



# Early Human Development

## ANAT 305

### Course Description

This course provides students with lectures and comprehensive overview of the early stages of human development and genetics, including major events of the embryonic period, the current understanding of the molecular events that guide development, beginning with the formation of gametes and ending with the formation of 3D body plan.

Credit: 2 semester credits

Repeatable: No

**Competencies:** At the end of Early Human Development, the student will have had the opportunity to practice the following competencies through meeting the objectives of the course:

#### Medical Knowledge

- MK1 Demonstrate knowledge of normal and abnormal structure and function of the human body on the macroscopic, microscopic and molecular levels.
- MK2 Identify the pathology and pathophysiology of various diseases and correlate them with clinical signs and symptoms.
- MK4 Differentiate between normal and abnormal development and age-related changes across the life span.
- MK5 Demonstrate comprehension of clinical interventions and agents including pharmaceutical, surgical, genetic, complementary and alternative medicines, and other therapies.

### Course Structure

The course includes 28 lectures, 2 quizzes, midterm and final exams.

**Objectives:** Particular consideration will be given to the nucleic acids structure and functions, chromosome anatomy, human karyotypes, gametogenesis and chromosomal errors, gene mutations, fertilization, cleavage, gastrulation, formation of the tube-within-a-tube body plan. Special emphasis will be made on the developmental abnormalities and ways of their prevention, diagnostics, human assisted reproductive technology, prenatal genetic screening and clinical applications of these knowledge.

By the end of the course, students should be able to:

- understand the scientific basis of embryology and genetics;
- understand the molecular mechanisms of inheritance
- understand and explain the major events of the embryonic period;

- understand and explain the chromosome anatomy and mechanisms of inheritance;
- understand the mechanisms of chromosomal errors and gene mutations;
- understand a 3-dimensional structure of an embryo and fetus;
- recognize common abnormalities;
- apply the knowledge for interpretation of symptoms and signs of common congenital and developmental anomalies;
- communicate information about human development using language appropriate to professional colleagues and to the lay person;
- accurately advise patients on many issues in future, such as (reproduction, birth defects, prenatal development, prenatal genetic screening, in vitro fertilization, stem cells, and cloning).

Students must pursue independent, self-directed and critical learning.

**Schedule:** To be posted at the beginning of the term on the online calendar.

**Assignments:** online Kaplan lectures.

**Textbooks and Reference Materials:**

**Textbooks:**

Langman's Medical Embryology; thirteenth edition (2015).

Thomas W. Sadler PhD.

Walter Kumels

ISBN-13: 978-14511911646

ISBN-10: 1451191642

Harpers Illustrated Biochemistry 30th Edition,

Victor Rodwell, David Bender, Kathleen M. Botham, Peter J. Kennelly), P. Anthony Weil.:

McGraw-Hill

ISBN-13: 978-0071825344

ISBN-10: 0071825347

Nussbaum, R.L., McInnes, R.R., and Huntington, F.W.:

Thompson & Thompson – Genetics in Medicine, latest edition (8<sup>th</sup>),

WB Saunders Company

ISBN-13: 858-2766666666

ISBN-10: 1416030808

**Complementary readings:**

Larsen's human embryology 5th edition.

Gary C. Schoenwolf... [et al.].

Elsevier.

ISBN: 9781455706846

The developing human: clinically oriented embryology 10<sup>th</sup> edition

Keith L. Moore, T.V.N. Persaud, Mark G. Torchia.

Elsevier.

ISBN-13: 978-1437720020

ISBN-10: 1437720021

Jorde L.B., Carey J.C., Bamshad M.J., and White R.L., **Medical Genetics** 3<sup>rd</sup> edition,  
Mosby

Elsevier.

ISBN-13: 978-0323053730

ISBN-10: 0323053734

Turnpenny, P., and Ellard, S: **Emery's Elements of Medical Genetics**, latest edition,  
WB Saunders

Elsevier.

ISBN-13: 978-0702040436

ISBN-10: 0702040436

### **Evaluation:**

There will be two quizzes, a midterm and final exam through the term.

Quizzes I and II will be conducted before the midterm and final exam respectively.

The midterm exam will be taken in week # 7, and final exam will be taken on week # 14. Each exam will include the entire topics covered in each block.

Quizzes and exams will be on USMLE (multiple choice) format. According to USMLE procedures, the time allocated for completing an exam will be approximately one minute per number of exam questions. Exams will be revised in full after examination.

The value of each question is the same for both the quizzes and exams.

The final grade is expressed as the percentage of the correct answers to the questions in all the quizzes and exams.

### **Grade:**

Percent of Points	Letter Grade
95-100%	A(h)
90-94%	A
85-89%	B+
80-84%	B
75-79%	C+
70-74%	C
<70%	F

**Attendance:** in accordance with the Student Handbook.

**Policies:** The Course Syllabus may be modified at the discretion of the Course director to accommodate the changes that normally take place throughout the semester. Students will be notified each time a change to the Course Syllabus is required. Some topics might be assigned as independent study. Students will be notified when a topic is assigned as independent study.

**Faculty:**

Dr. Iuliia Zhuravlova, Associate Professor, MD, PhD, course director

Dr. Manish Mishra, Associate Professor, MS, PhD