

Republic of Yemen
Ministry of Higher Education & Scientific Research
Emirates International University



Faculty of - Medicine & Health sciences...

Department of Clinical pharmacy....

Program of Pharm D

Course Specification of Botany

Course No. (BOT 103)



2017.

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Prepared by:

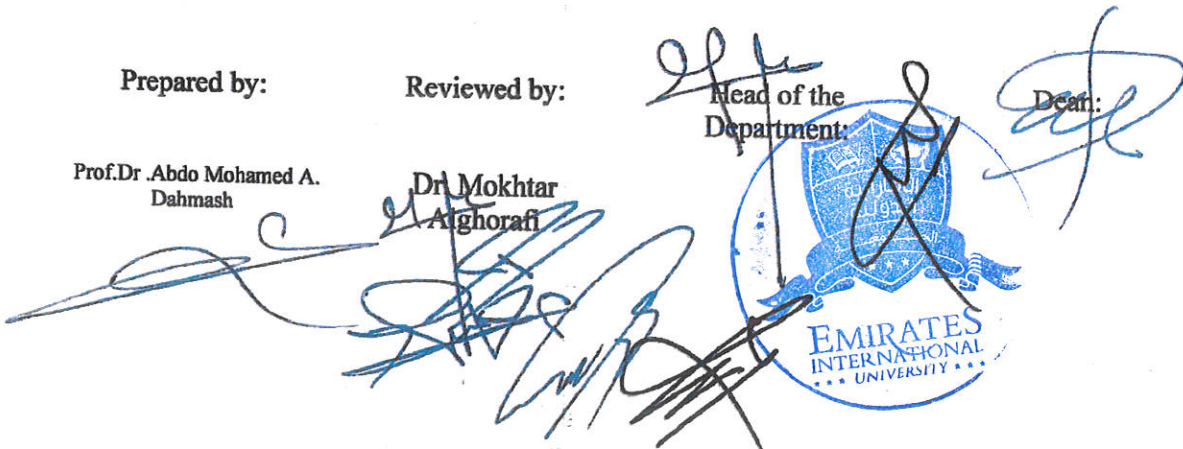
Prof.Dr .Abdo Mohamed A.
Dahmash

Reviewed by:

Dr Mokhtar
Alghorafi

Head of the
Department:

Dean:



I. Course Identification and General Information:

1	Course Title:	Botany			
2	Course Code & Number:	BOT 103			
3	Credit Hours:	Credit Hours	Theory Hours		Lab. Hours
			Lectu	Exercise	
		3	2	--	2
4	Study Level/ Semester at which this Course is offered:	1 Level /2 nd Semester			
5	Pre –Requisite (if any):	None			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	Bachelor of Pharm. D			
8	Language of Teaching the Course:	English			
9	Study System:	Semester-based System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	Faculty of Medicine & Health sciences			
12	Prepared by:	Prof.Dr .Abdo Mohamed A. Dahmash			
13	Date of Approval:				

II. Course Description:

This course is designed to provide the student with the necessary basics knowledge in definition of botany ,classification of plants , structure of embryo and germination ,structure of flowering plants, morphology of flowering plant, flower ,inflorescences and fruits, plant anatomy, plant taxonomy and plant physiology.Importance of botany for pharmacy students with reference to its natural products and uses in medicine as therapy .

III. Course Intended Learning Outcomes (CILOs) : Upon successful completion of the course, students will be able to:		Referenced PILOs	
A. Knowledge and Understanding:		I, A or E	
a1	Define botany , importance of botany for pharmacy students with reference to its natural products and uses in medicine as therapy		A1 A6
a2	Discuss importance botany and relationship between botany and other sciences		
B. Intellectual Skills:			
b1	Distinguish between structure of embryo of different plants		B6
b2	Write a full scheme for classification of flowering plants.		
C. Professional and Practical Skills:			
c1	Visit some habitats to Collect some plants to study the morphology and anatomy.		C4 C1
c2	Use the microscope in examines sections(anatomy) of roots, stems and leaves		
D. Transferable Skills:			
d1	Work effectively as part of a team to collect data and/or produce reports and presentations		D3 D2
d2	Develop the decision making and problem solving abilities		

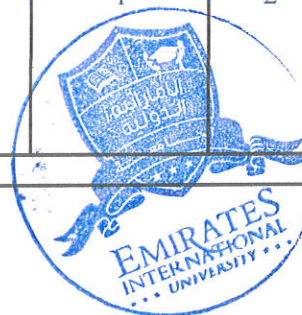
(A) Alignment of Course Intended Learning Outcomes (Knowledge and Understanding) to Teaching Strategies and Assessment Methods:		
Course Intended Learning Outcomes	Teaching Strategies	Assessment Strategies
a1 Define botany , importance of botany for pharmacy students with reference to its natural products and uses in medicine as therapy	<ul style="list-style-type: none"> ♦ Interactive lectures, ▪ discussions, ▪ Brainstorming ▪ Self-learning 	<ul style="list-style-type: none"> ▪ Written tests ▪ Short reports, ▪ Home works and assignments,
a2 Discuss importance botany and relationship between botany and other sciences	<ul style="list-style-type: none"> •Interactive lectures, ▪ discussions, ▪ Brainstorming ▪ Self-learning ▪ Field visits. 	<ul style="list-style-type: none"> ▪ Written tests ▪ assignments,.
(B) Alignment of Course Intended Learning Outcomes (Intellectual Skills) to Teaching Strategies and Assessment Methods:		
Course Intended Learning Outcomes	Teaching Strategies	Assessment Strategies
b1 Distinguish between structure of embryo of different plants	<ul style="list-style-type: none"> •Interactive lectures, ▪ discussions, ▪ Brainstorming •Self-learning ▪ 	<ul style="list-style-type: none"> ▪ Final Written Exam ▪ Short reports, ▪ Home works ▪ Assignments,.
b2 Write a full scheme for classification of flowering plants.	<ul style="list-style-type: none"> Interactive lectures, ▪ discussions, ▪ Brainstorming •Self-learning ▪ 	<ul style="list-style-type: none"> ▪ Final Written Exam ▪ Short reports, ▪ Home works ▪ Assignments,.
(C) Alignment of Course Intended Learning Outcomes (Professional and Practical Skills) to Teaching Strategies and Assessment Methods:		
Course Intended Learning Outcomes	Teaching Strategies	Assessment Strategies
c1 Visit some habitats to Collect some plants to study the	Interactive lectures,	<ul style="list-style-type: none"> ▪ Final Written Exam

	morphology and anatomy.	<ul style="list-style-type: none"> ▪ discussions, ▪ Brainstorming •Self-learning 	<ul style="list-style-type: none"> ▪ Short reports, ▪ Home works ▪ Assignments.,
c2	Use the microscope in examines sections(anatomy) of roots, stems and leaves	Interactive lectures, <ul style="list-style-type: none"> ▪ discussions, ▪ Brainstorming •Self-learning 	<ul style="list-style-type: none"> ▪ Short reports, ▪ Home works and assignments,
(D) Alignment of Course Intended Learning Outcomes (Transferable Skills) to Teaching Strategies and Assessment Methods:			
	Course Intended Learning Outcomes	Teaching Strategies	Assessment Strategies
d1	Work effectively as part of a team to collect data and/or produce reports and presentations	<ul style="list-style-type: none"> ▪ Discussion ▪ Self Learning ▪ Seminars 	<ul style="list-style-type: none"> ▪ Discussion. ▪ Group work
d2	Develop the decision making and problem solving abilities	<ul style="list-style-type: none"> ▪ Discussion ▪ Self Learning ▪ Seminars 	<ul style="list-style-type: none"> ▪ Discussion. ▪ Group work
		▪	▪

IV. Course Contents:

A. Theoretical Aspect:

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
1	Introduction	<ul style="list-style-type: none"> – Define of botany... – Important of botany for pharmacy students with reference to its natural products and uses in medicine as therapy, Fields of botany 	1	2	a1,a2,b1



No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
		- Plant classification			
2	Structure of embryo and germination	- Parts of seeds, seeds endospermic and non-endospermic , condition requirements for germination, types of germination, ...	1	2	a2,a3,b1
3	Morphology of flowering plants...	- Root systems and shoot system and its modification and functions for each... Parts of a typical of leaf, types of leaves, Veination of leaves, arrangements of leaves , modification and function of leaves... - Definition of flower, parts of flower, aestivation of sepals and petals, placentation, ovary position , pollination , fertilization, inflorescences and fruits	4	8	,b1,b2,
4	Plant anatomy	- Meristematic and permanent tissues, anatomy of roots, stem and leaves.	5	10	b2, c2,
5	Plant taxonomy	- Principles & system of classification , unit of classification, scientific name and vernacular or common name, herbarium with examples of taxonomy for monocots and dicots.... ...	1	2	c1, c2,d1
6	Midterm...	Midterm theoretical exam.	1	2	a1, a2, b1, a3,b1, b2,c1,c2
7	Plant physiology	- Physiology of growth,	2	4	a1,a2,b1,c1d1

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
		<p>products of photosynthesis. Plant nutrition, protoplast, protoplasm , colloidal system, water relation cellular respiration</p> <p>– Define of enzymes, important of enzymes, active sites, effecting an enzymes on activation of energy, classification of enzymes, types of hormones, types of transports.</p>		
12	Final Theoretical Exam		1	2	a1, a2,a3, b1, b2, c1,c2
Number of Weeks /and Units Per Semester			16	32	

B. Case Studies and Practical Aspect:

No.	Tasks/ Experiments	Week Due	Contact Hours	Learning Outcomes (CILOs)
1	Introduction	1	2	a1, a2,a3
2	Morphology of plants: Examine morphological features of different plant types.	1	2	b1,b2,c1, c2,d1
3	- Plant cells: Onion leaf epidermis; Elodea , potato tuber cells; tomato epidermis; and asparagus tuber cells.	1	2	b1, b2,c1, c2, d1
4	- Anatomy of root: Regions of growth in a root; dicot & monocots.	1	2	b1, b2,c1, c2, d1
5	- Anatomy of stem : Dicot and monocot stems;	1	2	b1,b2,c1,c2,

No.	Tasks/ Experiments	Week Due	Contact Hours	Learning Outcomes (CILOs)
	fundamental tissues; ground tissues, vascular tissues; and woody stems and herbaceous stem tissues in cross and longitudinal sections.			d1,d2
6	- Anatomy of leaves : External and internal features of monocot and eudicots leaves; and leaves adaptations to extreme environments.	1	2	b1,b2,c1,c2, d1,d2
7	- Photosynthesis: Pigment chromatography. Measurement photosynthesis.	1	2	b1,b2,c1,c2, d1,d2
8	- Classification and systematic: Nonvascular plants (Mosses, gametophyte, and sporophyte).Seedless vascular plants (Lycophyte and pteriophyta).	1	2	b1,b2,c1,c2, d1
9	Mid-Term Practical Exam	1	2	a1, a2,a3,b1, b2,c1,c2,
10	- Classification and systematic :Seed- non flowering (Gymnosperms) and seed-flowering plants(Angiosperms).	1	2	a1, a2, b1,d1,d2
11	- Angiosperms :Flower	1	2	a1, a2, b1,b2, c1,c2
12	- Inflorescences	1	2	a1, a2, b1,b2, c1,c2
13	- Flesh fruits, dry dehiscent fruits; dry indehiscent fruits.	1	2	a1, a2,a3, b1,b2, c1,c2
14	- Review	1	2	b1, b2,c1,c2
15	Final Practical Exam Including Project presentation & Evaluation	15	2	a1, a2, a3, b1, b2, c1,c2
Number of Weeks /and Units Per Semester		15	30	

V. Teaching Strategies of the Course:

Interactive lectures,
discussions,
Brainstorming
Self-learning
Seminars

VI. Assessment Methods of the Course:

- Final Exam
- Short reports,
- Home works
- Assignments,.
- Discussion.
- Group work

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

No.	Assignments	Week Due	Mark	Aligned CILOs (symbols)
1	Assignments : Searching about some plants in Yemen	10 th	5	a1,a2,b1,b2,c1
Total				

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Assignments	10 th	5	5%	a1,a2,b1,b2,c1
2	Quizzes 1 & 2	6 th , 12 th	5	5%	a1, a2, b1,b2,
3	Mid-Term Theoretical Exam	8 th	20	20%	a1, a2, , b1,b2,

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
4	Mid-Term Practical Exam	10 th	5	5%	c1, c2,
5	Final Practical Exam including Project Presentation & Evaluation	15 th	15	15%	c1, c2,
6	Final Theoretical Exam	16 th	50	50%	a1, a2, a3, b1, b2, c1, c2,
Total			100	100%	

IX. Learning Resources:

1- Required Textbook(s) (maximum two):

- 1- Course notes by staff member Dahmash , A.M. Sana'a university , Faculty of Science , Biology Department,
- 2- Bell, A.D.(1991):Plant form : An illustrated Guide to flowering plant morphology . The external features of plants are examined in this beautifully illustrated book, Oxford University press, Oxford.
- 3- Berg, L.R.(1997): Introductory Botany: plant , people and the Environment .A general botany text with an environmental emphasis, Saunders college publishing, Philadelphia.

2- Essential References:

- 1.Solomon, Berg, Martin (1998): Biology 5th edition by Solomon, Eldra P., Berg, Linda R., Martin, Diana WBiology 3-Jane B. Reece and et al. (2010) Biology (Camp ell) , Publisher : Benjamin Cummings; 9th edition
- 4-Shipunov, Alexey. Introduction to Botany (2020). URL:
This book was prepared at Minot State University (North Dakota, USA) with the help of students in Biology 154 and Biology 310 classes.

3- Electronic Materials and Web Sites etc.:

Websites:

-[http:// www.saunderscollege.com/life_sci/titles.html](http://www.saunderscollege.com/life_sci/titles.html) and dick on Solomon/ Berg/ Martin biology for link to chapter –related resources on the World Wide Web.

-<http://www.ashipunov.info/shipunov/school/biol>.

X. Course Policies: (Based on the Uniform Students' By law (2007))	
1	Class Attendance: Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	Tardiness: A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	Exam Attendance/Punctuality: No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	Assignments & Projects: Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	Cheating: Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	Forgery and Impersonation: Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	Other policies: The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

Faculty of Medicine & Health Sciences ---

Department of Clinical Pharmacy

Program of Pharm D

Course Plan (Syllabus) of Botany

Course No. (BOT 103)

I. Information about Faculty Member Responsible for the Course:							
Name of Faculty Member:	Prof.Dr .Abdo Mohamed A. Dahmash	Office Hours					
Location& Telephone No.:	75440493						
E-mail:	abdudamash--@yahoo.com	SAT	SUN	MON	TUE	WED	THU



II. Course Identification and General Information:

1	Course Title:	Botany			
2	Course Code & Number:	BOT 103			
3	Credit Hours:	Credit Hours	Theory Hours		Lab. Hours
			Lectu	Exercise	
		3	2	--	2
4	Study Level/ Semester at which this Course is offered:	1 Level /2nd Semester			
5	Pre –Requisite (if any):	None			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	Bachelor of Pharm. D			
8	Language of Teaching the Course:	English			
9	Study System:	Semester-based System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	Faculty of Medicine & Health sciences			
12	Prepared by:	Prof.Dr .Abdo Mohamed A. Dahmash			
13	Date of Approval:				

III. Course Description:

This course is designed to provide the student with the necessary basics knowledge in definition of botany ,classification of plants , structure of embryo and germination ,structure of flowering plants, morphology of flowering plant, flower ,inflorescences and fruits, plant anatomy, plant taxonomy and plant physiology.Importance of botany for pharmacy students with reference to its natural products and uses in medicine as therapy .



IV. Course Intended Learning Outcomes (CILOs) :

Upon successful completion of the Course, student will be able to:

	A. Knowledge and Understanding:
a1	Define botany , importance of botany for pharmacy students with reference to its natural products and uses in medicine as therapy
a2	Discuss importance botany and relationship between botany and other sciences
	B. Intellectual Skills:
b1	Distinguish between structure of embryo of different plants
b2	Write a full scheme for classification of flowering plants.
	C. Professional and Practical Skills:
c1	Visit some habitats to Collect some plants to study the morphology and anatomy.
c2	Use the microscope in examines sections(anatomy) of roots, stems and leaves
	D. Transferable Skills:
d1	Work effectively as part of a team to collect data and/or produce reports and presentations
d2	Develop the decision making and problem solving abilities

V. Course Contents:

A. Theoretical Aspect:

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours
1	Introduction	<ul style="list-style-type: none"> - Define of botany... - Important of botany for pharmacy students with reference to its natural products and uses in medicine as therapy, Fields of botany - Plant classification 	1	2
2	Structure of embryo and germination	<ul style="list-style-type: none"> - Parts of seeds, seeds endospermic and non- 	1	2

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours
		endospermic , condition requirements for germination, types of germination, ...		
3	Morphology of flowering plants...	<ul style="list-style-type: none"> – Root systems and shoot system and its modification and functions for each... Parts of a typical of leaf, types of leaves, Veination of leaves, arrangements of leaves , modification and function of leaves... – Definition of flower, parts of flower, aestivation of sepals and petals, placentation, ovary position , pollination , fertilization, inflorescences and fruits 	4	8
4	Plant anatomy	– Meristematic and permanent tissues, anatomy of roots, stem and leaves.	5	10
5	Plant taxonomy	– Principles & system of classification , unit of classification, scientific name and vernacular or common name, herbarium with examples of taxonomy for monocots and dicots.....	1	2
6	Midterm...	Midterm theoretical exam.	1	2
7	Plant physiology	<ul style="list-style-type: none"> – Physiology of growth, products of photosynthesis. Plant nutrition, protoplast, protoplasm , colloidal system, water relation cellular respiration – Define of enzymes, important of enzymes, active sites, effecting 	2	4

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours
		an enzymes on activation of energy, classification of enzymes, types of hormones, types of transports.		
12	Final Theoretical Exam	–	1	2
Number of Weeks /and Units Per Semester	16	– 32		

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours
1	Introduction	<ul style="list-style-type: none"> – Define of botany... – Important of botany for pharmacy students with reference to its natural products and uses in medicine as therapy, Fields of botany – Plant classification 	1	2
2	Structure of embryo and germination	<ul style="list-style-type: none"> – Parts of seeds, seeds endospermic and non-endospermic , condition requirements for germination, types of germination, ... 	1	2
3	Morphology of flowering plants...	<ul style="list-style-type: none"> – Root systems and shoot system and its modification and functions for each... Parts of a typical of leaf, types of leaves, Veination of leaves, arrangements of leaves , modification and function of leaves... – Definition of flower, parts of flower, aestivation of sepals and petals, placentation, ovary position 	4	8

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours
		, pollination , fertilization, inflorescences and fruits		
4	Plant anatomy	– Meristematic and permanent tissues, anatomy of roots, stem and leaves.	5	10
5	Plant taxonomy	– Principles & system of classification , unit of classification, scientific name and vernacular or common name, herbarium with examples of taxonomy for monocots and dicots.... ...	1	2
6	Midterm...	Midterm theoretical exam.	1	2
7	Plant physiology	– Physiology of growth, products of photosynthesis. Plant nutrition, protoplast, protoplasm , colloidal system, water relation cellular respiration – Define of enzymes, important of enzymes, active sites, effecting an enzymes on activation of energy, classification of enzymes, types of hormones, types of transports.	2	4
12	Final Theoretical Exam		1	2
Number of Weeks /and Units Per Semester			16	32

B. Case Studies and Practical Aspect:

No.	Tasks/ Experiments	Week Due	Contact Hours
1	Introduction	1	2
2	Morphology of plants: Examine morphological features of different plant types.	1	2

No.	Tasks/ Experiments	Week Due	Contact Hours
3	- Plant cells: Onion leaf epidermis; Elodea , potato tuber cells; tomato epidermis; and asparagus tuber cells.	1	2
4	- Anatomy of root: Regions of growth in a root; dicot & monocots.	1	2
5	- Anatomy of stem : Dicot and monocot stems; fundamental tissues; ground tissues, vascular tissues; and woody stems and herbaceous stem tissues in cross and longitudinal sections.	1	2
6	- Anatomy of leaves : External and internal features of monocot and eudicots leaves; and leaves adaptations to extreme environments.	1	2
7	- Photosynthesis: Pigment chromatography. Measurement photosynthesis.	1	2
8	- Classification and systematic: Nonvascular plants (Mosses, gametophyte, and sporophyte). Seedless vascular plants (Lycophyte and pteriophyta).	1	2
9	Mid-Term Practical Exam	1	2
10	- Classification and systematic :Seed- non flowering (Gymnosperms) and seed-flowering plants(Angiosperms).	1	2
11	- Angiosperms :Flower	1	2
12	- Inflorescences	1	2
13	- Flesh fruits, dry dehiscent fruits; dry indehiscent fruits.	1	2
14	- Review	1	2
15	- Final Practical Exam Including Project presentation & Evaluation	15	2
Number of Weeks	- 15		



No.	Tasks/ Experiments	Week Due	Contact Hours
/and Units Per Semester			

VI. Teaching Strategies of the Course:

- Interactive lectures,
- discussions,
- Brainstorming
- Self-learning
- Seminars

VII. Assessment Methods of the Course:

- Final Exam
- Short reports,
- Home works
- Assignments,.
- Discussion.
- Group work

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

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Assignments	10 th	5	5%	A1,A2,B1,B2,C1
2	Quizzes 1 & 2	6, 12	5	5%	a1, a2,, b1,b2,c1,c2
3	Mid-Term Theoretical Exam	8	20	20%	a1, a2,a3,

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
					b1,b2,c1,c2
4	Mid-Term Practical Exam	10	5	5%	a1, a2, a3, b1, b2, c1, c2,
5	Final Practical Exam including Project Presentation & Evaluation	15	15	15%	a1, a2, a3, b1, b2, c1, c2,
6	Final Theoretical Exam	16	50	50%	a1, a2, a3, b1, b2, c1, c2,
Total			100	100%	

1- Required Textbook(s) (maximum two):

- 4- Course notes by staff member Dahmash , A.M. Sana'a university , Faculty of Science , Biology Department,
- 5- Bell, A.D.(1991):Plant form : An illustrated Guide to flowering plant morphology . The external features of plants are examined in this beautifully illustrated book, Oxford University press, Oxford.
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3	No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
	Assignments & Projects:
4	Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
	Cheating:
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7	Other policies: The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.