DISCIPLINE SHEET

1. Study programme

1.1.	"CAROL DAVILA" UNIVERSITY OF MEDICINE AND PHARMACY BUCHAREST
1.2.	FACULTY OF DENTISTRY
1.3.	DEPARTMENT 3rd
1.4.	DISCIPLINE Embryology and Microbiology
1.5.	STUDY DOMAIN: Health, sectoral regulated within the European Union
1.6.	STUDY LEVEL: I (Bachelor's degree) and II (Master's degree)
1.7.	STUDY PROGRAMME: DENTAL MEDICINE IN ENGLISH

2. Discipline

2.1.	Discipline name according to the study curriculum: EMBRYOLOGY				
2.2.	Discipline code: MD01F05EN				
2.3.	Discipline type (FD/SD/CD): FD				
2.4.	Discipline optionality (COD/ED/FAD): COD				
2.5.	Lectures tenure: Prof. dr. Andreea Didilescu, Senior Lecturer dr. Anca Coricovac, Senior Lecturer dr. Claudiu Călin, Senior Lecturer dr. Mihai Andrei				
2.6.	Practical classes / seminar tenure: Senior Lecturer dr. Anca Coricovac, Senior Lecturer dr. Claudiu Călin, Senior Lecturer dr. Mihai Andrei, Assistant Prof. dr. Raluca-Paula Vacaru				
2.7. Year of study	I	2.8. Semester	I	2.9. Evaluation (E/C/V)	E

3. Estimated total time (hours/ semester of teaching and training activity /individual study)

I. University training						
3.1. Number of hours per week	4	from which:	3.2. lecture	2	3.3. practical class/ seminar	2
3.4. Total hours in the study curriculum	56	from which:	3.5. lecture	28	3.6. practical class/ seminar	28
II. Preparation/ individual study						
Time distribution						hours
Study of lecture materials, textbooks, books, study of the minimum recommended bibliography						56
Additional documentation activity in the library, on online platforms						12
Specific preparation activities for projects, practical classes, preparation of assignments, reports						14
Preparation for presentations or evaluations, preparation for the final examination						12
Tutoring activity						-
Other activities						-
3.7. Total hours of individual study						94
3.8. Total hours per semester (3.4.+3.7.)						150
3.9. Number of credits						5

4. Prerequisites (where appropriate)

4.1. curriculum	-
4.2. proficiencies	-

5. Conditions (where appropriate)

5.1. for lecture activity	-
5.2. for practical class/ seminar activity	-

6. Learning outcomes*

Knowledge	Skills	Responsibility and autonomy
Students must demonstrate an understanding of: **General embryology concepts:** - Processes that take place in the gonads: spermatogenesis and oogenesis; - Fertilization (in the fallopian tube) and segmentation; - Nidation and blastocystogenesis; - Gastrulation and neurulation – formation of the embryonic layers and the onset of the nervous system; - Derivatives of the three embryonic layers and the clinical implications of developmental anomalies. **Specific embryology concepts for head/neck development and dentinogenesis:** - Development of the cephalic extremity: facial buds, formation of the face, nasal cavities and palate; - Branchial region: pharyngeal arches, pouches and grooves; - Mesobranchial field: development of the tongue, thyroid gland and pituitary gland; - Odontogenesis and dentition development: stages of proliferation and histodifferentiation, amelogenesis, dentinogenesis, development of the root and of the tooth supporting structures, dental eruption;	Students must be able to: - correctly interpret microscopic images; - know concepts related to the general and specific normal embryological development of the head, neck and dento-maxillary apparatus; - recognize the early signs and causes of developmental disorders; - correlate clinical findings with underlying biological processes.	**Ethics:** - commitment to continuing education in the field of developmental biology and dento-maxillary development in particular; - possibility of interrelation with other information acquired from fundamental disciplines **Professional development:** - basic knowledge in areas of interest and specific to the future profession; - critical evaluation of new research in the field of embryonic and dento-maxillary development; - efficient use of information sources and communication resources

- Temporomandibular joint (TMJ): evolution of the condyle, articular disc and temporal component; - Introduction to molecular embryology of the head and neck. **Notions regarding specific developmental anomalies:** - Anomalies in the development of germ layers; - Craniofacial anomalies: defects in the formation of the face, nasal fossae and palate; - Developmental anomalies of the tongue, thyroid and pituitary; - Dental anomalies: causes, mechanisms and clinical aspects; - Infectious, chemical, medicinal and physical agents affecting development.		

7. Discipline objectives (correlated with learning outcomes)

7.1. General objective	- Acquiring knowledge about the prenatal development of human structures.
7.2. Specific objectives	- Knowledge of the stages and peculiarities of the development of the cephalic extremity. - Relating information to applications in clinical embryology.

8. Contents

8.1. Lecture	**Teaching methods**	**Observations**
1. Pre-embryonic period. Processes that take place in the gonads: spermatogenesis, oogenesis. Embryonic period. The main processes that take place in the fallopian tube: fertilization.	Interactive display of the teaching material according to the analytical program, using multimedia means, power point presentations.	2 hours
2. Embryonic period. The main processes that take place in the fallopian tube: segmentation. Processes that take place in the uterus: nidation and blastocystogenesis.		2 hours
3. Embryonic period. Processes that take place in the uterus: gastrulation and neurulation.		2 hours
4. Formation of germ layers and early derivatives. Clinical applications and abnormalities in early development		2 hours
5. Generalities about the development of the cephalic extremity. Facial buds. Development of the face, nostrils and palate.		2 hours

6. The branchial region. Branchial (pharyngeal) arches, pouches and grooves.		2 hours
7. The main anomalies in the formation of the face, nasal fossae and palate: mechanisms, clinical aspects.		2 hours
8. Mesobranchial field. Development of the tongue, thyroid gland and pituitary gland. Developmental abnormalities.		2 hours
9. Tooth development. Stages of proliferation and histodifferentiation. Amelogenesis and dentinogenesis.		2 hours
10. Tooth development. Development of the dental root and of the tooth supporting structures. Tooth eruption.		2 hours
11. The main anomalies in tooth development. Etiology. Clinical aspects.		2 hours
12. Development of the temporomandibular joint (TMJ). Mandibular condyle in the human fetus at early stages- embryologic evolution. The articular disc. The temporal component of the TMJ.		2 hours
13. Molecular basis for embryonic development of the head and neck.		2 hours
14. Teratology - infectious, drug-related, chemical and physical agents.		2 hours

Recent bibliography:

1. Carlson BM (2013). Human embryology and developmental biology. Saunders; 5th edition.
2. Moore KL, Persaud TVN, Torchia MG (2015). The Developing Human. Clinically Oriented Embryology.Tenth edition. Saunders Elsevier.
3. Sadler TW, Langman J (2011). Langman's Medical Embryology. Philadelphia, Pa.; London : Lippincott Williams & Wilkins ; 12th edition.
4. 3D Atlas of Human Embryology (2016) https://www.3dembryoatlas.com

Periodical publications (optional)

5. Journal of Dental Research
6. Romanian Journal of Morphology and Embryology

8.2. Practical classes/ seminar	**Teaching methods**	**Observations**
1. Gametogenesis. Adjustment mechanisms. Clinical applications: abnormalities in spermatogenesis	PowerPoint presentation; drawings, explanations; microscopic examination of histological sections, embryos and human fetuses; imagistic study.	2 hours
2. Gametogenesis. Microscopic images.		2 hours
3. Extraembryonic tissues and membranes.		2 hours
4. Fetal-placental circulation.		2 hours
5. Skull development. Endochondral and intramembranous neurocranium and viscerocranium. Microscopic images.		2 hours
6. Branchial (pharyngeal) arches, pouches and grooves. Microscopic images. Development of the salivary glands.		2 hours
7. The main anomalies in the development of the cephalic extremity - imaging examples.		2 hours

8. Mesobranchial field - derivatives. Microscopic images.		2 hours
9. Biology of the dentin-pulp complex. Microscopic images.		2 hours
10. Biology of the tooth supporting structures. Microscopic images.		2 hours
11. Dental development anomalies – imagistic examples.		2 hours
12. Directions for postnatal growth and remodelling of the skull and TMJ.		2 hours
13. Signalling pathways in odontogenesis.		2 hours
14. Teratogenic agents: mechanisms of action and effects.		2 hours

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9. Assessment

Activity type	9.1. Evaluation criteria	9.2. Evaluation methods	9.3. Percentage of final grade
9.4. Lecture	**A. Knowledge for mark 5:** Basic understanding of general embryology **B. Additional knowledge for mark 10:** In-depth understanding of embryology	**Theoretical exam** - written exam - 45 grid questions (single-choice responses)	**80%**
9.5. Practical classes/ seminar	**Periodic evaluations. Seminars.**	**Seminars** from the subjects presented in the course and practical works.	**10%**
	A. Knowledge for mark 5: Basic essentials of embryology and microscopy; **B. Additional knowledge for mark 10:** In-depth essentials, the possibility of interrelation, and correct interpretation of microscopic images.	**Practical assessment** Laboratory examination	**10%**
9.5.1. Individual project (if any)	-	-	-
Minimum performance standard			
- Basic knowledge in Embryology			