



مواصفات مقرر: الأحواض الرسوبية والنظام البترولي لليمن Course Specification of: Sedimentary Basins and Petroleum System of Yemen

المعلومات العامة عن المقرر					
1.	اسم المقرر Course Title	Sedimentary Basins and Petroleum System of Yemen الأحواض الرسوبية والنظام البترولي لليمن			
2.	رمز المقرر ورقمه Course Code and Number	PNGE261			
3.	الساعات المعتمدة للمقرر Credit Hours	الساعات المعتمدة Credit Hours			الإجمالي Total
		محاضرات Lecture	عملي Practical	سمنار/تمارين Seminar/Tutorial	
		2	-	-	2
4.	المستوى والفصل الدراسي Study Level and Semester	2 nd level, 2 nd semester			
5.	المتطلبات السابقة المقرر (إن وجدت) Pre-requisites (if any)	-			
6.	المتطلبات المصاحبة (إن وجدت) Co-requisites (if any)	-			
7.	البرنامج الذي يدرس له المقرر Program (s) in which the course is offered	BSc in Petroleum and Natural Gas Engineering			
8.	لغة تدريس المقرر Language of teaching the course	English/Arabic			
9.	نظام الدراسة Study System	Semesters			
10.	مكان تدريس المقرر Location of teaching the course	Faculty of Petroleum and Natural Resources Buildings			
11.	اسم معد (و) مواصفات المقرر Prepared by	Prof. Abdulkarim Al-Subbary			
12.	تاريخ اعتماد مجلس الجامعة Date of Approval	2020			

وصف المقرر Course Description	
وصف المقرر بالإنجليزية	وصف المقرر بالعربية
The course objective is to teach student the relationship between basin forming and the occurrence of oil and gas deposits (petroleum system). The course gives insight into the mechanisms of basin-creating subsistence, heat regime and typology of sedimentary basins. Analysis and interpretation of sedimentary features for the recognition of the depositional systems. Geologic control on reservoir quality and petroleum systems.	يهدف المقرر إلى تعليم الطالب العلاقة بين تكوين الحوض وتواجد النفط والغاز (النظام البترولي). يقدم هذا المساق نظرة ثاقبة على آليات إنشاء الأحواض، ونظام الحرارة و تصنيف الأحواض الرسوبية. تحليل وتفسير السمات الرسوبية للتعرف على أنظمة الترسيب. التحكم الجيولوجي في نوعية الخزان والأنظمة البترولية.
مخرجات تعلم المقرر (CILOs) Course Intended Learning Outcomes	
After completing the course, the student will be able to:	بعد الانتهاء من دراسة المقرر سوف يكون الطالب قادرا على أن:

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Dean of the Development
& Quality Assurance Center
Assoc.Prof. Huda Al-Emad

Rector of Sana'a University
Prof. Dr. Al Qaseem Mohammed Abas



a1.	Explain the types of sedimentation basins, the mechanisms leading to their formation and factors influencing the evolution of settling sediment basin.	يوضح أنواع أحواض الترسيب، والآليات المؤدية إلى تكوينها والعوامل المؤثرة على تطور ترسيب أحواض الترسيب.	a1.
a2.	Show the main elements of the facies analysis and stratigraphy of the sequences, which form the basis for the analysis of sediment basin filling.	يعرض العناصر الرئيسية لتحليل السحنات وتتابع الطبقات، التي تظهر في الأساس تحليل لعملية ملء حوض الترسيب.	a2.
a3.	Define the elements of petroleum system in potential oil and gas Basins	يحدد عناصر النظام النفطي في أحواض النفط والغاز المحتملة	a3.
b1.	Interpret the stratigraphic architecture of basin filling and prepare a forecast of occurrence of reservoir and sealing rocks for hydrocarbon.	يفسر الهندسة الطبقات من تعبئة الحوض وإعداد التنبؤ بوقوع الخزان وصخور الختم للهيدروكربون.	b1.
c1.	Perform a chronostratigraphic correlation of the sedimentary succession based on integrated sedimentological, seismic and log data.	ينفذ إجراءات المضاهاة للتعاقب الرسوبي استناداً إلى بيانات رسوبية وزلزالية وسجلية متكاملة.	c1.
d1.	Prepare a review report of different type of Basin and their potentiality to Hydrocarbon	يقوم بإعداد تقرير مراجعة لأنواع مختلفة من الأحواض وإمكانات احتوائها للنفط	d1.

مواعمة مخرجات تعلم المقرر مع مخرجات التعلم للبرنامج: Alignment of CILOs (Course Intended Learning Outcomes) to PILOs (Program Intended Learning Outcomes)			
مخرجات التعلم المقصودة من المقرر (Course Intended Learning Outcomes)		مخرجات التعلم المقصودة من البرنامج (Program Intended Learning Outcomes) (تكتب جميع مخرجات البرنامج كما هي رمزا ونصا)	
a1.	explain the types of sedimentation basins, the mechanisms leading to their formation and factors influencing the evolution of settling sediment basin.	A1	Demonstrate the concepts of basic science and mathematics related to field of petroleum engineering.
a2.	show the main elements of the facies analysis and stratigraphy of the sequences, which form the basis for the analysis of sediment basin filling.	A2	Define the basic concepts of petroleum exploration, drilling and production as well as demonstrate global and local safety and environment impact on oil and gas operations.
a3.	define the elements of petroleum system in potential oil and gas Basins	A3	Utilize formation evaluations, well logging, well test analysis, modeling and simulation programs to define properties of reservoir rock and fluid in oil and gas bearing formation
b1.	Interpret the stratigraphic architecture of basin filling and prepare a forecast of occurrence of reservoir and sealing rocks for hydrocarbon.	B2	Evaluate well logs and well test operations to identify maps of reservoir and select the best method of petroleum recovery.
c1.	Perform a chronostratigraphic correlation of the sedimentary succession based on integrated sedimentological, seismic and log data.	C2	Analysis of well logs and well testing and practice the techniques for constructing engineering graphics.
d1.	Prepare a review report of different type of Basin and	D3	Prepare technical petroleum reports



their potentiality to Hydrocarbon

مواءمة مخرجات التعلم باستراتيجيات التعليم والتعلم والتقويم

Alignment of CILOs to Teaching and Assessment Strategies

أولاً: مواءمة مخرجات تعلم المقرر (المعارف والفهم) باستراتيجية التعليم والتعلم والتقويم:

First: Alignment of Knowledge and Understanding CILOs

مخرجات المقرر / المعرفة والفهم Knowledge and Understanding CILOs	استراتيجية التعليم والتعلم Teaching Strategies	استراتيجية التقويم Assessment Strategies
a1- Explain the types of sedimentation basins, the mechanisms leading to their formation and factors influencing the evolution of settling sediment basin.	Class discussion Lectures Directed self-study Tutorial	Quiz Exam Oral question and presentations
a2 - Show the main elements of the facies analysis and stratigraphy of the sequences, which form the basis for the analysis of sediment basin filling.		
a3 - Define the elements of petroleum system in potential oil and gas basins		

ثانياً: مواءمة مخرجات تعلم المقرر (المهارات الذهنية) باستراتيجية التدريس والتقويم:

Second: Alignment of Intellectual Skills CILOs

مخرجات المقرر / المهارات الذهنية Intellectual Skills CILOs	استراتيجية التعليم والتعلم Teaching Strategies	استراتيجية التقويم Assessment Strategies
b1 - Interpret the stratigraphic architecture of basin filling and prepare a forecast of occurrence of reservoir and sealing rocks for hydrocarbon.	Class discussion Lectures Directed self-study Tutorial Brain storm	Quiz Exam Oral question and presentations.

ثالثاً: مواءمة مخرجات تعلم المقرر (المهارات المهنية والعملية) باستراتيجية التدريس والتقويم:

Third: Alignment of Professional and Practical Skills CILOs

مخرجات المقرر / المهارات المهنية والعملية Professional and Practical Skills CILOs	استراتيجية التعليم والتعلم Teaching Strategies	استراتيجية التقويم Assessment Strategies
c1- Perform a chronostratigraphic correlation of the sedimentary succession based on integrated sedimentological, seismic and log data.	Lectures Directed self-study Tutorial Computer based teaching	Quiz Exam Oral question and presentations

رابعاً: مواءمة مخرجات تعلم المقرر (المهارات العامة) باستراتيجية التدريس والتقويم:

Fourth: Alignment of Transferable (General) Skills CILOs

مخرجات المقرر Transferable (General) Skills CILOs	استراتيجية التعليم والتعلم Teaching Strategies	استراتيجية التقويم Assessment Strategies
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d1-	Prepare a review report of different type of Basin and their potentiality to Hydrocarbon	Group work Group discussions Presentation Project	Quiz Exam Oral question and presentations
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Course Content		محتوى المقرر			
Theoretical Aspect		موضوعات الجانب النظري			
الرقم Order	الموضوعات الرئيسية/ الوحدات Topic List / Units	الموضوعات الفرعية Sub Topics List	عدد الأسابيع Number of Weeks	الساعات الفعالية Contact Hours	رموز مخرجات التعلم المقرر (CILOs)
1	Definition of a basin in oil geology; economic basis	Factors controlling the development and filling of sedimentary basins	1	2	a1
2	Structure and rheology of the interior of the Earth	Types of boundaries of lithosphere plates.	1	2	a1 c1
3	Main mechanisms of base-making subsidence	Isostasy, stratigraphic record of isostatic compensation. Genesis of continental / ocean relief	2	4	b1 c1
4	Classification of basins based on the geotectonic environment	-Types of extensional basins. -Main stages of subsidence in the development of rift basin and its facies evolution. -Basins connected with sliding faults, main phases -Basins associated with Subduction	2	4	a1a2 a3c1d1
5	Type of basins and occurrence of source rocks	The main types of traps in pericratonic, rift, and passive	2	4	a1 a2 a3 b1
6	Objectives and basics of facies analysis methodology	Diachronic, Walther's law, principles of Lithostratigraphy and chronostratigraphic correlation	1	2	a1 a2 a3 b1 c1d1
7	Criteria for distinguishing facies	Facies associations, deposit systems, system sequences. Standard and local facies Intro to provenance analysis	1	2	a1 a2 a3 b1 c1
8	Fundamentals of sequence stratigraphy	Criteria and methods for identification of key correlative surfaces based on cores, drilling geophysics profiling and seismostratigraphy	2	4	a1 a2 a3 b1 c1
9	Use of facies analysis and sequence stratigraphy	to reconstruct the evolution of the sediment basin filling and for the exploration of Oil and Gas. Regional examples	1	2	all

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10	Petroleum System of Yemen	Basin example as a case study	1	2	a1 a2 a3 b1 c1
عدد الأسابيع والساعات الفعلية Number of Weeks /and Contact Hours Per Semester			14	28	

الموضوعات العملية (إن وجدت) Practical Aspect (if any)				
الرقم Order	التجارب العملية/ التمارين / تدريبات Practical / Exercises/Tutorials topics	عدد الأسابيع Number of Weeks	الساعات الفعلية Contact Hours	رموز مخرجات التعلم Course ILOs
1	NA	-	-	-
اجمالي الأسابيع والساعات الفعلية Number of Weeks /and Contact Hours Per Semester		NA		

استراتيجيات التعليم والتعلم Teaching Strategies	
<ul style="list-style-type: none"> ▪ Lectures ▪ Discussion ▪ Demonstration ▪ Brain storm ▪ Problem solving ▪ Case study, ▪ Computer based teaching ▪ Seminars 	

الأنشطة والتكليفات Tasks and Assignments					
م No	التكليف/ الواجب Assignments/ Tasks	نوع التكليف (فردى/ تعاونى)	الدرجة المستحقة Mark	أسبوع التتفيذ Week Due	مخرجات التعلم CILOs (symbols)
1	NA				
Total Score			إجمالي الدرجة	NA	

تقييم التعلم Learning Assessment					
الرقم No.	أنشطة التقييم Assessment Tasks	أسبوع التقييم Week due	الدرجة Mark	نسبة الدرجة إلى الدرجة Proportion النهائية of Final Assessment	مخرجات التعلم CILOs (symbols)
1	Participation	Weekly	5	5%	c1 d1



2	Small Project	Quarter	5	5%	all
3	Quizzes	End of a topic	5	5%	a1.a2.a3.b1
4	Mid-Term written exam	Week 7	15	15%	all
5	Final Exam (theoretical)	Week 16	70	70%	all
Total الإجمالي			100	%100	

Learning Resources مصادر التعلم

توثيق المراجع حسب نظام APA (اسم المؤلف، سنة النشر، اسم الكتاب، دار النشر، بلد النشر).

Required Textbook(s) المراجع الرئيسية (لا تزيد عن مرجعين)

- 1- Einsele, G., 2000. Sedimentary Basins. Springer-Verlag, 792 pp.
- 2- Catuneanu, O., 2006, Principles of Sequence Stratigraphy. Elsevier, 386 pp.

Essential References المراجع المساندة

1. Angevine, Ch., L., Heller, P., Paola, Ch., 1990. Quantitative Sedimentary Basin Modeling. AAPG, 133 pp.
2. Allen, P.A., Allen., J.R., 2005. Basin Analysis. Principles and Applications. Blackwell, 549 pp.
3. Andrew Miall, 1990. Principles of Sedimentary Basin Analysis (2nd Ed.), Springer-Verlag.669
4. Cathy J. Busby & Raymond V. Ingersoll. 1995. Tectonics of Sedimentary Basins, edited by Blackwell Science, 579 p.

Electronic Materials and Web Sites etc. المصادر الإلكترونية ومواقع الإنترنت

www.pepa.com
www.aapg.com
www.spe.com
www.springer.com

V. Course Policies:

1	Class Attendance: <ul style="list-style-type: none"> - Students are expected to attend classes regularly and promptly. - The attendance should not be less than 80%. - If the student has been absent, he is responsible for finding out any missed material by consulting other students or going to the professor's office hours.
2	Tardy: <ul style="list-style-type: none"> - Attendance and arriving on time for the class are necessary. If the student is late, he will be prevented from class.
3	Exam Attendance/Punctuality: <ul style="list-style-type: none"> - According to the rules the student gets absent in the exam of the course.
4	Assignments & Projects: <ul style="list-style-type: none"> - Papers survey or projects should be submitted by the time detriment by the professor.
5	Cheating: <ul style="list-style-type: none"> - According to the rules, cheating is a serious offense and will always result in an imposition of a penalty. The penalties that can be started from the range of canceling the result of the course to canceling the student's admission.



6	Plagiarism: <ul style="list-style-type: none">- Plagiarism is a serious offense and will always result in an imposition of a penalty. The penalties that can be started by making a zero mark for the work.
7	Other policies: <ul style="list-style-type: none">- The student should by a commitment by the rules inside class and university. Therefore, he is expected to show respect for his classmate, instructors & others.



قسم/ برنامج: هندسة النفط والغاز الطبيعي
العام الجامعي: 2019-2020م

خطة مقرر: الأحواض الرسوبية والنظام البترولي لليمن

Course Plan (Syllabus): Sedimentary Basins and Petroleum System of Yemen

معلومات عن أستاذ المقرر						
Information about Faculty Member Responsible for the Course						
الاسم Name	Prof. AbdulKarim Al-Subbary		الساعات المكتبية (أسبوعياً) Office Hours			
المكان ورقم الهاتف Location & Telephone No.	Sana'a University +967 733 63 68 31		السبت SAT	الأحد SUN	الاثنين MON	الثلاثاء TUE
البريد الإلكتروني E-mail	aalsubbari@yahoo.com					
			الأربعاء WED	الخميس THU		

معلومات عامة عن المقرر					
1.	اسم المقرر Course Title	Sedimentary Basins and Petroleum System of Yemen الأحواض الرسوبية والنظام البترولي لليمن			
2.	رمز المقرر ورقمه Course Code and Number	PNGE261			
3.	الساعات المعتمدة للمقرر Credit Hours	الساعات المعتمدة			الإجمالي Total
		محاضرات Lecture	عملي Practical	سمنار/تمارين Seminar/Tutorial	
		2	-	-	2
4.	المستوى والفصل الدراسي Study Level and Semester	2 nd level – Second Semester			
5.	المتطلبات السابقة للمقرر Pre-requisites	-			
6.	المتطلبات المصاحبة (إن وجدت) Co-requisite	-			
7.	البرنامج الذي يدرس له المقرر Program (s) in which the course is offered	BSc in Petroleum and Natural Gas Engineering			
8.	لغة تدريس المقرر Language of teaching the course	English/ Arabic			
9.	مكان تدريس المقرر Location of teaching the course	Faculty of Petroleum and Natural Resources Buildings			

وصف المقرر	
<p>The course objective is to teach student the relationship between basin forming and the occurrence of oil and gas deposits (petroleum system). The course gives insight into the mechanisms of basin-creating subsistence, heat regime and typology of sedimentary basins. Analysis and interpretation of sedimentary features</p>	<p>يهدف المقرر إلى تعليم الطالب العلاقة بين تكوين الحوض وتواجد النفط والغاز (النظام البترولي). يقدم هذا المساق نظرة ثاقبة على آليات إنشاء الأحواض، ونظام الحرارة و تصنيف الأحواض الرسوبية. تحليل وتفسير السمات الرسوبية للتعرف على أنظمة الترسيب. التحكم الجيولوجي في نوعية الخزان والأنظمة البترولية.</p>

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for the recognition of the depositional systems.
Geologic control on reservoir quality and
petroleum systems.

مخرجات تعلم المقرر Course Intended Learning Outcomes (CILOs)

After completing the course, the student will be able to:	بعد الانتهاء من دراسة المقرر سوف يكون الطالب قادرا على أن:
a1 explain the types of sedimentation basins, the mechanisms leading to their formation and factors influencing the evolution of settling sediment basin.	a1 - يوضح أنواع أحواض الترسيب، والآليات المؤدية إلى تكوينها والعوامل المؤثرة على تطور ترسيب أحواض الترسيب.
a2 show the main elements of the facies analysis and stratigraphy of the sequences, which form the basis for the analysis of sediment basin filling.	a2- يعرض العناصر الرئيسية لتحليل السحنات وتتابع الطبقات، التي تظهر في الأساس تحليل لعملية ملء حوض الترسيب.
a3 define the elements of petroleum system in potential oil and gas Basins	a3- يحدد عناصر النظام النفطي في أحواض النفط والغاز المحتملة
b1 Interpret the stratigraphic architecture of basin filling and prepare a forecast of occurrence of reservoir and sealing rocks for hydrocarbon.	b1- يفسر الهندسة الطبقات من تعبئة الحوض وإعداد التنبؤ بوقوع الخزان وصخور الختم للهيدروكربون.
c1 Perform a chronostratigraphic correlation of the sedimentary succession based on integrated sedimentological, seismic and log data.	c1 - ينفذ إجراءات المضاهاة للتعاقب الرسوبي استناداً إلى بيانات رسوبية وزلزالية وسجلية متكاملة.
d1 Prepare a review report of different type of Basin and their potentiality to Hydrocarbon	d1- يقوم بإعداد تقرير مراجعة لأنواع مختلفة من الأحواض وإمكانات احتوائها للنفط

محتوى المقرر Course Content

خطة تنفيذ الموضوعات النظرية Theoretical Aspect

الرقم Order	الوحدات (الموضوعات الرئيسية) Units	الموضوعات التفصيلية Sub Topics	الأسبوع Week Due	الساعات الفعلية Con. H
1	Definition of a basin in oil geology; economic basis	Factors controlling the development and filling of sedimentary basins	Week 1	2
2	Structure and rheology of the interior of the Earth	Types of boundaries of lithosphere plates.	Week 2	2
3	Main mechanisms of base-making subsidence	Isostasy, stratigraphic record of isostatic compensation. Genesis of continental / ocean relief	Week 3-4	4
4	Classification of basins based on the geotectonic environment	-Types of extensional basins. -Main stages of subsidence in the development of rift basin and its facies evolution. -Basins connected with sliding faults, main phases -Basins associated with Subduction	Week 5-6	4

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5	Mid Term exam		Week 7	2
6	Type of basins and occurrence of source rocks	The main types of traps in pericratonic, rift, and passive	Week8-9	4
7	Objectives and basics of facies analysis methodology	Diachronic, Walther's law, principles of Lithostratigraphy and chronostratigraphic correlation	Week 10	2
8	Criteria for distinguishing facies	Facies associations, deposit systems, system sequences. Standard and local facies Intro to provenance analysis	Week 11	2
9	Fundamentals of sequence stratigraphy	Criteria and methods for identification of key correlative surfaces based on cores, drilling geophysics profiling and seismic-stratigraphy	Week 12-13	4
10	Use of facies analysis and sequence stratigraphy	to reconstruct the evolution of the sediment basin filling and for the exploration of Oil and Gas. Regional examples	Week 14	2
11	Petroleum System of Yemen	Basin example as a case study	Week 15	2
12	Final Exam		Week 16	2
عدد الأسابيع والساعات الفعلية Number of Weeks /and Contact Hours Per Semester			16	32
Practical / Training/ Tutorials/ Exercises Aspects خطة تنفيذ موضوعات الجانب العملي				
الرقم Order	موضوعات العملي/ المهام / التمارين Practical/Tutorials/ Exercises Aspects		الأسبوع Week Due	الساعات الفعلية Cont. H
1	▪ NA			
إجمالي الأسابيع والساعات الفعلية Number of Weeks /and Contact Hours Per Semester			NA	

Teaching Strategies استراتيجيات التعليم والتعلم

- Lectures
- Discussion
- Demonstration
- Brain storm
- Problem solving
- Case study,
- Computer based teaching
- Seminars

Tasks and Assignments الأنشطة والتكليفات

م No	التكليف/ الواجب Assignments	نوع التكليف (فردى/ تعاوني)	الدرجة المستحقة Mark	أسبوع التنفيذ Week Due
1	NA	-	-	-

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Total Score إجمالي الدرجة	NA
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Learning Assessment تقويم التعلم				
م No	أساليب التقويم Assessment Method	موعد (أسبوع) التقويم Week Due	الدرجة Mark	الوزن النسبي % Proportion of Final Assessment
1	Participation	Weekly	5	5%
2	Small Project	Quarter	5	5%
3	Quizzes	End of a topic	5	5%
4	Mid-Term written exam	Week 7	15	15%
5	Final Exam (theoretical)	Week 16	70	70%
المجموع Total			100	100 %

Learning Resources مصادر التعلم
توثق المراجع حسب نظام APA (اسم المؤلف، سنة النشر، اسم الكتاب، دار النشر، بلد النشر).
Required Textbook(s) المراجع الرئيسية (لا تزيد عن مرجعين)
1. Einsele, G., 2000. Sedimentary Basins. Springer-Verlag, 792 pp.
2. Catuneanu, O., 2006, Principles of Sequence Stratigraphy. Elsevier, 386 pp.
Essential References المراجع المساندة
1. Angevine, Ch., L., Heller, P., Paola, Ch., 1990. Quantitative Sedimentary Basin Modeling. AAPG, 133 pp.
2. Allen, P.A., Allen., J.R., 2005. Basin Analysis. Principles and Applications. Blackwell, 549 pp.
3. Andrew Miall, 1990. Principles of Sedimentary Basin Analysis (2nd Ed.), Springer-Verlag. 669
4. Cathy J. Busby & Raymond V. Ingersoll. 1995. Tectonics of Sedimentary Basins, edited by Blackwell Science, 579 p.
5. Angevine C.L. et al., 1990. Quantitative Sedimentary Basin Modeling, AAPG Short Course Notes 32,
Electronic Materials and Web Sites etc. المصادر الإلكترونية ومواقع الإنترنت
www.pepa.com
www.aapg.com
www.spe.com
www.springer.com

VI. Course Policies:	
1	Class Attendance: <ul style="list-style-type: none"> - Students are expected to attend classes regularly and promptly. - The attendance should not be less than 80%. - If the student has been absent, he is responsible for finding out any missed material by consulting other students or going to the professor's office hours.
2	Tardy: <ul style="list-style-type: none"> - Attendance and arriving on time for the class are necessary. If the student is late, he will be prevented from class.



3	Exam Attendance/Punctuality: - According to the rules the student gets absent in the exam of the course.
4	Assignments & Projects: - Papers survey or projects should be submitted by the time detriment by the professor.
5	Cheating: - According to the rules, cheating is a serious offense and will always result in an imposition of a penalty. The penalties that can be started from the range of canceling the result of the course to canceling the student's admission.
6	Plagiarism: - Plagiarism is a serious offense and will always result in an imposition of a penalty. The penalties that can be started by making a zero mark for the work.
7	Other policies: - The student should by a commitment by the rules inside class and university. Therefore, he is expected to show respect for his classmate, instructors & others.