MINISTRY OF EDUCATION AND TRAINING   SOCIALIST REPUBLIC OF VIETNAM
CAN THO UNIVERSITY   Independence - Freedom - Happiness

SUBJECT OUTLINE DETAILS

1. Subject: Statitics for Biologists
  - **Code: CS464C**
  - **Credits:** 03
  - **Hours:** 35 theory hours, 20 practice hours and 20 self-study/homework exercises hours.

2. Management Unit:
  - **Department:** Socio-Economics and Policy study
  - **Faculty/School/Institute/Center/Department:** Mekong Delta Development Research Institute (MDI)

3. Prerequisites: Statistical probabilities (TN010)

4. Subject objectives:
   After completion of bio-statistics subject, students will achieve the expected learning outcomes:

4.1. Knowledge:
   4.1.1. Having basic knowledge of theory statistics and common probability distributions.
   4.1.2. Having Knowledge of research methods can be choice of experimental design arrangement in scientific research.
   4.1.3. Mastering the methods of synthesis and analysis models in the field of research.
   4.1.4. Having in-depth knowledge in the presentation, explain, interpret analysis results in scientific research.

4.2. Skill:
   4.2.1. Skilled use of statistical software commonly used in the analysis and synthesis of information in scientific research.
   4.2.2. Ability to perform experiments independently, know how to handle, data analyze, interpret the results sensibly scientific.
   4.2.3. Capable of teamwork, working independent with high scientific.
   4.2.4. Ability to perform in-depth research on agricultural, biology, environmental...

4.3. Attitude:
   4.3.1. Thinking dynamic, creative and professional ethics.
   4.3.2. Having serious mental learning, participation accountability, the style industry, dedication to the job.
   4.3.3. Having honest attitude in scientific research. Acumen in these situations.
   4.3.4. Accumulate experiences to shape thinking skills and reasoning.

5. Brief description of subject content:
   This course is designed to teach students of natural scientific fields (agriculture, biotechnology, environmental science,...), help students proficient experiment layout, methods of sampling, data collection and application of the principles of probability and statistics in hypothesis testing, master the methods and analytic models in the field research, presentation, explain and interpret analytic results and simulation predictions in scientific development.

6. Subject content structure:

	Content	Hours	Objectives
Chapter 1. 1.1. 1.2.	**Some conceptual and statistical quantities** Population and sample Variables and random variables	**3**	4.1.1; 4.1.4

1.3.	Descriptive measures			
1.4.	Estimative measures			
1.5.	Measures of dispersion			
Chapter 2.	**The statistical distributions**		**3**	4.1.1; 4.1.4
2.1.	Normal distribution (N~distribution)			
2.2.	Chi-square distribution (χ^2 distributions)			
2.3.	Student's distribution (t distribution)			
2.4.	Fisher distribution (F distribution)			
2.5.	Binomial distribution			
Chapter 3.	**Tests of hypothesis**		**5**	4.1.3; 4.1.4
3.1.	Statistical hypothesis			
3.2.	Hypothesis Testing			
3.3.	Z Test			
3.4.	T-test			
3.5.	F-test			
3.6.	χ^2 test			
Chapter 4.	**Single - factor experiments**		6	4.1.2; 4.1.3; 4.1.4; 4.2.1; 4.2.2; 4.2.4
4.1.	Introduction and concepts in experiments layout			
4.2.	Completely Randomized Design (CRD)			
4.3.	Randomized Complete Block Design (RCB)			
4.4.	Latin Square Design (LS)			
Chapter 5.	**Two - factor experiments**		**7**	4.1.2; 4.1.3; 4.1.4; 4.2.1; 4.2.2; 4.2.4
5.1.	Introduction factorial experiments			
5.2.	Main effect, single effect and interaction effect			
5.3.	Two Factorial experiment with Completely Randomized Design			
5.4.	Two Factorial experiment with Randomized Complete Block Design			
5.5.	Split-Plot Design			
5.6.	Strip-Plot Design			
Chapter 6.	**Three-factor experiments**		4	4.1.2; 4.1.3; 4.1.4; 4.2.1; 4.2.2; 4.2.4
6.1.	Interaction between three factors			
6.2.	Completely Randomized Design			
6.3.	Randomized Complete Block Design			
6.4.	Split-Plot Design			
6.5.	Strip-Plot Design			
6.6.	Split-Split-Plot Design			
6.7.	Split-Strip-Plot Design			
6.8.	Strip-Strip-Plot Design			
6.9.	Strip-Split-Plot Design			
Chapter 7.	**Comparison between treatment means**		3	4.1.3; 4.1.4; 4.2.1; 4.2.2; 4.2.4
7.1.	Principle comparing of treatment means			
7.2.	Least Significant Difference Test (LSD)			
7.3.	Duncan's Multiple Range Test (DMRT)			
7.4.	Turkey Test (TT)			
Chapter 8.	**Regression and correlation analysis and established mathematical models**		**4**	4.1.3; 4.1.4; 4.2.1; 4.2.2; 4.2.4
8.1.	Linear regression models			
8.2.	Non-Linear regression models			
8.3.	Single regression model			
8.4.	Multiple regression models			
8.5.	Time-series models			

8.6- 8.7.	Simulation and prediction models Data transformation		

7. Teaching method:
- Teaching theories in class
- Group/individual home exercises
- Exercises in class
- Computer practices with the commonly used statistical softwares

8. Duties of student:
Students have to do the following duties:
- Attend at least 80 % hours of the theoretical lessons.
- Join more than 90 % hours of computer practice with report results.
- Complete group exercises and individual assignments
- Attend mid semester and final exam.
- Proactively implementing self-study.

9. Assessment of student learning outcomes:

9.1. Assessment

No.	Point components	Rules and Requirement	Weights	Objectives
1	Overall attendance	- Attend at least 80 % hours of the total hours in the classes	5%	4.3.2
2	Group/individual assignments	- Report of the group/individual	10%	4.1 and 4.2
3	Computer practice	- Group reports - Join more than 90 % hours of computer practice	15%	4.1.2 to 4.1.4; 4.2.1 to 4.2.4
4	Mid-semester exam	- Written exam / test (60 minutes)	20%	4.1.1 to 4.1.4; 4.2.1
5	Final exam	- Written exam / test / (90 minutes)	50%	4.1; 4.2; 4.3

9.2. Grading
- Grading components and final test scores will be marked on a scale of 10 (0 to 10), rounded to one decimal place.
- Subject score is the sum of all the components of the evaluation multiplied by the corresponding weight. The subject score is marked on a scale of 10 and rounded to one decimal place, then is converted to A-B-C-D score and score on a scale of 4 under the academic provisions of the University.

10. Materials:

Materials information	Code number
[1] K.A. Gomez, and A.A. Gomez. 1984. Statistical Procedures for Agricultural Research, 2nd ed. New York: John Wiley & Son.	MT.002754, NN.013629 to NN.013633, TS.002132, TS.003102, Library of MDI
[2] Phan Thi Thanh Thuy. 2007. Syllabus Agricultural Statistics. Documentation for internal use.	Library of College of Agriculture and Applied Biology , Personal Bookshelf
[3] Duong Ngoc Thanh. 2006. Textbook in Applied Statistics for Socio- Economics Research	Library of MDI, Personal Bookshelf
[4] Mai Van Nam. 2004. Statistical theory syllabus, Can Tho University Publishing	KT.00853-23691 to KT00862-2369210

11. Self-study Guide:

Week	Content	Theory (hours)	Practice (hours)	Students' duties
1	**Chapter 1: Some conceptual and statistical quantities** 1.1. Population and sample 1.2. Variables and random variables 1.3. Descriptive measures 1.4. Estimative measures 1.5. Measures of dispersion	3	0	- Previous research and reference: +References/materials[1]: Chapter 1 + References/materials[2] Chapter 1 +References/materials[3]: Chapter 1 +References/materials[4]: Chapter 1, Chapter 4 - Review the contents of the modules studied in class
2	**Chapter 2: The statistical distributions** 2.1. Normal distribution 2.2. Chi-square distribution 2.3. Student's distribution 2.4. Fisher distribution 2.5. Binomial distribution	3	0	- Previous research and reference: + References/materials[2]: Chapter 2 +References/materials[3]: Chapter 2 - Review the contents of the modules studied in class
3	**Chapter 3: Tests of hypothesis** 3.1.Statistical hypothesis 3.2. Hypothesis Testing 3.3. Z Test	2	1	- Previous research and reference: +References/materials[2]: Chapter 3; Chapter 4 +References/materials[3]: Chapter 3 - Review the contents of the modules studied in class
4	3.4. T-test 3.5. F-test	2	1	- Previous research and reference: +References/materials[2]: Chapter 3; Chapter 4 - Review the contents of the modules studied in class
5	3.6. χ^2 test **Chapter 4: Single - factor experiments** 4.1. Introduction and concepts in experiments layout	2	1	- Previous research and reference: + References/materials[1]: Chapter 2 +References/materials[2]: Chapter 3; Chapter 4; Chapter 5; Chapter 10 - Review the contents of the modules studied in class - Make homework assignments
6	4.2. Completely Randomized Design (CRD) 4.3. Randomized Complete Block Design (RCB)	3	0	- Previous research and reference: +References/materials[1]: Chapter 2 +References/materials[2]: Chapter 5 - Review the contents of the modules studied in class - Review, prepare for mid-term exam
7	4.4. Latin Square Design (LS) * Mid semester exam	2	1	- Previous research and reference: +References/materials[1]: Chapter 2 +References/materials[2]: Chapter 5

				- Make homework assignments
8	**Chapter 5: Two - factor experiments** 5.1. Introduction factorial experiments 5.2. Main effect, single effect and interaction effect 5.3. Two factorial experiment with Completely Randomized Design	3	0	- Previous research and reference: +References/materials[1]: Chapter 3 +References/materials[2]: Chapter 6 - Review the contents of the modules studied in class
9	5.4. Two Factorial experiment with Randomized Complete Block Design 5.5. Split-Plot Design	3	0	- Previous research and reference: +References/materials[1]: Chapter 3 +References/materials[2]: Chapter 6 - Review the contents of the modules studied in class
10	5.6. Strip-Plot Design * solve the assignments	1	2	- Previous research and reference: +References/materials[2]: Chapter 6 - Review the contents of the modules studied in class - Make homework assignments
11	**Chapter 6: Three-factor experiments** 6.1. Interaction between three factors 6.2. Completely Randomized Design 6.3. Randomized Complete Block Design 6.4. Split-Plot Design 6.5. Strip-Plot Design 6.6. Split-Split-Plot Design	3	0	- Previous research and reference: +References/materials[1]: Chapter 4 +References/materials[2]: Chapter 7 - Review the contents of the modules studied in class
12	6.7. Split-Strip-Plot Design 6.8. Strip-Strip-Plot Design 6.9. Strip-Split-Plot Design * solve the assignments	1	2	- Previous research and reference: +References/materials[1]: Chapter 4 +References/materials[2]: Chapter 7 - Review the contents of the modules studied in class - Make homework assignments
13	**Chapter 7: Comparison between treatment means** 7.1. Principle comparing of treatment means 7.2. Least Significant Difference Test (LSD) 7.3. Duncan's Multiple Range Test (DMRT) 7.4. Turkey Test (TT)	3	0	- Previous research and reference: +References/materials[1]: Chapter 5 +References/materials[2]: Chapter 8 +References/materials[3]: Chapter 6 - Review the contents of the modules studied in class

14	**Chapter 8: Regression and correlation analysis and established mathematical models** 8.1. Linear regression models 8.2. Non-Linear regression models 8.3. Single regression model 8.4. Multiple regression models 8.5. Time-series models 8.6. Simulation and prediction models 8.7. Data transformation	4	0	- Previous research and reference: +References/materials[1]: Chapter 9 +References/materials[2]: Chapter 9; Chapter 11 +References/materials[3]: Chapter 7 +References/materials[4]: Chapter 5, Chapter 6; Chapter 8 - Review the contents of the modules studied in class - Make homework assignments - Prepare a personal computer for PC practice Individual and group practice computer - Submitted exercise group - Review the entire, final exam preparation
15	Computer practice	1	12	- Individual and group PC practice - Submitted exercise group - Review, prepare for final exam
	Total	**35**	**20**	

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ON BEHALF OF RECTOR   **HEAD OF DEPARTMENT**

DEAN/ DIRECTOR

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