

Republic of Yemen

Ministry of Higher Education & Scientific Research

21 SEPTEMBER UNIVERSITY of MEDICALS & APPLIED

SCIENCES



Program Anesthesia Technician

Course Specification of Principle of Airway Management and Mechanical Ventilator

Course No. (08.05.845)

2024

Prepared by:	Reviewed by:	Head of the Dep	Quality Unit	:	Dean
Dr. Abdulhameed Al-Thaifani	Dr fares Mahdi	Dr .fares Mahdi	Dr. Fadl Shujaa Al-deen		Dr Abdulsalam Dallak.

I. Course Identification and General Information:						
1	Course Title:	Principle of Airway Management and Mechanical Ventilator				
2	Course Code & Number:	(08.05.845)				
3	Credit hours:	Credit Hours				Total
		Th	Seminar	Prac	Train	
		2	-			2
4	Study level/ semester at which this course is offered:	third year/first semester				
5	Pre –requisite (if any):	-				
6	Co –requisite (if any):	-				
7	Program(s) in which the course is offered	Anesthesia Technician				
8	Language of teaching the course:	English				
9	Location of teaching the course:	Faculty of Medical Applied Science				
10	System of Study:	Semester				
11	Mode of delivery:					
12	Prepared By:	Dr. Ahmed ALmalahi				
13	Date of Approval	2024				

II. Course Description
The course on the principles of airway and ventilator management is designed for healthcare professionals involved in critical care, emergency medicine, and anesthesia. The curriculum covers essential topics such as anatomy and physiology of the airway, the indications and techniques for airway management, and the fundamentals of mechanical ventilation. Participants will learn about various airway devices, including endotracheal tubes, supraglottic airways, and alternatives for difficult airways. The course emphasizes the assessment of airway patency and the recognition of potential complications associated with airway interventions. In the ventilator management segment, attendees will explore concepts such as tidal volume, respiratory rate, and ventilatory modes. Emphasis will be placed on the interpretation of arterial blood gases and the adjustment of ventilation settings based on patient needs. Through a combination of lectures, hands-on simulations, and case discussions, participants will gain practical skills in airway management and ventilator operation. The course aims to enhance confidence and competence in managing patients who require airway support and

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mechanical ventilation in both emergency and critical settings

III. Course Intended Learning Outcomes (CILOs) : مخرجات تعلم (المقرر)		Referenced PILOs (مخرجات تعلم البرنامج)	
A. Knowledge and Understanding: Upon successful completion of the course, students will be able to:			
a1	explain the anatomy and physiology of the airway and respiratory system.	A1 .	Demonstrate the concepts and principles of anesthesia and different basic and humanities courses and its applications in anesthesia practice
a2	Describe the indications and contraindications for various airway management techniques.	A2	Describe normal and abnormal human behaviors, structure and function of human body and identify the basics of intensive care, medical emergencies that the anesthetist and high dependency care units and how to manage patients at risk.
a3	Demonstrate proficiency in basic airway management skills, including positioning, suctioning, and the use of airway adjuncts.	A3	Recognize the full details about the basic physics and its applications in anesthesia, the equipment's and apparatus in anesthesia and critical care unit.
B. Intellectual Skills: Upon successful completion of the course, students will be able to:			
b1	Explain the principles of positive pressure ventilation and the operation of different types of mechanical ventilators.	B1.	integrate assessment data to formulate anesthesia diagnosis.
b2	Assess and interpret ventilator settings and blood gas results to guide management decisions.	B2.	Synthesize knowledge derived from, medical, anesthesia, basic sciences and humanities courses into the practice of anesthesia

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b3	Recognize and manage complications associated with airway and ventilator management.	B3.	Interpret the basic normal anatomical structures on radiographs, C.T. scans and magnetic resonance images and readings of the standard monitors attached to the patient as well as additional monitors as central venous pressure monitoring.
C. Professional and Practical Skills: Upon successful completion of the course, students will be able to:			
c1	Apply evidence-based practices in airway and ventilator management in various clinical scenarios.	C1	Administer a range of assessment techniques, procedures and management appropriate to patient condition and maintain fluid therapy and blood transfusion.
c2	Demonstrate the ability to perform advanced airway interventions, including intubation and cricothyrotomy, under simulated conditions.	C2.	Perform an approach to the assessment of risk and need for consultation for an anesthetics, identify appropriate laboratory investigations, pre-medications and fasting guidelines and Set up anesthesia machine and its connections and demonstrate appropriate application and interpretation of commonly used monitors in anesthesia preoperatively
D. Transferable Skills: Upon successful completion of the course, students will be able to:			

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d1	Evaluate the ethical considerations and patient-centered approaches in airway and ventilator management decisions.	D1. Communicate effectively with individuals and groups and members of the health team in order to promote effective interpersonal relationships and teamwork
d2	Employ effective communication and accurate documentation while providing and/or managing for client needs.	D2. Demonstrate professional, ethical, moral, legal, and spiritual concepts into one's practice within a global environment

A) Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
explain the anatomy and physiology of the airway and respiratory system.	Lecture discussion Case discussion Brainstorming	Essay type Short answers Objective type
Describe the indications and contraindications for various airway management techniques.	Lecture discussion Case discussion Brainstorming	Essay type Short answers Objective type
Demonstrate proficiency in basic airway management skills, including positioning, suctioning, and the use of airway adjuncts.	Lecture discussion Case discussion Brainstorming	Essay type Short answers Objective type

(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
b1.Explain the principles of positive pressure ventilation and the operation of different types	Lecture discussion	Essay type Short answers

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of mechanical ventilators.	Case discussion Brainstorming	Objective type
b2.Assess and interpret ventilator settings and blood gas results to guide management decisions.	Lecture discussion Case discussion Brainstorming	Essay type Short answers Objective type
b3.Recognize and manage complications associated with airway and ventilator management.	Lecture discussion Case discussion Brainstorming	Essay type Short answers Objective type

(C) Alignment Course Intended Learning Outcomes of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
c1. Apply evidence-based practices in airway and ventilator management in various clinical scenarios.	Lab Practice Supervised Clinical practice	Evaluate with checklist Assess performance with rating scale Clinical exam
C2.Demonstrate the ability to perform advanced airway interventions, including intubation and cricothyrotomy, under simulated conditions.	Lab Practice Supervised Clinical practice	Evaluate with checklist Assess performance with rating scale Clinical exam

(D) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
D1.Evaluate the ethical considerations and patient-centered approaches in airway and ventilator management decisions.	Practice session Supervised clinical practice	Assess role plays with check-list on teaching techniques Assess health teaching with checklist Assess performance with rating scale
d2.Employ effective communication and accurate documentation while providing and/or managing for client	Practice session Supervised clinical practice	Assess role plays with the check-list on communication Assess communication techniques by rating scale

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needs.		Assess performance with rating scale
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IV. Course Content:					
A – Theoretical Aspect:					
Order	Units/Topics List	Sub Topics List	Number of Weeks	Contact hours	Learning Outcomes
1	Module 1: ▪ Introduction to Airway Management	Anatomy of the upper and lower airway Physiology of breathing and gas exchange Importance of airway patency in patient care Assessment of airway patency and potential obstructions	2	4	a1, b1, c1,
2	Module 2: Techniques of Airway Management	Bag-mask ventilation techniques Oropharyngeal vs. nasopharyngeal airways Endotracheal intubation: indications, contraindications, and techniques Supraglottic airway devices: types and use Emergency airway management techniques (e.g., cricothyrotomy)	2	4	a2, b2, c1, c2, d1, d2
3	Module 3: Basics of Mechanical Ventilation	Understanding the need for mechanical ventilation Overview of ventilator settings: tidal volume,	2	4	a1, c1, c2, d1, d2

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		respiratory rate, PEEP, FiO2 Modes of mechanical ventilation: assist-control, SIMV, pressure support Monitoring and assessing ventilator parameters			
4	Module 4: Ventilation Strategies in Clinical Practice	▪ Indications for starting mechanical ventilation ▪ Weaning protocols and criteria for extubation ▪ Management of complications related to mechanical ventilation (e.g., barotrauma, ventilator-associated pneumonia) ▪ Ethical considerations in end-of-life care related to ventilation	2	4	a3, c1, c2, d1, d2
5	Module 5: Advanced Airway and Ventilation Techniques	• Use of high-flow nasal cannula and CPAP/BiPAP • Non-invasive ventilation: indications and patient selection • Specialty airway management devices (e.g., video laryngoscopes) • Pediatric and bariatric considerations in airway management	2	4	a1, a2, c1, c2, d1, d2
6	Midterm exam	Midterm exam	1	2	a1, a2, a3, b2, b3, c1, c2, c1, d2
7	Module 6: Practical Skills and	Hands-on practice with airway devices and	4	6	a2, a3, b3, c1, c2, d1,

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	Simulation	ventilators			d2
		- Simulation scenarios for airway management in various clinical situations - Team-based approaches to managing difficult airways			
8	Module 7: Case Studies and Clinical Guidelines	- Review of clinical guidelines from organizations (e.g., AHA, ASA) - Discuss real-world case studies to analyze decision-making and outcomes - Develop critical thinking skills for airway and ventilator management in diverse patient populations	1	2	a3, b3, d1, d2
12	Final exam	Final exam	1	2	a1, a2, b1, b2, b3, c1, c2, d1, d2
Number of Weeks /and Units Per Semester			14	32	

B – Practical Aspect:

Order	Task/ Experiments	Number of Weeks	Contact hours	Learning Outcomes
	Not applicable			
Number of Weeks /and Units Per Semester				

V. Teaching strategies of the course

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1. Lecture – Discussion
2. Demonstration
3. Student assignment
4. Role Plays
5. Brainstorming
6. Case study
7. Field work

V. Assessments strategies of the course

Assess role plays with the check-list on communication
Assess communication techniques by rating scale
Assess performance with rating scale

VI. Assignments

No	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Performing health assessment and requesting diagnostic measures for three assigned patients	c1, c2, d1, d2	2	2.5
2	Write plan of management for three assigned patients	c1, c2, d1, d2	2	2.5

VII. Schedule of Assessment Tasks for Students During the Semester

Theoretical Part

No	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Attendance and activities	15th week	5	5%	a1, a2, b1, b2
2	Student assignments	5th and 12th week	5	5%	a1, a2, b3, b1, b2, b3
3	Mid-term exam	7th or 8th week	20	20%	a1, a2, b1, b2, c2, d2
4	Final-exam	16th-17th week	70	70 %	a1, a2, a3, b1, b2, c2, d2

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Clinical Part					
No	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
	Not applicable				
Number of Weeks /and Units Per Semester					

VIII. Learning Resources:

Written in the following order: (Author; Year of publication; Title; Edition – Place of publication – Publisher).

1- Required Textbook(s) (maximum two). المراجع الرئيسية:

1. "Fundamentals of Respiratory Care" by Kenneth A. P. McFadden, et al. - This book covers essential concepts in respiratory care, including airway management and mechanical ventilation.
2. "Principles of Mechanical Ventilation" by Martin J. Tobin - A comprehensive resource that explores the science and practice of mechanical ventilation, including details on airway management techniques.
3. "Airway Management: A Practical Guide" by Robert L. Wilkins and Oren E. W. Yedidia - This book provides practical insights and methodologies for effective airway management in various clinical scenarios.
4. "Clinical Airway Management" by Steven M. Yentis, et al. - This text focuses on practical approaches to airway management in both elective and emergency settings.
5. "The ICU Book" by Paul L. Marino - While not exclusively focused on ventilation, this text offers a solid foundation in critical care, including sections on ventilatory support and airway management.
6. "Mechanical Ventilation: Clinical Applications and Pathophysiology" by David C. Shelledy and David A. Durst - This book discusses various modes of mechanical ventilation and their applications, along with the underlying physiology.

2- Essential References. المراجع المساندة

1. "Manual of Respiratory Medicine" by John F. Murray and James F. Stoller - This manual covers clinical principles, including airway management and mechanical ventilation protocols.
2. Online Resources and Guidelines:

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	○ American Heart Association (AHA) Guidelines ○ Society of Critical Care Medicine (SCCM) Resources ○ European Respiratory Society (ERS) Guidelines These resources should provide a comprehensive foundation for understanding airway and ventilator management principles in clinical practice.
3- Electronic Materials and Web Sites etc. المصادر الإلكترونية ومواقع الإنترنت...الخ	
	1. http://www.google.com

IX. Course Policies: الضوابط والسياسات المتبعة في المساق	
1	Class Attendance: At least 75 % of the course hours should be attended by the student. Otherwise, he/she will not be allowed to attend the final exam
2	Tardy: any student who is late for more than 15 minutes from starting the lecture will not be allowed to attend the lecture and will be considered absent.
3	Exam Attendance/Punctuality: Any student who is late for more than 30 minutes from starting the exam will not be allowed to attend the exam and will be considered absent.
4	Assignments & Projects: Assignments and projects will be assessed individually unless the teacher request for group work
5	Cheating: Cheating by any means will cause the student failure and he/she must re-study the course
6	Plagiarism: Plagiarism by any means will cause the student failure in the course. Other disciplinary procedures will be according to the college rules.
7	Other policies (سياسات أخرى): -

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Faculty of Medical Applied Science

Bachelor **Anesthesia Technician**

Course Specification of Principle of Airway Management and Mechanical Ventilator

Course No. 08.05.845)

2024

Plan (Syllabus)

I. Course Identification and General Information:				
1	Course Title:	Principle of Airway Management and Mechanical Ventilator		
2	Course Code & Number:	(08.05.845)		
3	Credit hours:	Credit Hours		Total
		Th	Seminar	
		2	-	2
4	Study level/ semester at which this course is offered:	Third year/first semester		
5	Pre –requisite (if any):	-		
6	Co –requisite (if any):	-		
7	Program(s) in which the course is offered	Bachelor Anesthesia Technician		
8	Language of teaching the course:	English		
9	Location of teaching the course:	Faculty of Medical Applied Science		

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Dr. Ahmed Amalaha	Dr Fahmi AL-abasi	Dr .fares Mahdi	Dr. Fadl Shujaa Al-deen		Dr Abdulsalam Dallak.

10	System of Study:	Semester
11	Mode of delivery:	
12	Prepared By:	Dr. Ahmed ALmalahi
13	Date of Approval	2024

II. Course Description

The course on the principles of airway and ventilator management is designed for healthcare professionals involved in critical care, emergency medicine, and anesthesia. The curriculum covers essential topics such as anatomy and physiology of the airway, the indications and techniques for airway management, and the fundamentals of mechanical ventilation. Participants will learn about various airway devices, including endotracheal tubes, supraglottic airways, and alternatives for difficult airways. The course emphasizes the assessment of airway patency and the recognition of potential complications associated with airway interventions. In the ventilator management segment, attendees will explore concepts such as tidal volume, respiratory rate, and ventilatory modes. Emphasis will be placed on the interpretation of arterial blood gases and the adjustment of ventilation settings based on patient needs. Through a combination of lectures, hands-on simulations, and case discussions, participants will gain practical skills in airway management and ventilator operation. The course aims to enhance confidence and competence in managing patients who require airway support and mechanical ventilation in both emergency and critical settings.

(مخرجات تعلم المقرر). Course Intended Learning Outcomes (CILOs) :	
a1.explain the anatomy and physiology of the airway and respiratory system.	
a2.Describe the indications and contraindications for various airway management techniques.	
a3.Demonstrate proficiency in basic airway management skills, including positioning, suctioning, and the use of airway adjuncts.	
B1.Explain the principles of positive pressure ventilation and the operation of different types of mechanical ventilators.	
b2.Assess and interpret ventilator settings and blood gas results to guide management decisions.	
b3.Recognize and manage complications associated with airway and ventilator management.	
c1. Apply evidence-based practices in airway and ventilator management in various clinical	2.

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scenarios.
C2.Demonstrate the ability to perform advanced airway interventions, including intubation and cricothyrotomy, under simulated conditions.
d1.Evaluate the ethical considerations and patient-centered approaches in airway and ventilator management decisions.
d2.Employ effective communication and accurate documentation while providing and/or managing for client needs.

IV. Course Content:					
A – Theoretical Aspect:					
Order	Units/Topics List	Sub Topics List	Number of Weeks	Contact hours	Learning Outcomes
1	Module 1: ▪ Introduction to Airway Management	Anatomy of the upper and lower airway Physiology of breathing and gas exchange Importance of airway patency in patient care Assessment of airway patency and potential obstructions	2	4	a1, b1, c1,
2	Module 2: Techniques of Airway Management	Bag-mask ventilation techniques Oropharyngeal vs. nasopharyngeal airways Endotracheal intubation: indications, contraindications, and techniques	2	4	a2, b2, c1, c2, d1, d2

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		Supraglottic airway devices: types and use			
		Emergency airway management techniques (e.g., cricothyrotomy)			
3	Module 3: Basics of Mechanical Ventilation	- Understanding the need for mechanical ventilation - Overview of ventilator settings: tidal volume, respiratory rate, PEEP, FiO2 - Modes of mechanical ventilation: assist-control, SIMV, pressure support - Monitoring and assessing ventilator parameters	2	4	a1, c1, c2, d1, d2
4	Module 4: Ventilation Strategies in Clinical Practice	- Indications for starting mechanical ventilation - Weaning protocols and criteria for extubation - Management of complications related to mechanical ventilation (e.g., barotrauma, ventilator-associated pneumonia) - Ethical considerations in end-of-life care related to ventilation	2	4	a3, c1, c2, d1, d2
5	Module 5: Advanced Airway and Ventilation Techniques	- Use of high-flow nasal cannula and CPAP/BiPAP - Non-invasive ventilation: indications and patient selection - Specialty airway management devices (e.g., video	2	4	a1, a2, c1, c2, d1, d2

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		laryngoscopes) Pediatric and bariatric considerations in airway management			
6	Midterm exam	Midterm exam	1	2	a1, a2, a3, b2, b3, c1, c2, c1, d2
7	Module 6: Practical Skills and Simulation	- Hands-on practice with airway devices and ventilators - Simulation scenarios for airway management in various clinical situations - Team-based approaches to managing difficult airways	4	6	a2, a3, b3, c1, c2, d1, d2
8	Module 7: Case Studies and Clinical Guidelines	- Review of clinical guidelines from organizations (e.g., AHA, ASA) - Discuss real-world case studies to analyze decision-making and outcomes - Develop critical thinking skills for airway and ventilator management in diverse patient populations	1	2	a3, b3, d1, d2
12	Final exam	Final exam	1	2	a1, a2, b1, b2, b3, c1, c2, d1, d2
Number of Weeks /and Units Per Semester			14	32	

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B – Practical Aspect:

Order	Task/ Experiments	Number of Weeks	Contact hours	Learning Outcomes
	Not applicable			
	Number of Weeks /and Units Per Semester			

V. Teaching strategies of the course

- 1-Lecture – Discussion
- 2- Demonstration
- 3- Student assignment
- 4- Role Plays
- 5- Brainstorming
- 6- Case study
- 7- Field work

V. Assessments strategies of the course

Assess role plays with the check-list on communication
Assess communication techniques by rating scale
Assess performance with rating scale

VI. Assignments

No	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Performing health assessment and requesting diagnostic measures for three assigned patients	c1, c2, d1, d2	2	2.5
2	Write plan of management for three assigned patients	c1, c2, d1, d2	2	2.5

VII. Schedule of Assessment Tasks for Students During the Semester

Theoretical Part

No	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Attendance	15th	5	5%	a1, a2, b1, b2

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	and activities	week			
2	Student assignments	5th and 12th week	5	5%	a1, a2, b3, b1, b2, b3
3	Mid-term exam	7th or 8th week	20	20%	a1, a2, b1, b2, c2,d2
4	Final-exam	16th-17th week	70	70 %	a1, a2, a3, b1, b2, c2, d2
Clinical Part					
No	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
	Not applicable				
Number of Weeks /and Units Per Semester					

VIII. Learning Resources:

Written in the following order: (Author; Year of publication; Title; Edition – Place of publication – Publisher).

1- Required Textbook(s) (maximum two). المراجع الرئيسية:

7. "Fundamentals of Respiratory Care" by Kenneth A. P. McFadden, et al. - This book covers essential concepts in respiratory care, including airway management and mechanical ventilation.
8. "Principles of Mechanical Ventilation" by Martin J. Tobin - A comprehensive resource that explores the science and practice of mechanical ventilation, including details on airway management techniques.
9. "Airway Management: A Practical Guide" by Robert L. Wilkins and Oren E. W. Yedidia - This book provides practical insights and methodologies for effective airway management in various clinical scenarios.
10. "Clinical Airway Management" by Steven M. Yentis, et al. - This text focuses on practical approaches to airway management in both elective and emergency settings.
11. "The ICU Book" by Paul L. Marino - While not exclusively focused on ventilation, this text offers a solid foundation in critical care, including sections on ventilatory support and airway management.
12. "Mechanical Ventilation: Clinical Applications and Pathophysiology" by

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	David C. Shelledy and David A. Durst - This book discusses various modes of mechanical ventilation and their applications, along with the underlying physiology.
2- Essential References. المراجع المساندة	
	3. "Manual of Respiratory Medicine" by John F. Murray and James F. Stoller - This manual covers clinical principles, including airway management and mechanical ventilation protocols. 4. Online Resources and Guidelines: ○ American Heart Association (AHA) Guidelines ○ Society of Critical Care Medicine (SCCM) Resources ○ European Respiratory Society (ERS) Guidelines These resources should provide a comprehensive foundation for understanding airway and ventilator management principles in clinical practice.
3- Electronic Materials and Web Sites etc. المصادر الإلكترونية ومواقع الإنترنت... الخ	
	1. http://www.google.com
IX. Course Policies: الضوابط والسياسات المتبعة في المساق	
1	Class Attendance: At least 75 % of the course hours should be attended by the student. Otherwise, he/she will not be allowed to attend the final exam
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4	Assignments & Projects: Assignments and projects will be assessed individually unless the teacher request for group work
5	Cheating: Cheating by any means will cause the student failure and he/she must re-study the course
6	Plagiarism: Plagiarism by any means will cause the student failure in the course. Other disciplinary procedures will be according to the college rules.
7	Other policies (سياسات أخرى): -

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