REPUBLIC OF YEMEN
SANA'A UNIVERSITY
Faculty Of Veterinary Medicine
Veterinary Medicine Program

Course Specification of Veterinary Embryology

I. Course Identification and General Information:							
1	**Course Title:**	Veterinary Embryology					
2	**Course Number & Code:**	ANT235					
3	**Credit hours:**	**C.H**				**Total**	
		Theoretical	**Practical**	**Training**	**Seminar**		
		1	**1**			**2**	
4	**Study level/ semester at which this course is offered:**	Second Year: Second Semester					
5	**Pre –requisite (if any):**	ANT233, ANT231					
6	**Co –requisite (if any):**	None					
7	**Program (s) in which the course is offered:**	Bachelor Veterinary Medicine					
8	**Language of teaching the course:**	English					
9	**Location of teaching the course:**	Faculty of Veterinary Medicine					
10	**Prepared by:**	Dr. Saleh Ahmed Mohammed Ali Alomaisi					
11	**Date of approval:**						

II. Course description:

The course provided the student with knowledge and skills in the veterinary anatomy and embryology of the general events of embryogenesis as well as organogenesis of body systems in mammals and birds.
Teaches the students the normal embryological the mechanisms development (gametogenesis, fertilization, cleavage, gastrulation, neurulation, implantation, placentation, organogenesis.
The embryology of animals and the different congenital anomalies at the end of the course they are provided with the knowledge of the general and special embryology to be able to identify the organogenesis of animals and this help in understanding the teratology and its causes.

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Rector of Sana'a University
Prof. Dr. Al-Qassim Mohammed Abbas

III. Intended learning outcomes (ILOs) of the course:

(A) Knowledge and Understanding:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Knowledge and Understanding.

Program Intended Learning Outcomes (Sub-PILOs) in: Knowledge and Understanding		Course Intended Learning Outcomes (CILOs) in: Knowledge and Understanding	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
A1-	Demonstrate knowledge and understanding of concepts and principles of general culture, basic science, and supportive to veterinary medicine.	**a1-**	Identify developmental aspects of the early stages of development, embryogenesis, organogenesis, fetal membranes and late uterine growth, as well as the development of the extra embryonic membranes and placentation.
A2-	Illustrates basic concepts, principles, and theories related to animal production, animal health and nutrition, behavior management, breeding and care, and animal-related ethical Bloggs.	**a2-**	Assess the special embryology of body systems, twining and freemartins in mammals.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Knowledge and Understanding to Teaching and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Knowledge and Understanding		Teaching strategies/methods to be used	Methods of assessment
completing this course, students will be able to:		-Lectures using board, data shows and multimedia aids. - brainstorm. - discussion. -Self-learning by preparing essay and presentations (computer and faculty library) -Practical training (Clinical demonstrations, practice of skills, and discussions).	-Written exam -Practical exam -Oral exam - Quizzes - Report assignments - Discussion
a1-	Identify developmental aspects of the early stages of development, embryogenesis, organogenesis, fetal membranes and late uterine growth, as well as the development of the extra embryonic membranes and placentation.		
a2-	Assess the special embryology of body systems, twining and freemartins in mammals.		

		(a) Field visits (farms and villages) (b) General experimental animal teaching (c) Clinical and small group sessions (d) Outpatient clinic	

(B) Intellectual Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Intellectual skills

Program Intended Learning Outcomes (Sub-PILOs) in Intellectual skills		Course Intended Learning Outcomes (CILOs) of Intellectual Skills	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
B1-	Competently practices analytical and critical thinking skills in studying and assessing health problems and reading the results of animal medical examinations and in related sciences.	**b1-**	Distinguish the early and late developmental stages in vertebrates.
B2-	Predicts an appropriate medical diagnosis for the most common disease states through analysis of clinical story data and the results of medical examinations of sick animal.	**b2-**	Determine the developmental changes in body organs to the age of the embryo/fetus.

Teaching And Assessment Methods For Achieving Learning Outcomes:

Alignment of Learning Outcomes of Intellectual Skills to Teaching Methods and Assessment Methods:

Course Intended Learning Outcomes (CILOs) in Intellectual Skills.		Teaching strategies/methods to be used	Methods of assessment
After completing this course, students will be able to:		-Lectures using board, data shows and multimedia aids. - brainstorm.	-Written exam -Practical exam -Oral exam
b1-	Distinguish the early and late developmental stages in vertebrates.		

b2-	Determine the developmental changes in body organs to the age of the embryo/fetus.	- discussion. -Self-learning by preparing essay and presentations (computer and faculty library) -Practical training (Clinical demonstrations, practice of skills, and discussions). (a) Field visits (farms and villages) (b) General experimental animal teaching (c) Clinical and small group sessions (d) Outpatient clinic	- Quizzes - Report assignments - Discussion

(C) Professional and Practical Skills:

Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: Professional and Practical Skills

Program Intended Learning Outcomes (Sub-PILOs) in Professional and Practical Skills		**Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills**	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
C1-	Accurately records a comprehensive pathological story of a sick animal including information on healthy behavior and the necessary checks.	**c1-**	Examine slides of developed embryonic specimen and apply diagrams of developed organs and systems in frog, birds and mammals.
C2-	Practicing practical, diagnostic, clinical and research skills, including the collection of samples in various fields of veterinary medicine and related sciences, in a safe and effective manner, taking into account the ethics of the profession.	**c2-**	Detect the common developmental defects in animals successfully.

Teaching And Assessment Methods For Achieving Learning Outcomes:			
Alignment of Learning Outcomes of Professional and Practical Skills to Teaching and Assessment Methods:			
Course Intended Learning Outcomes (CILOs) in Professional and Practical Skills		**Teaching strategies/methods to be used**	**Methods of assessment**
After completing this course, students will be able to:		-Practical training (Clinical demonstrations, practice of skills, and discussions). (a) Field visits (farms and villages) (b) General experimental animal teaching (c) Clinical and small group sessions (d) Outpatient clinic - Case study	Written exam -Practical exam -Oral exam - Quizzes - Report assignments - Discussion
c1-	Examine slides of developed embryonic specimen and apply diagrams of developed organs and systems in frog, birds and mammals.		
c2-	Detect the common developmental defects in animals successfully.		

(D) General / Transferable Skills:			
Alignment of Course Intended Learning Outcomes (CILOs) to Program Intended Learning Outcomes (PILOs) in: General and Transferable skills			
Program Intended Learning Outcomes (PILOs) in General / Transferable skills		**Course Intended Learning Outcomes (CILOs) in General / Transferable skills**	
After completing this program, students will be able to:		**After completing this course, students will be able to:**	
D1-	Communicates effectively with Professional colleagues and animal owners and expresses his ideas clearly and objectively.	**d1-**	Communicate effectively with animal's owners using appropriate communication skills.
D2-	Develops his scientific, professional and research capabilities and follow what is emerging in his field of specialization and using computer applications and information and communication technology.	**d2-**	Demonstrate appropriate professional attitudes and behaviors in different practice situations.
Teaching And Assessment Methods For Achieving Learning Outcomes:			

Alignment of Learning Outcomes of General and Transferable skills to Teaching and Assessment Methods:			
Course Intended Learning Outcomes (CILOs) in General and Transferable Skills		**Teaching strategies/methods to be used**	**Methods of assessment**
After completing this course, students will be able to:		-Self-learning by preparing essay and presentations (computer and faculty library) - Scientific visits - discussions - Assignments	-Written exam -Practical exam -Oral exam - Report assignments - Discussion - Note performance
d1-	Communicate effectively with animal's owners using appropriate communication skills.		
d2-	Demonstrate appropriate professional attitudes and behaviors in different practice situations.		

IV. Course Content::

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	General Embryology. Embryological terms, gametogenesis, fertilization,	a1- a2- b1- b2- c1- c2- d1- d2	-	3	3
2	Embryological terms, cleavage,	a1- a2- b1- b2- c1- c2- d1- d2		1	1

3	Blastula formation and gastrulation in amphioxus, amphibian, birds and mammals.	a1- a2- b1- b2- c1- c2- d1- d2		2	2
4	Formation of fetal membranes	a1- a2- b1- b2- c1- c2- d1- d2		2	2
5	Implantation, placentation and formation of umbilical cord	a1- a2- b1- b2- c1- c2- d1- d2		1	1
6	Special Embryology development of uro-genital	a1- a2- b1- b2- c1- c2- d1- d2		1	1
7	Special Embryology (development of nervous,	a1- a2- b1- b2- c1- c2- d1- d2		1	1
8	Special Embryology development of digestive, respiratory and cardiovascular systems as well as sense organs and endocrine glands	a1- a2- b1- b2- c1- c2- d1- d2		2	2
9	Special Embryology development of respiratory	a1- a2- b1- b2- c1- c2- d1- d2		1	1
Number of Weeks /and Units Per Semester				**14**	**14**

b- Training Aspect:

Order	Training Tasks	CILOs (symbols)	Number of weeks	Contact hours
1	General embryology (embryological terms, Gametogenesis, ovulation, fertilization, cleavage, gastrulation, placentaion	a1- a2- b1- b2-c1- c2- d1- d2	3	6
2	Dissection of the fetus of mammals	a1- a2- b1- b2-c1- c2- d1- d2	2	4
3	Dissection of the embryo of bird	a1- a2- b1- b2-c1- c2- d1- d2	2	4
4	Preparing embryological slides	a1- a2- b1- b2-c1- c2- d1- d2	2	4

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5	Dissection of an deformed fetus	a1- a2- b1- b2-c1- c2- d1- d2	2	4
6	investigation and dissection of placenta and fetal membranes.	a1- a2- b1- b2-c1- c2- d1- d2	3	6
Number of Weeks /and Units Per Semester			**14**	**28**

IV. Teaching strategies of the course:

- Lectures using board, data shows and multimedia aids.
- Self-learning by preparing essay and presentations (computer and faculty library)
- Brainstorm
- Discussion
- Cooperative learning
- Practical training (Clinical demonstrations, practice of skills, and discussions).

  (a) Field visits (farms and villages)

  (b) General experimental animal teaching

  (c) Clinical and small group sessions

  (d) Outpatient clinic
- Tutorial classes (small group teaching)

3-Assessment Methods:

-Written exam
-Practical exam
-Oral exam

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-Quizzes - Report assignments - Discussion

V. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes (CILOs symbols)
1	**Participation quizzes and assignments**	**1-12**	**10**	10%	**a1, a3, b1, b2, b3, c1, c2, c3, d4**
2	**Mid-semester exam**	7	**10**	10%	**a1, a3, a4, b1, b2, c2**
3	**Practice exam**	**13**	**20**	20%	**a1, a3, b1, b2, b3, c1, c2, c3, d4**
5	**Oral exam**	**13**	**5**	5%	**a1, a3, b1, b2, b3, c1, c2, c3, d4**
	Final Exam	**16**	**55**	55%	**a1, a3, a4, b1, b2, c2**
	Total		**100**	**100%**	

VI. Students' Support:

Office Hours/week	Other Procedures (if any)
Saturday-Wednesday from 8:00 a.m.-2 p.m.	Student can contact me via email

VII. Learning Resource (MLA style or APA style)s:

1- Required Textbook(s) (maximum two)

- Developmental Anatomy
- Note boobs

2- Recommended Readings and Reference Materials

McGeady, T. A.; Quinn, P. J.; Fitz Patrik, E. S.; Ryan, M. T.; Kilroy, D.; and Lonergan, P. (2017): Veterinary Embryology. John Wiley & Sons, Ltd, second edition, U.K. Pp 232-240, SBN: 9781118940617.

Noden, D.M. and De Lahunta, A. (1985): The embryology of domestic animals developmental mechanisms and malformations. Williams and Wilkins Baltimore and London. Pp. 161-170.

Suvarna, S.K., Layton, c. and Bancroft, J.D. (2019): Bancroft's theory and practical of histological techniques. Eighth ed. Elsevier. China, ISBN: 978-0-7020-6864-5.

Victoria Aspinall , Melanie Cappello (2004);Introduction to Veterinary Anatomy & Physiology.

3- Essential References

Drew Noden and Alexander De Lahunta (2011): The Embryology of Domestic Species: Development Mechanisms and Malformations.

McGeady, T. A.; Quinn, P. J.; Fitz Patrik, E. S.; Ryan, M. T.; Kilroy, D.; and Lonergan, P. (2017): Veterinary Embryology. John Wiley & Sons, Ltd, second edition, U.K. Pp 232-240, SBN: 9781118940617.

Noden, D.M. and De Lahunta, A. (1985): The embryology of domestic animals developmental mechanisms and malformations. Williams and Wilkins Baltimore and London. Pp. 161-170.

Scheuer, L. and Black, S. (2000): Developmental juvenile osteology. San Diego, Elsevier Academic Press.
Sperber, G. H. (2001): Craniofacial development. BC Decker Inc Hamilton, London.
Smallwood, J.E. and J.F. george II. (1993): Anatomie atlas for computed tomography in the mesaticephalic thorax and abdomen. Vet. Radiol. Ultrasound. Pp.65-84.
Suvarna, S.K., Layton, c. and Bancroft, J.D. (2019): Bancroft's theory and practical of histological techniques. Eighth ed. Elsevier. China, ISBN: 978-0-7020-6864-5.

Veterinary developmental anatomy (2012): Veterinary Embryology class note by Thomas F. Fletcher, DVM PhD and Alvin F. Weber, DVM, PhD (CVM 6100).

4- Electronic Materials and Web Sites *etc*.	
	Journals: African veterinary anatomy Anatomia Histologia Embryologia Anatomical Record. JAVMA Journal of Veterinary Medicine Series C: Anatomia Histologia Embryologia Italian Journal Of Anatomy And Embryology Journal of Veterinary Anatomy Indian journal of veterinary anatomy JSCVMA Websites: http://vetvideos.com/ http://vanat.cvm.umn.edu/ http://www.vet.cornell.edu/oed/horsedissection/search.asp http://www.images4u.com/ http://www.vetmed.wsu.edu/ClientED/anatomy/#Cat http://www.jpowerpoint.com/ppt/veterinary-anatomy.html http://bibliodyssey.blogspot.com/2007/10/handbook-of-animal-anatomy.html American Veterinary Medical Association International Veterinary Information Services (IVIS). Vanat.cvm.umn.edu. Vet.net.com - Pub med. - Wikipedia
5- Other Learning Material:	

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X.	Course Policies:
1	**Class Attendance:** **MANDATORY TO ATTEND ALL COURSE LECTURES**
2	**Tardiness:** Not allowed at all. Students must be in class or in the practical session 10 minutes prior to the beginning of lectures or practical session
3	**Exam Attendance/Punctuality:** Attendance is mandatory; absence is accepted with valid excuse
4	**Assignments & Projects:** All assignments and projects are to be submitted on their due date. Any assignment turned in after the due date will not be accepted without valid and reasonable excuse
5	**Cheating:** Not tolerated and may lead to **EXPELLING** the student from the program
6	**Plagiarism:** Not tolerated **AT ALL** and may lead to **EXPELLING** the student from the program
7	**Other policies:** 1. All devices must be on silent or at least on vibration during lectures/labs 2. Before any exam (written, oral) we must check student's identity (student's card, ID, passport). Without any of these documents, the student will not be allowed in the exam room. 3. Any of type/ form of cheating is not allowed no matter what. **4.** Maintain silence during lectures/exam and disturbance is not allowed. For any questions students should raise their hand and wait for permission to talk.

Course Plan of Veterinary Embryology

I. - Information about Faculty Member Responsible for the Course:								
Name of Faculty Member	Dr. **Saleh Ahmed Mohammed Ali Alomaisi**	**Office Hours**						
Location & Telephone No.	Sana'a, Thamar Governorate 776017635	**SAT**	**SUN**	**MON**	**TUE**	**WED**	**THU**
E-mail	alomisy78@gmail.com alomisy78@yahoo.com	8am 2pm	8am 2pm	8am 2pm	8am 2pm	8am 2pm	

I. Course Identification and General Information:						
1	**Course Title:**	Veterinary Embryology				
2	**Course Number & Code:**	ANT235				
3	**Credit hours:**	**C.H**				**Total**
		Theoretical	**Practical**	**Training**	**Seminar**	
		1	**1**			**2**
4	**Study level/ semester at which this course is offered:**	Second Year: Second Semester				
5	**Pre –requisite (if any):**	ANT233, ANT231				
6	**Co –requisite (if any):**	None				
7	**Program (s) in which the course is offered:**	Bachelor Veterinary Medicine				
8	**Language of teaching the course:**	English				
9	**System of Study:**	Regular / Semesters				
10	**Mode of delivery:**	Lectures and Practical				
11	**Location of teaching the course:**	Faculty of Veterinary Medicine				

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II. Course Description:

The course provided the student with knowledge and skills in the veterinary anatomy and embryology of the general events of embryogenesis as well as organogenesis of body systems in mammals and birds.

Teaches the students the normal embryological the mechanisms development (gametogenesis, fertilization, cleavage, gastrulation, neurulation, implantation, placentation, organogenesis.

The embryology of animals and the different congenital anomalies at the end of the course they are provided with the knowledge of the general and special embryology to be able to identify the organogenesis of animals and this help in understanding the teratology and its causes.

II. Intended learning outcomes (ILOs) of the course:

After completing this course, students will be able to:

a1. Identify developmental aspects of the early stages of development, embryogenesis, organogenesis, fetal membranes and late uterine growth, as well as the development of the extra embryonic membranes and placentation.
a2. Assess the special embryology of body systems, twining and freemartins in mammals.
b1. Distinguish the early and late developmental stages in vertebrates.
b2. Determine the developmental changes in body organs to the age of the embryo/fetus.

c1. Examine slides of developed embryonic specimen and apply diagrams of developed organs and systems in frog, birds and mammals..

c2. Detect the common developmental defects in animals successfully.
d1. Communicate effectively with animal's owners using appropriate communication skills.
d2. Demonstrate appropriate professional attitudes and behaviors in different practice situations.

X. Course Content:

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A – Theoretical Aspect:			
Order	**Topics List**	**Week Due**	**Contact Hours**
1	General Embryology. Embryological terms, gametogenesis, fertilization.	1-3	3
2	Embryological terms, cleavage.	4	1
3	Blastula formation and gastrulation in amphioxus, amphibian, birds and mammals.	5	1
4	Formation of fetal membranes	6-7	2
5	**Mid-Term Exam**	8	1
6	Implantation, placentation and formation of umbilical cord	9-10	2
7	Special Embryology development of uro-genital	11	1
8	Special Embryology (development of nervous,	12	1
9	Special Embryology development of digestive, respiratory and cardiovascular systems as well as sense organs and endocrine glands**.**	13-14	2
10	Special Embryology development of respiratory	15	1
11	**Final Exam**	16	1
Number of Weeks /and Units Per Semester		**16**	**16**

b- Training Aspect:			
Order	**Training Tasks**	**Week Due**	**Contact hours**
1	General embryology (embryological terms, Gametogenesis, ovulation, fertilization, cleavage, gastrulation, placentaion	1-3	6
2	Dissection of the fetus of mammals	4-5	4
3	Dissection of the embryo of bird	6-7	4

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4	**Mid-Term Exam**	8	2
5	Preparing embryological slides	9-11	6
6	Dissection of an deformed fetus	12-13	4
7	Investigation and dissection of placenta and fetal membranes.	14-15	4
8	**Final Exam**	16	2
Number of Weeks /and Units Per Semester		**16**	**32**

XI. Teaching strategies of the course:

- Lectures using board, data shows and multimedia aids.
- Self-learning by preparing essay and presentations (computer and faculty library)
- Brainstorm
- Discussion
- Cooperative learning
- Practical training (Clinical demonstrations, practice of skills, and discussions).

  (a) Field visits (farms and villages)

  (b) General experimental animal teaching

  (c) Clinical and small group sessions

  (d) Outpatient clinic
- **Tutorial classes (small group teaching)**

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II. Assessment Methods:

-Written exam
-Practical exam
-Oral exam
-Quizzes
- Report assignments
- Discussion

No.	Type of Assessment Tasks	Week Due	Mark	Proportion of Final Assessment
1	**Participation quizzes and assignments**	**1-12**	**10**	**10%**
2	**Mid-semester exam**	7	**10**	**10%**
3	**Practice exam**	**13**	**20**	**20%**
4	**Oral exam**	**13**	**5**	**5%**
5	**Final Exam**	**16**	**55**	**55%**
	Total		**100**	**100%**

II. Learning Resource (MLA style or APA style)S:

6- Required Textbook(s) (maximum two)

- Developmental Anatomy
- Note boobs

7- Recommended Readings and Reference Materials

McGeady, T. A.; Quinn, P. J.; Fitz Patrik, E. S.; Ryan, M. T.; Kilroy, D.; and Lonergan, P. (2017): Veterinary Embryology. John Wiley & Sons, Ltd, second edition, U.K. Pp 232-240, SBN: 9781118940617.

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Victoria Aspinall , Melanie Cappello (2004);Introduction to Veterinary Anatomy & Physiology.

8- Essential References

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Veterinary developmental anatomy (2012): Veterinary Embryology class note by Thomas F. Fletcher, DVM PhD and Alvin F. Weber, DVM, PhD (CVM 6100).

9- Electronic Materials and Web Sites *etc*.

Journals:

African veterinary anatomy

Anatomia Histologia Embryologia

Anatomical Record.

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	JAVMA Journal of Veterinary Medicine Series C: Anatomia Histologia Embryologia Italian Journal Of Anatomy And Embryology Journal of Veterinary Anatomy Indian journal of veterinary anatomy JSCVMA Websites: http://vetvideos.com/ http://vanat.cvm.umn.edu/ http://www.vet.cornell.edu/oed/horsedissection/search.asp http://www.images4u.com/ http://www.vetmed.wsu.edu/ClientED/anatomy/#Cat http://www.jpowerpoint.com/ppt/veterinary-anatomy.html http://bibliodyssey.blogspot.com/2007/10/handbook-of-animal-anatomy.html American Veterinary Medical Association International Veterinary Information Services (IVIS). Vanat.cvm.umn.edu. Vet.net.com - Pub med. - Wikipedia
10- Other Learning Material:	

XIII. Course Policies:	
1	**Class Attendance:** **MANDATORY TO ATTEND ALL COURSE LECTURES**
2	**Tardy:** Not allowed at all. Students must be in class 10 minutes prior to the beginning of lectures
3	**Exam Attendance/Punctuality:**

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Dr. Saleh Alomaisi	Dr. Abdulraqeb Alshami	Ass. Prof. Dr. Abdu Alraoof Al-Shawkany	Ass. Prof. Dr. Huda Al-Emad

Rector of Sana'a University
Prof. Dr. Al-Qassim Mohammed Abbas

	Attendance is mandatory; absence is accepted with valid excuse
4	**Assignments & Projects:** All assignments and projects are to be submitted on their due date. Any assignment turned in after the due date will not be accepted without valid and reasonable excuse.
5	**Cheating:** Not tolerated and may lead to **EXPELLING** the student from the program
6	**Plagiarism:** Not tolerated **AT ALL** and may lead to **EXPELLING** the student from the program
7	**Other policies:** 1. All devices must be on silent or at least on vibration during lectures/labs. 2. Before any exam (written, practical, oral) student's identity will be checked (student's card, ID, passport). Without any of these documents, the student will not be allowed in the exam room. 3. Any of type/ form of cheating is not allowed no matter what. 4. Maintain silence during lectures and disturbance is not allowed.