**Instructor:** Ajchara Aksomboon Vongsawan

**Semester 2:** (SCI 31242) 1.5 Credits, 60 hours

Science majors in Mathayom 4, Secondary Grade 10, continues semester 2 of 2021 Academic School Year with Advanced level Biology 2 (SCI 31242). Biology 2 centers on understanding the basics of gene and gene expression leading to its usage in biotechnology and bioengineering. The whole semester exemplifies on how the genetic make-up is important in heredity as well as how such basic knowledge can be manipulated at the molecular level targeting on detection and disease treatment as well as environment remediation. Mutation at multiple levels as well as in different organisms will be studied and undergo discussion for a more in depth understanding of positive and negative outcomes resulting from mutations. Moreover, students are expected to acquire hands-on experiments correlating with subject matter.



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| **Grade 10 (M4): Year 1 Biology 2****Semester 2:** **(SCI 31242) 1.5 Credits, 60 hours** |  |
| **Course Content** | **Details** | **Campbell Biology**  |
| **Unit 1: Heredity** | • Gregor Mendel: also known as the Father of Modern Genetics.• Mendel’s experiments with pea plants• Mendel’s Laws of Inheritance• The Chromosomal Basis of Inheritance• Genetic Material and Gene Expression• Mechanisms leading to Mutations | Chapters 14-15 |
| **Unit 2: Genes and Chromosome** | • History of Genetic Material: experiments leading to unraveling Genetic Material, DNA structure and function.• DNA Replication• Central Dogma: Gene flow from DNA-RNA-Protein | Chapters 16-17 |
| **Midterm Exam**  | **Material Covered from Units 1 and 2** |  |
| **Unit 3: Genetics and DNA Technology** | • Errors during Gene Expression giving rise to Mutations• Genomics and Biotechnology• Genetic Engineering/  Recombinant DNA Technology | Chapters 18-21 |
| **Unit 4: Evolution** | • Darwin’s Theory of Natural Selection• Genotype Frequency• Hardy-Weinberg Theory • Origin of Species | Chapters 22-23 |
| **Final Exam** | **Material Covered from Units 3 and 4** |  |

**Expectations from students:**

(1) to always attend class

(2) to critically read the assigned material before class

(3) to enthusiastically participate in class discussions and problem-solving sessions

(4) to diligently prepare for all exams

**Evaluation Points**

Laboratory Experiment(s) 10

Lab Report 10

Cloning Research Project

(Group Work with Presentation)20



Pop Quiz10 (+Concept map)

Class Attendance/Class Participation 10

Midterm 20

Final Exam 20

**Study and Reading Materials:**

**(1) Campbell PowerPoint Lectures and uploads given in conjunction with textbooks**

**(2) Textbook**

Biology: A Global Approach, Global Edition, 10/E

Neil A. Campbell, University of California, Riverside

Jane B. Reece, Palo Alto, California

Lisa Urry

Michael L Cain, Bowdoin College, Brunswick, Maine

Steven A Wasserman, University of California, San Diego

Peter V Minorsky, Mercy College, Dobbs Ferry, New York

Robert B Jackson, Duke University, Durham, North Carolina

**or equivalent version**.