



Course Specification of Pharmaceutical Calculations

I. Course Identification and General Information:						
1	Course Title:	Pharmaceutical Calculations				
2	Course Number & Code:	Ph212				
3	Credit hours: 1hrs	C.H				
		Theoretica l	Practica l	Traini ng	Semina r	Total
		1				1
4	Study level/ semester at which this course is offered:	First year/First semester				
5	Pre –requisite (if any):					
6	Co –requisite (if any):	Pharmacy Orientation				
7	Program (s) in which the course is offered:	Bachelor of Pharmacy				
8	Language of teaching the course:	English				
9	The department in which the course is offered:	Pharmaceutics and Industrial Pharmacy				
10	Location of teaching the course:	Faculty of Pharmacy-Sana'a University				
11	Prepared by:	Prof Dr/ Mahmoud Mahyoob Alburyhi				
12	Date of approval:					

II. Course description:

The aim of the course is to acquire students with the principles of pharmaceutical calculations. In addition to managing proper and safe dispensing of medicine.

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ا.د. محمود البريهي

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ا.د. محمود البريهي

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

At the end of this course, the students will be able to:

1. Distinguish the methods of pharmaceutical calculation
2. Recognize the proper medical terminology, abbreviations and symbols in health reports and pharmacy practice
3. Calculate the proper dose of drugs for adults and pediatrics
4. Apply simple mathematical conversions for weight, volume, temperatures
5. Utilize the proper medical terminology, to communicate with other health care professionals
6. Employ proper calculations for preparation of different pharmaceutical preparations
7. Communicate effectively with patients and health care professionals
8. Work effectively as a part of a team to perform the required tasks

IV. 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-	Recognize the principles of physical, clinical, social, behavioral, health and pharmaceutical sciences.	a1-	Distinguish the methods of pharmaceutical calculation
A4-	Recognize the pharmaceutical dosage form design and the quality control of pharmaceutical formulations according to GMP and pharmacopeial requirements to support the pharmaceutical industries and research.	a2-	Recognize the proper medical terminology, abbreviations and symbols in health reports and pharmacy practice

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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:		<ul style="list-style-type: none"> Lectures brain storming 	<ul style="list-style-type: none"> Attendance, Quiz and
a1-	Distinguish the methods of pharmaceutical calculation	and discussion	<ul style="list-style-type: none"> project Written and oral exams
a2-	Recognize the proper medical terminology, abbreviations and symbols in health reports and pharmacy practice		

(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:	
B3	Design different types of safe and effective pharmaceutical dosage forms and develop novel methods of qualitative and quantitative analytical and biological analysis for pharmaceutical and biopharmaceutical products that support pharmaceutical research.	b1-	Calculate the proper dose of drugs for adults and pediatrics
B5	Interpret the prescriptions, patient and clinical data, Analysis all the encountered pharmaceutical problems and plan the strategies for their solution, to develop the health care.	b2-	Apply simple mathematical conversions for weight, volume, temperatures

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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, solving problem, discussion and brain storm	Report, Written and oral exams
b1- Calculate the proper dose of drugs for adults and pediatrics		
b2- Apply simple mathematical conversions for weight, volume, temperatures		

(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:	
C3-	Extract, isolate, purify, identify and formulate the natural products and assure their rational use	c1-	Utilize the proper medical terminology, to communicate with other health care professionals
C5-	Conduct research studies and utilize the results in different pharmaceutical fields	c2-	Employ proper calculations for preparation of different pharmaceutical preparations
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

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After completing this course, students will be able to:		- Lectures, discussion and brain storm	- Written and oral exams
c1-	Utilize the proper medical terminology, to communicate with other health care professionals		
c2	Employ proper calculations for preparation of different pharmaceutical preparations		

(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:	
D3	Develop financial, market management, writing, presentation and time management skills as well as creativity, critical thinking, problem solving and decision making abilities.	d1-	Communicate effectively with patients and health care professionals
		d2	Work effectively as a part of a team to perform the required tasks

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:		Lectures, discussion and brain storm	Written and oral exams
d1-	Utilize the proper medical terminology, to communicate with other health care professionals		
d2	Employ proper calculations for preparation of different pharmaceutical preparations		

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V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	Introduction Some fundamentals of measurement and pharmaceutical calculations	a1, b1,c1	Pharmacy definition, units arithmetic symbols, Fractions Ratios Length, weight and volume	1	1
2	The International System of Units Interpretation of prescription or medication order	b1, c2,d1	Metric system Common system The apothecaries, Avoirdupois measure	1	1
3	Household measures Reducing and enlarging formula	a1, b2	Applications	1	1
4	Density Specific gravity Specific volume	a1, b2	Applications	1	1
5	pharmaceutical measurement	a1,a2,b1,c1,d1	Weight and volume of liquids and percentage preparation	1	1

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6	Percentage preparation Ratio strength Simple conversion from percentage to ratio strength	a1,a2,b2,c2,d1	Applications	1	1
7	Mid-term exam	a1-2, b1-2, c1-2		1	1
8	Dilution and concentration	a1, b2	Applications	2	2
9	Stock solution, Dilution	a1, b2	Applications	1	1
10	Allegation medial	a1,b1,1	Applications	1	1
11	Allegation alternate	a1,b1,c2	Applications	1	1
12	Calculation of pediatric dose according to body weight, age and body surface area	a1,a2,b1,c2,d1	Applications	1	1
13	Calculation of chemotherapeutic dose according to body weight, age	a1,a2,c2,d1,d2	Applications	1	1
14	Calculation of chemotherapeutic dose according to body surface area	a1,a2, b2,c2,d1,d2	Applications	1	1
15	Final-term exam	a1-2, b1-2, c1-2		1	1
Number of Weeks /and Units Per Semester				16	16

VI. a- Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions, tutorials and brainstorming.

b-Assessment Methods:

Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, project, and Written exam

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	a1-2, b1-2, d1-2	Sporadic through the semester	10

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2	Reports	c1-2, d1-2		
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VIII. 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	Quizzes, Attendance, Participation,	All weeks	5	10%	a1-2, b1-2, c1-2, d1-2
2	Written Mid exam, Oral exam, reports, projects	2-14	15	30%	a1-2, b1-2, c1-2
3	Written Final exam	16th	30	60%	a1-2, b1-2, c1-2
Total			100	100%	

IX. Students' Support:

Office Hours/week	Other Procedures (if any)
2 hours per week	

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

1- Required Textbook(s) (maximum two)

1. A book prepared by the staff members
2. Howard C. Ansel.,2013, Pharmaceutical Calculation, Lippincott, (14th edition),Williams and Wilkins .
3. Jones, D., 2008, "FASTtrack Pharmaceuticals- dosage form and design" 1st edition, Pharmaceu Press, London.
4. Aulton, M.E. (ed). (2013) Pharmaceutics, the design and manufacture of medicines. 4th editiChurchill Livingstone, Edinburgh.

2- Recommended Readings and Reference Materials

Loyd, V Allen J.,2013, Remington: The Science and Practice of Pharmacy 22nd edition,
Pharmaceutical Press, London.

3- Electronic Materials and Web Sites etc.

www.pubmed.com
<http://www.sciencedirect.com>

4- Other Learning Material:

J. Pharm. Sci
Published articles related to the discussed topics
United States Pharmacopeia and National Formulary (latest edition) United States Pharmacopeial Convention Inc., Rockville, MD.
British Pharmacopoeia (latest edition), HMSO. London.

XI. Facilities Required:

1 - Accommodation:

- Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc.
- Well-equipped laboratories with all required equipment and reagents.

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2 - Computing resources:	- Computer laboratory with internet facilities.
XII. Course Improvement Processes:	
1- Strategies for obtaining student feedback on effectiveness of teaching	
	<ul style="list-style-type: none"> ▪ Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester. ▪ Meeting with students and faculty (once per semester).
2- Other strategies for evaluation of teaching by the instructor or by the department.	
	<ul style="list-style-type: none"> ▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
3- Processes for improvement of teaching.	
	<ul style="list-style-type: none"> ▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
4- Processes for verifying standards of students' achievement	
	<ul style="list-style-type: none"> ▪ Checking of a sample of students' work by an independent faculty member. ▪ Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. ▪ Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). ▪ Regular follow-up of laboratory logbooks to assess the practical achievement of students.
5- Procedures for periodically reviewing of course effectiveness and planning for improvement	

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	<ul style="list-style-type: none"> ▪ Student rating and feedback ▪ Peer rating and feedback ▪ Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	<ul style="list-style-type: none"> ▪ Conducting regular workshops for the staff for improving their course specification skills. ▪ Regular revision of course specification and syllabus items.

XIII. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to -----	
1	Class Attendance: <ul style="list-style-type: none"> ▪ Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	Tardy: <p>- Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.</p>
3	Exam Attendance/Punctuality: <ul style="list-style-type: none"> ▪ Exam attendance is obligatory unless being excused by the department and faculty. ▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	Assignments & Projects: <ul style="list-style-type: none"> ▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	Cheating: <ul style="list-style-type: none"> ▪ Punishment of cheating will be according to the general policy of the university in this respect.

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6	<p>Plagiarism:</p> <ul style="list-style-type: none"> Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	<p>Other policies:</p> <ul style="list-style-type: none"> General policies of the Students' Affairs of the University and the Quality Assurance Unit.

Course Plan of Pharmaceutical Calculations

I. - Information about Faculty Member Responsible for the Course:								
Name of Faculty Member	Prof Dr/ Mahmoud Mahyoob Alburyhi		Office Hours					
Location & Telephone No.	777970600		SAT	SUN	MON	TUE	WED	THU
E-mail	buryhi@yahoo.com				2hrs	2hrs		

II. Course Identification and General Information:	
1-	<p>Course Title:</p> <p style="text-align: center;">Pharmaceutical Calculations</p>

الرئيس الجامعة عميدة مركز التطوير وضمان الجودة عميد الكلية رئيس القسم نائب العميد لشؤون الجودة الموصف
 ا.د. القاسم محمد عباس ا.م.د. هدى العماد د.خالد الشوبية ا.د. ماجد علوان ا.د. محمود البريهي ا.د. محمود البريهي



2-	Course Number & Code:	Ph212				
3-	Credit hours: 1hrs	C.H				Total
		Th.	Seminar	Pr.	F. Tr.	
		1	-	-		1
4-	Study level/year at which this course is offered:	First year/ First semester				
5-	Pre –requisite (if any):					
6-	Co –requisite (if any):	Pharmacy Orientation				
7-	Program (s) in which the course is offered	Bachelor of Pharmacy				
8-	Language of teaching the course:	English				
9-	System of Study:	Semesters				
10-	Mode of delivery:	Regular				
11-	Location of teaching the course:	Faculty of Pharmacy-Sana'a University				

III. Course description:

The aim of the course is to acquire students with the principles of pharmaceutical calculations. In addition to managing proper and safe dispensing of medicine.

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

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At the end of this course, the students will be able to:

1. Distinguish the methods of pharmaceutical calculation
2. Recognize the proper medical terminology, abbreviations and symbols in health reports and pharmacy practice
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4. Apply simple mathematical conversions for weight, volume, temperatures
5. Utilize the proper medical terminology, to communicate with other health care professionals
6. Employ proper calculations for preparation of different pharmaceutical preparations
7. Communicate effectively with patients and health care professionals
8. Work effectively as a part of a team to perform the required tasks

V. Course Content:

1 – Course Topics/Items:

a – Theoretical Aspect

Order	Topic List / Units	CILOs (symbols)	Sub-topic List	Number of weeks	Contact hours
1	Introduction Some fundamentals of measurement and pharmaceutical calculations	a1, b1,c1	Pharmacy definition, units arithmetic symbols, Fractions Ratios Length, weight and volume	1	1
					1

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2	The International System of Units Interpretation of prescription or medication order	b1, c2,d1	Metric system Common system The apothecaries, Avoirdupois measure	1	
3	Household measures Reducing and enlarging formula	a1, b2	Applications	1	1
4	Density Specific gravity Specific volume	a1, b2	Applications	1	1
5	pharmaceutical measurement	a1,a2,b1,c1,d1	Weight and volume of liquids and percentage preparation	1	1
6	Percentage preparation Ratio strength Simple conversion from percentage to ratio strength	a1,a2,b2,c2,d1	Applications	1	1
7	Mid-term exam	a1-2, b1-2, c1-2		1	1
8	Dilution and concentration	a1, b2	Applications	2	2
9	Stock solution, Dilution	a1, b2	Applications	1	1
10	Allegation medial	a1,b1,1	Applications	1	1
11	Allegation alternate	a1,b1,c2	Applications	1	1
12	Calculation of pediatric dose according to body weight, age and body surface area	a1,a2,b1,c2,d1	Applications	1	1
13	Calculation of chemotherapeutic dose according to body weight, age	a1,a2,c2,d1,d2	Applications	1	1
14	Calculation of chemotherapeutic dose according to body surface area	a1,a2, b2,c2,d1,d2	Applications	1	1

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15	Final-term exam	a1-2, b1-2, c1-2	1	1
Number of Weeks /and Units Per Semester			16	16

VI. a- Teaching strategies of the course:

Lecture method, Group Discussion, Problem solving sessions, tutorials and brainstorming.

b-Assessment Methods:

Oral Exam, Quizzes, Attendance, Participation, Short answers, reports, project, and Written exam

VII. Assignments:

No.	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Homework Assignments	a1-2, b1-2, d1-2	Sporadic through the semester	10
2	Reports	c1-2, d1-2		

VIII. 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	Quizzes, Attendance, Participation,	All weeks	5	10%	a1-2, b1-2, c1-2, d1-2
2	Written Mid exam, Oral exam, reports, projects	2-14	15	30%	a1-2, b1-2, c1-2
3	Written Final exam	16th	30	60%	a1-2, b1-2, c1-2
Total			100	100%	

IX. Students' Support:

Office Hours/week	Other Procedures (if any)
رئيس الجامعة ا.د. القاسم محمد عباس	الموصف ا.د. محمود البريهي
عميدة مركز التطوير وضمان الجودة ا.م.د. هدى العماد	نائب العميد لشؤون الجودة ا.د. محمود البريهي
عميد الكلية د.خالد الشوبية	رئيس القسم ا.د. ماجد علوان



2 hours per week

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

5- Required Textbook(s) (maximum two)

5. A book prepared by the staff members
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7. Jones, D., 2008, "FASTtrack Pharmaceutics- dosage form and design" 1st edition, Pharmaceu Press, London.
8. Aulton, M.E. (ed). (2013) Pharmaceutics, the design and manufacture of medicines. 4th editiChurchill Livingstone, Edinburgh.

6- Recommended Readings and Reference Materials

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7- Electronic Materials and Web Sites etc.

www.pubmed.com
<http://www.sciencedirect.com>

8- Other Learning Material:

J. Pharm. Sci
Published articles related to the discussed topics
United States Pharmacopeia and National Formulary (latest edition) United States Pharmacopeial Convention Inc., Rockville, MD.
British Pharmacopoeia (latest edition), HMSO. London.



XI. Facilities Required:	
1 - Accommodation:	<ul style="list-style-type: none"> - Well-equipped lecture halls with data show facilities, whiteboards, net connection, etc. - Well-equipped laboratories with all required equipment and reagents.
3 - Computing resources:	<ul style="list-style-type: none"> - Computer laboratory with internet facilities.
XII. Course Improvement Processes:	
6- Strategies for obtaining student feedback on effectiveness of teaching	
	<ul style="list-style-type: none"> ▪ Student-based assessment of the effectiveness of teaching using a questionnaire designed by the Quality Assurance Unit at the end of the semester. ▪ Meeting with students and faculty (once per semester).
7 Other strategies for evaluation of teaching by the instructor or by the department.	
	<ul style="list-style-type: none"> ▪ Assessment of the course syllabus and contents by the teachers using a questionnaire designed by the Quality Assurance Unit of the university at the end of the semester. ▪ Regular meeting and discussion of the course content between the Head of Department and the teaching staff of the course (for theory and practice).
8- Processes for improvement of teaching.	
	<ul style="list-style-type: none"> ▪ Revision of the course specification and its teaching strategies every three academic years after consideration of all issues raised by the teachers and/or students during regular meetings and discussions. ▪ Exploring any possible defects in the course that might be encountered by the teaching staff and their mitigation in subsequent improved versions of course specification.
9- Processes for verifying standards of students' achievement	

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	<ul style="list-style-type: none"> Checking of a sample of students' work by an independent faculty member. Periodic exchange and check marking of a sample of students' assignments with a faculty member from another institution. Adoption of scoring rubrics to assess the students' achievement (both for ongoing or summative assessments). Regular follow-up of laboratory logbooks to assess the practical achievement of students.
1⁰- Procedures for periodically reviewing of course effectiveness and planning for improvement	
	<ul style="list-style-type: none"> Student rating and feedback Peer rating and feedback Regular meeting of the Curriculum Committee of the faculty.
6- Course development plans	
	<ul style="list-style-type: none"> Conducting regular workshops for the staff for improving their course specification skills. Regular revision of course specification and syllabus items.

XIII. Course Policies: (including plagiarism, academic honesty, attendance etc)	
The University Regulations on academic misconduct will be strictly enforced. Please refer to -----	
1	Class Attendance: <ul style="list-style-type: none"> Attendance of all lectures and practical sessions is required. Unexcused absence exceeding 25% of the lectures or practical sessions will disqualify the student from entering the final exam.
2	Tardy: <p>- Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent.</p>

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3	Exam Attendance/Punctuality: <ul style="list-style-type: none">▪ Exam attendance is obligatory unless being excused by the department and faculty.▪ Absence from assignments or exams will be dealt with according to the general policy of the university.
4	Assignments & Projects: <ul style="list-style-type: none">▪ Assignments: Written and oral; Laboratory logbook signed by the responsible demonstrator. ▪ Projects: Not applicable.
5	Cheating: <ul style="list-style-type: none">▪ Punishment of cheating will be according to the general policy of the university in this respect.
6	Plagiarism: <ul style="list-style-type: none">▪ Plagiarism in written essays, reports, etc. is not accepted, and students who plagiarize the works of others will be punished according to the general policy of the university.
7	Other policies: <ul style="list-style-type: none">▪ General policies of the Students' Affairs of the University and the Quality Assurance Unit.