2.5. Mineral 4.3. Nutrient balance for human's health and oriented use of food for human 4.4. Plant use as food and nutrition for human 4.4.1. Food crops 4.4.2. Oil and herb crops 4.4.3. Crops for drink processing 4.4.4. Medical herbs 4.4.5. Poinson and allergic crops 4.4.6. Mushroom and alga **Seminar/Discussion:** *(1 hour)* Choose a scientific paper and discuss on human's food and nutrition from plant. **Practice/**E**xperiment/ Field survey:** *(3 hours)* Survey on commercial crops and use local crops for serving human's demands.
	***B/* Self- study contents**: *(18 hours)* 4.5. The significant of plant to human's food and nutrition. 4.6. Read paper, prepare and discuss presentation in group at class
11,12	**Chapter 5: Origin of crops and development of agriculture**
	A/* Main contents: (6 hours)* **Theory:** *(3 hours)* 5.1. Evolution of human 5.2. Evolution of plant 5.2.1. Center of plant origin 5.2.2. Domestication of plant 5.2.3. Breeding new cultivars 5.3. Evolution of agriculture 5.4. The impact of evolution of agriculture to world population. **Seminar/Discussion:** *(3 hours)* Choose a scientific paper and discuss on breeding new cultivars and the impact of

	evolution of agriculture to world population.
	***B/* Self- study contents**: *(12 hours)* 5.5. The impact of technical application to harvest tiem and quality of product. 5.6. Read paper, prepare and discuss presentation in group at class
13,14,15	**Chapter 6: Plant and environment**
	A/* Main contents: (9 hours)* **Theory:** *(3 hours)* 6.1. Ecology 6.1.1. Community ecology 6.1.2. Food chain and food web - Producer - Consumer 6.1.3. Energy transfer and pyramid of energy - Trophic level - Adaptation and competition of creatures (water, light, nutrion) - Interaction: Antagonism (Predation, parasitism, or herbivory), mutualism, commensalism, amensalism, competition 6.2. Energy transfer 6.3. Sustainable ecology 6.3.1. Input materials for agricultural production and quality of product 6.3.2. Integrated pest management (IPM) 6.3.3. Enviromental problems and food safety **Seminar/Discussion:** *(1 hour)* Choose a scientific paper and discuss on sustainable agricultural production. **Practice/Experiment/ Field survey:** *(5 hours)* Survey on field ecology system.
	***B/* Self- study contents**: *(18 hours)* 6.4. Plant and sustainable ecology system 6.5. Review lessons

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTRUE
FACULTY OF AGRONOMY

COURSE SYLLABUS
NHE03007: Principles of fruit production

Credits: 3 (Lecture: 2 – Practice: 1,0); Self-Learning: 6
Term: 5
Prerequisite course(s): None
Preceding course: NHE01002 Introductory Biology 3

COURSE OBJECTIVES:

This course aims to provide students with:
- ***Knowledge***: To understand the importance of commercial fruit production which is a high profitable profession of agricultural section, the constrains and challenges of fruit tree production for domestic and export markets in future. To apply principle science of nursery, mangement, harvest and post-harvest techniques.
- ***Skills***: To impliment propagation techniques, apply technologies for fruit production. To make plan and calculate investment and profit. To communicate professional knowledge with manager of local/ company/ farm, farmer/worker and other connected persons.
- **Attitude and ethics**: contribute initiatively, motivate, behave honestly, persuade full responsibly. To be initiative to seek experience and learn all life.

COURSE EXPECTED LEARNING OUTCOMES

Notation	**Course expected learning outcomes** After successfully completing this course, students are able to	**Program expected learning outcomes**
Knowledge:		
K1	Analyse major issue and update infomation of fruit tree production in Vietnam	ELO3
K2	Describle botanic characteristics, vegetative and generative growth of fruit tree in connecting with climatic conditions.	ELO3
K3	Propose principles of production procedure for different types of fruit tree and plan for new fruit tree farm, farm management for non-bearing and bearing stage of fruit tree, harvest and post harvest handling for tropical, subtropical and temperate fruit tree	ELO4, ELO5, ELO2
Skills		

K4	Demonstrate skilfully techniques of propagation, cultivation, IPM and harvest of fruit tree, write report and communicate in English	ELO7, ELO9, ELO10
K5	Explore and solve basic problems which may affect negatively to fruit tree on the commercial farm.	ELO11
K6	Work independently or in group; Plan and impliment tasks with full responsibility and cooperation; Support and develop community spirit.	ELO6
Ethics and Attitude		
K7	Contribute initiatively; motivate; To be initiative to seek experience and learn all life	ELO12
K8	Behave honestly, persuade full responsibly	ELO13, ELO14

COURSE DESCRIPTION

NHE03007. Principles of Fruit Production (3: 2 - 1; 6; 135)

This course consists of 7 chapters about 10 lessons and practices 5 lessons. This course will educate the imprtance of fruit production in agricultural section and society; Characteristics of morphology and structure of fruit tree. Vegetative and generative growth of fruit tree in connecting with enviroment factors. Management techniques are applied for nursery, establishing a new farm, non-bearing and bearing fruit tree. Harvest and principles of handling system for commercial fruits.

Preceding course: NHE01002 – Introductory Biology 3

ASSESSMENT METHODS

Grading: *10 points.*

Weighting:

- Attendance: 10%
- Formative assessment: 30%
- Final exam: 60%

Assessment summary

Rubric	Course expected learning outcome	Weighting (%)	Week
Attendance		**10**	
Rubric 1: Participant	K4, K6, K8	10	1-10
Formative asessment		**30**	
Rubric 2: Presentation	K4, K5, K7, K8	10	2-9
Rubric 3: Practice and report	K4, K3, K4, K6, K8	10	5-9
Rubric 4: Mid-term exam	K1, K2, K4, K5, K7, K8	10	6

Final assessment		**60**	
Rubric 5: Final exam	K1, K2, K4, K5, K6, K7, K8	60	Following University schedule

TEXT BOOKS AND REFERENCES

**** Text Books/Lecture Notes:***

1. Phạm Thị Hương, Vũ Thanh Hải, 2015. Bài giảng "Principle of fruit production".
2. Trần Thế Tục. Giáo trình Cây ăn quả. Nhà xuất bản Nông nghiệp, 2008.

**** Additional references:***

1. Bhatt Dhillon (2012). Fruit Tree Physiology Mar 1. Narendra publishing House.
2. Carr M. K. V. (2014). Advances in Irrigation Agronomy: Fruit Crops. Cambridge University Press.
3. Graham Seymour and Gregory A (2013). The Molecular Biology and Biochemistry of Fruit Ripening. Wiley-Blackwell Publisher.
4. Hartmann and Kester's (2002). Plant propagation: Principles and practices. Prentice Hall.
5. Julie M. (2001). Horticulture Science, Elsvier publishing House.
6. Jules Janick (2001). Horticultural Science. W.H. Freeman and Company.
7. Nakasone H.Y. and R.E. Paul (1998). Tropical Fruit, Cab International.
8. www.actahort.org
9. Nguyễn Văn Kế (2014). Cây ăn quả nhiệt đới: giống – kỹ thuật trồng và chăm sóc một số cây đặc sản. NXB Nông nghiệp.
10. Vũ Công Hậu (1996) Trồng cây ăn quả ở Việt Nam. Nhà xuất bản Nông nghiệp.
11. Journal of Science and Development, Vietnam national university of Agriculture.

COURSE OUTLINES

Week	Content
1	**Chapter 1: Introduction of fruit production** ***A/* Main contents***: (3 hours)*** **Theory:** *(3 hours)* 1.1. Subject introduction 1.2. The role of fruit production 1.3. Overview of fruit production on the world. 1.4. The past, present and future of fruit production in Vietnam: challenging, oppotunities and oriented development ***B/* Self- study contents**: *10 hours)* 1.5. Update infomation on area, yield, producvity, import and export value on fruit on the world and Vietnam. 1.6. Find and read documents on nutrition value and useage of fruits. 1.7. Update applied techiques of typical fruit production area.
2,3	**Chapter 2: Structures and growth of fruit tree**

	A/* Main contents: (8 hours)* **Theory: (***2 hours***)** 2.1 Structures of fruit tree (Root, trunk, branch, leaf, flower and fruit) 2.2 Growth stages of fruit tree 2.3 Senescense and juvenile of fruit tree 2.4 Flowering, pollination and fruit set 2.5 Fruit growth **Practice/ experiment contents:** *(5 hours)* Practice 1: Morphological study of fruit crops **Semina/Discussion:** *(1 hours)* 1. Root Asphyxia and Irrigation Management in Avocado Orchards
	***B/* Self- stusy contents**: *(10 hours)* 2.6. Classification system for fruit trees. 2.6. Vegetative and generative growth of fruit trees. 2.7. Read paper, prepare and discuss presentation in group at class
4	**Chapter 3: Climate for fruit production**
	A/* Main contents: (3 hours)* **Theory:** *(2 hours)* 3.1 Temperature 3.2 Humidity and moisture 3.3 Light 3.4 Nutrient and soil 3.5 Other environment factors **Practice/Experiment:** *0 hours)* **Seminar/Discussion:** *(1 hours)* 2. Effects of root pruning on the vegetative growth and fruit quality of Zhanhuadongzao trees
	***B/* Self- stusy contents**: *(6 hours)* 3.6. Classification of fruit tree based on climate criterie. 3.7. Impact of climate on vegetative and generative growth of fruit tree 3.8. Read paper, prepare and dicuss presentation in group at class
5,6	**Chapter 4: Nursery and propagation of fruit tree**
	A/* Main contents: (16 hours)* **Theory** *(5 hours)* 4.1. Nursery 4.2. Fruit tree propagation 4.3. Seed propagation 4.4. Vegetative propagation 4.4.1. Air layering 4.4.2. Cutting 4.4.2. In vitro **Practice/Experiment:** *10 hours) (choose 2 of 3 practices)*

	Practice 2: Seed propagation Practice 3: Layering and air layering. Practice 4: Grafting for fruit crops **Seminar/Discussion:** *(1 hours)* 3. Stamen and Pollen Development
	***B/* Self- stusy contents**: *(32 hours)* 4.5. Applied techniques for seed and vegetative propagation 4.6.. Read paper, prepare and dicuss presentation in group at class
7	**Chapter 5: Planning and** designing farm for fruit tree
	A/* Main contents: (13 hours)* **Theory:** *(2 hours)* 5.1. Planning for fruit tree production 5.2. Farm design of fruit tree 5.3. Principle rules of fruit farm design. 5.4. Barrier tree design for fruit tree farm 5.5. Plotting, irrigation and drainage system 5.6. Kinds and cultivars of fruit tree in farm 5.7. Density and planting fruit tree **Practice/Experiment/ Field survey:** *(10 hours)* Survey on commercial cultivars and techniques are applying for a specific fruit tree. **Seminar/Discussion:** *(1 hours)* 4. Production of true-to-type guava nursery plants via application of iba on soft wood cuttings
	***B/* Self- stusy contents**: *(26 hours)* 5.8. Planning and design of fruit tree farm, selecting types, cultivars, density... for new fruit tree farm. 5.9. Read paper, prepare and dicuss presentation in group at class
8,9	**Chapter 6: Orchard management of fruit tree**
	A/* Main contents: (16 hours)* **Theory:** *(5 hours)* 6.1. Triming and canopy control 6.2. Fertilizing 6.3. Irrigation 6.4. Flowering and fruit set control 6.5. Pest and disease management 6.6. Other techniques **Practice/Experiment: (***10 hours) (Choose 2 of 3 practices)* Practice 5: Pruning and canopy management Practice 6: Fertilizing for fruit crops Practice 7: IPM for fruit tree **Seminar/Discussion:** *(1 hours)* 5. Graft compatibility of Citrus with plants in the aurantioidease and their susceptibility

	to Citrus tristeza virus
	***B/* Self- stusy contents**: *(32 hours)* 6.7. Farm management for fruit tree such as pruning, fertilizing, irrigating... 6.8. Read paper, prepare and dicuss presentation in group at class
10	**Chapter 7:** Harvest and store of fruit
	A/* Main contents: (3 hours)* **Theory:** *(2 hours)* 7.1. Change during fruit ripening 7.1. Harvest indices 7.2. Store and quality control **Practice/Experiment:** *(0 hours)* **Seminar/Discussion:** *(1 hours)* 6. Canopy Management for Pacific Northwest Vineyards
	***B/* Self- stusy contents**: *(6 hours)* 7.3. Impact of applied techniques on harvest and fruit quality at harvest and post harvest. 7.4. Read paper, prepare and dicuss presentation in group at class.

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTRUE
FACULTY OF FOOD SCIENCE AND TECHNOLOGY

COURSE SYLLABUS
CPE03001: Postharvest Physiology and Handling of Horticultural Crops

Credits: 4 (Lecture: 3 – Practice: 1); Self-Learning: 8
Term: 6
Preceding course: NHE02003- Plant physiology; CPE02001 – General Bio-chemistry

COURSE OBJECTIVES:

This course aims to focus on the following:
- ***On knowledge:*** Identify common factors related to quantitative and qualitative losses of horticultural commodities after harvest, including physiological considerations as well as compositional and physical changes occurring during maturation and deterioration. Understand mechanical and practical procedures of harvesting, handling, storage, and marketing horticultural perishables in relation to commodity requirements and responses to ensure safe, effective and sustainable postharvest systems.
- ***On skills:*** Students will be able to analyse the common factors related to quantitative and qualitative losses of horticultural commodities after harvest and apply relevant techniques to manage plant product's quality and improve postharvest shelflife. They will be good at English, communication and team work.
- ***On attitude and responsibility:*** Students know how to work independently, to organize, allocate tasks efficiently and longlife learning. Having a good professional ethnic and high responsibility. Following the regulations in food safety.

COURSE EXPECTED LEARNING OUTCOMES

Notation	**Course expected learning outcomes** After successfully completing this course, students are able to	**Program expected learning outcomes**
Knowledge		
K1	Analyze relationship between postharvest physiology and Bio-chemistry processes and change in postharvest quality of plant products	ELO3
K2	Apply simple techniques to handle and store products after harvest for ensuring quality	ELO4

Skills Sử dụng động từ Bloom đầu câu		
K3	Work effectively in group to manage quality of food supply chain (cases of plant products)	ELO6
K4	Develop good communication for extension job	ELO7
K5	Use specialized English in the field of postharvest physiology and handling of horticultural crops	ELO8
K6	Perfom analysis skills at laboratory to determine products quality	ELO 10
K7	Have critical thinking in analyzing and evaluating the causes of product damage and selecting solutions to manage the quality of postharvest products.	ELO 11
Ethics and Attitude		
K8	Practice lifelong learning through self-assessment and conception, searching and updating professional knowledge and skills	ELO 12
K9	Have responsibility and professional ethics in applying postharvest technology to ensure food hygiene and safety	ELO 13
K10	Implement regulations/ legislation to ensure food quality and safety of postharvest products	ELO 14

COURSE DESCRIPTION

CPE03001: Postharvest physiology and handling of horticultural crops (4: 3-1; 8; 180). This course consists of 3 chapters including 15 topics on: overview of factors related to quantitative and qualitative losses of horticultural commodities after harvest, including physiological considerations as well as compositional and physical changes occurring during maturation and deterioration. Commercial procedures of harvesting, handling, storage, and marketing horticultural perishables in relation to commodity requirements and responses.

This course consists of 5 lessons of practices: 1). Structure of plant products; 2). Measurement of respiration rate of plant products; 3). Measurement of total weight loss of plant products after harvest; 4). Ethylene application in ripening of fruits; 5). Cold sorage methods for plant products.

Previous courses: NHE02003- Plant physiology; CPE02011 – General Bio-chemistry

ASSESSMENT

Grading: 10

Weighting:

- Attendance: 10 %

- Formative assessment (Oral presentation/Assignment, midterm exam, practical report: 10%
- Final exam: 60%

Assessment summary

Rubric	Course expected learning outcome	Weighting (%)	Week
Attendance		**10**	
Rubric 1 – Participant	K1, K2, K3, K4, K8	10	1-15
Formative asessment		**30**	
Rubric 2 – Group discussion	K3, K9	5	W3, W7, W12
Rubric 3 – Group work	K3, K5	5	W2-3, W5-7, W10-12
Rubric 4 – Oral presentation	K4	10	W8, W14
Rubric 5 – Midterm exam	K1, K2, K5, K7	20	W 10
Rubric 6 – Practical and report	K1, K2, K3, K6, K7	20	W5-10
Final exam		**60**	
Rubic 7 - Final exam	K1, K2, K5, K7, K10	30	Following University schedule

TEXT BOOKS AND REFERENCES

**** Text Books/Lecture Notes:***

1. Lecture Note of UC Davis
2. Kader, A.A. 2002. ***Postharvest Technology of horticultural crops***. USA.
3. Mohammed Wasim Siddiqui. 2015. ***Postharvest Biology and Technology of Horticultural Crops: Principles and Practices for Quality Maintenance***.

**** Additional references:***

1. E Yahia. 2011. ***Postharvest Biology and Technology of Tropical and Subtropical Fruits (4 volumes).***
2. Florkowski, Shewfelt, Brueckner and Prussia. (2014). ***Postharvest Handling, A Systems Approach***. Academic Press. 592 p.
3. Sunil Pareek. (2016) ***Postharvest Ripening Physiology of Crops***. CRC Press. 643 p.
4. Ron B.H. Wills, John Golding. (2015). ***Advances in Postharvest Fruit and Vegetable Technology***. CRC Press. 403 p.

COURSE OUTLINE

Week	Content
1-7	**Chapter 1: General Biological Considerations**
	A/* Main contents: (15 hours)* **Theory:** 1.1. Morphology, structure, growth and development 1.2. Respiration: measurement, comparative rates, significance, and affecting factors. 1.3. Role of plant hormones, especially ethylene in senescence. 1.4. Composition, quality, and safety. 1.5. Fruit maturation, ripening, and senescence. 1.6. Transpiration: characterization, significance, and affecting factors. 1.7. Physiological disorders. 1.8. Pathology: host-pathogen relationships, disease control methods. **Practice/Experiment:** *(6 hours)* Structure of plant products **Seminar/Discussion:** *(4 hours)*
	***B/* Self- study contents**: *(40 hours)* 1.1. Other postharvest physiology (Senescence, germination...) 1.2. Composion of plant products: hydratcarbon, protein, lipid, pigments, aroma... 1.3. Nutritional composition of agricultural products and its role on human health
8-13	**Chapter 2: Commercial Practices**
	A/* Main contents: (15 hours)* **Theory:** 2.1. Harvesting and handling systems; pre-harvest factors influencing quality. 2.2. Preparation for market: sorting, sizing, washing, waxing, packaging, etc. 2.3. Temperature and relative humidity control, cooling methods, storage methods. 2.4. Modified and controlled atmosphere storage **Practice/ experiment contents:** *(24 hours)* 1). Measurement of respiration rate of plant products; 2). Measurement of total weight loss of plant products after harvest; 3). Ethylene application in ripening of fruits; 4). Cold sorage methods for plant products. **Seminar/Discussion:** *(4 hours)*
	***B/* Self- study contents**: *(40 hours)* Different methods of food storage
14-15	**Chapter 3: Postharvest handling system for specific plant products**
	A/* Main contents: (5 hours)*

	Theory: 3.1. Postharvest handling system for vegetables 3.1.1. Leafy vegetables 3.1.2. Root/tuber vegetables 3.2. Postharvest handling system for fruits 3.2.1. Tropical 3.2.2. Sub-tropical 3.2.3. Temperate 3.3. Postharvest handling system for seeds **Seminar/Discussion:** *(2 hours)*
	***B/* Self- study contents**: *(40 hours)* Postharvest handling system for specific plant products

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTRUE
FACULTY OF ACCOUNTING AND BUSINESS MANAGEMENT

COURSE SYLLABUS
KDE02006: Principles of management

Credits: 2 (Lecture: 2 – Practice: 0); Self-Learning 4
Term: 6
Prerequisite course(s): None

COURSE OBJECTIVES

This course aims to help learners gaining basic knowledge in management sciences, methods of management, difference between managers and leaders, methods of planning, organization, leading and monitoring in an organization. Addition, the module helps learners to improve their skills in information technology, English, and decision control, thereby forming skills, ethics and attitude in individual and teamwork and active learning and adaptation to business environment.

COURSE EXPECTED LEARNING OUTCOMES

Notation	**Course expected learning outcomes** After successfully completing this course, students are able to	**Program expected learning outcomes**
Knowledge:		
K1	Apply general principles of management in order to analysis and solve issues in business units	ELO1, ELO4
K2	Present the development of management theories and the tendency of modern management.	ELO4, ELO8
K3	Analyse the nature of managers and leaders	ELO4, ELO6
K4	Apply the content, tools and appropriate methods in order to planning, organizing, leading and controlling in agribusiness management	ELO4, ELO6, ELO7
Skills		
K5	Fluently practice in Microsoft offices	ELO8
K6	Show English skills of: listening, speaking, reading, writing academic materials	ELO8

K7	Synthesize and identify manage information and basic decision-making methods for organization's issues	ELO6, ELO7, ELO8, ELO11
K8	Naturalize tools for collecting, processing and aggregating information in management	ELO7, ELO8
Ethics and Attitude		
K9	Develop independent-working, time allocation, well-organized and task assignment.	ELO12, ELO13, ELO14
K10	Be active in learning, in knowledge and experience accumulation; in looking materials to approach modern science and lifelong learning.	ELO12, ELO13, ELO14
K11	Demonstrate responsibility for professional ethics, environment and society.	ELO12, ELO13, ELO14

COURSE DESCRIPTION

KDE02006. Principles of Management (2TC: 2-0; 4; 90)

This course consists of 7 chapters about Management and Management Theories; Managers vs Leaders vs Entrepreneur; Information and Decision Making; Planning; Organizing; Leading; Controlling.

Prerequisite: None

ASSESSMENT

Grading: 100 points

Weighting

- Attendance: 10%
- Formative assessment: 30%
- Final exam: 60%

Assessment summary

Rubric	Course expected learning outcome	Weighting (%)	Week
Attendance		**10**	**1-10**
Rubric 1. Participant	K9, K11, K10, K11	10	1-10
Formative assessment		**30**	
Rubric 2. Discusion	K1,K2,K4	5	2-10
Rubric 3. Group work	K3,K4,K9	5	1-10
Rubric 4. Presentation	K5,K8,K10	5	6,7,8

Rubric 5. Assignment	K4,K6	15	2-10
Final exam		**60**	
Rubric 6. Paper final examination	K1,K2,K3,K4,K6,K11	60	After week 10

TEXT BOOKS AND REFERENCES

**** Text Books/Lecture Notes:***

Robert Kreitner and Carlene Cassidy **(**2012), *Principles of management*, South-Western College Pub

Chuck Williams (2013), *Effective Management*, South-Western College Pub

Ranjay Gulati et. al. (2014) *Management*, Nitin Nohria Cengage Learning

**** Additional references:***

Gary Yukl (2013), *Leadership in organization*, 8th Edition, Pearson

Kevin Roe (2014), *Leadership: Practice and Perspectives*, Oxford university press, Inc.

COURSE OUTLINE

Week	Content
1,2	**Chapter 1: Management and Management theories**
	***A/* Main contents:** *(6 hours)* **Theory:** *(3 hours):* 1.1. Definition and Nature of Management 1.2. Organization 1.3. Management as a science, an act and a profesion 1.4. Effectiveness and Effeciency 1.5. Management theories **Discussion**: *(1 hour)* "Kaizen Management" **Other activities:** *(2 hours)* Precourse survey Game on "Nature of management"
	***B/* Self-learning contents:** *(12 hours)* Readings about Taylor and Fayol's principles of classical management Blue Card design
3,4	**Chapter 2: Managers, Enterpreneurs and Leaders**
	A/* Main contents: (6 hours)* **Theory:** *(3 hours)* 2.1. Managers 2.2. Enterpreneurs 2.3. Leaders **Discussion:** *(1.5 hours)*

	Differences between managers and leaders "Leader of Trung Nguyen coffee" **Other activities**: *(1.5 hours)*
	***B/* Self-learning contents**: *(12 hours)* Reading chapter 2 Reading on styles and methods of management Blue Card design
5	**Chapter 3: Information and Decision Making in Management**
	A/* Main contents: (3 hours)* **Theory:** *1.5 hours* 3.1. Managic Information 3.2. Managic Decision **Discussion:** *(1.5 hours)* Situation: Decision making
	***B/* Self-learning contents**: *6 hours)* Reading chapter 3 Blue Card design
6,7	**Chapter 4: Planning**
	A/* Main contents: (6 hours)* **Theory:** *(3 hours)* 4.1. Definition and Significance of Planning 4.2. Clasification of Planning 4.3. Methods of Planning 4.4. Tools for Planning 4.5. Process of Planning **Presentation:** *(1hour)* *Present SWOT of Vinamilk, King Do cake .....* **Other activities:** *(2 hours)* *Plan for start up of KFC shop near the campus*
	***B/* Self-learning contents**: *(3 hours)* Blue Card design
8	**Chapter 5: Organizing**
	A/* Main contents: (3 hours)* **Theory:** *(1.5 hours)* 5.1. Definition and Objectives 5.2. Basement for organizational structures 5.3. Rules in organizing 5.4. Types of organizational structures 5.5. Capacity of management **Other activities:** *(1.5 hours)* *Watching video about issue in organization*

	Designing some organizational structures *Doing excercise about capacity of management*
	***B/* Self-learning contents**: *(6 hours)* Readings about advantages and disadvantages of organizational structures Blue Card design
9	**Chapter 6 : Leading**
	A/* Main contents: (3 hours)* **Theory:** *(1.5 hours)* 6.1. Definition 6.2. Power classification 6.3. Leading methods 6.4. Leading Styles 6.5. Promotion **Discussion** *(1.5 hours)* *Discussion on real power in management* *Doing 30 minute quizz (game)*
	***B/* Self-learning contents**: *(6 hours)* Blue Card design
10	**Chapter 7: Controling**
	A/* Main contents: (3 hours)* **Theory:** *(1.5 hours)* 7.1. Definition and Objectives 7.2. Requirement for controling system 7.3. Rules in controling 7.4. Methods of controling 7.5. Process of controling 7.6. Content of controling 7.7. Nature of controling 7.8. Technique in controling **Discussion** *(1.5 hours)* *Situation: Letter sending by post*
	***B/* Self-learning contents**: *(6 hours)* Blue Card design

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTRUE
FACULTY OF BIOTECHNOLOGY

COURSE SYLLABUS
SHE03005: Applied Bioinformatics

Credits: 3 (Lecture: 2 – Practical: 1); Self-Learning:9
Term: 6
Preceding course: NHE02003 - Plant genetics; THE02001 - Application of computers in Agriculture

COURSE OBJECTIVES:

The purpose of the course is to provide students with the concepts of bioinformatics, biological databases and the role of databases in research, analysis and practical applications. The module also provides students with tools for analysing data for specific research purposes; Assist students in combining the use of databases and tools to create research ideas and practical applications. In addition, the exercises aim to assist students in using a combination of tools and software to analyse the data.

COURSE EXPECTED LEARNING OUTCOMES

Notation	**Course expected learning outcomes** After successfully completing this course, students are able to	**Program expected learning outcomes**
Knowledge:		
K1	Analyse and select biological databases and use bioinformatics tools in research and practical applications.	ELO3
Skills:		
K2	Read and understand biophysical materials in English.	ELO8
K3	Conduct the researches and application of plant production.	ELO10
K4	Apply the critical thinking in analysing, evaluating and solving the related issues.	ELO11
Ethics and Attitude:		
K5	Have a good learning attitude; keep updating the technology and new innovation in research on crops.	ELO12

COURSE DESCRIPTION

SHE03005. Applied Bioinformatics (3: 2 – 1; 6; 135)

This course consists of 9 chapters. General introduction of bioinformatics in the direction of application; Biological basis for bioinformatics; Method of searching materials for study and research; Biological database; Identification of nucleotide sequences and sequence registers; Basic search engines and sequence analysis; Genome browser; Analyze genetic relationships, study evolution; Use of tools to exploit the database; Use a combination of tools, software to analyze the data. This course also consists of 6 Exercises aim to assist students in using a combination of tools and software to analyze the data.

Preceding course: NHE02003 - Plant genetics; THE02001 - Application of computers in Agriculture

ASSESSMENT

1.Grading: 10 points scale

2 .Weighting:

- Attendance: 10 %
- Formative assessment: 30%
- Final Exam: 60%

3. Assessment summary

Rubric	Course expected learning outcome	Weighting (%)	Week
Attendance			
Rubric 1: Attendance	K2, K3, K4, K5	10	1 - 15
Formative assessment			
Rubric 2: Practices	K1, K2, K3, K4, K5	10	11 -15
Rubric 3: Mid-term	K1, K2, K3, K4, K5	20	10
Final exam			
Rubric 4: Final exam	K1, K2, K3, K4, K5	60	Following University schedule

TEXT BOOKS AND REFERENCES

**** Text Books/Lecture Notes:***

Nguyen Duc Bach, Trinh Thi Thu Thuy (2014). Applied Bioinformatics, Vietnam National University of Agriculture.

**** Additional references:***

1. Arthur M. Lesk (2014). Introduction to Bioinformatics, 4th Edition. ISBN-13: 978-0199651566
2. Bioinformatics for Beginners: Genes, Genomes, Molecular Evolution, Databases and Analytical Tools.
3. Steven Haddock, Casey Dunn (2011). Practical Computing for Biologists First Edition. 520 pages.
4. Jean-Michel Claverie and Cedric Notredame (2006). Bioinformatics for Dummies, 452 p

COURSE OUTLINE

Week	Content
1	**PART 1. INTRODUCTION** **CHAPTER 1:** **INTRODUCTION TO BIOINFORMATICS** ***A/* Main contents** *(3 hours)* 1.1. Concept 1.2. The biological basis for the birth and development of bioinformatics 1.3. The role of bioinformatics in biological research 1.4. Bioinformatics mission and direction 1.5. Development trend of bioinformatics
	B/ Self- study contents: *(6 hours)* 1. According to the contents mentioned in Chapter 1 of the Applied Bioinformatics
2	**CHAPTER 2:** **BIOLOGICAL BACKGROUND OF BIOINFORMATICS** ***A/* Main contents** *(3 hours)* 2.1. Genome and genome studies (genomics) 2.2. Gene detection and gene function determination 2.3. Functional functioning of genes and regulation of gene activity 2.4. Proteomics and Proteomics Research (Proteomics) 2.5. Evolution and molecular nature of evolution in organisms
	B/ Self- study contents: *(6 hours)* 1. According to the contents mentioned in Chapter 2 of the Applied Bioinformatics Lecture
3	**CHAPTER 3:** **SEARCHING AND MANAGING RESEARCH MATERIALS** ***A/* Main contents** *(3 hours)* 3.1. Document database in research in biology 3.2. Database books and journals 3.3. Find and manage research materials

	3.4. Cite research papers.
	B/ Self- study contents: *(6 hours)* 1. According to the contents mentioned in Chapter 3 of the Applied Bioinformatics Lecture
4, 5	**PART 2** **BIOLOGICAL DATABASES AND SEQUENCE SUBMISSION** **CHAPTER 4:** **BIOLOGICAL DATABASES** ***A/* Main contents** *(6 hours)* 4.1. Introduction to Biological Database 4.2. The role and significance of the biological database 4.3. Classification of biological databases 4.4. Basic biological databases 4.5. Database exploitation in crop breeding
	B/ Self- study contents: *(12 hours)* 1. According to the contents mentioned in Chapter 4 of the Applied Bioinformatics
6	**CHAPTER 5:** **SEQUENCING AND SEQUENCE SUBMISSION** ***A/* Main contents** *(3 hours)* 5.1. The importance of DNA sequencing 5.2. Determine the new generation sequence and assembly sequence 5.3. Register Sequence
	B/ Self- study contents: *(6 hours)* 1. According to the contents mentioned in Chapter 5 of the Applied Bioinformatics
7	**PART 3** **ANALYSIS TOOLS, EXPOILATION AND BIOLOGICAL SEQUENCE ANALYSIS** **CHAPTER 6:** **GENOME BROWSER** ***A/* Main contents** *(3 hours)* 6.1. The concept of genome browser 6.2. Characteristics and applications of browser genomes 6.3. Genome browser specific 6.4. Introduce some important browser genome
	B/ Self- study contents: *(6 hours)*

	1. According to the contents mentioned in Chapter 6 of the Applied Bioinformatics
8	**CHAPTER 7:** **STARTING WITH ANALYSIS TOOLS** ***A/* Main contents** *(3 hours)* 7.1 Introduction of some basic analytical tools 7.2. Search engines and analysis of nucleotide sequences 7.3. Search engines and protein sequence analysers 7.4. Pairing sequence 7.5. Align multiple sequences 7.6. Analysis of protein function 7.7. Tools for analysing genomic functions 7.8. Tool for analysing molecular structure
	B/ Self- study contents: *(6 hours)* 1. According to the contents mentioned in Chapter 7 of the Applied Bioinformatics.
9	**CHAPTER 8:** **EXPLOITATION AND BIOLOGICAL DATA ANALYSIS** ***A/* Main contents** *(3 hours)* 8.1. Determine the location of the organism in the classification system 8.2. Use article articles, magazines 8.3. Find and exploit the birth order 8.4. Predict the characteristics of the protein, compare the structure and predict the function 8.5. Comparison of sequences 8.6. Detects the gene and locates the gene in the genome. 8.7. SNPs and applications data 8.8. Limit maps and applications 8.9. Analysis of biodiversity and molecular evolution 8.10. Relationship between gene and disease
	B/ Self- study contents: *(6 hours)* 1. According to the contents mentioned in Chapter 8 of the Applied Bioinformatics
10	**CHAPTER 9:** **INTRODUCTION TO SOFTWARE FOR DATA ANALYSIS** ***A/* Main contents** *(3 hours)* 9.1. Basic operations with nucleotide sequences, amino acids 9.2. Register the biological order 9.3. Use the genome browser to find out the genome of some species 9.4. Sequence analysis tools 9.5. Building classification trees 9.6. Synthesis exercises
	B/ Self- study contents: *(6 hours)* 1. According to the contents mentioned in Chapter 9 of the Applied Bioinformatics
	THE MID-TERM TEST 45 minutes with 40 multiple questions

11 - 15	**PRACTICE (15 hours)** **Practice on computer (1 credit, 15 periods, 30 practice periods)** Practice 1. DNA sequencing and sequencing tools (5 hours) Practice 2. Database of gene bank, metadatabase and database specific (5 hours). Practice 3. Sequence submission into the gene bank. Biological Sequence Analysis (5 hours) Practice 4. Alignment and Similar Sequence Searching (5 hours) Practice 5. Analysis of genetic relationships, classification tree construction (5 hours) Practice 6. Summary Exercises (5 hours)
	Additional topics for self-study students 1. Brief overview of Bioinformatics, roles, applications 2. Classify the biological database and application of these databases 3. Find out about genome banking plant objects (rice, corn, soybean, potato) 4. Grouping tools for sequence analysis, application 5. Genome browser and application in genome mining 6. BLAST tools, variants, and applications 7. Methods of sequencing and sequencing registers 8. SNP database, real applications of this database 9. Database of relationships between genes, mutations and diseases 10. Incorporate bioinformatics tools to develop a Marker assisted Selection (MAS) technique for bio-agronomic traits: productivity, quality, and disease resistance. 11. Open Topic: Students select their own topic

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTRUE
FACULTY OF BIOTECHNOLOGY

COURSE SYLLABUS

SHE03054: Biosafety

Credits: 2 (Lecture: 2 – Practical: 0); Self-Learning: 4
Term: 6
Preceding course: None

COURSE OBJECTIVES:

- ***Knowledge***

+ The learners understand the general knowledge about biosafety, generalization of the knowledge about risk levels of biological agents that have potential in causing biological hazards and biological disaster.
+ The learners can understand, compare and explain: the biosafety level; The essential elements of the four laboratory biosafety levels 1, 2, 3 and 4; the principal use of safety equipment; biological safety of genetically modified organisms and products from them;
+ The learners can understand, summarize and categorize the methods, protocols, and processes for the risk analysis process (basic concepts, risk assessment, risk management).
+ The learners can understand the bioethical issues, bioethical standards. In addition, learners can distinguish between principled bioethical standards and opinions.
+ The learners can: understand, analyze and compare the conventions and international agreements on biosafety which our country involved; apply their knowledge to solve practical problems related to bio-safety knowledge;
+ Learners can understand and capable of applying biosafety knowledge management in laboratory biosafety levels.

- ***Skills***

+ The learners have ability to summarize, analyze, assess, forecast, write and present report on biosafety-related issues.
+ The learners have ability to work independently, observation skills, organizational skills and teamwork.
+ The learners can enhance the application of their knowledge into practice.

- ***Ethic and attitude***

+ The learners actively involved in the learning process, willing to help and share their experiences with colleagues.

COURSE EXPECTED LEARNING OUTCOMES

Notation	Course expected learning outcomes	Program

	After successfully completing this course, student should be able to:	**expected learning outcomes**
Knowledge		
K1	Desribe general introduction of bio-safety, history of bio-safety, biotechnology and risk issues.	ELO5
K2	Explain the general knowledge of biosafety guidelines in Biotechnology lab. - Bio-safety levels - Safety equipment - Sterilization methods - Laboratory waste treatment process - Transport of hazardous biological material - Emergency procedures	ELO5
K3	Describe recombinant DNA technology, gene transformation techniques. The development and acceptance of GMOs worldwide and in Vietnam and the risks of biotech organism.	ELO5
K4	Conduct a risk assessment and risk management plan for genetically modified organisms; Identify and analyze the benefits and risks of biotech organism.	ELO5
K5	Apply techniques to assess the risk of genetic modifications on human, animal health and environment. Contents of risk assessment and management of GMOs.	ELO5
K6	Evaluate risk assessment of biotech organism.	ELO5
K7	Applying and implement testing procedures, sampling in the GMO test (detection of GMOs: tools, methods used in analysis and bio-safety assessment of GMOs).	ELO5
K8	Identify, analyze the impact of domestic and foreign regulations related to GMO, international conventions, treaties and agreements on Bio-safety	ELO5
K9	Explain the main issues in bioethics and bioethical issues in research application of biotechnology, ethical and social issues arising from biotechnology innovation and commercialization.	ELO5
Skills		
K10	Apply good microbiological techniques.	ELO10
Ethics and Attitude		
K11	Act professionally, lawfully, honestly and responsibly to ensure that risks and hazards are minimized; Respect biological ethics.	ELO13, ELO14

COURSE DESCRIPTION

SHE03054. Biosafety (2: 2-0; 4; 90)

This course consists of 8 main chapters, focusing on General of biosafety; Laboratory biosafety guidelines; Overview of wide applications of biotechnology and controversies worldwide; Risk assessment and management: principles and procedures; Biosafety assessment of GMOs and their effects to Environment, Human and Animal Health; Tools, methods used in analysis and biosafety assessment of GMOs; International conventions, treaties and agreements on biosafety; Bioethics; Biotechnology and intellectual property rights.

ASSESSMENT

1. Grading: 10 points

2. Weighting:

- ✓ Attendance: 10 %
- ✓ Formative assessment: 30%
- ✓ Final exam: 60%

3. Assessment summary

Rubric	Course expected learning outcome	Weighting (%)	Week
Attendance			1 – 10
Rubric 1: Participant	K10, K11	10	1 – 10
Formative assessment			1 – 10
Rubric 2: Group discussion	K1, K2, K3, K4, K5	10	1 – 10
Rubric 3: Group work	K1, K2, K3, K4, K5	5	
Rubric 4: Group oral presentation	K1, K2, K3, K4, K5	5	
Rubric 5: Formative assessment	K1, K2, K3, K4, K5, K10	10	
Final exam			10
Rubric 6: Final exam	K1, K2, K3, K4, K5, K6, K7, K8, K9, K10	60	10

TEXT BOOKS AND REFERENCES

**** Text Books/Lecture Notes:***

Lecture Notes: Lecture of Bio-safety _ Department of Plant Biotechnology

**** Additional references:***

- Cartagena Protocol on biosafety
- Biosafety guidelines (1974)

- NIH Guidelines for Research Involving Recombinant DNA Molecules (updated November 2013)
- Biosafety Microbiological and Biomedical Laboratories (HHS Publication No. (CDC) 93-8395).

COURSE OUTLINE

Week	Content
6	***Chapter 1: General of bio-safety***
	A/* Main contents: (3 hrs)* **Theory:** 1.1. General introduction of bio-safety; 1.2. History of bio-safety, biotechnology and risk issues; 1.3. General concerns of using recombinant DNA technology derived products.
	***B/* Self- study contents**: *(6 hrs)* 1.4. Students are required to read books and references before attending the class.
2	**Chapter 2: Laboratory Biosafety**
	A/* Main contents: (3 hrs)* **Theory:** 2.1. Bio-safety levels 2.2. Safety equipment 2.3. Sterilization methods 2.4. Laboratory waste treatment process 2.5. Transport of hazardous biological material 2.6. Emergency procedures
	***B/* Self- study contents**: *(6 hrs)* 2.7. Students are required to read books and references before attending the class.
3, 4	***Chapter 3: Biosafety of genetically modified organisms***
	A/* Main contents: (6 hrs)* **Theory:** 3.1. The development and acceptance of GMOs worldwide and in Vietnam 3.2. Traditional breeding and genetic modification 3.3. Principles and methods to produce GMO 3.4. Characteristics of GMOs 3.5. Controversial issues about GMO bio-safety
	***B/* Self- study contents**: *(12 hrs)* 3.6. Students are required to read books and references before attending the class.
5, 6	**Chapter 4: Risk assessment and management principles and procedures**
	A/* Main contents: (6 hrs)* **Theory:**

	4.1. Concepts used in bio-safety assessment 4.2. Bio-safety assessment regulations and objectives 4.3. Components and procedure of risk assessment 4.4. Approaches to risk assessment and management 4.5. Sampling procedures 4.6. Sample preparation procedures 4.7. Techniques of GMO Detection: - GMO detection by phenotypic characterization - Molecular detection and quantification of GMOs - DNA- based methods - Molecular detection and quantification of GMOs – protein- based methods - Molecular detection and quantification of GMOs - other methods 4.8. Limits and outlook of GMO analysis
	***B/* Self- study contents**: *(12 hrs)* 4.13. Students are required to read books and references before attending the class.
7 - 9	***Chapter 5:* International conventions, treaties and agreements on Biosafety**
	A/* Main contents: (3 hrs)* **Theory:** 5.1. Framework of Biosafety in Vietnam **Seminar:** *(6 hrs)* 5.1. Convention on biological biodiversity, CBD, 1992 5.2. Group seminar (multiple topics). 5.3. Convention on biological biodiversity, CBD, 1992. 5.4. Agreement on the application of sanitary and phytosanitary measures, 1994 5.5. Agreement on technical barrier to trade, 1994 5.6. International Plant Protection Convention (IPPC), 1997 5.7. Convention on access to information, public participation in decision making and access to justice in environmental matters, 1998. 5.8. Cartagena Protocol on biosafety, 2000. 5.9. International treaty for plant genetic resources for food and agriculture, 2001 5.10. The World Health Organization and Food and Agriculture Organization Codex Alimentarius). 5.11. Framework of Biosafety in Vietnam.
	***B/* Self- study contents**: *(18 hrs)* 5.12. Students are required to read books and references before attending the class.
10	***Chapter 6: Bioethics: Ethical and social issues arising from biotechnology innovation and commercialization***
	A/* Main contents: (3 hrs)* **Theory:** 6.1. Overview; Definition of Bioethics 6.2. Principles of bioethics 6.3. Bioethical issues in research application of biotechnology

	6.4. Other considerations
	***B/* Self- study contents**: *(6 hrs)* 6.5. Students are required to read books and references before attending the class.

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTRUE
FACULTY OF AGRONOMY

COURSE SYLLABUS
KDE03000: Farm management

Credits: 3 (Lecture: 3 – Practice: 0); Self-Learning: 6
Term: 7
Preceding course: KDE02006 - Principles of Management

COURSE OBJECTIVES:

This course aims to help student to obtain basis knowledge and skill on farm management; be able to apply these knowledge and skills on planning, organizing, managing organizational resources and evaluating farm operation efficiency; be able to solve basis problems on farm production; having good attitude and ethics.

COURSE EXPECTED LEARNING OUTCOMES

Notation	Course expected learning outcomes After successfully completing this course, students are able to	Program expected learning outcomes
Knowledge:		
K1	Synthesize basis management knowledge related to farm management.	ELO4, ELO5
K2	Apply basis management knowledge to manage farm production business.	ELO4, ELO5
Skills:		
K3	Use English in study including skills *i.e.*, listening, speaking, reading and writing.	ELO7, ELO8
K4	Carry out competently skills on defining production line, planning, managing farm resources and evaluating farm production and business efficiency.	ELO9,ELO11
K5	Carry out competently skills on problem solving.	ELO10, ELO11
K6	Be able to work individually and group effectively; sharing, time management, effectively work organize and design.	ELO6
Ethics and Attitude:		
K7	Be active and creative in study; to be fluent in searching documents to modern science and having life long learning awareness	ELO12, ELO13, ELO14

K8	Have professional ethnics, self-responsibility to environment and society.	ELO12, ELO13, ELO14

COURSE DESCRIPTION

KDE03000 – Farm management: 3TC (3: 3-0; 6; 135).

This course includes 8 chapters, providing basis knowledge on farm management; Farm production line and production scale; production plan; Farm resource management; Farm production accounting and analyzing; and farm development.

Prerequisite: None

Previous course: KDE02006 - Principles of Management

ASSESSMENT

Grading: 100 points

Weighting:

- Attendance: 10%
- Formative assessment: 30%
- Final exam: 60%

Assessment summary

Rubric Evaluation	Course expected learning outcome	Weight (%)	Week
Rubric 1: Attendance assessment	K7, K8	10	1-15
Formative assessment			
Rubric 2: Group discussion	K3, K4, K5	5	2,3,6,7,8, 11 12,13,15
Rubric 3: Homework and exercise assessment	K1, K2, K3, K4, K5.	10	4,5,10,14
Rubric 4: Midterm assessment	K3, K5, K6	15	9
Final exam			
Rubric 5: Final exam	K1,K2, K3, K4, K5, K6	60	Following University schedule

TEXT BOOKS AND REFERENCES

**** Text Books/Lecture Notes:***

- Text Books/Lecture Notes: Lecture notes given by lecturer.

**** Additional references:***

1) Bui Thi Nga (2012). Management textbook. Hanoi University of Agriculture Publishing House.
2) Ronald Kay (2016). Farm management, 8th edition. McGraw-Hill Education
3) Frank Ellis (1993). Peasant Economics (second Edition). Cambridge University Press.
4) Gulati, Ranjay (2014). Management. Cengage Publishing House

COURSE OUTLINE

Week	Content
	Chapter 1: **General overview of management**
	A/ **Main content***: (3 hrs)* **Theory:** *(2.0 hrs)* 1.1. Definition, roles and main function of management 1.1.1. Basis definitions 1.1.2. Management factors 1.2. Nature of management 1.3. Organization 1.3.1. Definition 1.3.2. Organization characteristics 1.3.3. Main organization activities **1.5. Result and efficiency of management** 1.5.1. Result 1.5.2. Efficient **Seminar/discussion:** *(1.0 hr.)* - Management factors - Results and efficiency of management
	B/ **self study**: *(6 hrs)* Read given documents Analyze management factors
2	***Chapter 1:*** **General overview of management**
	A/ **Main contents***: (3 hrs)* **Theory:** *(2,0 hrs)* 1.6. Management decision 1.6.1.1 Definition and management decision functions 1.6.2 Management decision functions 1.6.3 Requirements of management decision 1.6.4 Bases and factors affection decision making processes 1.6.5 Decision making methods **Seminar/discussion:** *(1.0 hr)* - Decision making processes - Rationality of the decision

	B/ Self study: *(06 hrs)* - Read given documents - Decision making processes and rationality of the decision
3	***Chapter 2: Overview on agricultural farm***
	***A/* Main content:** *(3tiết)* **Theory:** *(2.0 hrs)* 2.1. Definition, classification and characteristics of agricultural household farm 2.1.1. Definition 2.1.2. Classification 2.1.3. Characteristics 2.1.4. Comparison between agricultural household economy and household farm economy **Seminar/discussion:** *(1.0 hrs)* - Characteristics of agricultural household farm Differences between family, household and household farm.
	***B/* Self study**: *(6 hrs)* - Read required documents - Characteristics of agricultural household, differences between family, household and household farm.
4	***Chapter 2: : Overview on agricultural farm***
	***A/* main contents:** *(3 hrs)* **Theory:** *(2.0 hrs)* 2. 2. Agricultural household and farm management 2. 2.1. Definition 2. 2.2. Management contents 2.2.3. Management methods 2.2.4. Application of management contents and methods in agricultural household and farm management. **Exercise:** *(1.0 hr)* - Management contents and methods Application of management contents and methods in agricultural household and farm management
	***B/* Self study**: *(6 hrs)* - Read required documents Management contents and methods, application of management contents and methods in agricultural household and farm management.
5	***Chapter 3:* Production line of agricultural household and household farm**

	***A/* Main contents:** *(3 hrs)* **Theory:** *(2.0 hrs)* 3.1. Production line of agricultural household, farm 3.1.1. Production line definition 3.1.2. Production business enterprise 3.1.2.1. Definition 3.1.2.2. Business enterprise classification 3.1.2.3. Business enterprise combination 3.1.3. Bases for business enterprise combination 3.1.3.1. Demand 3.1.3.2. Regional nature and socioeconomic conditions 3.1.3.3. Potential benefit of business enterprise 3.1.4. Define and selection of production line for household and farm 3.1.4.1. Define household production line 3.1.4.2. Production line selection 3.1.5. Production line adjustment, supplementary and change 3.1.5.1. Adjustment and supplementary 3.1.5.2. Production line change **Exercise:** *(1.0 hr)* Production line
	***B/* Self study**: *(6 hrs)* - Read required documents - Find out example about production line of a certain agri.household farm in practice.
6	***Chapter 3:* Production line of agricultural household and household farm**
	***A/* main contents:** *(3 hrs)* **Theory:** *(2.0 hrs)* 3.1.6. Business enterprise specialization and synthesis development; and production line efficiency measurement indicators 3.1.6.1. Business specialization indicators 3.1.6.2. Business enterprise combination indicators 3.1.6.3. Production line efficient indicators 3.2. Agricultural household farm production scale 3.2.1. Definition, production scale classification 3.2.1.1. Definition 3.2.1.2. Classification 3.2.2. Factors affecting household farm scale 3.2.2.1. Land availability 3.2.2.2. Household farm production line 3.2.2.3. Infrastructure and farming technique 3.2.2.4. Household education 3.2.3. Production scale measurement indicators 3.2.3.1. Direct indicators 3.2.3.2. Indirect indicators

	Seminar/discussion: *(1.0 hr)* Why in production line business enterprise specialization must associated with synthesis development; and production line efficiency measurement.
	***B/* Self study**: *(6 hrs)* - Read required documents - Business enterprise specialization and synthesis development; and production line efficiency measurement indicators
7	***Chapter 4: Application of economic principles in business – production of the agri. household farm***
	***A/* Main contents:** *(3 hrs)* **Theory:** *(2.0 hrs)* 4.1. Application of agricultural economics 4.1.1.Definition 4.1.2. Classification 4.1.2.1. Technical efficiency 4.1.2.2. Allocative efficiency 4.1.2.3. Economic efficiency 4.2. Production decision in the relation with economic principles 4.2.1. Marginal decision 4.2.2. Diminishing return rules **Seminar/discussion:** *(1.0 hrs)* Technical efficiency, allocative efficiency and economic efficiency
	***B/* Self study**: *(6 hrs)* - Read required documents - Theory on technical efficiency, allocative efficiency and economic efficiency.
8	***Chapter 4: Application of economic principles in business – production of the agri. household farm***
	***A/* Main contents:** *(3 hrs)* **Theory:** *(2.0 hrs)* 4.2. Production decision in the relation with economic principles 4.2.3. Average product 4.2.4. Input application in the relation with profit maximization 4.2.5. Replace input to another input 4.2.6. Product selection 4.2.7. Competitive products 4.2.8. Supplementary product 4.2.9. Production cost 4.2.10. Equal marginal product and opportunity cost 4.2.11. Maximize profit and minimize loss **Seminar/discussion:** (1,0 hr) Main basic economic principles: theory and application
	***B/* Self study**: *(6 hrs)* - Read required documents

	- Main basic economic principles: theory and application.
9	***Chapter 5: Agricultural household business and production plan***
	***A/* Main contents:** *(3 hrs)* **Theory:** *(2.0 hrs)* 5.1. Definition, role and plan classification in household and farm 5.1.1. Definition 5.1.2. Role of plan 5.1.3. Plan classification 5.2. Plan establishment method 5.2.1. Farm establishment method 5.2.2. Annual plan 5.2.3 Seasonal plan 5.2.4. Expense, product distribution and profit plan 5.3. Plan building and implementation 5.3.1. Plan establishment organization 5.3.2. Plan implementation 5.2.8. Evaluating training program **Midterm exam/discussion:** *(1.0 hr)* Agri.household business and production plan in agri. household farm.
	***B/* Self study**: *(6hrst)* - Read required documents - Define agri.household business and production plan: types and methods.
10	***Chapter 6: Production factor management in agri.household farm***
	***A/* Main contents:** *(3 hrs)* **Theory:** *(2.0 hrs)* 6.1. Production factor definition and classification 6.1.1. Definition 6.1.2. Classification 6.2. Land management 6.2.1. Land definition and characteristics 6.2.2. Land use objective and requirements 6.2.3. Land use management contents 6.2.3.1. Land classification 6.2.3.2. Define production land size 6.2.3.3. Land use plan 6.2.3.4. Land distribution plan for crop and animal husbandry 6.2.3.5. Land distribution plan for building 6.2.3.6. Land protection, improvement, and fertile plan 6.2.3.7. Household and farm land use indicators **Exercise:** *(1.0 hr)* Farm land use plan

	***B/* Self study**: *(6 hrs)* - Read required documents - Land characteristics and land use plan
11	***Chapter 6: Production factor management in agri.household farm***
	***A/* Main contents:** *(3 hrs)* **Theory:** *(2.0 hrs)* 6.3. Production mean management 6.3.1. Definition and classification 6.3.1.1. Definition 6.3.1.2. Classification 6.3.2. Production mean management 6.3.2.1. Fixed asset management 6.3.2.2. Liquid asset management 6.3.3. Production mean management indicator 6.4. Capital management 6.4.1. Definition and classification 6.4.1.1. Definition 6.4.1.2. Classification **Seminar/discussion:** *(1.0 hr)* - Production means: Types and management methods
	***B/* Self study**: *(6 hrs)* - Read required documents - Production means.
12	***Chapter 6: Production factor management in agri.household farm***
	***A/* Main contents:** *(3 hrs)* **Theory:** *(2.0 hrs)* 6.4.2. Fixed capital management 6.4.2.1. Define demand for fixed capital 6.4.2.2. Provide fixed capital for production 6.4.2.3. Fixed capital 6.4.2.4. Fixed capita usage 6.4.3. Liquid capital usage 6.4.3.1. Define demand 6.4.3.2. Liquid capital usage 6.4.3.3. Liquid capital usage solutions 6.4.4. Liquid capital usage indicator 6.5. Labor management 6.5.1. Definition and classification 6.5.2. Labor characteristics 6.5.3. Labor usage 6.5.3.1. Define labor demand 6.5.3.2. Demand supply source

	6.5.3.3. Task design 6.5.3.4. Labor cooperation 6.5.3.5. Hired in labor and payment 6.5.4. Labor usage measurement indicators **Seminar/discussion:** *(1.0 hr)* - Discuss on farm capital - Labor source and usage in agri.household farm.
	***B/* Self study**: *(6 hrs))* - Read required documents - Labor and capital sources in agri.household farm.
13	***Chapter 7:* Household and farm production and business accounting**
	Main contents: *(3 hrs)* **Theory:** *(2.0 hrs)* 7.1. Household and farm production and business accounting 7.1.1. Definition and objective 7.1.1.1. Definition 7.1.1.2. Objective 7.1.2. Economic accounting 7.1.2.1. Expense accounting 7.1.2.2. Per unit cost accounting 7.1.2.3. Revenue and profit accounting 7.1.2.4. SNA based accounting 7.1.2.5. Net income accounting 7.1.2.6. Accounting profit **Seminar/discussion:** *(1.0 hr)* Household and farm production and business accounting: Theory and application
	***B/* Self study**: *(6 hrs))* - Read required documents Household and farm production and business accounting: Theory and application

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTRUE
FACULTY OF ACCOUNTING AND BUSINESS MANAGEMENT

COURSE SYLLABUS
KDE03001: Cooperatives and small business management

Credits: 3 (Lecture: 3 – Practice: 0); Self-Learning 6
Term: 7
Prerequisite course(s): None

COURSE OBJECTIVES:

This course aims to provide students with the management knowledge and skills in cooperatives and small business (SMEs) including knowledge and skill of business planning, financial management, marketing management and personnel management of cooperatives and SMEs. At the same time, the learners have the capacity of self-awareness, self-education, sense of responsibility, professional ethics and professional working style.

COURSE EXPECTED LEARNING OUTCOMES

Notation	Course expected learning outcomes After successfully completing this course, students are able to	Program expected learning outcomes
Knowledge		
K1	Apply the theoretical knowledge of management, economics, accounting, finance, marketing in the production and trading of plant and animal products, and other products of a cooperative or small business.	ELO2
K2	Evaluate the regional and national market developments for the products and services of a cooperative or small business.	ELO2
K3	Develop a business strategy for a cooperative or a small enterprise	ELO2
Skills		
K4	Coordinate to work in group	ELO5, ELO 6,
K5	Make decision to solve the problem in a cooperative or a small enterprise.	ELO 7, ELO 8
K6	Plan, organize, lead and control a cooperative or a small enterprise	ELO9
Ethics and Attitude		
K7	Recognize the responsibility and professional ethics of the	ELO11, ELO13

	cooperative and SMEs' staff	
K8	Improve management knowledge and skills in small enterprises and cooperatives	ELO12, ELO14

COURSE DESCRIPTION

KDE03001. Cooperatives and small business management (3: 3-0; 6; 135).

This course consists of 6 chapters on Overview of Cooperatives and small business (SMEs); Evaluate business opportunities of Cooperatives and Small enterprises; Develop a business plan for Cooperatives and SMEs; Financial Management of Cooperatives and SMEs; Marketing Management in cooperatives and SMEs; Human Resource Management in Cooperatives and SMEs.

Prerequisite: None

ASSESSMENT

Grading: 100 points

Weighting:

- Attendance: 10%
- Formative assessment: 30%
- Final exam: 60%

Assessment summary

Rubric	Course expected learning outcomes	Weighting (%)	Week
Attendance			
Rubric 1: Attendance	K4, K7	10	1-10
Formative assessment			
Rubric 2: Group discussion	K2,3,4, 5	10	1-6
Rubric 3: Project	K1,2,3,4,5,6,7,8	20	1-10
Final exam			
Final exam	K1,2,3,4,5,6,7,8	60	11

TEXT BOOKS AND REFERENCES

**** Text Books/Lecture Notes:***

Justin G. Longenecker, J. William Petty, Leslie E. Palich (2013), Small business management, Launching and growing entrepreneurial venture, 17 ed. Cengage Publishing House, USA.

**** Additional references:***

Nothhaft, Henry R (2011), Great again: Revitalizing America's entrepreneurial leadership, Harvard Business Press, xxvii, 193 p. ; 24 cm,

Bamford, Charles E (2011), Entrepreneurship: A small business approach. McGraw-Hill / Irwin, xix, 347 p.; 25cm,

James B. E, Steven M. B. (2000), Sales and Operations for your small business, USA

COURSE OUTLINE

Week	Content
1-3	***Chapter 1: Overview of Cooperatives (COOP) and small business management***
	A/* Main contents: (8 hrs)* **Theory** *(5 hrs)***:** 1.1 The basic concepts 1.2 Characteristics of COOP and SMEs 1.3 History and the revolution of SMEs 1.4 Management of COOP and SMEs 1.5 Status of COOP and SMEs management 1.6 The role and contribution of COOP and SMEs **Group discussion/seminar:** *(1 hr)* - Discussion topic from the scientific article: Real situation of clam farm management in the Northern area of Vietnam. **Project**: *(2 hrs)* (working in group from 1-8 students): Propose and evaluate the business idea; Formulize the business group
	***B/ Self- learning contents**: (16 hrs)* Study and research the real situation of cooperative and small enterprises in Vietnam nowadays. What are the limitation in the management of SMEs and COOP in Vietnam?
3-6	***Chapter 2: Evaluation the business opportunity for SMEs and COOPs***
	***A/ Main contents**: (8 hrs)* **Theory** *(6 hrs):* 2.1 Advantages of COOP and SMEs 2.2 Disadvantages of COOP and SMEs 2.3 Opportunities of COOP and SMEs 2.4 Threaten of COOP and SMEs 2.5 Business idea for COOP and SMEs **Group discussion/ seminar:** *(1 hr)* - Discussion topic from the scientific article: Investment climate in Agriculture of Hanoi **Project** *(1 hrs):* Prepare condition to apply the business plan in reality
	***B/ Self- learning contents**: (16 hrs)*

	Use SWOT tools to analyse the situation and opportunities for doing business of COOP and SMEs in Vietnam
6-8	***Chapter 3: Development of a business plan for COOP and SMEs***
	A/ Main contents**:** *(7 hrs)* **Theory** *(5 hrs):* 3.1 Proposal the name, field and kind of doing business 3.2 Planning managerial staffs 3.3 Preparation of business objectives 3.4 Establish Marketing Plan 3.5 Site selection and service 3.6 Financial Planning 3.7 HR Planning. **Project:** *(2 hrs)* Implement the project.
	B/ Self- learning contents: *(14 hrs)* Meet, talk and exchange with at least 5 people who are owners of shops, small business, cooperative managers ... learning about business experience.
8-10	***Chapter 4. Financial Management in Cooperatives and SMEs***
	A/ Main contents**:** *(6 hrs)* ***Theory*** *(4 hrs):* 4.1 Short-term financial plan 4.2 Long-term financial plan 4.3 Governance current cash flow 4.4 Financial Assessment 4.5 Credit Policy **Group discussion/ seminar:** *(1 hr)* - Case study of financial management **Project** *(1 hr)*: Continue to implement the business project. Practicing financial management skills for the group's business project. ***B/ Self- learning contents***: *(12 hrs)* Meet, talk and exchange with at least 5 people who are owners of shops, small business, cooperative managers ... about their financial management experience.
10-12	***Chapter 5. Marketing Management in cooperatives and SMEs***

	A/ Main contents*: *(7 hrs) **Theory:** *(5 hrs)* 5.1 Role of Marketing Management in COOP and SMEs 5.2 Identifying target market 5.3 Product Development Services 5.4 Development of distribution network 5.5 Prices Setting 5.6 Sales and Promotion **Group discussion/ seminar:** *(1 hr)* - Case study of marketing management **Project** *(1 hr)*: Continue to implement the business project. Practicing marketing management skills for the group's business project. ***B/ Self- learning contents*: *(14 hrs)*** Meet, talk and exchange with at least 5 people who are owners of shops, small business, cooperative managers ... about their marketing management experience.
13-15	***Chapter 6. Personnel Management of Cooperatives and SMEs***
	A/ Main contents*: *(9 hrs) **Theory:** *(5 hrs)* 6.1 HR Planning 6.2 Recruitment 6.3 Development of human resources **Project:** *(4 hrs)* - Practicing HR management skills for the group's business project *(1 hr).* - Presentation and submission of project results *(3 hrs)* Each group report their project results (10 minutes) and submit the reports (2-3 word pages or 10 PowerPoint presentation slides) ***B/ Self- learning contents*: *(18 hrs)*** Meet, talk and exchange with at least 5 people who are owners of shops, small business, cooperative managers ... about their HR management experience.

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTRUE
FACULTY OF BIOTECHNOLOGY

COURSE SYLLABUS
SHE03058: High-tech in Agriculture

Credits: 2 (Lecture: 2 – Practice: 0); Self-Learning: 4
Term: 8
Previous course: None

COURSE OBJECTIVES:

This course aims to provide students with:

- *Knowledge:*
  - The learners understand the general knowledge basic laws, basic principles of economics in high-tech agriculture and trends as well as urgent requirements for the development of high-tech agriculture.
  - The learners can understand, compare and explain: Equipment in greenhouse; The role of IPM and the prospects of greenhouse technology;
  - The learners can understand, summarize and categorize the methods, protocols, and processes for principles and applications of landless technology, pros and cons using hydroponic and aeroponic technology;
  - The learners can understand and explain some of the economic aspects of commercial production, recognizes the patterns of management, operation and development of high-tech agriculture in the world and Vietnam
  - Learners can understand and learners can operate and build high-tech agriculture models in practice
- *Skills:*
  - The learners have ability to summarize, analyze, assess, forecast, write and present report on high-tech agriculture.
  - The learners have ability to work independently, observation skills, organizational skills and teamwork.
  - The learners can enhance the application of their knowledge into practice.
- *Ethic and attitude*
  - The learners actively involved in the learning process, willing to help and share their experiences with colleagues.
  -

COURSE EXPECTED LEARNING OUTCOMES

Notation	**Course expected learning outcomes** After successfully completing this course, student are able to	**Program expected learning outcomes**

Knowledge		
K1	Apply basic scientific and economic principles to the analysis of high technology development trends in agriculture in Vietnam and others countries.	ELO1
K2	Describe farming practices, the role of IPM in greenhouse and the prospects for greenhouse application.	ELO3, ELO5
K3	Apply landless planting techniques	ELO5
K4	Apply and evaluate the effectiveness of the principles and techniques of landless technology.	ELO4, ELO5
K5	Analyze basic economic and profitability factors of high-tech agribusiness.	ELO1, ELO4
K6	Manage plans , production and marketing of crop products; Anticipate the economic aspects of applying high technology to large-scale commercial production.	ELO4, ELO5
K7	Analyze and evaluate the efficiency of operating models of management, operation and development of high technology in Vietnam and others countries	ELO1, ELO4, ELO5
K8	Identify, practice and evaluate the effectiveness, safety and sustainability of high-tech agricultural production models	ELO1, ELO4, ELO5
Skills		
K9	Work independently; Develop observation and, organizational skills; Work effectively in teams; Discuss and present seminars clearly and logically	ELO6, ELO7, ELO8
K10	Apply the principles of operation of hi-tech agricultural in practice	ELO9, ELO10, ELO11
Ethics and Attitude		
K11	Act professionally, lawfully, honestly and responsibly to ensure that risks and hazards are minimized; Respect biological ethics must be respected.	ELO12, ELO13, ELO14

COURSE DESCRIPTION

SHE03058. High-tech in Agriculture (2: 2-0; 4, 90)

This course consists of 6 chapters which include General of High-tech in Agriculture; Farming system in greenhouse; Landless planting technology; Some economic aspects of commercial production; Models of management, operation and development of high-tech agriculture in Vietnam and others countries; Practical model of high tech agriculture.

ASSESSMENT

Grading: 10 points

Weighting:

- ✓ Attendance: 10 %
- ✓ Formative assessment: 30%
- ✓ Final exam: 60%

Assessment summary

Rubric	Course expected learning outcome	Weighting (%)	Week
Attendance			
Rubric 1: Attendance	K1, K2, K3, K4, K5, K6, K7, K8, K10	10	10
Formative assessment			
Rubric 2: Group discussion	K1, K2, K3, K4, K5	5	4,5,6
Rubric 3: Group work	K1, K2, K3, K4, K5	5	4,5,6
Rubric 4: Group oral presentation	K1, K2, K3, K4, K5, K9, K11	10	4,5,6
Rubric 5: Formative assessment	K1, K2, K3, K4, K5	10	4,5,6
Final assessment			
Rubric 6: Final assessment	K1, K2, K3, K4, K5, K6, K7, K8, K10	60	Following University schedule

TEXT BOOKS AND REFERENCES

**** Text Books/Lecture Notes:***

- Benton Jones (2014). Complete Guide for Growing Plants Hydroponically. CRC Press
- Nguyen Quang Thach, Nguyen Thanh Hai. (2015). Lecture Note High-tech in Agriculture. Faculty of Biotechnology
- Vu Quang Sang, Phạm Van Cuong, Nguyen Thi Nhan, Nguyen Van Phu, Mai Thi Tan, Nguyen Thi Kim Thanh. (2015). Text Book Applied Plant Physiology. NXB VNUA.

**** Additional references:***

- Dhiren Vandra.(2012). Application of Hightech Agriculture to overcome disasters in agri: High Tech Agriculture (Micro Irrigation, Mulching and Green Houses). LAP LAMBERT Academic Publishing.
- Craig Baird. (2010). The Complete Guide to Building Your Own Greenhouse: Everything You Need to Know Explained Simply (Back-To-Basics).Atlantic Publishing group.

- Bob Long. (2012). The EZ Guide To Aeroponics, Hydroponics and Aquaponics: How to Create a Sustainable Food Supply. Limited Holding LLC.

COURSE OUTLINE

Week	Content
7	***Chapter 1: General of High-tech in Agriculture***
	A/* Main contents: (3 hrs)* **Theory:** - 1.1. Some concepts concerning high-tech agriculture - 1.2. Scientific principles of scientific, economy and trading of high-tech agricultural - 1.3. Process and agricultural development trend tech
	B/ Self- study contents: (6 hrs) - 1.4. Students are required to read books and references before attending the class.
2	**Chapter 2: *Farming system in greenhouse***
	A/* Main contents: (5 hrs)* **Theory:** - 2.1.Introduction of equipment systems and types of greenhouses - 2.2. Farming techniques in greenhouse - 2.3. The role of ipm - 2.4. The prospects of greenhouse technology
	B/* Self- study contents: (10 hrs)* - 2.5. Students are required to read books and references before attending the class.
2, 4	***Chapter 3:*** Landless planting technology
	A/* Main contents: (5 hrs)* **Theory:** - 3.1. General concept - 3.2. History of landless technology farming techniques - 3.3. Plants in the solution - 3.4. Plants with nutritional prescription - 3.5. Aeroponics - 3.6. Nutrient solution - 3.7. Pros and cons using landless technology - 3.8. Application of using landless technology
	B/* Self- study contents: (10 hrs)* - 3.9. Students are required to read books and references before attending the class.
5, 6	***Chapter 4: Some economic aspects of commercial production***
	A/* Main contents: (4 hrs)*

	Theory: - 4.1. Orientation of production, business and research of high-tech agricultural - 4.2. Product selection, selection area Agriculture high-tech - 4.3. Investment analysis and profit
	***B/* Self- study contents**: *(8 hrs)* - 4.4. Students are required to read books and references before attending the class.
7 - 9	***Chapter 5: Models of management, operation and development of high-tech agriculture in Vietnam and others countries***
	A/* Main contents: (8 hrs)* **Theory** *(6 hrs)* **:** - 5.1. High-tech Agriculture in Vietnam - 5.2. High-tech Agricultural models in Vietnam and others countries **Discussion and seminar presentation** *(2 hrs):* - 5.3. Discussion and seminar presentation *(2 hrs)*
	***B/* Self- study contents**: *(16 hrs)* - 5.4. Students are required to read books and references before attending the class.
10	***Chapter 6:* Practical model of high tech agriculture**
	A/* Main contents: (5 hrs)* **Theory** - 6.1. Visit High tech agriculture models *(5 hrs)*
	***B/* Self- study contents**: *(10 hrs)* - 6.2. Students are required to read books and references before attending the class.

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTRUE
FACULTY OFAGRONOMY

COURSE SYLLABUS
NHE04001: Plant Nutrition

Credits: 3 (Lecture: 2 – Project: 1); Self-Learning:9
Term: 6
Preceding course: MTE01002 – General chemistry 2; NHE02002 – Plant Morphology and atanomy

COURSE OBJECTIVES:

he course is to help students to understand main knowledge in plant nutrients, to apply for giving out new techniques in fertilization for high efficiency, increasing crop yield and quality also saving environment, ability of group working well.

COURSE EXPECTED LEARNING OUTCOMES

Notation	Course expected learning outcomes After successfully completing this course, students are able to:	Program expected learning outcomes
Knowledges		
K1	Analyze the essential and classification elementsin the plant**s**	ELO2
K2	Presentthe mechanic of uptake mineral nutrients and effects of the environmental factors on rate of uptake	ELO2, ELO3
K3	Explain and analyze uptake mechanisms, function and uses of plant macronutrietns and micronutritents	ELO3, ELO5
Skills		
K4	Evaluate new techniques for fertilization	ELO9, ELO11
K5	Manage plan for fertilization application	ELO10, ELO111
K6	Apply the suitable nutrientsfor hydroponic cultivation	ELO9, ELO10
K7	Work effectively in group	ELO6, ELO7
Ethics and Attitude		
K8	Be proactive in taking the knowledges	ELO12
K9	Be responsible and honesty	ELO13

COURSE DESCRIPTION

NHE04001. Plant Nutrition (3: 2 – 1; 6; 135)

This course consists of 5 chapters: chapter 1: essential elements and classification; chapter 2: mechanic of the uptake and effects of the environment on rate of uptake, chapter3: Understanding in macro-nutrients and micro-nutrients; chapter 4: Nutrient and resistance to stress conditions; chapter 5: Some laws for using fertilizers.

Preceding course: MTE01002 – General chemistry 2; NHE02002 – Plant Morphology and atanomy

ASSESSMENT

1.Grading: 10

2 .Weighting:

-Asidous score :10 %

- point of midterm and exam 30 %
- point of the final exam : 60%

3. Assessment summary

Rubric	Course expected learning outcome	Weighting (%)	Week
Attendance		**10**	**1-10**
Rubric 1: Participant	K1, K3, K3,K4,K5, K9	7	
Rubric 2: Discusion	K1, K2, K3,K4,K5, K7	3	5
Formative asessment		**30**	
Rubric 3:Oral Presentation	K5, K6, K7, K9	10	6
Rubric 4: Field trip	K4, K7, K8, K9	10	7
Rubric 5: Practical and Report	K3,K4,K5, K6	10	5
Exam		**60**	**8**
Rubric 6:midterm exam	K1, K2, K3,K4,K5,	20	9

TEXT BOOKS AND REFERENCES

**** Books:***

Marsher, H (2011).Mineral Nutrition of Higher Plant. 889 pages

**** References:***

1. John L. Havlin (2013) Soil fertility and fertilizers

Allen V. Barker (2010). Hand book of Plant Nutrition

COURSE OUTLINE

Week	Contents
	Chapter 1: **The essential elements and classification**
1 2	***A/*** **The *contents for teaching*** *(5 hours)* **Theory contents :** 1.1. Fuctions of Plant Nutrition 1.2. The essential elements 1.3. The essential mineral elements 1.4 Classification of the essential mineral elements 14.1: Prime Maccronutrients 1.4.2. The secondry Maccronutrients 1.4.3. The micronutrients . 1.5. The methods for discovery of mineral nutrients 1.5. methods for study of plant nutrient **Contenst for practical part:** *(3 hours)* Determination of N, P, K in the pant samples **Contents for seminar:** *(3.hours)* The micro-nutrients in agriculture
	B/**The contents for homwork**: *(12.hours)* 1.6 Funtions of prime macronutrients 1.7. Funtions of secondry macronutrients 1.8. Funtions of micronutrients
3 4 5 6	***Chapter 2:*****The mechanics of mineral nutrient uptake and effects of environmental factors on rate of uptake**
	A/: **The *contents for teaching*** *(5.hours)* **Theory contents :** 1.3. The mechanics of mineral nutrient uptake 1.3.1. Passive transport of M.N. and characteristics 1.3.2. Active transport of M.N. and characteristics 1.4. The effects of environmental factors on rate of uptake 1.4.1. The Effects of pH 1.4.2. The Effects of temperature 1.4.3. The Effects of Soil solution 1.4.4. The Effects of water content 1.4.5. The Effects of oxygen content in the soil 1.4.6. The Effects of relationship between elements 1.4.7. Applying in fertilization **Contents for seminar:** *(0 hour)*
	B/**The contents for homework**: *(15.hours)* 1.4.8. The Effects of pH

7	1.4.9. The Effects of temperature 1.4.10. The Effects of Soil solution 1.4.11. The Effects of water content 1.4.12. The Effects of oxygen content in the soil 1.4.13. The Effects of relationship between elements
8	Chapter 3: **Physiologycal funtions and techniques of mineral nutrients**
9 10 11 12 13	***A/* The *contents for teaching*:** *(10 hours)* **Theory contents :** 1.1.Physiologycal funtions and techniques of prime macronutrients 1.1.1. Physiologycal funtions and techniques of N 1.1.2. Physiologycal funtions and techniques of P 1.1.3. Physiologycal funtions and techniques of K 1.2. Physiologycal funtions and techniques of secondry macronutrients 1.2.1. Physiologycal funtions and techniques of Mg 1.2.2. Physiologycal funtions and techniques of Ca 1.2.3. Physiologycal funtions and techniques of S 1.3. Physiologycal funtions and techniques of micronutrients 1.3.1. Physiologycal funtions and techniques of Fe 1.3.2. Physiologycal funtions and techniques of Cu 1.3.3. Physiologycal funtions and techniques of Zn 1.3.4. Physiologycal funtions and techniques of Mn 1.3.5. Physiologycal funtions and techniques of B 1.3.6. Physiologycal funtions and techniques of Mo 1.3.7. Physiologycal funtions and techniques of Cl 1.4. The foliar application 1.4.1. The mechanics of mineral nutrient uptake in leaf 14.2. Advantages of foliar application 1.4.3. Disadvantages of foliar application **The contents for project :** *(15 hours)* ***3.1. Phase 1.*** Understanding Hydroponic Models (Week 1): - Group results are to be achieved: At least three common hydroponic models in the world and in Vietnam: design (photos, drawings); Analyzing the pros and cons of each system; articles, research reports on the above models - Classroom lessons and instructions needed: methods of collecting and processing materials; select the appropriate model for the project; develop and present plans - Knowledge and skills Students have learned: The advantages / disadvantages of each hydroponic system and the appropriate model for the project; Skills acquisition and processing materials; Skills to prepare and present the plan

	3.2. Phase 2. Design and installation of static hydroponic system; Seedling Preparation (Week 2, Week 3) - The results that the team must achieve: Complete plan to implement 1 on the subject. Complete static hydroponic system; 5 seedlings of leafy vegetables grow at 2 weeks of age - Lessons and instructions needed: Practical planning; basic systems in the installation of static hydroponic systems; Nursery systems. - Knowledge and skills Learned: Principles of operation of static hydroponic systems; Knowledge of germination and development stages of seedlings; operating skills of static hydroponic systems; composting, sowing, tending seedlings after germination 3***.3. Phase 3.*** Prepare the substrate, nutrient solution; Tree planting (Week 3) - The results that the team must achieve: Complete plan to follow the theme. Suitable nutrient solutions for selected hydroponics systems; 50 have planted seedlings, plants grow well - Lessons and instructions needed: Practical planning; system of nutrient solution phase; Systems for planting trees on the substrate - Knowledge and skills learned: Knowledge of the role of minerals in plants, knowledge of factors affecting the uptake and utilization of plant minerals; Skills in solution, Tree planting skills ***3.4. Phase 4.***Care, adjust nutrient solution, monitor and harvest (week 4 to 10) - The results that the team must achieve: Complete plan to implement 1 on the subject. Well-maintained hydroponic system; Harvested 0.5 kg of vegetable according to the requirements - Lessons and instructions needed: Practical planning; pH-regulating technology, EC; technical operation of hydroponic systems; Tree care systems; Collection system of vegetable products. - Knowledge and skills learned: Knowledge of plant growth and development characteristics; Nutrition diagnostic skills through observation or use of assessment equipment
	B/**The contents for homework** *(30 hours)* 1. The researchs in applying N, P, K for crops 2. The researchs in applying Ca, Mg, S for crop 3. The researchs in applying Micro nutrients for crop Các The method of prediction of

	mineral nutrient status
14	***Chater 4:*** Nutrient and resistance to stress conditions
	A/* The *contents for teaching*: *(2 hours) **Theory contents :** 1.1. The mechanic of the stress resistances **1.2.** The effects of macro nutrients on stress resistances **1.3.** The effects of micronutrients on stress resistances **The contents for practical part***(0 hour)* **Contents for seminar: (0***)* **Contents for field trip:**
	B/*Contents for homework:** *(6.hours)* 1; The physiologycal mechanics of the stress resistances ***2. Researchs in the fuction of Ca and micronutrient for stress resistance
15	Chapter 5: : Some laws for using fertilizers. ***A/* The *contents for teaching*: *(2 hours)*** **Theory contents :** 1.1. Feedback law of Liebig 1.2. Minimum law of Liebig 1.3. Law of reduction of fertilization efficiency 1.4. Law of quality for agricultural products **The contents for practical part** *(0 hour)* **Contents for seminar: (0***)* **Contents for field trip:0** ***B/* Contents for homework:***(6.hours)*** *1*. Calculation of economy maximum applied level 2. Calculation of technique maximum applied level 3 Idea inquality for agricultural products

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTRUE
FACULTY OF AGRONOMY

COURSE SYLLABUS
MTE04001: Crop ecology

Credits: 3 (Theory: 2 – Practical: 1); Self-Learning: 6
Term: 7
Preceding courses: QLE03001 – Plant-land-water relationship; NHE04001 – Plant nutrition;

COURSE OBJECTIVES:

The course aims to provide students basic knowledge on (1) plant ecology including relationships and interactions between biophysical environment to the target crops; (2) knowledge on roles and skills in land, water and energy management - 3 main factors contributing to productivity of the target crop systems; (3) Some scenarios of future agricultural production in context of population pressure and resource degradation. The basis knowledge will help students to develop ideas for designing sustainable crop system and agronomic solutions to achieve productivity goals whilst fulfilling other important requirement for future agriculture: sustainability of the agro ecosystem& human welfare.

COURSE EXPECTED LEARNING OUTCOMES:

Notation	Course expected learning outcomes After successfully completing this course students are able to	Program expected learning outcomes
Knowledge:		
K1	Explain concepts of crop ecology and interactions between plants and the biophysical environment	ELO3
K2	Describe and analyse roles and skills (of stakeholders) in land, water and energy management - 3 main factors contributing to the productivity of the target crop systems.	ELO3
K3	Analyse fundamental issues in the multidimensional relationship between and among elements of the agricultural ecosystem.	ELO3
K4	Analyse and evaluate the attributes of some agricultural models based on knowledge from other subjects and personal experiences	ELO5
Skills:		

K5	Work effectively in teams	ELO6
K6	Observation & analysis skill	ELO7, ELO8, ELO9, ELO10, ELO11
K7	Solve hypotheses (selection, analyse, and justify relevant information).	ELO10, ELO11
Ethics and Attitude:		
K8	Be aware of life-long learning: enthusiasm in reading developing assumptions for each specific situation and seeking for answers.	ELO12
K9	Be aware of the twofold impacts of human activities on the attributes of agro-ecosystems - a necessary foundation for changing behaviour in the environment.	ELO13, ELO14

COURSE DESCRIPTION

MTE04001. Crop Ecology (3: 3-0; 6; 135)

This course consists of 3 main chapters, focusing on History of crop ecology and its application in sustainable intensive agriculture; Knowledge on crop ecology including: relationships and interactions between elements of the biophysical environment and the target crops; Knowledge on roles and skills (of stakeholders) in land, water and energy management - and 3 main factors contributing to productivity of the target crops; (3) Some scenarios of future agricultural production in context of population pressure and resource degradation. The basis knowledge will help students to develop ideas for designing sustainable crop system and agronomic solutions to achieve productivity goals whilst fulfilling other important requirement for future agriculture: sustainability of the agroecosystem & human welfare.

Preceding courses: QLE03001 – Plant-land-water relationship; NHE04001 – Plant nutrition;

ASSESSMENT

1. Grading: 10 score scale

2. Weighting:

- Attendance: 10%
- Formative assessment: 30%
- Final exam: 60%

3. Assessment summary

Rubric	Course expected learning outcome	Weight (%)	Week
Attendance		**10**	
Rubric 1: Attendance	K1, K2, K3	10	1-15
Formative assessment		**30**	
Rubric 2: Group working	K4, K5, K6, K7, K9	15	9-12

Rubric 3: Presentation	K3, K4, K5, K6, K7, K8, K9	15	9-12
Final exam		**60**	
Rubric 4: Final examination	K7, K8, K9	60	Following University schedule

TEXT BOOKS AND REFERENCES

**** Text books/mandatory references:***

1. Connor, D.J., Loomis, R.S., Cassman, K.G (2011). Crop ecology: Productivity and Management in Agricultural Systems. Second edition. Cambridge.
2. Kropff, M.J. and Struik, P.C., (2002). "Developments in crop ecology." NJAS 50(2).
3. Porter, J., Costanza, R., et al. (2009). "The Value of Producing Food, Energy, and Ecosystem Services within an AgroEcosystem." A Journal of the Human Environment**38**(4): 186-193.

**** Selective references:***

1. Edwards, D.P., Fisher, B., Wilcove, D.S. (2011). "High Conservation Value or high confusion value? Sustainable agriculture and biodiversity conservation in the tropics." Conservation Letters 5:20–27.
2. Godfray, H.C.J. (2015). "The debate over sustainable intensification." Food Sec. 7:199–208
1. ChapinIII, F. S., Zavaleta, E. S., et al. (2000). "Consequences of changing biodiversity." Nature 405.

**** Other References:***

4. Bộ môn Côn trùng (Chủ biên), (2004). Giáo trình côn trùng chuyên khoa. NXB. Nông nghiệp, Hà Nội, 280p.
5. Timothy D. Schowalter, (2006). Insect Ecology – An Ecosystem Approach. Second edition. AP Academic Press is an inprint of Elsevier, 572p.
6. Van Driesch R., Mark Hoddle and Ted Center, (2008). Control of pests and weeds by natural enemies: *An Introduction to Biological Control*. Blackwell publishing Ltd. Australia, 473p.

COURSE OUTLINE

Week	Contents
	Chapter 1: Agroecosystem
	A/ Main contents: *(6 class hours)* **Theory:** *(5 class hours)* 1. The nature (attributes) of the agroecosystem 2. Relevant topics

Week	Contents
1-2	3. Ecological services of the agroecosystem 4. Strategies to maintain agroecosystem services **Seminar/discussion:** *(1 class hours)* Based on student questions (from other courses, or experience), developing assumptions and seeking for answers/solutions.
	***B/*Reading materials**: *(10class hours)* 1. Reading Chapter I: Agricultural System (Connor) 2. Reading paper of Kropff (2002) and Porter (2009)
3-5	***Chapter 2:* Land resource and soil nutrient management**
	A/*Main contents: (9class hours)*** **Theory:***(7class hours)* 1. Land resources 2. Plant nutrition 3. Management strategies for soil nutrition 4. Farming practices and impacts on soil nutrition **Seminar/discussion:** *(2class hours)* Based on student questions (from other courses, or experience), developing assumptions and seeking for answers/solutions.
	***B/*Reading materials**: *(15 class hours)* 1. Reading Chapter Soil resources and Soil management (Connor)
6-12	***Chapter 3: Management strategy for irrigated agriculture***
	A/*Main contents: (20 class hours)*** **Theory:** *(05 class hours)* 1. Principles of effective water utilization 2. Farming practices and impacts on water management and utilization 3. Water resource management in irrigated areas **Practise in field:** *(6 class hours)* **Seminar/discussion:** *(9 class hours) (midterm score +cc)* 1. Analysing ecological, economic and social advantages of intercropping systems? Why do less farmers apply such system? 2. Land is the basis resource for sustainable agroecosystems, why do farmers taking less care of this resource? 3. Dependence on agrochemicals in agriculture, and consequences to ecology, economics and society. 4. Assumptions for reducing farmer's dependence on agrochemicals 5. Other relevant topics selected by students themselves
	***B/*Reading materials**: *(25class hours)* 1. Reading Chapter Strategies and tactics for rain fed agriculture and Water management in irrigated agriculture (Connor). 2. Reading articles in reference list
12-15	***Chapter 4:* Technology changing in high agricultural production**

Week	Contents
	***A/* Main contents:** *(10class hours)* **Theory:** *(8class hours)* 1. Energy used in agricultural production 2. Characteristics of high productivity agricultural systems 3. Solutions for less energy-dependence agricultural systems **Seminar/discussion:** *(2class hours)* 1. Continue discussing not-yet answered questions given in group discussions and mid-term presentations. 2. Other questions from students' experiences and assumptions
	***B*/Reading materials**: *(10class hours)* 1. Reading chapters: Energy and labour; Technological change in high-yield crop agriculture; The future of agriculture (Connor)

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTRUE
FACULTY OF AGRONOMY

COURSE SYLLABUS
NHE04008: Research Methods

Credits: 2 (Lecture: 2 – Practice: 0); Self-Learning 4
Term: 7
Prerequisite: THE03001 – Applied statistics in agriculture
Preceeding course:SNE03002 –English for Agronomy

COURSE OBJECTIVES:

This course helps promote students better understanding in research; encourage learners to identify research problems and select pertinent research methodology, search and screen information. Students perceive creditability/accountability and ethics in research.

COURSE EXPECTED LEARNING OUTCOMES

Notation	**Course expected learning outcomes** After successfully completing the course the students are able to**:**	**Program expected learning outcomes**
Knowledge		
K1	Interpret the nature of science, differentiate between basic and applied research; significance of research; attributes of a good research.	ELO1, ELO2
K2	Differentiate qualitative and quantitative research; Identify and establish the steps of research process; particularly experimental research	ELO3, ELO4
K3	List and explain basic components of a research and a report of research results (Thesis, papers)	ELO2, ELO3
Skills		
K4	Design and write a scholarly research proposal	ELO6, ELO8, ELO10, ELO11
K5	Write report and effectively present research results verbally	ELO7, ELO8, ELO9, ELO11
K6	Use English well in reading, evaluating and synthesizing scientific literature. Work and collaborate in team effectively	ELO7, ELO8
Ethics and attitude		

K7	Be honest, independent, careful, creative in doing research	ELO12, ELO13
K8	Be perceive creditability and ethics in conducting research	ELO13; ELO14
K9	Be skillful in searching for helpful information; consciousness for Lifelong learning	ELO12

COURSE DESCRIPTION

NHE04008. Research Methods (2 Credits: 2-0; 4; 90).

This course consists of 6 main chapters, providing the offers knowledge on significance of research; classification of research; research process; identifying research ideas, research problems, formulation research questions/hypothesis, writing research proposal; Literature review and search for information; basic concepts of research/experimental design and sampling; Writing and publishing research results.
Prerequisite: THE03001 – Applied statistics in Agriculture;
Preceding course: NHE03001 – English for Agronomy

ASSESSMENT

1. Grading scale: 10

2. Final grade composes of the following components:

- Attendance: 10 %
- Oral presentation/Paper analysis: 20%
- Midterm exam: 20%
- Final exam: 50%

Assessment summary

Rubric	Course expected learning outcomes	Weighting (%)	Week
Attendance			
Rubric 1: Class attendance	K8, K9	10	1-10
Formative assessment			
Rubric 2: Group oral presentation	K2, K6, K7, K8, K9	6	6-7, 9-10
Rubric 3: Research proposal evaluation	K1, K2, K4, K5, K6	7	10
Rubric 4: Exercise on research paper analysis	K1, K3, K5, K7, K9	7	8
Rubric 5: Midterm exam	K1, K2, K3, K4, K5, K6, K7, K8, K9	20	6
Final exam			
Rubric 6: Final exam	K1, K2, K3, K4, K5, K6, K7, K8, K9	60	Exam week

TEXT BOOKS AND REFERENCES

**** Text books/Lecture notes:***

Booth, W. C., G.Colomb, J. M. Williams (2003).The craft of research, second edition, The University of Chicago Press, 346p.

McMillan, V. E. (1997). Writing papers in the biological sciences.Second Edition. Bedford/St. Martin's. Boston & New York..

Salkind, N. J. (2000). Exploring research, Fourth Edition, Prentice Hall.

Vũ Cao Đàm (2005). Phương pháp luận nghiên cứu khoa học. NXB Khoa họcvà Kỹ thuật

**** Additional references***

Journals related to agronomy, horticulture

COURSE OUTLINE

VIII. Course outline

Week	*Content*
1-2	***Chapter 1: Science, research and research process***
	A/ Main contents*: (6 hrs)* **Theory:** *(5 hrs)* 1.2. Science and research 1.1.1. Science and research defined 1.1.2. Attributes of a good research 1.1.3. Scientific methodology/methods 1.2. Goals of research and basic steps in doing research 1.2.1. Objectives of research 1.2.2. Motivation of research 1.2.3. Steps of research process **Seminar/discussion:** *(1 hrs)* - Defining research topic and research ideas (0.5 hrs) - Formulating research questions and theoretical framework (0.5 hrs)
	***B/*Self-study**: *(12 hrs)* - The origin of research ideas in the past of famous scientists - Bases to define research ideas, with emphasis on crop science - Difference between basic and applied research
3	***Chapter 2: Classification of research and experimental research methods***

	A/*Main content: (3 hrs)* **Theory: (3 hrs)** 2.1. Classification of research 2.2. Research methodology and research methods 2.2.1. Research methodology 2.2.2. Research methods 2.3. Different research methods **Seminar/discussion:** *(0 hrs)* **Seminar** (0 hrs)
	***B/*Self-study**: *(6 hrs)* - Research methods with emphasis on experimental research methods
4-5	***Chapter 3: Defining research problem and developing research proposal***
	***A/* Main contents:** *(6. hrs)* **Theory:** *(6 hrs)* 3.1. Attributes of a research topic 3.2. Defining research problem 3.2.1. Checking on your own strength and interest 3.2.2. Looking at previous works 3.2.3. Taking notes and exploring your interest 3.3. Converting ideas into research topic 3.3.1. Research problems and research questions 3.3.2. Research hypothesis and research objectives 3.4. Writing research proposal 3.4.1. Goals of research proposal 3.4.2. Contents of research proposal **Seminar/discussion:** *(0 hrs)*
	***B/*Self-study**: *(12 hrs)* - Arguments and reasoning on formulation research questions and hypothesis - Formulation research objectives
6-7	***Chapter 4: Literature review and source of information***
	***A/* Main contents:** *(6. hrs)* **Theory:** *(5 hrs)* 4.1. Objectives, content review structure 4.2. Information sources 4.2.1. Scientific journals 4.2.2. Abstract 4.2.3 Proceedings 4.2.4. Masters‘ and doctoral theses 4.3. Information and literature retrieval 4.3.1. Traditional information retrieval

	4.3.2. Search for information using computers and on-line retrieval **Seminar/discussion:** *(1 hrs)* Effective review of literature
	***B/*Self-study**: *(12 hrs)* - Objectives of literature review - Steps in review of literature - Writing a literature review and literature citation
8	***Chapter 5: Basic concepts on research design and sampling***
	***A/* Main contents:** *(3 hrs)* **Theory:** *(3 hrs)* 5.1. Significance of research design 5.2. Properties of a good research design 5.3. Important concepts in research design 5.3.1. Independent and dependent variables 5.3.2. Extraneous variable 5.3.3. Control, experimental group and control group 5.3.4. Experiment, treatment, experimental unit 5.4. Basic principles of design of experiment 5.4.1. Principles of replication and randomization 5.4.2. Principles of local control 5.5. Some main experimental layouts in experimental research 5.6. Reliability of measurements 5.7. Internal and external validity of experimental design 5.8 Sampling and sampling strategy **Seminar/discussion:** *(0 hrs)*
	B/Self-study: (6 hrs) - Error control, experimental design in agricultural research - Sampling, data collection, data analysis
9-10	***Chapter 6: Writing research results***
	***A/* Main contents:** *(6 hrs)* **Theory:** *(5 hrs)* 6.1. Structure of a report and research article 6.2. Some hints in writing papers 6.2.1. Preparation and writing 6.2.2. Use of writing style 6.3. Verbal report presentation 6.3.1. Structure of a presentation 6.3.2. Format and outline of presentation 6.3.3. Use of software and presentation

	Seminar/discussion: *(1 hrs)* - Critical analysis of papers
	***B/* Self-study**: *(12 hrs)* - Writing a good quality paper/report (organization, citation, writing style, presentation of results, discussion) - Preparation for a verbal presentation of results (thesis defence, symposium, conference, etc..)

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTURE
FACULTY OF AGRONOMY

COURSE SYLLABUS
NHE04002: Weed Science

Credits: 3 credits (Lecture:2 – Practice:1); Self-Learning:6
Term: 8
Preceding course: NHE01002 - Introductory Biology; MTE04001 – Crop Ecology

COURSE OBJECTIVES

This course aims to help student having the basic knowledge of weed science and integrated weed management in sustainable agriculture; selecting the suitable weed control for each crop

COURSE EXPECTED LEARNING OUTCOMES

Notation	Course expected learning outcomes After successfully completing this course, students are able to	Program expected learning outcomes
Knowledge:		
K1	Explain the concept of weeds; Analyze the undesirable effects of weeds; Classify the weeds	ELO3,9,10,11
K2	Analysethe ecology of weeds and invasive plants	ELO3,9,10,11
K3	Analyse the relationship between weed and soil, weed control pratices and the soil	ELO3, 10
K4	Apply the suitable weed control for each crop	ELO5, 9,10
K5	Analyse the herbicide resistance	ELO5,9,11
Skills		
K6	Speak English fluently in discussion	ELO8
K7	Arrange the group and individual work	ELO6,7,11
Ethics and Attitude		
K8	Be aware of lifelong learing	ELO12,13, 14

COURSE DESCRIPTION

NHE04002. Weed Science (3; 2-1; 6; 90).

This course consists of 8 chapters about Weeds and Their importance; The ecology of weeds and invasive plants; Weed and Soil; Management methods for cropland and invasive weeds; Introduction to Herbicides; Plant-Herbicide and Soil-Herbicide Interactions; Herbicide Resistance; Herbicide application and practices consist 6 lessons about identifying the common weed in the field; identifying some of the common herbicides; investigating the weed in the upland field; investigating the weed in the lowland field; investigating the seed of weed in the field and evaluating the herbicide use efficiency.

Preceding course: NHE01002 - Introductory Biology; MTE04001 – Crop Ecology

ASSESSMENT

Grading: 10

Weighting:

- Attendance: 10%
- Formative assessment: 30%
- Final exam: 60%

Assessment summary

Rubric	Course expected learning outcome	Weighting (%)	Week
Attendance		**10**	
Rubric 1: Participant	K1, K2, K3, K4, K5	7	1 – 10
Rubric 7: Practice and report	K1, K3, K4	3	8 – 10
Formative asessment		**30**	
Rubric 2: Oral individual presentation	K1, K2, K3	10	6
Rubric 3: Oral group presentation	K4, K5, K6, K8	10	10
Rubric 4: Group work	K1, K2, K3, K4, K5, K6, K8	5	8 – 10
Rubric 5: Group discussion	K1, K2, K3, K4, K5	5	8-10
Final assessment		**60**	
Rubric 6: Report	K1, K3, K4, K5	5	6
Rubric 8: Final exam	K1, K2, K3, K4, K5	55	Following University schedule

TEXT BOOKS AND REFERENCES

**** Text Books/Lecture Notes***

1. Merill A. Ross and Caróle A. Lembi (2008). Applied Weed Science: In cluding the ecology and management of invasive plant. Pearson education

**** Additional references***

1. Robert L. Zimdahl. 2007. *Fundamentals of weed science*. Elsevier
2. Zimdahl, R. L 2013. *Fundamentals of weed science*, 4rd ed. Academic Press,
3. Rao, V. S. (2014). *Transgenic Herbicide Resistance in Plants*. CRC Press.
4. Glenn C. Klingman (1982). *Weed Science: Principles and Practices*. John Willey and Sons

COURSE OUTLINE

Week	Content
1,2	**Chapter 1: Weeds and Their impotance** ***A/* Main contents***: (....)*** **Theory: (***5 hrs)* **Chapter 1: Weeds and Their impotance** 1.1.What are weeds? 1.2.The undesirable effects of weeds Impacts on crops Direct impacts on Humans Impacts on Livestock The concept o invasive species Impact of invasive plants 1.3. The positive impacts of weeds 1.4. Classification of weeds -Interference with growth of dsesirable plants Competition Allelopathy Parasitism -Weed life cycles -Shoot regeneration - Persistence of weeds Weed seeds Seed Banks Vegetative reproductive structure **Practice/Experiment:** *(2.5 hrs)* Identifying the common weed in the field **Seminar/Discussion:** *(1 hrs)* The undesirable effects of weeds

	***B/* Self- study contents**: *(17 hrs)* Weeds and Their impotance
3,4	**Chapter 2: The ecology of weeds and invasive plants**
	A/* Main contents:* **Theory:** *(3 hrs)* 2.1.What is Ecology and Why is it important? 2.2. Some concepts relevant to weed ecology 2.3. Ecosystem, Ecology of weeds 2.4. The mechanisms of plant invasions 2.5. Weed life cycles and management **Semina/Discussion:** *(1 hrs)* 2.6. The mechanisms of plant invasion
	***B/* Self- stusy contents**: *(8 hrs)* The ecology of weeds and invasive plants
4	**Chapter 3: The soil system**
	A/* Main contents:* **Theory:** *(.2 hrs)* 3.1. The soil system 3.2. Weed and Soil 3.3. Weed control pratices and the soil. **Practice/Experiment:** *(5 hrs)* Investigating the seed of weed in the field
	***B/* Self- stusy contents**: *(14 hrs)* Soil and weed
5	**Chapter 4: Management methods for cropland and invasive weeds**
	A/* Main contents: (....hrs)* **Theory:** *(3 hrs)* 4.1.New direction in weed management 4.2. Scientific Approach to solving weed and invasive plant problems 4.3. Management Methods for Cropland and Invasive Weeds **Practice/Experiment:** *(5 hrs)* Investigating the weed in the upland field and how to control Investigating the weed in the lowland field and how to control
	***B/* Self- stusy contents**: *(8 hrs)* Management methods for cropland and invasive weeds
6	**Chapter 5: Introduction to Herbicides**

	A/* Main contents:* **Theory:** *(3 hrs)* 5.1. History of Hebicides 5.2. Characteristics of Herbicides 5.3. Herbicide classification 5.3. Concerns Regarding Herbicide use **Practice/Experiment:** *(2.5 hrs)* Identifying some of the common herbicide
	***B/* Self- stusy contents**: *(11 hrs)* Herbicide
7,8	**Chapter 6: Plant-Herbicide and Soil-Herbicide Interactions**
	A/* Main contents:* **Theory:** *(3 hrs)* 6.1. Plant-Herbicide Interaction 6.1.1. Herbicide Uptake 6.1.2.Herbicide movement 6.1.3. Herbicide Mode of Action 6.1.4. Herbicide Fate 6.1.5. Plant-Related selectivity 6.2. Soil-Herbicide Interaction 6.2.1. Fate of Herbicides in the soil 6.2.2. Soil, Herbicides, and Weed Control **Semina/Discussion:** *(1 hrs)* Plant-Herbicide Interaction
	***B/* Self- stusy contents**: *(8 hrs)* Plant-Herbicide and Soil-Herbicide Interactions
8,9	**Chapter 7: Herbicide Resistance**
	A/* Main contents:* **Theory:** *(3 hrs)* 7.1. Weed resistance to Herbicides 7.2. Crop resistance to Herbicides **Semina/Discussion:** *(1 hrs)* 7.3. Weed resistance to Herbicides
	***B/* Self- stusy contents**: *(8 hrs)* Herbicide resistance
9,10	**Chapter 8: Herbicide application**
	A/* Main contents:* **Theory:** *(4 hrs)*

	8.1. Application Equipment 8.2. Keeping Herbicides on Target 8.3. Herbicide Incorporation Techniques and Equipment 8.4. Equipment Calibration and Asscociated Procedures **Practice/Experiment:** *(2.5 hrs)* Evaluating the herbicide use efficiency
	***B/* Self- stusy contents**: *(13 hrs)* Herbicide application for upland crop and lowland crop

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTRUE
FACULTY OF AGRONOMY

COURSE SYLLABUS
NHE04007: Sustainable Farming

Credits: 02 (Lecture: 1.5 – Practice: 0.5); Self-Learning: 04
Term: 7
Prerequisite course(s): None
Preceding course(s): QLE03001. Plant-Water-Soil Relationships; NHE04001. Plant Nutrition

COURSE OBJECTIVES:

This course aims to help students access to the knowledge of sustainable farming practices and their effects on conservating natural recourses, dealing with the climate changing and sustainable agriculture, food quality and food safety. Students would manipulate general principles of sustainable farming in order to recommend and constructing the sustainable farming practices

COURSE EXPECTED LEARNING OUTCOMES

Notation	Course expected learning outcomes After successfully completing this course, students are able to	Program expected learning outcomes
Knowledge		
K1	Understanding the definition and criteria of sustainable farming. Analyzing the effects of farming practices on conservating natural recourses, dealing with climate changing and sustainable food production, food quality and food safety	ELO2, ELO3, ELO9
K2	Applying the principles of sustainable farming practices in food production activities.	ELO5, ELO2, ELO9
K3	Analyzing the principles of soil tillage in sustainable farming	ELO3, ELO9
K4	Constructing modeling of sustainable farming systems adapted to regional conditions.	ELO2, ELO3, ELO5
Skills		
K5	Fluent using English in discussion	ELO8, ELO7
K6	Group – based learning, self – learning	ELO6, ELO13
K7	Constructing crop rotation for a farm based on regional natural, economic and social conditions	ELO3, ELO11, ELO14
Ethics and Attitude		
K8	Being awarded of finding references about sustainable farming	ELO3, ELO12

	practices adapting with climate changing.	

COURSE DESCRIPTION

NHE4007: Sustainable farming (2: 1,5 – 0,5; 4; 90).

This course consists of 04 chapters with content on: Sustainable farming and its importance, Cropping system and its principles; Principles of soil tillage in sustainable farming; The models of sustainable farming system in the world and in Vietnam

There are 03 practice sessions with content on: Identifying agronomic biological characteristics of some crop varieties; Designing crop rotation for different ecological areas; Soil tillage for lowland and upland crops in sustainable farming.

Prerequisite course(s): None

Preceding course(s): QLE03001 – Plant – water – soil relationships;
NHE04001 – Plant Nutrition

ASSESSMENT

Grading: 10 points

Weighting:

- Attendance: 10 %
- Formative assessment: 30 %
- Final exam: 60 %

Assessment summary

Rubric	Course expected learning outcomes	Weighting (%)	Week
Attendance		**10**	
Rubric 1: Class attendance	K1, K2, K3, K4, K5, K8	7	1 – 10
Rubric 2: Practice and report	K1, K3, K4, K8	3	8 – 10
Formative assessment		**30**	
Rubric 3: Individual oral presentation	K1, K2, K3	3	6
Rubric 4 : Group oral presentation	K4, K5, K6	3	10
Rubric 5: Group work	K1, K2, K3, K4, K5,K6	2	8 – 10
Rubric 6: Group discussion	K1, K2, K3, K4, K5, K7, K8	2	8-10
Rubric 7: Midterm exam	K1, K3, K4, K5	20	6
Final exam		**60**	
Rubric 7 : Final exam	K1, K2, K3, K4, K5	60	Following University schedule

TEXT BOOKS AND REFERENCES

1 – Albert O., Aweto (2013). *Shifting Cultivation and Secondary Succession in the Tropics*. Cabi.

2- Kroeck (2011). *Crop rotation and cover cropping*. Chealsea Gree.

COURSE OUTLINE

Week	Content
1	**Chapter 1: introduction of sustainable farming**
	A/ **Main contents***: (3 lessons)* **Theory:** 1.1. Opinion about sustainable farming 1.2. Criterion, the importance of sustainable farming 1.3. Effects of sustainable farming practices on different factors: 1.3.1. Effects of sustainable farming practices on conservating natural resources. 1.3.2. Effects of sustainable farming practices on dealing with climate changing 1.3.3. Effects of sustainable farming practices on sustainable food production.
	B/ **Self- stusy contents**: *(6 periods)* Being awarded of self – learning; finding materials and references
2, 3, 4, 5, 6	**Chapter 2: cropping system and general principles of sustainable farming practices.**
	A/ **Main contents***: (10 periods)* **Theory (**10 periods**)** 2.1. definition and the importance of cropping system 2.2. scientific base of identifying cropping system 2.3. definition and roles of crop rotation 2.4. definition and principles of intercropping (mixed cropping and relay cropping) 2.5. Definition and principles of multiple cropping in agriculture 2.6. Organic farming and principles of sustainable farming **Practice/ experiment contents:** *(10 periods)* Identifying agronomic biological characteristics of some crop varieties Designing crop rotation for different ecological areas.
	B/ **Self- stusy contents**: *(30 periods)* Finding and self – learning the references about cropping system, types of cropping system and scientific base of constructing cropping systems in modern agriculture.
6,7,8,9	**Chapter 3: principles of soil tillage in sustainble farming (6 periods)**
	A/ **Main contents***: (3 periods)* **Theory:** 3.1. Definition of soil tillage in sustainbale farming 3.2. Modern soil tillage trending 3.3. Principles of soil tillage for lowland crops in sustainnable farming 3.4. Principles of tillage for upland crops in sustainnable farming

	Content of discussion: (3 period) Principles of tillage for different crop in sustainbale farming **Content of practice**: **(5 periods)** Tillaging for lowland and upland crops in sustainable farming.
	***B/* Self- stusy contents**: *(12 periods)* Finding and self – learning the references about soil tillage methods and applying them in sustainable food production.
10	**Chapter 4: Modelling sustainable farming systems in the world and in Vietnam**
	A/* Main contents: (2 periods)* **Theory:** 4.1. Characters of sustainable farming models in the world and in Vietnam. 4.2. sustainable farming models in the world and in Vietnam 4.3. sustainability of these farming systems. **Practice/Experiment:** *(5 periods)* Field trips to explore the models of sustainable farming systems in Vietnam **Seminar/Discussion:** *(1 periods)* Regional modelling sustainable farming systems in different areas.
	***B/* Self- stusy contents**: *(6 periods)* Finding and self – learning the references about cropping system, types of cropping system and scientific base of designing cropping systems in modern agriculture.

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTRUE
FACULTY OF AGRONOMY

COURSE SYLLABUS
NH04006: Intergraded Pest Management

Credits: 3 (Lecture: 2 – Practice: 1); Self-Learning: 6
Term: 8
Prerequisite course(s): None
Preceding course: NHE03003 – Plant pathogens

COURSE OBJECTIVES:

This course aims to help student achieving basically and practical knowledge of IPM what bases on setting up and complementing IPM program for specific crop in each agri-economical system. This is to protect for producing, environment and increasing income of farmers; For learners, their skills of designing and carrying out a IPM program, as well as of interview for farmers (PRA), working team, decision making, presentation, economic analyses will achieve and improve; other purpose of this subject for students are soft skills following positive, sharing, authority, active.

COURSE EXPECTED LEARNING OUTCOMES

	Course Expected Learning Outcomes	**Program Expected Learning Outcomes**
	After successful completing this course you should be able to:	
Acknowledge		
K1	Analyze and estimation of relationship between factors of plant ecology, pest and social human activity	ELO3
K1	Promotion of technical control methods and procedures of IPM program under the useful practically and scientifically	ELO3, ELO4, ELO5
Skills		
K3	Design and carry out the research what concerns with crop science and post-harvesting processing	ELO6, ELO8, ELO10
K4	Analyze, estimate and propose the solutions to practical issues related to crop science, plant protection, plant genetic and crop breeding.	ELO9, ELO10
K5	Communicate in writing papers and present the research proposal and studying results.	ELO10

K6	Achieve good communication skills; read the papers and present in English about the IPM issues	ELO7, ELO8
Ethics and Attitude		
K7	Ability to work independently and teamwork; sharing, assigning tasks, and monitoring the members of group	ELO12
K8	Active, creative; be aware of accumulating practical experiences and self-study in your life.	ELO12
K9	Be modesty, honest, good working style and high responsibility	ELO13
K10	Be aware of food security and the impact of GMO crops on economic, social and ethical issues.	ELO14
K11	Believe in scientific knowledge; adhere to and obey and the law	ELO14

COURSE DESCRIPTION

NHE04006. Integrated Pest Management (3: 2-1-6; 135)

This course consists of 5 main chapters, providing students with basic knowledge on: Pests, humans and pest management, scientific background of IPM measures, ecosystems and interactions between pests, Measures in IPM, Practice in Establishing and Implementing IPM Programs, Integrated Pest Management of Some Major Pests on Important Crops.

Preceding course: NHE03003 – Plant pathogens

ASSESSMENT

Grading: 10 points

Weighting:

- Attendance: Class attendance + Discussion: 10 %
- Formative assessment: practical report + midterm exam: 30%
- Final exam: 60 %

Assessment summary

Rubric	Course expected learning outcome	Weighting (%)	Week
Attendence			
Rubric 1 – Participant	K1, K2, K5	10	1-10
Rubric 2 – Discussion	K1, K2, K4, K5, K8, K9	5	1-10
Formatic assessment			
Rubric 3 – Team working	K1, K2, K4, K5, K7, K8, K9	5	3-7
Rubric 4 - Assignment	K1, K2, K5, K8, K9, K10	5	3-7
Rubric 5 – Practical homework	K1, K2, K5, K7, K9	5	3-7
Rubric 6 – Practical exam	K1, K2, K5, K8, K9	10	3-7
Rubric 7 – Mid exam	K1, K2, K5, K8, K9	10	3-7

Final exam			
Rubric 8 – Final exam	K1, K2, K5, K8, K9, K10, K11	60	Following University schedule

TEXT BOOKS AND REFERENCES

**** Text Books/Lecture Notes:***

1. Norris, R. F., E. P. Caswell-Chen, and M. Kogan 2003. Concepts in integrated pest management. Upper Saddle River, NJ, Prentice-Hall
2. Nguyen Van Đinh (2007). *Textbook: Biocontrol in plant protection*. Hanoi Agricultural Publicing House (in Vietnamese).
3. Nguyen Van Đinh (2005). *Text book: Animal pests on Agricultural crops*. Hanoi Agricultural Publicing House (in Vietnamese).
4. Le Lương Te (2007). Text book: *Plant Diseases*. Hanoi Agricultural Publicing House (in Vietnamese).
5. Nguyen Viet Tung (2012) Principles and control methods to prevent insect pests. *Insect and animal pests on Agricultural crops*. Hanoi Agricultural Publicing House (in Vietnamese), pp: 401- 419
6. Nguyen Viet Tung (2006). *Text book: Genaral insect*. Hanoi Agricultural Publicing House (in Vietnamese).

**** Refferences:***

1. Vu Quang Con (2007). Host and pest relationship of insect. Technique and Science Publicing House (in Vietnamese). *pp* 49-66
2. Entomological Department (2004). Text book: *Specialized insect*. Hanoi Agricultural Publicing House (in Vietnamese).
3. Nguyen Van Đinh et al.(2012). *Insect and animal pests on Agricultural crops*. Hanoi Agricultural Publicing House (in Vietnamese)
4. FAO (2000). *Tomato Integrated Pest Management*
5. FAO (2000). *Eggplant Integrated Pest Management*
6. FAO (2000). *Integrated Pest and Disease control of fruit crops in Pakistan*
7. FAO (2000). *Cabbage Integrated Pest Management*
8. Fliert E.V.D, Ann R. Braun (2002). *Farmer field School for Integrated Crop Management of Sweetpotato*
9. Ha Quang Hung (1998). *Text Book: Intergated Pest Management.* Hanoi Agricultural Publicing House (in Vietnamese).
10. Nguyen Van Hung (2006). *Tea Integrated Pest Management*. Hanoi Agricultural Publicing House (in Vietnamese).
11. Nguyen Đuc Khiem (2006). *Agriculture Insect*. Hanoi Agricultural Publicing House (in Vietnamese).
12. Pham Van Lam (2002). Enemy *Resources of insect pest: research and practics*. Hanoi Agricultural Publicing House (in Vietnamese)..
13. Pham Binh Quyen (2006). Ecological insect. Education Publicing House (in Vietnamese)..

COURSE OUTLINE

Weeks	Contents	ELO
8	Chapter 1: Pests, humans and pest management	
	A / The main contents of the class: (1t) Content theory: 1.1. Pest status 1.2. The importance of the pest 1.3. Pest Management	K2,K5,K6, K8, K9, K10, K11
	B / Self-study contents at home: (2 periods) 1.1. Pest status 1.2. The importance of the pest 1.3. Pest Management	K2,K5,K6, K8, K9, K10, K11
1.	Chapter 2: Pests and Harms	
	A / Summary of the main content in the class: (2) Content of theory: 2.1. The general impact of the pest 2.2. Plant disease 2.3. Weed 2.3. Nematode 2.4. Molluscs 2.5. Arthropods 2.6. Vertebrates Content of teaching practice / practice: (7.5t) Diseases of plants and nematodes Foot joints and pests Weed	K2,K3, K4, K5, K6,K7,K8,K9, K11..
	B / Self-study contents at home: (4 items) 2.1. The general impact of the pest 2.2. Plant disease 2.3. Weed 2.3. Nematode 2.4. Molluscs 2.5. Arthropods 2.6. Vertebrates	K2,K3, K4, K5, K6,K7,K8,K9, K11..

...2..	Chapter 3: History of Pest Management Development	
	A / Summary of the main content in class: (1) Content theory: 3.1. Ancient period (10,000 BC) 3.2. The era of AD 3.3. 17th century 3.4. 18th century 3.5. 19th century 3.6. Early twentieth century 3.7. Late 20th century	K2, K3, K4, K5, K6, K7, K8, K9, K10, K11
	B / Self-study contents at home: (2) 3.1. Ancient period (10,000 BC) 3.2. The era of AD 3.3. 17th century 3.4. 18th century 3.5. 19th century 3.6. Early twentieth century 3.7. Late 20th century	K2, K3, K4, K5, K6, K7, K8, K9, K10, K11.
...2..	Chapter 4: Eco-system and Pest	
	A / Summary of the main content in the class: (1txt) Content Theory: (1t) 4.1. Definitions and terms 4.2. Nutritional fluctuations 4.3. Limitations on resources and edge	K2, K5, K6.
	B / Self-study contents at home: (2) 4.1. Definitions and terms 4.2. Nutritional fluctuations 4.3. Limitations on resources and edge	K2, K5, K6
.2....	Chapter 5: Pest biology	
	A / Summarize the main contents in class: (.1 periods) Content theory: 5.1: Principles of Pest Population Principles 5.2. Invasive process of the pest 5.3. Pest genetics	K1, K5, K6
	B / Self-study contents at home: (2 periods)	K1, K5, K6

	5.1: Principles of Pest Population Principles 5.2. Invasive process of the pest 5.3. Pest genetics	
..3...	Chapter 6: Ecology for relationship of pest	
	A / Summary of the main contents of the class: (.1) Content Theory: (1t) 6.1. Fluctuations of nutrition 6.2. The transformation of the shelter 6.3. Importance of the interaction between nutrient source and habitat change. 6.4. Impact of physical factors 6.3.2. IPM on the plant and the economic significance of the pest Practical / Practical Teaching Content: (2.5) Carry out fieldwork and ecological painting.	.K1, K5, K9, K11.
	B / Self-study contents at home: (2) 6.1. Fluctuations of nutrition 6.2. The transformation of the shelter 6.3. Importance of the interaction between nutrient source and habitat change. 6.4. Impact of physical factors 6.3. IPM on the plant and the economic significance of the pest	.K1, K5, K9, K11.
3	Chapter 7: Biodiversity and IPM program	
	A / Summary of the main content in the class: (2) Content GD theory: (2) 7.1. Biodiversity and agricultural activities 7.2. Importance of biodiversity with IPM 7.3. Application of biodiversity in IPM system	K1, K5, K11
	B / Self-study contents at home: (4 items) 7.1. Biodiversity and agricultural activities 7.2. The importance of biodiversity with IPM 7.3. Application of biodiversity in IPM system	K1,K5, K11
4	Chapter 8: But decided to implement pest management	
	Chapter 8: But decided to implement pest management A / Summary of the main content in the class: (3txt) Content GD theory: (3)	K1,K5, K6, K10, K11

	8.1. Determine the status of the pest 8.2. Basic techniques in assessing pest populations 8.3. Threshold 8.4. Other factors affect the decision to manage the detriment 8.5. Establish and implement an IPM program on rice	
	B / Self-study contents at home: (6) 8.1. Determine the status of the pest 8.2. Basic techniques in assessing pest populations 8.3. Threshold 8.4. Other factors affect the decision to manage the detriment 8.5. Establish and implement an IPM program on rice	K1,K5, K6, K10, K11
5	Chapter 9: IPM Objectives and Strategies	
	A / Summary of the main content in the class: (3txt) Content Theory: (3t) 9.1. Key strategies of IPM 9.2. The objectives of the IPM 9.3. Threshold 9.4. Other concepts	K1, K3, K4, K5.
	B / Self-study contents at home: (6) 9.1. Key strategies of IPM 9.2. The objectives of the IPM 9.3. Threshold 9.4. Other concepts	K1, K3, K4, K5.
6	Chapter 10: The Spread of Pests and Measures to Prevent Them	
	A / Summary of the main content in the class: (1txt) Content GD theory: (1) 10.1. History process 10.2. The mechanism of transmission of pests 10.3. But the legal aspect of pest prevention 10.4. Pest risk analysis (PRA) 10.5. Preventing and identifying pests early 10.6. Intrusion and preventive measures	K3, K5, K7, K8
	B / Self-study contents at home: (2) 10.1. History process 10.2. The mechanism of transmission of pests	K3, K5, K7, K8

	10.3. But the legal aspect of pest prevention 10.4. Pest risk analysis (PRA) 10.5. Preventing and identifying pests early 10.6. Intrusion and preventive measures	
6	Chapter 11: Pesticide	
	A / Summary of the main content in the class: (2) Content GD theory: (2) 11.1. Types of plant protection drugs 11.2. The process of discovering pesticides 11.3. Chemical properties 11.4. Application technology 11.5. Environmental problems 11.6. Toxicity of pesticides 11.7. Legal aspects of pesticide use 11.8. Protect consumers	K2, K5, K6, K7, K8, K11
	B / Self-study contents at home: (4 items) 11.1. Types of plant protection drugs 11.2. The process of discovering pesticides 11.3. Chemical properties 11.4. Application Technology 11.5. Environmental problems 11.6. Toxicity of pesticides 11.7. Legal aspects of pesticide use 11.8. Protect consumers	K2, K5, K6, K7, K8, K11
7	Chapter 12: Resistance, Recovery, and Replacement	
	A / Summary of the main content in the class: (1txt) Content GD theory: (1) 7.1. Biodiversity and agricultural activities 7.2. The importance of biodiversity with IPM 7.3. Application of biodiversity in IPM system	K2, K3, K5,K6, K8, K10
	B / Self-study contents at home: (2) 12.1. Pest resistance 12.2. Recoverability of the pest 12.3. Alternate pest 12.4. Warnings about 3R (K, P, T)	K2, K3, K5,K6, K8, K10

7	Chapter 13: Biological contol	
	A / Summary of the main content in the class: (2) Content GD theory: (2) 13.1. Why biological methods must be applied 13.2. Concepts in biological measures 13.3. Biological measures and implementation process 13.4. Some examples of biological measures Content of teaching practice / practice: (2.5 more) Natural enemies	K2, K3, K4, K6, K10.
	B / Self-study contents at home: (4 items) 13.1. Why biological methods must be applied 13.2. Concepts in biological measures 13.3. Biological measures and implementation process 13.4. Some examples of biological measures	K2, K3, K4, K6, K10.
8	Chapter 14: Behavior control	
	A / Summary of the main content in the class: (1txt) Content GD theory: (1) 14.1. Introduction to behavioral measures 14.2. The tactical (tactical) method is based on the vision of the pest 14.3. Measure (tactical) based on the hearing of the pest 14.4. Measure (tactical) based on the smell of the pest 14.5. Tactical (tactical) measures based on the pest	K2, K3, K5, K8,K9, K11
	B / Self-study contents at home: (2) 14.1. Introduction to behavioral measures 14.2. The tactical (tactical) method is based on the vision of the pest 14.3. Measure (tactical) based on the hearing of the pest 14.4. Measure (tactical) based on the smell of the pest 14.5. Tactical (tactical) measures based on the pest	K2, K3, K5, K8,K9, K11
8	Chapter 15: Mechanical Physical control	
	A / Summary of the main content in the class: (1txt) Content GD theory: (1) 15.1. Improve the habitat of the pest 15.2. Physical restraint	K2, K3, K5, K8,K9,K10, K11

	15.3. Kill directly	
	B / Self-study contents at home: (2) 15.1. Improve the habitat of the pest 15.2. Physical restraint 15.3. Kill directly	K2, K3, K5, K8,K9,K10, K11
8	Chapter 16: Cultivation Control	
	A / Summary of the main content in the class: (2) Content GD theory: (2) 16.1. Prevent 16.2. Sanitary paddy fields 16.3. Let the land rest 16.4. Intercropping 16.5. Rotational 16.6. Growing on schedule 16.7. Density of planting 16.8. Making the soil 16.9. Fertilizer 16.10. Seed structure	K1, K2, K3, K5, K8, K10, K11
	B / Self-study contents at home: (4 items) 16.1. Prevent 16.2. Sanitary paddy fields 16.3. Let the land rest 16.4. Intercropping 16.5. Rotational 16.6. Growing on schedule 16.7. Density of planting 16.8. Making the soil 16.9. Fertilizer 16.10. Seed structure	K1, K2, K3, K5, K8, K10, K11
9	Chapter 17: Resistant Breeding	
	A / Summary of the main content in the class: (1txt) Content GD theory: (1) 17.1. Resistance of plants	K1, K3, K6, K7, K8, K11

	17.2. Select varieties 17.3. Genetic applications in IPM	
	B / Self-study contents at home: (2) 17.1. Resistance of plants 17.2. Select varieties 17.3. Genetic applications in IPM	K1, K3, K6, K7, K8, K11
9	Chapter 18: Implementation of the IPM program	
	A / Summary of the main content in the class: (2) Content GD theory: (2) 18.1. Visit an IPM program 18.2. Develop an IPM program 18.3. Some examples of IPM programs 18.4. Implement an IPM program Practical / Practical Teaching Content: (2.5) Implement and develop an IPM program.	K2, K4,K9, K10
	B / Self-study contents at home: (4 items) 18.1. Visit an IPM program 18.2. Develop an IPM program 18.3. Some examples of IPM programs 18.4. Implement an IPM program	K2, K4,K9, K10
10	Chapter 19: Environmental and social constraints to the IPM program	
	A / Summary of the main content in the class: (1txt) Content GD theory: (1) 19.1. Shyness and attitude of the community 19.2. Environmental issues	K1, K4, K7
	B / Self-study contents at home: (2) 19.1. Shyness and attitude of the community 19.2. Environmental issues	K1, K4, K7
10	Chapter 20: IPM in the future	
	A / Summary of the main content in the class: (1txt) Content GD theory: (1)	K1, K4, K7

	20.1 How to measure processes in IPM 20.2. Orientation change 20.3. Development strategy	
	B / Self-study contents at home: (2) 20.1 How to measure processes in IPM 20.2. Orientation change 20.3. Development strategy	K1, K4, K7

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTRUE
FACULTY OF AGRONOMY

COURSE SYLLABUS
NHE04003: Principles and practices of plant propagation

Credits: 2 (Theory teaching: 1.5 – Practice 0.5); Self-Learning: 4
Term: 8

Preceding course: NHE03002 – Plant Breeding

COURSE OBJECTIVES

This course aims to provide students with...

- Knowledge on the real situation of plant propagation (especially on horticultural crops) in Vietnam and in the world, role and organization of a nursery
- Knowledge on the effect of environmental factors to the rooting and seed germination, principle and technique of plant propagation.
- Skill on analyze the status of plant propagation (especially horticultural crops) in Vietnam
- Skill on plant propagation (herbaceous plants, woody plants, tubers, seeds etc.)
- Skill on select an appropriate propagation method for certain crop.
- Skill on develop a propagation procedure for a certain crop

COURSE EXPECTED LEARNING OUTCOMES

Notation	Course expected learning outcomes After successfully completing this course, students are able to	Program expected learning outcomes
Knowledge		
K1	Identify the role of plant propagation in agriculture and the characteristics of seedling production in Vietnam	ELO3
K2	Analyze effect environmental factors on the rooting and growth of seedling during propagation (related to the real seedling production in Vietnam)	ELO3
K3	Select the most suitable propagation method for each type of plant (fruit/flower/and vegetable) under curtain condition.	ELO4, ELO5
K4	Select suitable propagation procedure for different crop.	ELO5
K5	Apply knowledge on nursery design and produce high quality seedlings	ELO5
Skill K9, K10 sử dụng động từ Bloom ở đầu câu		
K6	Making compost, potted media for propagation and planting.	ELO10
K7	Making plant propagation plan	ELO9

K8	Identify and solve problem in propagation process	ELO11
K9	Communicate and write report in English	ELO7, ELO8
K10	Work independently and effectively in group	ELO6
Ethichs and Attitude		
K11	Be active, creative and self-learning	ELO12
K12	Be honest, professional; have good attitude and high responsibility.	ELO13

COURSE DESCRIPTION

NHE04003. Principles and Practice of Plant Propagation (2: 1,5-0,5; 4; 90).
The module provides information on the characteristics of seedling production in Vietnam, knowledge of nursery organization, effect of the environmental factors, and the principle of plant propagation. Training skill in plant propagation and the ability to produce high quality of seedling that meet the demand of the market.
Preceding course: NHE03002 – Plant breeding

ASSESSMENT

1. Grading: 10

2 . Weighting:

- Attendance: 10%
- Process (including practice, presentation, report) 30%
- Final examination: 60%

Assessment summary

Rubric	Expected learning outcomes	Percentage (%)	Week
Attendance			
Rubric 1 – Class attendance	K1, K2, K3, K4, K5, K6, K7, K10	10	1-9
Process			
Rubric 3- Practice	K5, K6, K7, K8	10	4-8
Rubric 2 – Seminar/presentation	K1, K2, K3, K5, K7, K8, K9, K10	10	9
Rubric 4- Midterm	K1, K2, K3, K4, K5	10	7
Final exam			
Rubric 5 – Final exam	K1, K2, K3, K4, K5, K6, K7, K8, K9, K10	60	14-15

TEXT BOOKS AND REFERENCES

1. Caula A. Beyl,Robert N. Trigiano (2016). Plant Propagation Concepts and Laboratory Exercises, Second Edition. CRC press

2. Phạm Thị Minh Phượng (2014). Bài giảng : Nguyên lý và Thực hành nhân giống cây trồng.
3. James W. Boodley and Steven E. Newman (2008). The commercial greenhouse. Third edition. Delmar Cengade learning, Canada
4. Hartmann, Kester, Davies and Geneve (2014). Hartmann & Kester's plant propagation: Principles and Practices. Eight edition. Pearson. USA

VIII. Course outline

Week	Contain
9	**Chapter 1: Introduction**
	A/ Contain*: (1 hours)* **Class: Role of plant propagation in Agricultural production** 1.1. Role of plant propagation in Agricultural production 1.2. Characteristics of seedling production in Vietnam
	B/ Preparation: *(2 hours)* - Where is the main horticulture production area in Vietnam? Where the seedling come from? - Identify the climatic and weather characteristics of the horticultural production in Vietnam? - Find out the difficulties and limitations in high quality seedling production in Vietnam.
2	***Chapter 2:*** **Effect of temperature, light, moisture and other environmental factors on the rooting and growth of seedling**
	A/ Contain*: (2 hours)* **Class:** 2.1. Effect of temperature 2.2. Effect of light 2.3. Effect of humidity and moisture 2.4. Effect of other factors
	B/ Preparation: *(4 hours)* - Reading documments on the effect of environmental factors on rooting, germination.
3, 4	***Chapter 3:*** **Nursery**
	A/ Contain**:** *(2 hours)* **Class:** 3.1. Nursery organization 3.2. Role and types of greenhouse in horticultural industry 3.3. Media 3.4. Tray/pot/beding preparation
	B/ Preparation**:** (4 hours) - Greenhouse structure and materials - Media and method of making meadia - Reading documments on making propagated media
4	***Chapter 4:*** **Seedling propagation**

	A/ Contain**:** *(2 hours)* **Class:** 4.1. Concept 4.2. Characteristic and physyology of seed 4.3. Seed germination and effect of enviromental factors 4.4. Seed treaments and sowing **Practice:** *(6 hours)* Lesson 1. Seed propagation - Media propagation - Seed treament technique - Seed sowing technique - Seedling caring - Seedling data record: germination rate, survive rate, etc.
	B/ Preparation: *(4 hours)* - Publications related to sowing horticultural crops - Applied technique to increase the quality seed propagation
5	***Chapter 5:*** **Cutting propagation**
	A/ Contain**: (***2 hours)* **Clas:** *(2 hours)* 5.1. Principle 5.2. Environmental effects 5.3. Type of cutting 5.4. Cutting technique **Practice:** *(6 hours)* Lesson: Herbacius/wood cutting technique - Media preparation - Cutting treament - Cutting technique - Seedling caring - Data record
	B/ Preparation: *(4 hours)* Cutting propagation documents
6	***Chapter 6:*** **Marcotting propagation**
	A/ Contain**:** *(1 hours)* **Class:** *(1 hours)* 5.1. Principle 5.2. Marcotting technique 5.2.1. Layering 5.2.2.Marcoting **Practice:** *(6 hours)* Marcoting propagation - Media preparation - Marcoting treament - Marcoting technique - Seedling caring

	- Data record
	B/ Preparation: *(2 hours)* Marcotting propagation documents
7	***Chapter 7:*** **grafting**
	A/ Contain**:** *(6 hours)* **Class:** *(4 hours)* 7.1. Principle 7.3. Type of grafting and grafting technique 7.3.1. Budding 7.3.2. Eye grafting **Field trip** *(2 hours)* - Visting a nursery - Giving questions, discussion about nursary activities. **Midterm** (20 mins) **Practice:** *(8 hours)* Grafting propagation - Stock plant preparation - Budding/eye preparation - Grafting - Seedling caring - Data record
	B/ Preparation: *(8 hours)* Grafting propagation documents
8	***Chapter 8:*** **Invitro propagation**
	A/ Contain**:** *(1 hours)* **Class:** *(1 hours)* 8.1. Concept 8.2. Principle 8.3. Material preparation 8.4. Media preparation 8.5. Technique
	B/ Preparation: *(2 hours)* Invitro propagation documents
9	***Chapter 9: Other propagation methods***
	A/ Contain: (5 hours) **Class*****: (2 hours)*** 9.1**.** Bulb propagation 9.2. Seperately propagation **Presentation:** ***(3 hours)*** Making a propagation plan for a horticultural crop (group working) - Explain the reason to choose the propagation plan for a certain crop - Place, size and condition to conduct the plan - How to organize the plan

	- Estimate capital investment, multiplication rate, runing time and profit - List the risk and solution
	B/ Preparation: *(30 hours)* - *Presentation* .
	Practice: (6 hours) Lesson: Bulb scalling and chipping technique - Media preparation - Chipping/scalling treament - Chipping/scalling technique - Seedling caring - Data record

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTRUE
FACULTY OF AGRONOMY

COURSE SYLLABUS
NHE04004: Greenhouse & Nursery Crops Production

Credits: 2 (Lecture: 2 – Practice: 0); Self-Learning 4
Term: 8
Prerequisite course(s): None.

COURSE OBJECTIVES:

Upon successful completion of the course, students:
1. Know the components of the greenhouse environment including structure, glazing, benching
2. Identify common methods to control environmental factors (lighting system, temperature, cooling, ventilation and irrigation systems and how each is used to grow plants.
3. Are able to use suitable growing media for greenhouse crops and understand the concept of salt/nutrient/fertilizer management as it relates to particular greenhouse crops for food safety and quality (*i.e.*, cost effectiveness and environmental responsibilities)
4. Understand the concepts of soilless culture, hydroponics and aeroponics environmentally responsible way.
The knowledge and skills will be developed through a student centered, service-learning environment including writing exercises, demonstrations, problem solving, and responsibility

.

COURSE EXPECTED LEARNING OUTCOMES

Notation	**Course expected learning outcomes** After successfully completing the course the students are able to**:**	**ELOs**
Knowledge		
K1	Analyze the environmental characteristics in greenhouse and greenhouse styles/types	ELO3, ELO5
K2	Select materials suitable for particular horticultural crops and cultivation techniques	ELO3, ELO5
K3	Design and manage plan for sustainable and environment-friendly crops production.	ELO5
Skills		

K4	Implement cultural practices for growing crops in greenhouse	ELO9, ELO11
K5	Work in group and lead group work	ELO6
K6	Critically think in problem solving related to crops production in greenhouse and nursery	ELO9, ELO11
K7	Use professional English for reading literature, writing essay/term paper and reporting research results	ELO7, ELO8
Ethics and attitude		
K8	Practice long-life learning through self-assessment and conception, searching knowledge and ability to use evaluation and synthetic skills	ELO12
K9	Show responsibility and morality	ELO13, ELO14

COURSE DESCRIPTION

NHE04004. Greenhouse and nursery crops production (2 credits: 2- 0; 4; 90). This course consists of 4 main chapters on the current state of greenhouse horticulture. Components of GH environment, GH structure, glazing materials. Environmental factors (light, temperature, humidity) in GH and control of environmental factors (ventilation system, cooling system, irrigation system, lighting), growing media; plant nutrients, nutrient and pest management. Horticultural crops grown in GH and nursery.

ASSESSMENT

1. Grading scale: 10

2. Final grade composes of the following components:

- Attendance: 10%
- Formative assessment: 20%
- Midterm exam: 20%
- Final exam: 50%

Assessment summary

Rubrics	Course expected learning outcomes	Weighting (%)	Week
Attendance			
Rubric 1 – Class attendance	K5, K8, K9	10	1-11
Formative assessment			
Rubric 2 – Group discussion	K5, K7, K8, K9,	5	2-4, 8-9,10
Rubric 3 – Group oral presentation	K3, K5, K6, K7, K8, K9	5	
Rubric 4 – Field trip report	K1, K4, K5, K6, K7, K8, K9	5	11
Rubric 5 – Essay/Term paper	K1, K2, K3, K6, K7	5	10
Final assessment			
Rubric 6 – Midterm exam	K1, K2, K3, K6, K7, K8	20	6

Rubric 7 – Final exam	K1, K2, K3, K6, K7, K8	50	Exam wk

TEXT BOOKS AND REFERENCES

**** Text Books/Lecture Notes:***

- Phạm Ngọc Tuân (2008). Kỹ thuật nhà lưới, Bài giảng, khoa Nông Lâm, Trường ĐH Đà Lạt
- McMahon, R. W. (1992) An introduction to greenhouse production.
- Impron (2011) A greenhouse Crop Production System for Tropical Lowland Condition, PhD. Thesis, Wageningen University.
- Food and Agriculture Organization of the United Nations (2013). Good Agricultural Practices for greenhouse vegetable crops, FAO Plant Production and Protection Paper 217

**** Additional literature:*** Journals related to crop science, horticulture e.g. J. Hort. Sci., Chronica Horticulturae.

COURSE OUTLINE

Week	Content
1	**Chapter 1: General introduction to greenhouse and nursery crops production**
	A/Main contents (3 hours) 1.3. Field ands greenhouse/nursery crop production 1.4. Advantages and requirements of GH and nursery crops production 1.5. World trend of GH horticulture and current state in Vietnam
	B/* Self-study**: ***(6 hours) - Development history of controlled/protected crop production - New developments in greenhouse crops production - Commercial horticultural crops grown in GH, production and value
2-4	**Chapter 2: Greenhouse structure and design**
	A/Main contents (6 hours) 2.1. Greenhouse styles/types 2.2. Greenhouse structure 2.3. Frame and glazing materials 2.4. Greenhouse site selection 2.5. GH environmental factors **Seminar/discussion *(2 hours)*** Greenhouse types suitable to Việt Nam climatic conditions
	***B/* Self-study**: *(16 hours)* - Greenhouse structure and styles in different climates - Materials used for framing, glazing appropriate for crops, environmental factors and investment cost - Setting greenhouse in optimal location

Week	Content
5-7	**Chapter 3: Equipments for controlling environmental factors in GH**
	A/Main contents (6 hours) 3.1. Irrigation/watering system 3.2. Lighting system 3.3. Colling and ventilation system 3.4. Benching system 3.5. Pest control and management **Sminar/discussion:** ***(2 hours)*** - Greenhouse lighting and types of lamps used - GH temperature and humidity control
	B/ **Self-study**: ***(16 hours)*** - Irrigation combined with fertilization (fertigation) - Ventilation system - New lighting technology applied in GH crops production with emphasis on LEDi
8-9	**Chaper 4: Nutrition, planting methods, growing media and irrigation water**
	A/ **Main contents:** ***(3 hours)*** 4.1. GH plant nutrition 4.2. Planting methods: soil beds, containers, soilless culture 4.3. Functions and properties of growing medium 4.4. Preparation of handlingof growing medium 4.5. Irrigation water, irrigation and fertilization 4.6. Hydroponics and aeroponics **Seminar/discussion:** ***(2 hours)*** Nutrient management and selection of growing media suitable for particular crops
	B/ **Self-study**: ***(10 hours)*** - Nutrient and pH requirement and management for GH crops - Diagnosis of nutrient deficiency - Advantages and disadvantages of growing media and environmental polution problems
10	***Chaper 5:*** Greenhouse production of specific horticultual crops
	A/ **Main contents:** ***(2 hours)*** 5.1. Tomato culture 5.2. Lettuce culture 5.3. Cucumber cultivation 5.4. Floriculture: Orchids, lilium, chrysanthemum, roses **Seminar/discussion:** *(0 hours)*
	B/ **Self-study**: *(4 hours)* - Techniques used for vegetables and ornamentals in greenhouse culture
11	**Field trips: (4 hours)** **Students are reuoired to take a visit to greenhouse production units: Vegetable and Fruit Research Institute, Food Crops Research Institute, Vân Nội Cooperative (Đông Anh) or other chosen by themsevs**
	Self-study and Reporting: 8 hours

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTRUE
FACULTY OF AGRONOMY

COURSE SYLLABUS
NHE04005: Crop Management System for Vegetable Production

Credits: 2 (Lecture: 2 – Practice: 0); Self-Learning 4
Term: 8
Preceeding course: NHE04001 – Plant mineral nutrition, NHE03003 – Plant pathology, NHE03004 – Insect pest management.

COURSE OBJECTIVES:

Upon successful completion of the course, students:
1. Know the components of the greenhouse environment including structure, glazing, benching
2. Identify common methods to control environmental factors (lighting system, temperature, cooling, ventilation and irrigation systems and how each is used to grow plants.
3. Are able to use suitable growing media for greenhouse crops and understand the concept of salt/nutrient/fertilizer management as it relates to particular greenhouse crops for food safety and quality (*i.e.*, cost effectiveness and environmental responsibilities)
4. Understand the concepts of soilless culture, hydroponics and aeroponics environmentally responsible way.
The knowledge and skills will be developed through a student centered, service-learning environment including writing exercises, demonstrations, problem solving, and responsibility

.

COURSE EXPECTED LEARNING OUTCOMES

Notation	**Course expected learning outcomes** After successfully completing the course the students are able to**:**	**ELOs**
Knowledge		
K1	Analyze the environmental characteristics in greenhouse and greenhouse styles/types	ELO3, ELO5
K2	Select materials suitable for particular horticultural crops and cultivation techniques	ELO3, ELO5
K3	Design and manage plan for sustainable and environment-friendly crops production.	ELO5

Skills		
K4	Implement cultural practices for growing crops in greenhouse	ELO9, ELO11
K5	Work in group and lead group work	ELO6
K6	Critically think in problem solving related to crops production in greenhouse and nursery	ELO9, ELO11
K7	Use professional English for reading literature, writing essay/term paper and reporting research results	ELO7, ELO8
Ethics and attitude		
K8	Practice long-life learning through self-assessment and conception, searching knowledge and ability to use evaluation and synthetic skills	ELO12
K9	Show responsibility and morality	ELO13, ELO14

COURSE DESCRIPTION

NHE04004. Greenhouse and Nursery Crops Production (2: 2- 0; 4; 90)

This course consists of 4 main chapters, focusing on the current state of greenhouse horticulture. Components of GH environment, GH structure, glazing materials. Environmental factors (light, temperature, humidity) in GH and control of environmental factors (ventilation system, cooling system, irrigation system, lighting), growing media; plant nutrients, nutrient and pest management. Horticultural crops grown in GH and nursery.

Preceeding course: NHE04001 – Plant mineral nutrition, NHE03003 – Plant pathology, NHE03004 – Insect pest management.

ASSESSMENT

1. Grading scale: 10

2. Final grade composes of the following components:

- Attendance: 10%
- Formative assessment: 20%
- Midterm exam: 20%
- Final exam: 50%

Assessment summary

Rubric	Course expected learning outcomes	Weighting (%)	Week
Attendance			
Rubric 1: Class attendance	K5, K8, K9	10	1-11
Formative assessment			
Rubric 2: Group discussion	K5, K7, K8, K9,	5	2-4, 8-9,10

Rubric 3: Group oral presentation	K3, K5, K6, K7, K8, K9	5	
Rubric 4: Field trip report	K1, K4, K5, K6, K7, K8, K9	5	11
Rubric 5: Essay/Term-paper	K1, K2, K3, K6, K7	5	10
Final assessment			
Rubric 6: Midterm exam	K1, K2, K3, K6, K7, K8	20	6
Rubric 7: Final exam	K1, K2, K3, K6, K7, K8	50	Following University schedule

TEXT BOOKS AND REFERENCES

**** Text Books/Lecture Notes:***

- Phạm Ngọc Tuân (2008). Kỹ thuật nhà lưới, Bài giảng, khoa Nông Lâm, Trường ĐH Đà Lạt
- McMahon, R. W. (1992) An introduction to greenhouse production.
- Impron (2011) A greenhouse Crop Production System for Tropical Lowland Condition, PhD. Thesis, Wageningen University.
- Food and Agriculture Organization of the United Nations (2013). Good Agricultural Practices for greenhouse vegetable crops, FAO Plant Production and Protection Paper 217

**** Additional literature:*** Journals related to crop science, horticulture e.g. J. Hort. Sci., Chronica Horticulturae.

COURSE OUTLINE

Week	Content
1	**Chapter 1: General introduction to greenhouse and nursery crops production**
	A/Main contents (3 hours) 1.6. Field ands greenhouse/nursery crop production 1.7. Advantages and requirements of GH and nursery crops production 1.8. World trend of GH horticulture and current state in Vietnam
	B/* Self-study**: ***(6 hours) - Development history of controlled/protected crop production - New developments in greenhouse crops production - Commercial horticultural crops grown in GH, production and value
2-4	**Chapter 2: Greenhouse structure and design**

Week	Content
	A/Main contents (6 hours) 2.1. Greenhouse styles/types 2.2. Greenhouse structure 2.3. Frame and glazing materials 2.4. Greenhouse site selection 2.5. GH environmental factors **Seminar/discussion *(2 hours)*** Greenhouse types suitable to Việt Nam climatic conditions
	***B/* Self-study**: *(16 hours)* - Greenhouse structure and styles in different climates - Materials used for framing, glazing appropriate for crops, environmental factors and investment cost - Setting greenhouse in optimal location
5-7	**Chapter 3: Equipments for controlling environmental factors in GH**
	A/Main contents (6 hours) 3.1. Irrigation/watering system 3.2. Lighting system 3.3. Colling and ventilation system 3.4. Benching system 3.5. Pest control and management **Sminar/discussion: *(2 hours)*** - Greenhouse lighting and types of lamps used - GH temperature and humidity control
	B/* Self-study**: ***(16 hours) - Irrigation combined with fertilization (fertigation) - Ventilation system - New lighting technology applied in GH crops production with emphasis on LEDi
8-9	**Chaper 4: Nutrition, planting methods, growing media and irrigation water**
	A/* Main contents: *(3 hours) 4.1. GH plant nutrition 4.2. Planting methods: soil beds, containers, soilless culture 4.3. Functions and properties of growing medium 4.4. Preparation of handlingof growing medium 4.5. Irrigation water, irrigation and fertilization 4.6. Hydroponics and aeroponics **Seminar/discussion: *(2 hours)*** Nutrient management and selection of growing media suitable for particular crops
	B/* Self-study**: ***(10 hours) - Nutrient and pH requirement and management for GH crops - Diagnosis of nutrient deficiency - Advantages and disadvantages of growing media and environmental polution problems
10	***Chaper 5:*** Greenhouse production of specific horticultual crops

Week	Content
	A/* Main contents: *(2 hours) 5.1. Tomato culture 5.2. Lettuce culture 5.3. Cucumber cultivation 5.4. Floriculture: Orchids, lilium, chrysanthemum, roses **Seminar/discussion:** *(0 hours)*
	***B/* Self-study**: *(4 hours)* - Techniques used for vegetables and ornamentals in greenhouse culture
11	**Field trips: (4 hours)** **Students are reuoired to take a visit to greenhouse production units: Vegetable and Fruit Research Institute, Food Crops Research Institute, Vân Nội Cooperative (Đông Anh) or other chosen by themsevs**
	Self-study and Reporting: 8 hours

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTRUE
FACULTY OF AGRONOMY

COURSE SYLLABUS
NHE04005: Crop Management System for Vegetable Production

Credits: 3 (Lecture: 2 – Practice: 1); Self-Learning: 6
Term: 8
Prerequisite course(s): NHE02004 – Plant physiology

COURSE OBJECTIVES:

This course aims to provide students with...
- The knowledge on the characteristics, the status, and the importance of the vegetable industry, based on which proposals are made to solve the problems in vegetable production of Vietnam.
- The knowledge on the classification, environmental requirements, morphological characteristics, growth and development of vegetable plants; principles of production planning, and technical solutions for commercial vegetable production.
- The skills in developing a production process, applying the process in commercial vegetable production (leaf, fruit, and tuber vegetables), and ensuring safety, sustainability, and effectiveness.
- The skills in vegetable production planning and management, which ensures safety, sustainability, and effectiveness.
- The skills for effective group working, and a high sense of responsibility.
- The knowledge and the sense of responsibility to conform to the regulations and laws on safe vegetable production and environment protection.

COURSE EXPECTED LEARNING OUTCOMES

	Course expected learning outcomes Upon successful completion of this course, students are able to:	**Program expected learning outcomes**
Knowledge:		
K1	Understand the characteristics, advantages, and difficulties of the vegetable production in Vietnam, and then propose directions for its future development.	ELO3
K2	Describe the botanical, growth, and development characteristics of vegetables in relationship with their surrounding environmental conditions.	ELO3
K3	Determine the adequate cultivation conditions for vegetables.	ELO4, ELO5, ELO14
K4	Design a production process for each specific vegetable type.	ELO5
K5	Apply the basic principles and technical methods into production and management of vegetables	ELO5
Skills		

K6	Skillfully apply technical methods into the production of commercial vegetables, and ensure product safety and quality	ELO10
K7	Develop a production & management plan for vegetable production based on the cultivation conditions.	ELO9
K8	Identify and eliminate the risks on the field which could negatively affect vegetable growth and development	ELO11
K9	Be able to communicate and write reports in English on vegetable production and management.	ELO7, ELO8
K10	Work independently and in groups; share personal ideas, assign tasks, and supervise members of the group.	ELO6
K11	Develop a working plan for the group, and execute the plan in a cooperative spirit, showing evidence of collective intelligence.	ELO6
Ethics and Attitude		
K12	Work actively and creatively, have a sense for acquiring practical experiences and lifelong learning.	ELO12
K13	Be modest and faithful, love the job and feel attachment to it, have good working behavior, have a high sense of responsibility	ELO13
K14	Always conform to the regulations and laws on environment protection and food safety in crop production	ELO14

COURSE DESCRIPTION

NHE04005. Crop Management System for Vegetable Production (3: 2 – 1; 6; 135)

This course consists of 23 main lecturers, providing with content of introduction on vegetable production in Vietnam, distribution sources and requirement of surrounding conditions for vegetables; basic principles and technical measures in vegetable production and management; vegetable post-harvest treatment, safe vegetables, cultivation techniques of a number of major vegetables.

There are 7 practical lessons with content of recognizing different vegetable seed and seedlings; techniques of sowing and germination, techniques of land preparing, planting and caring vegetables; evaluating growth and development capacities of major vegetables.
Prerequisite course: NHE02004 – Plant physiology

ASSESSMENT

Grading: 10-point
Weighting:
Attendance 10%
Formative assessment 50%
Final assessment 40%
Assessment summary:

Rubric	Course expected learning outcome	Weighting (%)	Week
Attendance			
Rubric 1: Class attendance & quizzes	K2, K13	10	1 - 15
Formative assessment			
Rubric 2: Report of field survey	K1, K5, K8, K9	10	14
Rubric 3: Porfolio of field survey	K10, K11, K12, K13	5	14
Rubric 4: Group oral presentation	K1, K8, K9, K10, K11, K12, K13	5	15
Rubric 5: Midterm exam	K2, K3, K5, K14	10	6
Rubric 6: Practice sessions	K4, K6, K7, K8, K9, K10, K11, K12, K13, K14	20	15 - 18
Final assessment			
Rubric 7: Final exam	K2, K3, K5, K14	40	19 - 21

TEXT BOOKS AND REFERENCES

**** Text Books/Lecture Notes:***

1) Trần Thị Minh Hằng. 2015. Lecture on "Crop management systems for vegetable production".
2) G E Welbaum. 2015. Vegetable Production and Practices. CaBi Publishing.
3) George, R. A. T. 2011. Tropical vegetable production. CaBi Publishing.
4) Tạ Thu Cúc, Hồ Hữu An, Nghiêm Bích Hà. 2007. "Vegetable plants" *(Giáo trình Cây rau)*. Agricultural publishing house *(NXB Nông nghiệp)*

**** Additional references:***

1) John L. Havlin. 2013. Soil fertility and Fertilizers. Prentice Hall
2) Anthony E.Hall. 2001. Crop Responses to Enviroment. CRC Press.
3) Merrill A. Ross, Carole A. Lembi. Applied Weed Science.
4) N.K.Fageria, V.C. Baligar. 2006. Physiology of Crop Production.
5) Allen V. Barker. 2010. Handbook of Plant Nutrition. Taylor and Francis
6) Gopinadhan Paliyath. 2009. Postharvest Biology and technology of fruits, vegetable, and flowers. Wiley Blackwell.
7) Gangawane,LV and VC Khilare. 2008. Crop Diseases: Idenfitication and Management. Daya Publishing.
8) Maynard, D.N. and G.J. Hochmuth. 2007. *Knott's Handbook for Vegetable Growers*, 5th Ed. Wiley and Sons, New York.

COURSE OUTLINE

Week	Content
10	**Chapter 1: Introduction**
	A/ Main contents: (9 hours) Theoretical contents: (3 hours) 1.1. Nutritional benefits and economical importance of vegetables 1.2. Vegetable production and consumption 1.3. Main characteristics of vegetable production 1.4. Potentials, challenges, and development trends of vegetable industry in Vietnam Seminar/discussion: (3 hours) Present and discuss the results of field investigation on the current status of vegetable production and consumption in the local community. Field survey: (3 hours) Field survey on the current situation of vegetable production and consumption in the local community.
	B/ Self-study content: (10 hours) - Collect the statistical data on the production areas, productivity, efficiency, import and export values of vegetables of Vietnam and the world from the websites of FAO, Vietnam Statistics Deparment - Read some papers on the value of vegetables - Learn about the current status of vegetable production in Vietnam from website and other publications
2	**Chapter 2: Origins, Classifications, and environmental requirements of vegetable crops**
	A/ Main contents: (3 hours) Theoretical contents: 2.1. Origin of vegetable crops 2.2. Classification of vegetable crops 2.3. Effect of Environmental factors on vegetable growth and development
	B/ Self-study contents: (10 hours) Learn about the different vegetable crops Read some papers on the effects of environmental factors on the growth and development of vegetable crops.
3, 4	**Chapter 3: Principles and basic techniques of vegetable production and management**
	A/ Main contents: (11 hours) Theoretical contents: (5 hours) 3.1. Introduction to vegetable production systems 3.2. Planning and designing vegetable fields 3.3. Nursery production 3.4. Production seasons and rotations 3.5. Soil preparation and management 3.6. Seeding and planting techniques for vegatables 3.7. Fertilizing methods 3.8. Irrigation methods 3.9. Pests and diseases controls 3.10. Growth and development controls

	3.11. Harvest and postharvest productions Practice sessions: (6 hours) Session 1. Vegetable seed identification Session 2. Nursery production Session 3. Vegetable seedling identification
	B/ Self-study content: (20 hours) Learn about the different vegetable production systems; nursery techniques; basic cultivation techniques applied in vegetable production, harvest and post-harvest production.
4	**Chapter 4: Safe vegetable production**
	A/ Main contents: (1 hour) Theoretical contents: (1 hour) 4.1. The importance of safe vegetable production 4.2. Reasons for unsafe vegetables 4.3. Solutions for safe vegetable production
	B/ Self-study contents: (10 hours) Learn about the regulations, technical standards for safe vegetable produciton; VietGAP standards.
5	**Chapter 5: Brassicaceae crops - Cabbage production**
	A/ Main contents: (5 hours) Theoretical contents: (3 hours) 5.1. Nutrition values and economical importance 5.2. Origin, distribution, and classification 5.3. Botanical characteristics 5.4. Cabbage cultivars 5.5. Major growth and development stages 5.6. Effect of environmental factors on cabbage plant 5.7. Cultivation techniques Practice sessions: (2 hours) Session 4. Soil preparation for cabbage production and planting Session 5. Caring for cabbage plants Session 6. Evaluation of the growth and development of cabbage plants
	B/ Self-study contents: (10 hours) Learn about the cabbage varieties used in Vietnam, and cabbage production proccess
6	**Chapter 6: Solanaceae crops - Tomato production**
	A/ Main contents: (6 hours) Theoretical contents: (3 hours) 6.1. Nutrition values and economical importance 6.2. Origin, distribution and classification 6.3. Botanical characteristics 6.4. Tomato cultivars 6.5. Effect of environmental factors on tomato plant 6.6. Cultivation techniques 6.7. Harvest and post-harvest production Practice sessions: (3 hours) Session 4. Soil preparation for tomato production and planting

	Session 5. Caring for tomato plants Session 6. Evaluation of the growth and development of tomato plants
	B/ Self-study contents: (10 hours) Learn about the tomato varieties used in Vietnam, and tomato production proccess
7	**Chapter 7: Potaton production**
	A/ Main contents: (5 hours) Theoretical contents: (3 hours) 7.1. Nutrition values and economical importance 7.2. Origin, distribution, and classification 7.3. Botanical characteristics 7.4. Main growth and development stages 7.5. Effect of environmental factors on potato plant 7.6. Potato cultivars 7.7. Cultivation techniques 7.8. Tuber seed propagation Practice: (2 hours) Practice 4. Soil preparation for potato production and transplanting Practice 5. Caring for potato plants Practice 6. Evaluation of the growth and development of potato plants
	B/ Self-study contents: (10 hours) Learn about the potato varieties used in Vietnam, and potato production proccess
8	**Chapter 8: Cucurbitaceae crops - Cucumber production**
	A/ Main contents: (5 hours) Theoretical contents: (3 hours) 8.1. Nutrition values and economical importance 8.2. Origin, distribution, and classification 8.3. Botanical characteristics 8.4. Cucumber cultivars 8.5. Effect of environmental factors on cucumber plant 8.6. Cultivation techniques 8.7. Harvest Practice: (2 hours) Practice 4. Soil preparation for cucumber production and transplanting Practice 5. Caring for cucumber plants Practice 6. Evaluation of the growth and development of cucumber plants
	B/ Self-study contents: (10 hours) Learn about the cucumber varieties used in Vietnam and cucumber production proccess

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTRUE
FACULTY OF AGRONOMY

COURSE SYLLABUS
NHE04011: Sustainable Agriculture

Credits: 4 (Lecture: 3 – Practice: 1); Self-Learning: 8
Term: 8
Preceding course: MTE04001- Crop Ecology, QLE03001 – Plant-water-soil Relationships; NHE03003 – Plant Pathology; NHE03004 – Integrated Pest Management

COURSE OBJECTIVES:

After finishing the course, learners understand the general knowledge about sustainable agriculture, from definition to basic principles and practice; know how to build and manage an agricultural system in sustainable way and how to assess one agricultural system is sustainable or not; and get knowledge about various sustainable agriculture systems therefore building up the understanding of learners about the need of developing the agricultural system in sustainable way as well as the necessary skills in sustainable agriculture research and development.

COURSE EXPECTED LEARNING OUTCOMES

Notation	Course expected learning outcomes After successfully completing this course, students are able to	Program expected learning outcomes
Knowledge		
K1	Summarize the general knowledge about sustainable agriculture, from definition to basic principles and practice	ELO3
K2	Design and manage an agricultural system in sustainable way and assess suitability of agricultural system	ELO5, ELO9
K3	Distinguish about various sustainable agriculture systems	ELO9
Skills		
K4	Perform different tools used in sustainable agriculture research and development.	ELO11
K5	Develop the skills in team work, group discussion and seminar	ELO6, ELO7
K6	Use English; Develop communication skills	ELO7, ELO8
Ethics and Attitude		
K7	Be aware of the necessary of sustainable agriculture development	ELO14, ELO13

K8	Be aware of self study and research	ELO12

COURSE DESCRIPTION

NHE04011. Sustainable Agriculture (4: 3 – 1; 8; 180)

This course consists of 6 chapters that includes the content of system theory and agriculture system; Definition, characteristics of sustainable agricultural system and methodology to assess the sustainability of an agriculture system; Method to build a sustainable agriculture system; Sustainable management method in agriculture; Different forms of sustainable agricultural systems; Sustainable agriculture research and development.

Preceding course: MTE04001- Crop Ecology, QLE03001 – Plant-water-soil Relationships; NHE03003 – Plant Pathology; NHE03004 – Integrated Pest Management

ASSESSMENT

Grading: 10 point

Weighting:

- Attendance: 10 %
- Formative assessment: 30 %
- Final exam: 60 %

Assessment summary

Rubric	Course expected learning outcome	Weighting (%)	Week
Attendance			
Rubric 1: Class attendance	K1, K2, K3, K4, K5, K6, K7, K8	10	1-15
Formative assessment			
Rubric 2: Group discussion	K1, K2, K5, K6, K7, K8	10	1-10, 14
Rubric 3: Presentation	K3, K5, K6, K7, K8	5	11-13
Rubric 4: Field trip and report	K3, K5, K6, K7, K8	5	13
Rubric 5: Practice	K4, K5, K6, K8	10	4 -13
Final assessment			
Rubric 6: Final exam	K1, K2, K4, K6, K7	60	Following University schedule

TEXT BOOKS AND REFERENCES

**** Text Books/Lecture Notes:***

PhamTien Dzung and Vu Dinh Ton (2015). Agricultural System.

Tran Duc Vien, PhamVan Phe and Ngo The An (2004). Agro-ecology.

**** Additional references:***

Behnassi, M., Shahid, S.A, D'Silva, J. (2011). Sustainable agricultural development: recent approaches in resources management and environmentally-balanced production enhancement, Springer, New York, 275p.

Bohlen, P.J. (2009). Sustainable agroecosystem management: Integrating ecology, economics and society, Taylor&Francis Group, 301 p.

Food and Agriculture Organization (FAO). (2013). Sustainability Assessment Of Food and Agriculture Systems .Ver.3. Retrieved from http://www.fao.org/nr/sustainability/sustainability-assessments-safa/en/

Mollison, B. and Mia Slay, R. (1994), The introduction of sustainable agriculture.

COURSE OUTLINE

Week	Content
1,2,3	**Chapter 1: System Theory and Agricultural Systsem**
	A/* Main contents: *(7 hrs)* **Theory:** 1.1. Concepts of System Theory 1.2. Classification of system 1.3. System thinking 1.4. Definition of agricultural system 1.5. The components of agricultural system and the relationship between each others **Discussion:** *(2 hrs)* - Group discuss about the concepts of system theory and make the illutrated examples. - Group discuss about the components of agricultural system and the relationship between each others and make the illutrated examples
	***B/* Self- study contents**: *(5 hrs)* 1.6. Concepts of System Theory 1.7. The components of agricultural system
4,5,6	**Chapter 2: Sustainable agriculture**

	A/* Main contents: (4 hrs)* **Theory:** 2.1. Definition of sustainable agriculture 2.2. History of sustainable agriculture 2.3. Characteristics of sustainable agriculture 2.4. The principles on building sustainable agriculture 2.5. The methods to assess the sustanability of agricutural system **Discussion:** *(5 hrs)* - Group discussion about the principles and characteristics of sustainable agriculture - Comparision between sustainable agriculture and conventional agriculture - Group discussion about some important criterias to assess the sustanability of agricutural system.
	***B/* Self- stusy contents**: *(10 hrs)* 2.6. The principles and characteristics of sustainable agriculture 2.7. Sustainability assessment method FAO (SAFA)
7,8	**Chapter 3: Building the sustainable agriculture system**
	A/* Main contents: (4 hrs)* **Theory:** 3.1. Building the sustaible agriculture base on principle of ecological system 3.2. The factors influence the sustanability development 3.3. The situation of agriculture in Vietnam and solutions to develop sustainable agriculture system **Discussion:** *(2 hrs)* - Group discussion about the principles of ecological system - The relationship between ecology and sustainable agricultural development - Determination of chalenges and oppotunities of sustainable agricultural developmen - Solutions to overcome the difficulties to develop sustainable agriculture system
	***B/* Self- stusy contents**: *(5 hrs)* 3.4. The principles of ecological system
9,10	**Chapter 4: The management of sustainable agriculture**
	A/* Main contents: (4 hrs)* **Theory:** 4.1. Environment and ecology management 4.2. Water resource management

	4.3. Soil management 4.4. Intergarted pest management 4.5. Crop management **Discussion:** *(2 hrs)* - Group discuss about importance of each management method - Determine the approriate techniques for each management method
	***B/* Self- stusy contents**: *(5 hrs)* 4.6. The management methods of sustainble agriculture
11,12,13	**Chapter 5: Forms of sustainable agriculture**
	A/* Main contents: (3 hrs)* **Theory:** 5.1. Problems with improper farming systems 5.2. Chaging farming system 5.3. Agro-forestry system 5.4. VAC system 5.5. Organic Agriculture 5.6. Permaculture 5.7. Ecological Agricuture 5.8. Natural Farming **Seminar:** *(6 hrs)* - Presentation about chosen sustainable agricultural system by group - Watching video about some sustainable agricultural system **Fieldtrip**: (*15 hrs)* - Visit one chosen farming and writting report.
	***B/* Self- stusy contents**: *(10 hrs)* - 5.9. Prepare seminar about one sustainable agricultural system by group
14,15	**Chapter 6: Participatory rural aprraisal (PRA)**
	A/* Main contents: (5 hrs)* **Theory:** 6.1. Site description 6.2. Information gathering methods 6.4. Some PRA tools **Discussion:** *(1 hrs)* - Group discuss about the importance of participatory of farmer in PRA - Group discuss about the importance of PRA on agricultural system development **Practice:** *(15 hrs)*

	- Practice some PRA tools: Participatory mapping, Problem tree, SWOT analysis.
	***B/* Self- stusy contents**: *(5 hrs)* - Participatory rural appraisal (PRA)

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTRUE
FACULTY OF AGRONOMY

COURSE SYLLABUS
NHE04009: Internship

Credits: 2 (Lecture: 0 – Practice: 2); Self-Learning: 4
Term: 8
Prerequisite course(s): None

COURSE OBJECTIVES:

This course aims to provide students the opportunities to

- Practice the crop production techniques; build and select the production process suitable for different agricultural crops using their knowledge and skills.
- Know clearly about the real professions/WoWs: organization framework, scale, working area, infrastructure and materials used for production and business, current situation of crop production, business and manegement of WoWs.
- Practice the solf skills normally used in the professional working environments: communication, working in a group; planning; problem defining and solving, case study.
- Make acquataince with WoWs (employers, customers, collegues, technicians, workers...); build and enhance the relationship in profession area in order to get the oppotunity to find the job after graduation.
- Practice the working behavior: active, initiative, creative, high responsibility, good cooperation with collegues/coworkers, conform the regulations and laws...
- Practice the habit of exchange knowledge, learning from the others, accumulating the professional experiences, defining, analyzing and solving the problems of the professional reality, having the consciousness of self-study all life.

COURSE EXPECTED LEARNING OUTCOMES

	Course expected learning outcomes After successfully completing this course you should be able to:	**Program expected learning outcomes**
Knowledge:		
K1	Evaluate the cultivation methods applied in the real crop production	ELO3, ELO5
K2	Apply effectively knowledge to the real crop production	ELO3, ELO4, ELO5
K3	Evaluate the effects of all the factors on professional environment/World of Works	ELO1
K4	Apply the knowledge of society and contemporary problems to carry out the work in professional working environment	ELO1
Skills		

K5	Carry out skillfully enough all the techniques of crop production	ELO9, ELO10
K6	Define and solve the problems arising in the crop production reality	ELO11
K7	Enhance the skill of information collection, data treatment, report writing and presentation	ELO7, ELO11
K8	Skillful in communication, group working, planning, case study, problem solving	ELO6, ELO7, ELO8
Ethics and Attitude		
K9	Take a sense of initiative in doing business; self study and accumulate the real experiences.	ELO12
K10	Have a sense of cooperation with collegues/coworkers, pay attention and help each other in doing completely the jobs and making progress together.	ELO13
K11	Active, agile, have a sense of high responsibility in assigned job.	ELO13
K12	Conform the regulation and laws of WoWs; good consciousness of discipline	ELO14

COURSE DESCRIPTION

NHE04009: Internship (2: 0 - 2 - 4; 90).
Making the internship plan; getting to know about the WoWs (internship place): organization framework, scale, working area, infrastructure and materials used for production and business, current situation of crop production, business and manegement of WoWs.; learn about the crop production processes applied in internship place; participate in all activities including general and professional activities (crop cultivation, breeding and seed production, scientific research on crop production...) at WoWs; data collection and treatment; writing report and presenting at student seminar.

ASSESSMENT

Grading: 10-point
Weighting:
- Formative assessment: 100%

Assessment summary

Rubric	Course expected learning outcome	Weighting (%)	Week
Formative assessment			
Rubric 1: Assessment of site supervisor	K4, K8, K9, K10, K11, K12	20	2
Rubric 2: Report of internship	K1, K2, K3, K4, K5, K6, K7, K8	30	3

Rubric 3: Portfolio of internship	K1, K7, K8	20	3
Rubric 4: Group oral presentation	K2, K3, K4, K5, K6, K7, K8, K9, K10, K11	30	3

TEXT BOOKS AND REFERENCES

**** Text Books/Lecture Notes:***

1. Faculty of Agronomy. 2015. Internship guiddbook.

COURSE OUTLINE

Week	Content
11	**Making group internship plan**
	***A/* Content of group working:** (*10 hours*) - Making a group of 6 – 8 students - Assigning the concrete duty and responsibilty to each group member - Contact to host site/ site supervisor - Getting consultation with internship coordinator to make the detail plan for 2 weeks of internship.
	B/ Self-study contents: *(5 hours)* Learn the crop production processes for crops produced at host site Make diary
1	**Getting to know about WoW (host site)**
	***A/* Activities at host site:** *(10 hours)* - Collect information about host site: history of establishment and development, scale, organization framework, working area, production and business activities of WoW... - Getting to know the functions and duties of different units/departments belong to host site; working positions and requirements; enrolment requirement of WoW... - Survey on the difficulties and advantages of WoW and development strategy in the near future. - Getting to know about the regulations and laws ralated to working area in host site.
	***B/* Self-study contents**: *(5 hours)* Collect, synthese and treat the information/data and write the report Make diary
1	**Learn about the crop production processes applied at host site**
	***A/* Contents:** *(10 hours)* Survey on the professional activites at host site Learn about the crop production processes applied at host site

	***B/* Self-study contents**: *(5 hours)* Learn about the crop production processes applied at host site. Make diary
1 and 2	**Carry out the common works and professional works at host site**
	***A/* Contents:** *(75 hours)* - Carry out all the assigned common works at host site - Carry out all the assigned professional works: crop cultivation, harvest and post harvest handling, scientific research on crop production, plant breeding and seed production.
	***B/* Self-study**: *(45 hours)* Make diary; summary all the works done and experiences learned, report to internship coordinator at Faculty.
2	**Synthese and treat the data/information; write the report and do ppt presentation about the results of internship**
	***A/* Contents:** *(10 hours)* - Synthese and treat the data/information - Analyse the data/information and write the report. - Do ppt presentation at student seminar - Discuss the results of internship at student seminar
2	**Summary meeting and evaluation of the internship results** *(5 hours)*
	- Summarise the results of internship - Give the recommendations to the University, Faculty, WoWs and students in order to enhace the effectiveness of internship

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VIETNAM NATIONAL UNIVERSITY OF AGRICULTURE

FACULTY OF AGRONOMY

COURSE SYLLABUS
NHE04010: UNDERGRADUATE THESIS

Credits: 10 (Lecture:0 – Practice:10); Self-Learning: 30
Term: 9
Prerequisite course: NHE04008- Research methods

COURSE OBJECTIVES

The course aims to help students improve their professional knowledge and skills and soft skills through conducting a research project under the guidance of the teacher.

COURSE EXPECTED LEARNING OUTCOMES

Notation	Course expected learning outcomes After successfully completing this course, students are able to	Program expected learning outcomes
Knowledge		
K1	Analyze the relationship between biological, genetic, physiological and environmental factors affecting the crop	ELO3
K2	Apply knowledge of economics to manage, produce and trade in plant products	ELO1, ELO4
K3	Establish a safe, efficient and sustainable management system of crop production	ELO4, ELO5
Skills		
K4	Assess the effectiveness, safety and sustainability of crop production models	ELO9
K5	Carry out scientific research of crop science and crop production	ELO10
K6	Use argumentative thinking in analyzing, evaluating, and solving professional problems	ELO8, ELO11
Ethics and Attitude		
K7	Have a lifelong learning sense	ELO12
K8	Have a sense of responsibility and professional ethics	ELO13
K9	To well implement the provisions of the law on crop production	ELO14

COURSE DESCRIPTION

NHE04010. Undergraduate Thesis (10: 0– 10; 300; 450)

This course focuses on research proposal; Present research proposal; Design experiments, investigate and collect data; Present study progress; Analyze data, write thesis; Defend thesis. Topics covered in the thesis include areas relevant to effective, safe and sustainable management of crop production.

Prerequisite course: NHE04008 – Research methods.

ASSESSMENT

Grading: 10

Final score: is average score of 5 lecturers/members

+ Supervisor
+ Reviewer
+ Three members of the examination committee

TEXT BOOKS AND REFERENCES

- Supervisor provide 1 thesis of the similar study field from one university within top 500 universities
- Thesis handbook of the Faculty

COURSE OUTLINE

Week	Content
1 - 2	**Content 1 : Preparation of thesis study plan**
	1.1. Read references and write proposal
	1.2. Defend proposal
3 - 13	**Content 2 : Carry out experiments and collect data**
	2.1. Prepare research materials
	2.2. Design and layout experiments
	2.3. Collect/process experiment data
	2.4. Read references, write literature review
	2.5. Report research progress
14-15	**Content 3 : Analyse data, write reports and complete thesis**
	3.1. Analyse data

	3.2. Write reports and complete thesis
	3.3. Defend thesis
	Total