**Instructor:** Ajchara Aksomboon Vongsawan

**The Goal:**

Biology 5 (SCI 33241) for Mathayom 6 (Secondary Grade 12) Science-Math majors in the first semester Academic School Year 2022 serves as a pre-requisite for Science-Math majors in preparation for entering biomedical sciences as well as other science fields. The study approach focuses more intensely on analytical thinking while adhering to the Thai curriculum with English as the instructive language. Students should be more proficient with technical terms as well as the English language gearing science students to become more proficient in reading scientific papers. The course focus more comprehensively on multiple systems including the reproductive and developmental systems as well as introduction on the nervous system. Students are encouraged to link topics covered from year 1 to current year 3 biology in order to understand how each system function systematically as a whole.

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| **Grade 12 (M6) Year 3 Biology 5****Semester 1: (SCI 33241) 1.5 Credits, 60 hours** |
| **Course Content** | **Details** |
| **Unit 1: Animal Reproduction**  **Animal Development and Growth** | • Sexual and Asexual Reproduction• Male and Female Reproductive System• Spermatogenesis, Oogenesis, and Fertilization*• In vitro* fertilization• Embryogenesis |
| **Unit 2: Nervous System** | • Central Nervous System (CNS) in Vertebrates: Brain and Spinal Column (Function of Synapse within brain cells and Spinal Column)• Peripheral Nervous System (PNS): Cranial and Spinal Nerves, Ganglia, and Sensory Receptors• Function of Nervous System: Somatic and Automatic• Sympathetic Nervous System |
| **Midterm Exam**  | **Material Covered from Units 1 and 2** |
| **Unit 3: Endocrine System and Ductless**  **Glands**  **Endocrine System and Hormones** | • Endocrine System and Ductless Glands• Ductless gland and hormonal production in animals• Mechanism of Hormone produced from Ductless Glands/Endocrine Signaling• Hormonal Balance and Regulation |
|  **Unit 4: Conservation** | • Energy Transfer in Ecosystem• Biomass• Biogeochemical Cycles: Nitrogen, Sulfur,  Phosphorus• Renewable and Nonrenewable Energy• Sustainability• Environmental Problems |
| **Unit 5: Population Growth** | • Population Growth: Exponential and Logistic• Population Control |
| **Final Exam** | **Material Covered from Units 3 and 4** |
| **Grading and Evaluation** |
| **Percent Allocation** | **Percent** |
| Attendance and Participation | 10 |
| Assignments and Quiz | 20 |
| Experiments and Lab Report | 30 |
| Midterm | 20 |
| Finals | 20 |
| **Grade** | **Percent** |
| A | 80-100 |
| B+ | 70-74 |
| B | 75-79 |
| C+ | 65-69 |
| C | 60-64 |
| D+ | 55-59 |
| D | 50-54 |
| F | Below 50 |

**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

**Study and Reading Materials**

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

**(2) Textbooks**

2.1. 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**.

2.2. New Century Elective Biology: Secondary 4,5, and 6.

 Hodder Education Singapore, 2019 Edition.

 Beverly Tay, Loo Kwok Wai, Ong Bee Hoo, and Janlin Chan