## Course Syllabus

**1. Name of Curriculum** Bachelor of Science (Biology, Medical Science) Program.
**Faculty/Institute/College** International College, Mahidol University

**2. Course Code** ICBI 204
**Course Title** Developmental Biology

**3. Number of Credits** 4(4-0-8) (Lecture / Lab/self-study)

**4. Prerequisite** none

**5. Type of Course**
Elective course for 2nd or 3rd year Biology or Biomedical Science Students

**6. Tromester / Academic year**
First or Third Trimester of every academic year

**7. Course Condition**
Number of students is 20-30.

**8. Course Description**
Embryogenesis, molecular and cellular aspects of differentiation, morphogenesis in a variety of vertebrates and invertebrates, comparative study of normal and deviate development in well-known mammals.

**9. Course Objective**
This course is designed for Biology or Medical Science undergraduates to understand embryonic developmental stages in invertebrates and vertebrates, and to comprehend the principles and the key concepts of development.

**10.Course Outline**

| week | Topics/Seminar | Hours | | | Instructor |
|---|---|---|---|---|---|
| | | Lecture | Lab | Self-study | |
| 1 | Introduction<br>Basic concepts of development | 4 | - | 8 | Praneet |
| 2 | Genes and Development<br>Gene Regulation in development | 4 | - | 8 | Praneet |
| 3 | Divergence of cells in development<br>Basis of cell differentiation | 4 | - | 8 | Praneet |
| 4 | Principal stages of animal development<br>Early development of sea urchins | 4 | - | 8 | Pleanphit |
| 5 | Early development of snails<br>Early development of nematodes | 4 | - | 8 | Pleanphit |
| 6 | Early development of frogs<br>Midterm examination | 4 | - | | Pleanphit |
| 7 | Early development of chicks | 4 | - | 8 | Pleanphit |
| 8 | Metamorphosis in amphibians and | 4 | - | 8 | Pleanphit |

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|---|---|---|---|---|---|
| | insects<br>Regeneration and Aging | | | | |
| 9 | Early stage of human development, Gametogenesis<br>Fertilization, cleavage and implantation<br>Development of bilaminar embryonic disc and chorionic sac<br>Development of germ layers and early tissue organ differentiation | 4 | - | 8 | Prapee |
| 10 | Early tissue organ differentiation (cont.)<br>Organogenesis<br>Placenta and extraembryonic membranes | 4 | - | 8 | Prapee |
| 11 | Later human development<br>Development of nervous system and epidermis<br>Development of vascular system and endoderm | 4 | - | 8 | Jittipan |
| 12 | Development of the musculature and skeleton | | | | Jittipan |
| **Final Examination** | | | | | Pleanphit |
| Total | | 48 | - | 96 | |

**11. Teaching Method *(s)***

1. Lecture
2. Suggested readings
3. Discussion in class

**12. Teaching Media**

1. Powerpoint Presentations
2. Texts and teaching materials

**13. Measurement and Evaluation of Student Achievement**

Student achievement is measured and evaluated by

13.1 The ability to describe the embryonic developmental stages in invertebrates and vertebrates,

13.2 The ability to explain the principles of development

13.3 The ability to describe the key concepts of development.

Student's achievement will be graded according to the college and university standard using the symbols: A, B+, B, C+, C, D+, D and F. Minimal passing level is 60%. Student who earns 85% up will have Grade A, 80-84% Grade B+ , 75-79% Grade B, 70-74% Grade C+, 65-69% Grade C, 60-64% Grade D+, 55-59% D, less than 55 Grade F. Students must attend at least 80% of the total class hours of this course.

Ration of mark

Midterm Examination 40%

Final Examination 40%

Assignments and quizzes 20%
Total 100%
Range judges : $X \pm 2SD$ will be $C^{+}$ - C

**14. Course evaluation**

14.1 Students' achievement as indicated in number 13 above.
14.2 Students' satisfaction towards teaching and learning of the course using questionnaires.

**15. References**

1. Gilbert, Scott. F. Developmental biology. 6th Edition. USA. Sinaur Associates Inc. Publishers. 2000.
2. Moor, K.L. and Persand, T.V.N. The developing human: Clinically oriented embryology. 6th Edition. USA. WB Saunders Company, 1998. .

**16. Instructors**

Associate Professor Praneet Damrongphol
Assistant Professor Pleanphit Jaroensastraraks
Associate Professor Prapee Sretarugsa
Associate Professor Jittipan Chavadej

**17. Course Coordinator**

Assistant Professor Pleanphit Jaroensastraraks