**Instructor:** Ajchara Aksomboon Vongsawan

**The Goal:**

The three-year Biology curriculum serves as a pre-requisite for Science-Math majors in preparation for entering biomedical sciences as well as other science fields.

Mathayom 4 (Secondary Grade 10) - Year 1 Biology 1, 2

Mathayom 5 (Secondary Grade 11) - Year 2 Biology 3, 4

**Mathayom 6 (Secondary Grade 12) - Year 3 Biology 5, 6**

The study approach follows the Thai curriculum using combination of US and Singaporean textbooks. English is the language of instruction in the English Program. Students planning to enter the biomedical field or medical field within the Thai university system are advised to read a Thai version of textbook in preparation for their entrance exam due to technical term discrepancy that may be used in Thai exams. Pre-med and biomedical science students will be expected to pay close attention to current knowledge of bioscience technology for future use at undergraduate university level.

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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** |
| **Grade 12 (M6) Year 3 Biology 6**  **Semester 2: (SCI 33242) 1.5 Credits, 60 hours** | |
| **Course Content** | **Details** |
| **Unit 1: Biodiversity** | • Kingdoms of Life  • The Origin of Life and the Cell Theory  • Taxonomy and Biological Classification  • Binomial Nomenclature |
| **Midterm Exam** | **Material Covered from Unit 1** |
| **Unit 2:** **Muscular and Skeletal System** | • Protein Filaments for muscle function  • Interaction of Protein Filaments for Muscle  Function  • Muscular System in vertebrate: Skeletal,  Smooth, and Cardiac Muscle |
| **Unit 3: Animal Behavior** | • Mechanism of Animal Behavior  • Inherited Behavior  • Learned Behavior |
| **Final Exam** | **Material Covered from Units 2 and 3** |

**Expectations from students:**

(1) to always attend class and sign in roll call attendance (for online teaching roll call through

class line)

(2) to critically read the assigned material before class

(3) to enthusiastically participate in class discussions and problem-solving sessions (for online by zoom meetings).

(4) to diligently prepare for all exams

**Evaluation**

**Video Clip Presentation** with prepared dialogue will be assigned via classroom 15 points

**Lab and Lab Report** points

**Test with** **Mindmap** 20 points

**Class Attendance/ Class Participation** 10 points

**Midterm** 20 points

**Final** 20 points

**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