Sana'a University
Faculty of Engineering
Mechanical Engineering Department
Mechanical Engineering Program

33. Course Specification of Fluid Mechanics -I

I. Course Identification and General Information:						
1.	Course Title:	Fluid Mechanics-I.				
2.	Course Code & Number:	ME241.				
3.	Credit Hours:	C.H				TOTAL CR. HRS.
		Th.	Seminar/Tu	Pr	Tr.	
		2	2	-	-	3
4.	Study level/ semester at which this course is offered:	Third Year-First Semester.				
5.	Pre –requisite (if any):	Engineering Mechanics – Statics (BR007), Engineering Mechanics – Dynamics (BR008) and Differential Equations (BR104).				
6.	Co –requisite (if any):	None.				
7.	Program (s) in which the course is offered:	Mechanical Engineering Program.				
8.	Language of teaching the course:	English Language.				
9.	Location of teaching the course:	Mechanical Engineering Department.				
10.	Prepared By:	Associate Professor Dr. Abdul-Malik Momin.				
11.	Date of Approval:					

II. Course Description:

The course provides a study on main characteristics of fluid flow through fluid statics and dynamics. It will also cover the concept of the flow for laminar and turbulent flows in different channels through flow measurement. It will also cover the Dimensional Analysis. The case study will be taken into account for the real application of the Fluid Flow. Students should be able to define *fluid* properties, stresses in *fluids* at rest and in motion and types of *fluid* flows, energy and the hydraulic gradient lines for *flow* systems.

III. Alignments of the Course Intended learning outcomes (CILOs)		Referenced PILOs
a1	Define fluid properties and types of fluid flow.	A1

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a2	Describe the common instruments used in measuring pressures, velocity and flow rates.	A3
b1	Analyze problems in the applications of fluid flow systems.	B1
b2	Formulate the different problems of fluid mechanics systems from the manufacture point of view.	B2
c1	Apply ideas of development for best practice.	C1
c2	Implement different techniques for the analysis of the complex systems.	C2
d1	Estimate the needs for life- long learning.	D3
d2	Review the literature to reach to latest information in the applications of fluid mechanics.	D4

(A) Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies:

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
a1- Define fluid properties and types of fluid flow.	• Active Lectures. • Tutorials.	• Written Exam. • Homework.
a2- Describe the common instruments used in measuring pressures, velocity and flow rates		

(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
b1- Analyze problems in the Applications of fluid flow systems.	• Active Lectures. • Seminars. • Projects.	• Examination. • Homework. • Project Reports.
b2- Formulate the different problems of fluid mechanics systems from the manufacture point of view.		

© 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 ideas of development for best practice.	• Active Lectures. • Seminars. • Projects. • Problem Based Learning.	• Examination. • Homework. • Project Reports. • Presentations.
c2- Implement different techniques for the analysis of the complex systems.		

(D) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
d1- Estimate the needs for life-long learning.	• Team Work. • Directed Self – Study.	• Individual and Group Projects Reports. • Presentations
d2- Review the literature to reach to latest information in the applications of Fluid Mechanics.		

IV. Course Content:

A – Theoretical Aspect:

Order	Units/Topics List	Learning Outcomes	Sub -Topics List	Number of Weeks	Contact Hours
1.	Introduction to Fluid Mechanics.	a1, a2, c1.	• Definition of a Fluid. • Liquids and Gases. • Fluid Properties. • Dimensions and Units. • Topics in Dimensional Analysis.	1	2
2.	Fluid Statics.	a1, a2, b1, b2, c1, c2, d1, d2.	• Pressure and Pressure Measurements. • Forces on Plane Surfaces.	2	4

			• Forces on Curved Surfaces. • Archimedes Principle. • Buoyancy and Stability. • Floating Objects.		
3.	Fluid Kinematics.	a1, a2, b1, b2, c1, c2, d1, d2.	• Stream Lines. • Reynold Experiment. • Descriptors of Fluid Flows (Laminar, Transition and Turbulent). • Classifications of Flow (Steady, Unsteady, Uniform, Non-Uniform, Real, Ideal, Compressible, Incompressible, Viscous and Non-Viscous) • One, Two or Three Dimensional Flow. • Newton's Law of Viscosity.	3	6
4.	Fluid Flow in Pipes and Piping Systems.	a1, a2, b1, b2, c1, c2, d1, d2.	• Basic Components of a Typical Pipe Flow System. • Series Pipes. • Parallel Pipes. • Major Losses. • Minor Losses. • Darcy Welsbach Equation. • The Continuity Equation. • The Bernoulli Equation. • Pipe Flow Head Loss.	1	2

			• Euler's Equation.		
5.	Mid-Term Exam.	a1, a2, b1, b2, c1, c2.	• The First 4 Chapters.	1	2
6.	Flow Measurements.	a2, b2, d1, d2.	• Measuring Velocity. • Measuring Pressure. • Measuring Flow Rate (Discharge). • Measurements in Compressible Flow. • Accuracy of Measurements.	2	4
7.	Control Volume Approach and Continuity Equation.	a1, a2, b1, b2, c1, c2, d1, d2	• Rate of Flow. • Control Volume Approach. • Continuity Equation (Compressible Flow and Incompressible Flow). • Cavitation. • Differential Form of the Continuity Equation.	2	4
8.	Momentum Equation.	b2, c1, c2.	• Momentum Equation Derivation. • Navier Stokes Equation.	1	2
9.	Energy Equation.	a1, a2, b1, b2, c1, c2, d1, d2.	• Energy, Work and Power. • Energy Equation: General Form. • Contrasting the Bernoulli Equation and the Energy Equation. • Hydraulic and Energy Grade Lines.	2	4
10.	Final Exam.	a1, a2, b1, b2, c1, c2.	All the Chapters.	1	2
Number of Weeks /and Units Per Semester				**16**	**32**

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C – Tutorial Aspect:					
Order	**Units/Topics List**	**Learning Outcomes**	**Sub -Topics List**	**Number of Weeks**	**Contact Hours**
1.	Introduction to Fluid Mechanics.	a1, a2, c1.	• Definition of a Fluid. • Liquids and Gases. • Fluid Properties. • Dimensions and Units. • Topics in Dimensional Analysis.	1	2
2.	Fluid Statics.	a1, a2, b1, b2, c1, c2, d1, d2.	• Pressure and Pressure Measurements. • Forces on Plane Surfaces. • Forces on Curved Surfaces. • Archimedes Principle. • Buoyancy and Stability. • Floating Objects.	2	4
3.	Fluid Kinematics.	a1, a2, b1, b2, c1, c2, d1, d2.	• Stream Lines. • Reynold Experiment. • Descriptors of Fluid Flows (Laminar, Transition and Turbulent). • Classifications of Flow (Steady, Unsteady, Uniform, Non-Uniform, Real, Ideal, Compressible, Incompressible, Viscous and Non-Viscous) • One, Two- or Three-Dimensional Flow. • Newton's Law of Viscosity.	3	6

4.	Fluid Flow in Pipes and Piping Systems.	a1, a2, b1, b2, c1, c2, d1, d2.	• Basic Components of a Typical Pipe Flow System. • Series Pipes. • Parallel Pipes. • Major Losses. • Minor Losses. • Darcy Welsbach Equation. • The Continuity Equation. • The Bernoulli Equation. • Pipe Flow Head Loss. • Euler's Equation.	1	2
5.	Flow Measurements.	a2, b2, d1, d2.	• Measuring Velocity. • Measuring Pressure. • Measuring Flow Rate (Discharge). • Measurements in Compressible Flow. • Accuracy of Measurements.	2	4
6.	Control Volume Approach and Continuity Equation.	a1, a2, b1, b2, c1, c2, d1, d2	• Rate of Flow. • Control Volume Approach. • Continuity Equation (Compressible Flow and Incompressible Flow). • Cavitation. • Differential Form of the Continuity Equation.	2	4
7.	Momentum Equation.	b2, c1, c2.	• Momentum Equation Derivation. • Navier Stokes Equation.	1	2
8.	Energy Equation.	a1, a2, b1, b2, c1, c2, d1, d2.	• Energy, Work and Power. • Energy Equation: General Form.	2	4

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			• Contrasting the Bernoulli Equation and the Energy Equation. • Hydraulic and Energy Grade Lines.		
Number of Weeks /and Units Per Semester				**14**	**28**

V. Teaching Strategies of the Course:

- Active Lectures.
- Tutorials.
- Seminars.
- Projects.
- Problem Based Learning.
- Team Work.
- Directed Self –Study.

VI. Assignments:

No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1.	Assignment 1	a1, a2, b1, b2,c1, c2, d1, d2.	1st	1.25
2.	Assignment 2	a1, a2, b1, b2,c1, c2, d1, d2.	2nd	1.25
3.	Assignment 3	a1, a2, b1, b2,c1, c2, d1, d2.	3rd	1.25
4.	Assignment 4	a1, a2, b1, b2,c1, c2, d1, d2.	4th	1.25
5.	Assignment 5	a1, a2, b1, b2,c1, c2, d1, d2.	5th	1.25
6.	Assignment 6	a1, a2, b1, b2,c1, c2, d1, d2.	6th	1.25
7.	Assignment 7	a1, a2, b1, b2,c1, c2, d1, d2.	7th	1.25
8.	Assignment 8	a1, a2, b1, b2,c1, c2, d1, d2.	8th	1.25
9.	Assignment 9	a1, a2, b1, b2,c1, c2, d1, d2.	9th	1.25
10.	Assignment 10	a1, a2, b1, b2,c1, c2, d1, d2.	10th	1.25
Total				**15**

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

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1.	Assignment for Each Chapter.	Weekly	15	10 %	a1, a2, b1, b2,c1, c2, d1, d2.
2.	Mid-Term Exam.	8 th	25	16.7 %	a1, a2, b1, b2,c1, c2.
3.	Course File.	15 th	20	13.3 %	a1, a2, b1, b2,c1, c2, d1, d2.
4.	Final Exam.	16 th	90	60 %	a1, a2, b1, b2,c1, c2.
Total:			**150**	**100 %**	

VIII. Learning Resources:

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

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

1. Crowe, C. T., Elger, D.F.,William, B.C., Roberson, J.A., 2009, "Engineering Fluid Mechanics" , 9 th Edition, John Wiley and Sons.
2. Frank, M. and White, 1994, "Fluid Mechanics", 3 rd Edition,McGraw Hill Inc.

2- Essential References.

1. Bruce, R., Munson, Donald Young and Theodore H. Okishi, 2006, "Fundamentals of Fluid Mechanics", 5 th Edition, John Wiley and Sons Inc.
2. Streeter, V.I., Wylie, E.B. and Bedford, K.W., 1998, "Fluid Mechanics", 9 th Edition, McGraw Hill, N.Y.

3- Electronic Materials and Web Sites *etc*.

1. Journal of ASME, Fluid Mechanics.
2. The Fluid Power Journal: http://www.fluidpowerjournal.com.

I. Course Policies:

1	**Class Attendance:** - The student should be attending not less than 75% of total contact hours of the subject, otherwise he will not able to take exam and be considerd as an exam failure. If the student is absent due to illness, he/she should bring an approved statement from university Clinic.
2	**Tardy:**

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	- For lateness in attending the class, the student will be initially notified. If he repeates late in attending class he will be considered absent.
3	**Exam Attendance/Punctuality:** - The student should attend the exam on time. He is permitted to attend the exam half one hour from exam beginning, after that he/she will not be permitted to take exam and he/she is considered absent in the exam.
4	**Assignments & Projects:** - In general one assignment is given after each chapter of a course. The student should submit the assignment on time, mostly one week after giving the assignment
5	**Cheating**: - For cheating in exam, the student is considered as failure. In case the cheating is repeated three times during study the student will be disengaged from the Faculty
6	**Plagiarism**: Plagiarism is the attending of the student the exam of a course instead of other student. If the examination committee proved a plagiarism of a student, he will be disengaged from the Faculty. The final disengagement of the student from the Faculty should be confirmed from the Student Affair Council of the university.
7	**Other policies:** - The mobile phone is not allowable to be used during class lecture. It must be switched off, otherwise the student will be ordered to leave the lecture room. - The mobile phone is not allowed to be taken during the examination time. - Lecture notes and assignments may be given directly to students using soft or hard copy.

Reviewed By	**Vice Dean for Academic Affairs and Post Graduate Studies: Asst. Prof. Dr. Tarek A. Barakat** **President of Quality Assurance Unit: Assoc. Prof. Dr. Mohammed Algorafi** **Name of Reviewer from the Department: Asst.Prof. Dr. Eng. Hamoud A. Al-Nahari**
	Deputy Rector for Academic Affairs Asst. Prof. Dr. Ibrahim AlMutaa **Assoc. Prof. Dr. Ahmed Mujahed** **Asst. Prof. Dr. Munasar Alsubri**

Head of Department Asst. Prof. Dr. Adel Ahmed Al-Shakiri	Quality Assurance Unit Assoc. Prof. Dr. Mohammad Algorafi	Dean of the Faculty Prof. Dr. Mohammed AL-Bukhaiti	Academic Development Center & Quality Assurance Assoc. Prof. Dr. Huda Al-Emad	Rector of Sana'a University Prof. Dr. Al-Qassim Mohammed Abbas

33. Template for Course Plan of Fluid Mechanics -I

I. Information about Faculty Member Responsible for the Course:

Name of Faculty Member	Assoc. Prof. Dr. Abdul-Malik Momin	**Office Hours**					
Location& Telephone No.	Mechanical Engineering Department- 777943334	**SAT**	**SUN**	**MON**	**TUE**	**WED**	**THU**
E-mail	dramalikmomin@yahoo.com						

II. Course Identification and General Information:

1.	Course Title:	Fluid Mechanics-I.				
2.	Course Number & Code:	ME241.				
3.	Credit Hours:	C.H				Total Cr. Hrs.
		Th.	Seminar/Tu.	Pr.	Tr.	
		2	2	-	-	3
4.	Study level/year at which this course is offered:	Third Year-First Semester.				
5.	Pre –requisite (if any):	Engineering Mechanics – Statics (BR007), Engineering Mechanics – Dynamics (BR008) and Differential Equations (BR104).				
6.	Co –requisite (if any):	None.				
7.	Program (s) in which the course is offered	Mechanical Engineering Program.				
8.	Language of teaching the course:	English Language.				
9.	System of Study:	Semesters.				
10.	Mode of delivery:	Lectures and Tutorials.				
11.	Location of teaching the course:	Mechanical Engineering Department.				

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III. Course Description:

The course provides a study on main characteristics of fluid flow through fluid statics and dynamics. It will also cover the concept of the flow for laminar and turbulent flows in different channels through flow measurement. It will also cover the Dimensional Analysis. The case study will be taken into account for the real application of the Fluid Flow. Students should be able to define *fluid* properties, stresses in *fluids* at rest and in motion and types of *fluid* flows, energy and the hydraulic gradient lines for *flow* systems.

IV. Course Intended learning outcomes (CILOs) of the course

1.	Define fluid properties and types of fluid flow.
2.	Describe the common instruments used in measuring pressures, velocity and flow rates.
3.	Analyze problems in the applications of fluid flow systems.
4.	Formulate the different problems of fluid mechanics systems from the manufacture point of view.
5.	Apply ideas of development for best practice.
6.	Implement different techniques for the analysis of the complex systems.
7.	Estimate the needs for life- long learning.
8.	Review the literature to reach to latest information in the applications of fluid mechanics.

V. Course Content:

- Distribution of Semester Weekly Plan Of course Topics/Items and Activities.

A – Theoretical Aspect:

Order	Units/Topics List	Sub -Topics List	Number of Weeks	Contact Hours
1.	Introduction to Fluid Mechanics.	• Definition of a Fluid. • Liquids and Gases. • Fluid Properties. • Dimensions and Units. • Topics in Dimensional Analysis.	1st	2

2.	Fluid Statics.	• Pressure and Pressure Measurements. • Forces on Plane Surfaces. • Forces on Curved Surfaces. • Archimedes Principle. • Buoyancy and Stability. • Floating Objects.	2nd ,3rd	4
3.	Fluid Kinematics.	• Stream Lines. • Reynold Experiment. • Descriptors of Fluid Flows (Laminar, Transition and Turbulent). • Classifications of Flow (Steady, Unsteady, Uniform, Non-Uniform, Real, Ideal, Compressible, Incompressible, Viscous and Non-Viscous) • One, Two- or Three-Dimensional Flow. • Newton's Law of Viscosity.	4th ,5th ,6th	6
4.	Fluid Flow in Pipes and Piping Systems.	• Basic Components of a Typical Pipe Flow System. • Series Pipes. • Parallel Pipes. • Major Losses. • Minor Losses. • Darcy Weisbach Equation. • The Continuity Equation. • The Bernoulli Equation. • Pipe Flow Head Loss. • Euler's Equation.	7th	2
5.	Mid-Term Exam.	• The First 4 Chapters.	8th	2
6.	Flow Measurements.	• Measuring Velocity. • Measuring Pressure. • Measuring Flow Rate (Discharge).	9th ,10th	4

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		• Measurements in Compressible Flow. • Accuracy of Measurements.		
7.	Control Volume Approach and Continuity Equation.	• Rate of Flow. • Control Volume Approach. • Continuity Equation (Compressible Flow and Incompressible Flow). • Cavitation. • Differential Form of the Continuity Equation.	11th ,12th	4
8.	Momentum Equation.	• Momentum Equation Derivation. • Navier Stokes Equation.	13th	2
9.	Energy Equation.	• Energy, Work and Power. • Energy Equation: General Form. • Contrasting the Bernoulli Equation and the Energy Equation. • Hydraulic and Energy Grade Lines.	14th ,15th	4
10.	Final Exam.	All the Chapters.	16th	2
Number of Weeks /and Units Per Semester			**16**	**32**

B – Tutorial Aspect:

Order	Units/Topics List	Sub -Topics List	Number of Weeks	Contact Hours
1.	Introduction to Fluid Mechanics.	• Definition of a Fluid. • Liquids and Gases. • Fluid Properties. • Dimensions and Units. • Topics in Dimensional Analysis.	1st	2
2.	Fluid Statics.	• Pressure and Pressure Measurements. • Forces on Plane Surfaces. • Forces on Curved Surfaces. • Archimedes Principle. • Buoyancy and Stability.	2nd ,3rd	4

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		• Floating Objects.		
3.	Fluid Kinematics.	• Stream Lines. • Reynold Experiment. • Descriptors of Fluid Flows (Laminar, Transition and Turbulent). • Classifications of Flow (Steady, Unsteady, Uniform, Non-Uniform, Real, Ideal, Compressible, Incompressible, Viscous and Non-Viscous) • One, Two- or Three-Dimensional Flow. • Newton's Law of Viscosity.	4^{th} ,5^{th} ,6^{th}	6
4.	Fluid Flow in Pipes and Piping Systems.	• Basic Components of a Typical Pipe Flow System. • Series Pipes. • Parallel Pipes. • Major Losses. • Minor Losses. • Darcy Weisbach Equation. • The Continuity Equation. • The Bernoulli Equation. • Pipe Flow Head Loss. • Euler's Equation.	7^{th}	2
5.	Flow Measurements.	• Measuring Velocity. • Measuring Pressure. • Measuring Flow Rate (Discharge). • Measurements in Compressible Flow. • Accuracy of Measurements.	8^{th} ,9^{th}	4
6.	Control Volume Approach and Continuity Equation.	• Rate of Flow. • Control Volume Approach. • Continuity Equation (Compressible Flow and Incompressible Flow). • Cavitation. • Differential Form of the Continuity Equation.	10^{th} ,11^{th}	4

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7.	Momentum Equation.	• Momentum Equation Derivation. • Navier Stokes Equation.	12th	2
8.	Energy Equation.	• Energy, Work and Power. • Energy Equation: General Form. • Contrasting the Bernoulli Equation and the Energy Equation. • Hydraulic and Energy Grade Lines.	13th ,14th	4
Number of Weeks /and Units Per Semester			**14**	**28**

VI. Teaching strategies of the course:

- Active Lectures.
- Tutorials.
- Seminars.
- Projects.
- Problem Based Learning.
- Team Work.
- Directed Self –Study.

VII. Assignments:

No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1.	Assignment No.1	a1, a2, b1, b2,c1, c2, d1, d2.	1st	1.25
2.	Assignment No.2	a1, a2, b1, b2,c1, c2, d1, d2.	2nd	1.25
3.	Assignment No.3	a1, a2, b1, b2,c1, c2, d1, d2.	3rd	1.25
4.	Assignment No.4	a1, a2, b1, b2,c1, c2, d1, d2.	4th	1.25
5.	Assignment No.5	a1, a2, b1, b2,c1, c2, d1, d2.	5	1.25
6.	Assignment No.6	a1, a2, b1, b2,c1, c2, d1, d2.	6th	1.25
7.	Assignment No.7	a1, a2, b1, b2,c1, c2, d1, d2.	7th	1.25
8.	Assignment No.8	a1, a2, b1, b2,c1, c2, d1, d2.	8th	1.25
9.	Assignment No.9	a1, a2, b1, b2,c1, c2, d1, d2.	9th	1.25
10.	Assignment No.10	a1, a2, b1, b2,c1, c2, d1, d2.	10th	1.25
Total				**15**

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

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment
1.	Assignment for Each Chapter.	Weekly	15	10 %
2.	Mid-Term Exam.	8 th	25	16.7 %
3.	Course File.	15 th	20	13.3 %
4.	Final Exam.	16 th	90	60 %
Total:			**150**	**100%**

IX. Learning Resources:

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

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

1. Crowe, C. T., Elger, D.F.,William, B.C., Roberson, J.A., 2009, "Engineering Fluid Fluid Mechanics" , 9 th Edition, John Wiley and Sons.
2. Frank, M. and White, 1994, "Fluid Mechanics", 3 rd Edition,McGraw Hill Inc.

2- Essential References.

1. Bruce, R., Munson, Donald Young and Theodore H. Okishi, 2006, "Fundamentals of
2. Fluid Mechanics", 5 th Edition, John Wiley and Sons Inc.
3. Streeter, V.I., Wylie, E.B. and Bedford, K.W., 1998, "Fluid Mechanics", 9 th Edition,McGraw Hill, N.Y.

3- Electronic Materials and Web Sites *etc*.

1. Journal of ASME, Fluid Mechanics.
2. The Fluid Power Journal: http://www.fluidpowerjournal.com.

II. Course Policies:

1	**Class Attendance:** - The student should be attending not less than 75% of total contact hours of the subject, otherwise he will not able to take exam and be considerd as an exam failure. If the student is absent due to illness, he/she should bring an approved statement from university Clinic.
2	**Tardy:** - For lateness in attending the class, the student will be initially notified. If he repeates late in attending class he will be considered absent.

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3	**Exam Attendance/Punctuality:** - The student should attend the exam on time. He is permitted to attend the exam half one hour from exam beginning, after that he/she will not be permitted to take exam and he/she is considered absent in the exam.
4	**Assignments & Projects:** - In general one assignment is given after each chapter of a course. The student should submit the assignment on time, mostly one week after giving the assignment
5	**Cheating**: - For cheating in exam, the student is considered as failure. In case the cheating is repeated three times during study the student will be disengaged from the Faculty
6	**Plagiarism**: Plagiarism is the attending of the student the exam of a course instead of other student. If the examination committee proved a plagiarism of a student, he will be disengaged from the Faculty. The final disengagement of the student from the Faculty should be confirmed from the Student Affair Council of the university.
7	**Other policies:** - The mobile phone is not allowable to be used during class lecture. It must be switched off, otherwise the student will be ordered to leave the lecture room. - The mobile phone is not allowed to be taken during the examination time. - Lecture notes and assignments may be given directly to students using soft or hard copy.

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