



Course Specification

Name of Institution : Buriram Rajabhat University

Faculty / Program : Faculty of Sciences / Biology Program

Section 1

Overview

1. **Subject** : Genetics

Subject code : 4032401

2. **Credit** : 3 (2-2-5)

3. **Course**

Program of the course : Bachelor degree

Course Category : Required subject

4. **Instructor** : Miss Sirinee Jirajessada

5. **Semester / Year of study**

Semester : 2/2019

Student : Bachelor Degree in Biology (61/M.1)

Bachelor Degree in Biology (61/M.2)

6. **Pre-requisite** : None

7. **Co-requisite** : None

8. **Teaching venue:** Faculty Sciences

9. **Date of course preparation:** June 5, 2019

Section 2

Aims and Objectives

1. **Aim of Course**

Students are able to

1.1 Correctly acquire concept and theories in genetics.

<p>1.2 Analyze problems, apply both knowledge and skills, and properly use equipments to solve problems in genetics.</p> <p>1.3 Efficiently search for current topics and issues in genetics.</p> <p>1.4 Can correlate the use of genetics to other topics in related field of study.</p>
<p>2. The purpose of developing / updating the course</p> <p>-</p>

Section 3

Nature and Operation

<p>1. Course Description</p> <p>This course is designed to assist students to understand basic knowledge in genetics, concept of heredity according to Mendel's laws of inheritance, reproduction, non-Mendelian genetics, genetic material, gene, chromosome, gene expression, control of gene expression, gene and chromosome mutation, linkage and recombination, genetic engineering, quantitative genetics, population genetics, non-chromosomal inheritance and evolution genetics.</p>											
<p>2. Hours per semester</p> <table border="1"> <thead> <tr> <th>Lecture</th><th>Remedial Teaching</th><th>Practice / Field / internship</th><th>Self-study</th></tr> </thead> <tbody> <tr> <td>Lecture 32 Hours Laboratory 32 Hours</td><td>-</td><td>-</td><td>5 Hours/week</td></tr> </tbody> </table>				Lecture	Remedial Teaching	Practice / Field / internship	Self-study	Lecture 32 Hours Laboratory 32 Hours	-	-	5 Hours/week
Lecture	Remedial Teaching	Practice / Field / internship	Self-study								
Lecture 32 Hours Laboratory 32 Hours	-	-	5 Hours/week								
<p>3. Hours per week for individual consultation and technical advice to students</p> <p>- Every Wednesday 1 PM – 4 PM in the afternoon (Appointment is needed).</p>											

Section 4

Development & Students' Learning Performance

<p>1. Ethics</p> <p>1.1. The expected learning outcomes of TQF framework: morality</p> <p>1.1.1. Respect Thai culture. Recognizes the value of sacrifice and moral integrity.</p> <p>1.1.2. Punctuality, discipline and self-responsibility.</p> <p>1.1.3. Good leadership and good followers, be able to work as a group, and problem solving.</p> <p>1.1.4. Respect and listen to the opinions of others, including respect for the value and dignity of human beings.</p>
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<p>1.1.5. Respect and corporate the laws and social rules.</p> <p>1.1.6. Analyze and evaluate the effect of using knowledge in biology to people in the organization social and environment</p> <p>1.1.7. Practice ethics and code of conduct.</p>
<p>1.2. Teaching methods</p> <p>1.2.1. Lecturer being a good role model to students.</p> <p>1.2.2. Assign group topic of discussion.</p> <p>1.2.3. Discussion on the students' value & morality, such as, punctuality, discipline, honesty, responsibility for their own professional and social, tolerance, realistic, positive attitude towards the profession, and respect the rights and opinions of others.</p> <p>1.2.4. Make an agreement with students about the rules and practices in teaching.</p> <p>1.2.5. Student center teaching approach.</p>
<p>1.3. Evaluation methods</p> <p>1.3.1. Observe the ethical behavior of students, both in and outside the classroom</p> <p>1.3.2. Observe the punctuality and discipline.</p> <p>1.3.3. Observe the cheating habits during all examination.</p> <p>1.3.4. Self-responsibility and assignment.</p>
<p>2. Knowledge</p> <p>2.1. The expected learning outcome of TQF framework: knowledge</p> <p>Understand basic knowledge in genetics, concept of heredity according to Mendel's laws of inheritance, reproduction, non-Mendelian genetics, genetic material, gene, chromosome, gene expression, control of gene expression, gene and chromosome mutation, linkage and recombination, genetic engineering, quantitative genetics, population genetics, non-chromosomal inheritance and evolution genetics.</p>
<p>2.2. Teaching methods</p> <p>2.2.1. Lecture</p> <p>2.2.2. Assignment</p> <p>2.2.3. Discussion</p>
<p>2.3. Evaluation methods</p> <p>2.3.1. Observe students' behavior and activity in the classroom</p> <p>2.3.2. Homework, presentation, and discussion</p> <p>2.3.3. Test, examination</p>

3. Cognitive skills

3.1. The expected learning outcome of TQF framework: Cognitive skills

- 3.1.1. Students are able to develop the ability to think systematically.
- 3.1.2. Students are able to solve problems by rational thinking.
- 3.1.3. Search, interpret and evaluate information technology to solve problem creatively and making decision effectively.
- 3.1.4. Synthesize and use researches journal or reports and develop new ideas

3.2 Teaching methods

- 3.2.1 Discussion
- 3.2.2 Classroom activities
- 3.2.3 Assignment

3.3 Evaluation methods

- 3.3.1 Results of the activities assigned
- 3.3.2 Observe the expressions of the students' intellectual skills in all activities
- 3.3.3 Test/Quiz

4. Interpersonal skills and responsibility

4.1 The expected learning outcome of TQF framework: Interpersonal skills and responsibility

- 4.1.1 Students are able to collaborate well with others
- 4.1.2 Students are able to have a responsible for the assignment.
- 4.1.3 Students are able to adapt to different situations by planning and take the responsibility themselves.

4.2 Teaching methods (Learner - Centered)

- 4.2.1 Activities
- 4.2.2 Assignment
- 4.2.3 Problem solving

4.3 Evaluation methods

- 4.3.1 Observe the students' behavior and the atmosphere of group work/activities
- History, the way of life and sufficiency economy

5. Numerical analysis skills, communication and information technology

5.1 The expected learning outcome of TQF framework: Numerical analysis skills, communication and information technology

- 5.1.1 Students are able to improve skills in data collection, presentation by using appropriate information and communication technology in both spoken and written.

5.2 Teaching methods

5.2.1 Use the computer to search information and present the obtained information in class.

5.2.2 Communication and send homework via e-mail

5.3 Evaluation methods

5.3.1 Homework

5.3.3 Class presentations or activities

Section 5

Lesson Plans and Assessments

1. Lesson plans

Week	Topic	Hours/ Instructor	The purpose of teaching	Activities	Instruction media	Learning Outcomes				
						1	2	3	4	5
1	<ul style="list-style-type: none"> - Classroom commitment - Introduction - History of genetics - LAB : -lap agreement and equipments - Characteristics of fruit fly (<i>Drosophila melanogaster</i>) 	4 hours/ Miss Sirinee Jirajessada	<ul style="list-style-type: none"> - Make an agreement in learning - Overview the course - Knowing history of genetics - knowing characteristic of fruit fly 	<ul style="list-style-type: none"> - Make an agreement and commitment with students, Lecture, assignment, Practice, Laboratory 	Course Syllabus, handouts	●	●	●	●	●
2	<ul style="list-style-type: none"> - Mendel's laws of inheritance - Law of gene segregation - LAB : monohybrid cross of fruit fly lab (<i>D. melanogaster</i>) (chart diagram) 	4 hours/ Miss Sirinee Jirajessada	<ul style="list-style-type: none"> - Knowing mendelian genetics - Using Punnett's square to predict outcome of monohybrid cross 	<ul style="list-style-type: none"> Lecture, class activities, assignment, Practice, Laboratory 	Handouts, worksheet, homework,	●	●	●	●	●
3	<ul style="list-style-type: none"> - Mendel's laws of inheritance - Law of independent assortment - LAB : dihybrid cross of fruit fly 	4 hours/ Miss Sirinee Jirajessada	<ul style="list-style-type: none"> - Knowing mendelian genetics - Using Punnett's square to predict outcome of dihybrid cross 	<ul style="list-style-type: none"> Lecture, class activities, assignment, Laboratory 	Handouts, worksheet, homework	●	●	●	●	●

Week	Topic	Hours/ Instructor	The purpose of teaching	Activities	Instruction media	Learning Outcomes				
						1	2	3	4	5
	lab (<i>D. melanogaster</i>) (Chart diagram)									
4	<ul style="list-style-type: none"> - Probability and statistical analysis - addition law - multiplication law LAB : Chi-square test in genetic experiment	4 hours/ Miss Sirinee Jirajessada	- Knowing the multiplication rule and addition rule	Lecture, class activities, assignment, Laboratory	Handouts, worksheet, homework	●	●	●	●	●
5	<ul style="list-style-type: none"> - Non Mendelian genetics - Codominant - Incomplete dominant - Sex limited traits LAB : Human blood type	4 hours/ Miss Sirinee Jirajessada	- Knowing non Mendelian genetics	Lecture, class activities, assignment, Laboratory	Handouts, worksheet, homework	●	●	●	●	●
6	<ul style="list-style-type: none"> - Non Mendelian genetics (cont.) - Epistasis Lethal gene - Non chromosomal inheritance - Maternal effect LAB : Model of maternal inheritance in <i>Lymnaea peragra</i>	4 hours/ Miss Sirinee Jirajessada	- Knowing non Mendelian genetics	Lecture, class activities, assignment, Laboratory	Handouts, worksheet, homework	●	●	●	●	●
7	<ul style="list-style-type: none"> - Non Mendelian genetics (cont.) - Sex influent traits - Multiple alleles LAB : sex chromatin	4 hours/ Miss Sirinee Jirajessada	- Knowing non Mendelian genetics	Lecture, class activities, assignment, Laboratory	Handouts, worksheet, homework	●	●	●	●	●
Mid-term Examination										
8	<ul style="list-style-type: none"> - Linkage and recombination - Quantitative genetics 	4 hours/ Miss Sirinee Jirajessada	- Knowing linkage, recombination and quantitative genetics	Lecture, class activities, assignment, Laboratory	Handouts, worksheet, homework	●	●	●	●	●

Week	Topic	Hours/ Instructor	The purpose of teaching	Activities	Instruction media	Learning Outcomes				
						1	2	3	4	5
	LAB : qualitative genetics test in genetic experiment									
9	- Reproduction LAB: Mitosis and meiosis	4 hours/ Miss Sirinee Jirajessada	- Knowing the different of meiosis and mitosis	Lecture, class activities, assignment, Laboratory	Handouts, worksheet, homework	●	●	●	●	●
10	- Genetic material - discovery - component and function - Gene - Chromosome - Sex determination - LAB : - Human karyotype	4 hours/ Miss Sirinee Jirajessada	- Knowing genetic material	Lecture, class activities, assignment, Laboratory	Handouts, worksheet, homework	●	●	●	●	●
11	- Gene expression - Regulation of the gene expression - LAB : - operon model	4 hours/ Miss Sirinee Jirajessada	- Knowing gene expression	Lecture, class activities, assignment, Laboratory	Handouts, worksheet, homework	●	●	●	●	●
12	- mutation - LAB : Pedigree analysis of genetic disease	4 hours/ Miss Sirinee Jirajessada	Knowing mutation	Lecture, class activities, assignment, Laboratory	Handouts, worksheet, homework	●	●	●	●	●
13	- Population genetics - LAB : Population genetics.	4 hours/ Miss Sirinee Jirajessada	Knowing population genetics	Lecture, class activities, assignment, Laboratory	Handouts, worksheet, homework	●	●	●	●	●
14	- Evolution genetics - LAB: phylogenetics	4 hours/ Miss Sirinee Jirajessada	Knowing evolution genetics	Lecture, class activities, assignment, Laboratory	Handouts, worksheet, homework	●	●	●	●	●
15	- Genetic engineering	4 hours/ Miss Sirinee Jirajessada	Knowing genetic engineering	Lecture, class	Handouts, worksheet, homework	●	●	●	●	●

Week	Topic	Hours/ Instructor	The purpose of teaching	Activities	Instruction media	Learning Outcomes				
						1	2	3	4	5
	- LAB : model construction of gene cloning.			activities, assignment, Laboratory						
16	- Course conclusion and discussion of topics in genetics	4 hours/ Miss Sirinee Jirajessada	Make some conclusion and discussstion in the topics of genetics	Lecture, class activities, assignment, Laboratory		●	●	●	●	●
Final Examination										

Note : Learning Outcomes

1 = Ethics

2 = Knowledge

3 = Cognitive skills

4 = Interpersonal skills and responsibility

5 = Numerical analysis skills, communication and information technology

2. Assessment			
Learning outcomes	Assessment methods	Week	Percentile
1.1 - 1.3	Assessment from homework, presentation,	1 - 16	10%
2.1 - 2.3	Mid-term examination	Midterm	30%
2.1 - 2.3	Final examination	Final	30%
2.2 - 2.3	Laboratory	1 - 16	20%
1.1 - 1.2 3 and 5	Class participation	1 - 16	10%
		Total	100%

Section 6

Teaching Resources

1. Handouts

Handouts : Genetics, Faculty of Sciences. Buriram Rajabhat University.

2. Text books

โครงการพสว. สำนักงานสภาสถาบันราชภัฏ. (2544). **คู่มือปฏิบัติการชีววิทยา 2**. สำนักงานสภาสถาบันราชภัฏ.

ถวิล แสนตรง. (2548). **เอกสารประกอบการสอนวิชาชีววิทยา 1**.

คณะวิทยาศาสตร์ มหาวิทยาลัยราชภัฏบุรีรัมย์.

นันทนา ลิ้มสกุล. (2533). **พันธุศาสตร์**. โปรแกรมวิชาชีววิทยา สถาบันราชภัฏบุรีรัมย์.

บษกร ฉิ่งเล็ก. (2542). **ชีววิทยาทั่วไป 1**. โปรแกรมวิชาชีววิทยา คณะวิทยาศาสตร์และเทคโนโลยี สถาบันราชภัฏบุรีรัมย์.

ปรีชา สุวรรณพินิจ และ นางลักษณ์ สุวรรณพินิจ. (2540). **ชีววิทยา 1**.

สำนักพิมพ์แห่งจุฬาลงกรณ์มหาวิทยาลัย.

ปรีชา สุวรรณพินิจ และ นางลักษณ์ สุวรรณพินิจ. (2548). **ชีววิทยา 2**.

สำนักพิมพ์แห่งจุฬาลงกรณ์มหาวิทยาลัย.

เพ็ญแสง ปุตตะ. (2536). **ชีววิทยาทั่วไป 1**. ตำรา-เอกสารวิชาการ ฉบับที่ 65

ภาคพัฒนาตำราและเอกสารวิชาการ หน่วยศึกษานิเทศก์ กรมการฝึกหัดครู.

ภรณ์ อุทโยภาส. (2541). **ชีววิทยาเบื้องต้น**. สำนักพิมพ์มหาวิทยาลัยธรรมศาสตร์.

ภาควิชาพันธุศาสตร์ คณะวิทยาศาสตร์ มหาวิทยาลัยเกษตรศาสตร์. (2528). **บทปฏิบัติการพันธุศาสตร์**. คณะวิทยาศาสตร์ มหาวิทยาลัยเกษตรศาสตร์

ภาควิชาชีววิทยา คณะวิทยาศาสตร์ มหาวิทยาลัยขอนแก่น. (2541).

วิชา 311 102 ปฏิบัติการชีววิทยา I. คณะวิทยาศาสตร์ มหาวิทยาลัยขอนแก่น.

ภาควิชาชีววิทยา คณะวิทยาศาสตร์ มหาวิทยาลัยขอนแก่น. (2547).

วิชา 311 108 ปฏิบัติการชีววิทยาทั่วไป. คณะวิทยาศาสตร์ มหาวิทยาลัยขอนแก่น.

เรวัต ศุภมั่งมี. (2546). **สรุปเนื้อหาชีววิทยา**. นคราพับบลิชซิ่ง.

Buckley, Don. 2011. **Interactive Science: Cell and Heredity (Teacher's edition)**. Pearson. USA.

Moi Ho, Tan, 2017. **Biologi: Module & More**. Penerbitan Pelangi Sdn. Selangor, Malaysia.

Ling, You Li, SK, Chia, and GS, Yu. (2017). **Biologi: Hots Mastery**. Cemerlang Publications. Selangor, Malaysia.

Reece, J. B., Urry, L. A., and Cain M. L. (2011). **Cambell Biology**. (9th Edition). San

Francisco: Pearson Education.

2. Documents, resources and data suggested
 - 2.1. BRU Library
 - 2.2. Journal: International Journal of Selection and Assessment
 - 2.3. Website: <http://www.sciencedirect.com>
 - 2.4. Website: <http://www.pubmed.com>
 - 2.5. Website: <http://www.masteringbiology.com>

Section 7

Evaluation of Improvement & Course Operation

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| 1. Strategic course evaluation by students
Student's opinions on activities and course |
| 2. Strategic assessment of teaching
Evaluate teaching performance and students' achievement by using an assessment form. |
| 3. Teaching improvement
To be updated next semester. |

(Miss Sirinee Jirajessada)

Lecturer

Report : October 9th, 2019