



مواصفات مقرر: نمذجة ومحاكاة المكن

Course Specification of: Reservoir Modeling and Simulation

المعلومات العامة عن المقرر						
1.	اسم المقرر Course Title	نمذجة ومحاكاة المكن Reservoir Modeling and Simulation				
2.	رمز المقرر ورقمه Course Code and Number	PNGE 445				
3.	الساعات المعتمدة للمقرر Credit Hours	الساعات المعتمدة			الإجمالي Total	
		محاضرات Lecture	عملي Practical	سمنار/تمارين Seminar/Tutorial		تدريب Training
		2	1	1	-	4
4.	المستوى والفصل الدراسي Study Level and Semester	4 th level, 1 st semester				
5.	المتطلبات السابقة للمقرر (إن وجدت) Pre-requisites (if any)	PNGE 341, PNGE 363				
6.	المتطلبات المصاحبة (إن وجدت) Co-requisites (if any)	-				
7.	البرنامج الذي يدرس له المقرر Program (s) in which the course is offered	Bachelor of 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				
11.	اسم معد (و) مواصفات المقرر Prepared by	Assoc.Prof. Adel Al-Matary				
12.	تاريخ اعتماد مجلس الجامعة Date of Approval	2020				

وصف المقرر Course Description

The objective of this course is to teach the basic science, technology and related assumptions involved in carrying out an integrated reservoir characterization study. It will prepare students to understand and interpret techniques that underlie commercial software (but will not teach software usage itself). The course has three main components. 1) Data sources, quality and analysis, including spatial analysis. 2) Generating 3D models of reservoir properties - classical gridding and mapping, kriging as a data driven (variogram) form of classical mapping (estimation) and a means of data integration. Simulation techniques are introduced as a means of assessing uncertainty resulting from heterogeneity. 3) Scaling of grids and property models for the purpose of reservoir simulation is the final topic. The integration and application of all the major ideas is illustrated by a case study. The practical part of the classes (lab and design) will be devoted to work with a professional industrial reservoir simulator and the implementation of a group project.

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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:	
a1.	Explain the main terminology, concepts, tools, and techniques used for generating 3D static and dynamic reservoir models	a1.	يشرح المصطلحات الرئيسية والمفاهيم والأدوات والتقنيات المستخدمة لتوليد نماذج المكامن الثابتة والديناميكية ثلاثية الأبعاد
a2.	Show some of key issues in reservoir characterization & modeling, particularly uncertainty & heterogeneity	a2.	يعرض بعض القضايا الرئيسية في توصيف ونمذجة الخزان، وخاصة عدم اليقين وعدم التجانس
a3.	Describe types of reservoir simulators and their application and the importance of computer modeling in the field of reservoir management	a3.	يوصف أنواع محاكات المكامن وتطبيقاتها وأهمية النمذجة الحاسوبية في مجال إدارة المكامن
b1.	Select appropriate computer software and numerical simulator (Petrel) for modeling using the knowledge in the field of reservoir engineering, geology and exploitation of oil / gas fields	b1.	يختار برامج الكمبيوتر المناسبة والمحاكاة العددية (Petrel) للنمذجة باستخدام المعرفة في مجال هندسة المكامن والجيولوجيا واستغلال حقول النفط / الغاز
b2.	Develop a critical-thinking and problem-solving approach to modeling	b2.	يطور نهج التفكير النقدي وحل المشكلات للنمذجة
c1.	Practice skills in data analysis and evaluation of reservoirs	c1.	يمارس المهارات في تحليل البيانات وتقييم الخزانات
c2.	Practice using these tools (computer software and numerical simulator) – computer exercises for real problems through case studies	c2.	يتدرب على استخدام هذه الأدوات (برامج الكمبيوتر والمحاكاة العددية) - تمارين الكمبيوتر لحل المشاكل الحقيقية من خلال دراسات الحالة
d1.	Accept responsibility for the designated part of the task (project) and comply with the rules of teamwork	d1.	يقبل المسؤولية عن الجزء المعين من المهمة (المشروع) والامتثال لقواعد العمل الجماعي
d2.	perform and present a review of a paper/topic related to the course material	d2.	يقوم بإجراء وتقديم مراجعة لورقة / موضوع متعلق بمواد المقرر

مواءمة 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 main terminology, concepts, tools, and techniques used for generating 3D static and dynamic reservoir models	A1	Demonstrate the concepts of basic science and mathematics related to field of petroleum engineering.
a2.	Show some of key issues in reservoir characterization & modeling, particularly uncertainty & heterogeneity	A3	Utilize formation evaluations, well logging, well test analysis, modeling and simulation

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			programs to define properties of reservoir rock and fluid in oil and gas bearing formation
a3.	Describe types of reservoir simulators and their application and the importance of computer modeling in the field of reservoir management	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.	Select appropriate computer software and numerical simulator (Petrel) for modeling using the knowledge in the field of reservoir engineering, geology and exploitation of oil / gas fields	B1	Use the principles of engineering in developing solutions to practical petroleum engineering and select appropriate computer software for modeling
b2.	Develop a critical-thinking and problem-solving approach to modeling	B1	Use the principles of engineering in developing solutions to practical petroleum engineering and select appropriate computer software for modeling
c1.	Practice skills in data analysis and evaluation of reservoirs	C2	Analysis of well logs and well testing and practice the techniques for constructing engineering graphics.
c2.	Practice using these tools (computer software and numerical simulator) – computer exercises for real problems through case studies	C3	Deal with the high level of uncertainty in definition and solution of petroleum reservoir problems.
d1.	Accept responsibility for the designated part of the task (project) and comply with the rules of teamwork	D1	Collaborate effectively within multidisciplinary teams under stressful environment and within constraints.
d2.	perform and present a review of a paper/topic related to the course material	D3	Prepare technical petroleum reports.

مواعمة مخرجات التعلم باستراتيجيات التعليم والتعلم والتقييم		
Alignment of CILOs to Teaching and Assessment Strategies		
أولاً: مواعمة مخرجات تعلم المقرر (المعارف والفهم) باستراتيجية التعليم والتعلم والتقييم:		
First: Alignment of Knowledge and Understanding CILOs		
مخرجات المقرر / المعرفة والفهم	استراتيجية التعليم والتعلم	استراتيجية التقييم
Knowledge and Understanding CILOs	Teaching Strategies	Assessment Strategies
a1 - Explain the main terminology, concepts, tools, and techniques used for generating 3D static and dynamic reservoir models	Interactive Lectures Discussion	Examinations, Oral presentation Achievement tests
a2 - Show some of key issues in reservoir characterization & modeling, particularly uncertainty & heterogeneity		

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a3 -	Describe types of reservoir simulators and their application and the importance of computer modeling in the field of reservoir management		
ثانياً: موازنة مخرجات تعلم المقرر (المهارات الذهنية) باستراتيجية التدريس والتقييم:			
Second: Alignment of Intellectual Skills CILOs			
	مخرجات المقرر / المهارات الذهنية Intellectual Skills CILOs	استراتيجية التعليم والتعلم Teaching Strategies	استراتيجية التقييم Assessment Strategies
b1 -	Select appropriate computer software and numerical simulator (Petrel) for modeling using the knowledge in the field of reservoir engineering, geology and exploitation of oil / gas fields	Interactive Lectures Discussion Brain storm Problem solving	Essay test, Laboratory Performance
b2 -	Develop a critical-thinking and problem-solving approach to modeling		
ثالثاً: موازنة مخرجات تعلم المقرر (المهارات المهنية والعملية) باستراتيجية التدريس والتقييم:			
Third: Alignment of Professional and Practical Skills CILOs			
	مخرجات المقرر / المهارات المهنية والعملية Professional and Practical Skills CILOs	استراتيجية التعليم والتعلم Teaching Strategies	استراتيجية التقييم Assessment Strategies
c1-	Practice skills in data analysis and evaluation of reservoirs	Tutorials & practical classes, Computer based teaching	Achievement tests Chart Drawing practical exams
c2-	Practice using these tools (computer software and numerical simulator) – computer exercises for real problems through case studies		
رابعاً: موازنة مخرجات تعلم المقرر (المهارات العامة) باستراتيجية التدريس والتقييم:			
Fourth: Alignment of Transferable (General) Skills CILOs			
	مخرجات المقرر Transferable (General) Skills CILOs	استراتيجية التعليم والتعلم Teaching Strategies	استراتيجية التقييم Assessment Strategies
d1-	Accept responsibility for the designated part of the task (project) and comply with the rules of teamwork	A group project Seminars	Team working Poster presentation a brief report
d2-	perform and present a review of a paper/topic related to the course material		

Course Content محتوى المقرر

Theoretical Aspect الموضوعات الجانب النظري

رموز مخرجات	الساعات	عدد	الموضوعات الفرعية	الموضوعات الرئيسية /	الرقم
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Order	الوحدات Topic List / Units	Sub Topics List	الأسابيع Number of Weeks	الفعلية Contact Hours	التعلم للمقرر (CILOs)
1	Overview of Reservoir Characterization		1	2	a1, a2, a3
2	Data Sources, Quality and Analysis	<ul style="list-style-type: none"> o Types, scales, uncertainty o Short review of Probability o Univariate and bivariate Statistics o Measuring & Modeling Spatial Continuity (Variogram) 	1	2	a1, a2, a3, b2.c2
3	Framework Modeling	Mapping, Contouring, Faults	1	2	b1.b2.c1.c2
4	Grid Types	Design and their relation to reservoir features and model purpose	1	2	b1. 2.c1.c2
5	Geostatistical Estimation	Geostatistical Concepts <ul style="list-style-type: none"> o Kriging o (Estimation of Dependent Variables – if time) 	1	2	a1. b1. b2.c1.c2
6	Modeling concepts	type of models, check list for designing a model, concept of grid blocks, initial and boundary conditions, various flow models, concept of proper grid orientation	2	4	a1, a3,b1, b2.c1
7	Geostatistical Simulation	Simulation versus Estimation <ul style="list-style-type: none"> o Sequential Indicator Simulation o Object Modelling 	1	4	a1, a3 b1, b2
8	Up-gridding & Up-scaling	Simple averages, Pressure solver	1	2	b1, b2.c1.c2
9	Integrated Reservoir Characterization Case Study		1	2	all
10	Demo of Industry Software for Reservoir Characterization & Modelling	Petrel from Schlumberger (if time)	1	2	all
11	Introduction & Overview of reservoir simulation	Definition, Objectives and applications	1	2	a1, a3, b1
12	History Matching	Validity of the Reservoir Model, Strategy & Plans, Adjustment of parameters, Pressures, Pressure gradients, GOR-WOR behavior Automatic History Matching.	1	2	a3. c2. d2
13	Forecasting Future Performance	Planning prediction cases, Preparation of input data, Making a smooth transition from history to predictions, Review & Analysis of predicted performance, Evaluating & Monitoring predicted performance	1	2	a3 .c2. d2

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عدد الأسابيع والساعات الفعلية Number of Weeks /and Contact Hours Per Semester	14	28	
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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	Data Sources, Quality and Analysis	1	4	b2, c1, c2,
2	Introduction to Petrel Data Import, Input Data Editing	1	4	a1, b1, b2, c1, c2
3	Well Correlation	1	4	c1, c2
4	Fault Modeling	1	4	c1, c2
5	Pillar Gridding, Vertical Layering	1	4	c1, c2
6	Geometrical Property Modeling	1	4	b2, c1, c2,
7	Upscaling in the Vertical Direction	1	4	b2, c1, c2,
8	Facies Modeling	2	8	b2, c1, c2, d2
9	Petrophysical Modeling	2	8	b2, c1, c2, d2
10	Defining Fluid Contacts	1	4	b2, c1, c2, d2
11	Reservoir simulation	1	4	a3. b2, c1, c2, d2
اجمالي الأسابيع والساعات الفعلية Number of Weeks /and Contact Hours Per Semester		13	52	

استراتيجيات التعليم والتعلم Teaching Strategies	
<ul style="list-style-type: none"> ▪ Interactive Lectures ▪ Discussion ▪ Brain storm ▪ Problem solving ▪ Tutorials & practical classes, ▪ Computer based teaching ▪ Seminars 	

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

تقييم التعلم Learning Assessment

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الرقم No.	أنشطة التقييم Assessment Tasks	أسوع التقييم Week due	الدرجة Mark	نسبة الدرجة إلى الدرجة النهائية Proportion of Final Assessment	مخرجات التعلم CILOs (symbols)
1	Project	Week 13	40	20%	all
2	Written test 1	Week 8	30	15%	a1 a3 b1 b2
3	Participations	all	10	5%	all
4	Practical test	Week 7	20	10%	b1 b2 c1 c2
5	Final exam theory	Week16	70	35%	all
6	Final exam practical	Week14	30	15%	b1 b2 c1 c2
Total الإجمالي			200	%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. Deutsch, C., 2002, Geostatistical Reservoir Modelling, Oxford University Press 2. J. Fanchi, 2001. Principles of applied reservoir simulation, Elsevier,
Essential References المراجع المساندة
1. Schlumberger (2015). Petrel software Manual. 2. J. H. Abou-Kassem et al., 2006 Petroleum reservoir simulation – A basic Approach, GPC, Houston 3. Jensen, J., 2000, Statistics for Petroleum Engineers and Geoscientists (2nd edition) Elsevier 4. Cosentino l., 2001 Integrated Reservoir Studies, IFP Editions Technip
Electronic Materials and Web Sites etc. المصادر الإلكترونية ومواقع الإنترنت
1. www.spe.com 2. www.aapg.com 3. www.Springer.com 4. www.schlumberger.com

Course Policies الضوابط والسياسات المتبعة في المقرر	
1	Class Attendance حضور الفعاليات التعليمية - 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 الحضور المتأخر - 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 ضوابط الامتحان - According to the rules the student gets absent in the exam of the course.



4	Assignments & Projects <u>التعيينات والمشاريع</u> - Papers survey or projects should be submitted by the time detriment by the professor.
5	Cheating <u>الغش</u> - 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 <u>الانتحال</u> - 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 <u>سياسات أخرى</u> - 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 **Petroleum and Natural Gas Engineering**
العام الجامعي: 2019-2020م

خطة مقرر: نمذجة ومحاكاة المكنن

Course Plan (Syllabus): Reservoir Modeling and Simulation

معلومات عن أستاذ المقرر						
الاسم Name	Assoc.Prof. Adel M. Al-Matary	الساعات المكتبية (أسبوعياً) Office Hours				6
المكان ورقم الهاتف Location & Telephone No.	Sana'a 770770769	السبت SAT	الأحد SUN	الاثنين MON	الثلاثاء TUE	الأربعاء WED
البريد الإلكتروني E-mail	a.almatary@su.edu.ye					الخميس THU

معلومات عامة عن المقرر						
1.	اسم المقرر Course Title	نمذجة ومحاكاة المكنن Reservoir Modeling and Simulation				
2.	رمز المقرر ورقمه Course Code and Number	PNGE 445				
3.	الساعات المعتمدة للمقرر Credit Hours	الساعات المعتمدة Credit Hours				الإجمالي Total
		محاضرات Lecture	عملي Practical	سمنار/تمارين Seminar/Tutorial	تدريب Training	
		2	1	1	-	4
4.	المستوى والفصل الدراسي Study Level and Semester	4 th level, 1 st semester				
5.	المتطلبات السابقة للمقرر Pre-requisites	PNGE 341, PNGE 363				
6.	المتطلبات المصاحبة (إن وجدت) Co-requisite	-				
7.	البرنامج الذي يدرس له المقرر Program (s) in which the course is offered	Bachelor of 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				

وصف المقرر

The objective of this course is to teach the basic science, technology and related assumptions involved in carrying out an integrated reservoir characterization study. It will prepare students to understand and interpret techniques that underlie commercial software (but will not teach software usage itself). The course has three main components. 1) Data sources, quality and analysis, including spatial analysis. 2) Generating 3D models of reservoir properties - classical gridding and mapping, kriging as a data driven (variogram) form of classical mapping (estimation) and a means of data integration. Simulation techniques are introduced as a means of assessing uncertainty

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resulting from heterogeneity. 3) Scaling of grids and property models for the purpose of reservoir simulation is the final topic. The integration and application of all the major ideas is illustrated by a case study. The practical part of the classes (lab and design) will be devoted to work with a professional industrial reservoir simulator and the implementation of a group project.

Course Intended Learning Outcomes (CILOs) مخرجات تعلم المقرر

After completing the course, the student will be able to:	بعد الانتهاء من دراسة المقرر سوف يكون الطالب قادرا على أن:
a1. Explain the main terminology, concepts, tools, and techniques used for generating 3D static and dynamic reservoir models	يشرح المصطلحات الرئيسية والمفاهيم والأدوات والتقنيات المستخدمة لتوليد نماذج المكامن الثابتة والديناميكية ثلاثية الأبعاد
a2. Show some of key issues in reservoir characterization & modeling, particularly uncertainty & heterogeneity	يعرض بعض القضايا الرئيسية في توصيف ونمذجة الخزان، وخاصة عدم اليقين وعدم التجانس
a3. Describe types of reservoir simulators and their application and the importance of computer modeling in the field of reservoir management	يوصف أنواع محاكات المكامن وتطبيقاتها وأهمية النمذجة الحاسوبية في مجال إدارة المكامن
b1. Select appropriate computer software and numerical simulator (Petrel) for modeling using the knowledge in the field of reservoir engineering, geology and exploitation of oil / gas fields	يختار برامج الكمبيوتر المناسبة والمحاكاة العددية (Petrel) للنمذجة باستخدام المعرفة في مجال هندسة المكامن والجيولوجيا واستغلال حقول النفط / الغاز
b2. Develop a critical-thinking and problem-solving approach to modeling	يطور نهج التفكير النقدي وحل المشكلات للنمذجة
c1. Practice skills in data analysis and evaluation of reservoirs	يمارس المهارات في تحليل البيانات وتقييم الخزانات
c2. Practice using these tools (computer software and numerical simulator) – computer exercises for real problems through case studies	يتدرب على استخدام هذه الأدوات (برامج الكمبيوتر والمحاكاة العددية) - تمارين الكمبيوتر لحل المشاكل الحقيقية من خلال دراسات الحالة
d1. Accept responsibility for the designated part of the task (project) and comply with the rules of teamwork	يقبل المسؤولية عن الجزء المعين من المهمة (المشروع) والامتثال لقواعد العمل الجماعي
d2. perform and present a review of a paper/topic related to the course material	يقوم بإجراء وتقديم مراجعة لورقة / موضوع متعلق بمواد المقرر

Course Content محتوى المقرر

Theoretical Aspect خطة تنفيذ الموضوعات النظرية

الرقم Order	الوحدات (الموضوعات الرئيسية) Units	الموضوعات التفصيلية Sub Topics	الأسبوع Week Due	الساعات الفعالية Con. H
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1	Overview of Reservoir Characterization		Week 1	2
2	Data Sources, Quality and Analysis	<ul style="list-style-type: none"> o Types, scales, uncertainty o Short review of Probability o Univariate and bivariate Statistics o Measuring & Modeling Spatial Continuity (Variogram) 	Week 2	2
3	Framework Modeling	Mapping, Contouring, Faults	Week 3	2
4	Grid Types	Design and their relation to reservoir features and model purpose	Week 4	2
5	Geostatistical Estimation	Geostatistical Concepts <ul style="list-style-type: none"> o Kriging o (Estimation of Dependent Variables – if time) 	Week 5	2
6	Modeling concepts	type of models, check list for designing a model, concept of grid blocks, initial and boundary conditions, various flow models, concept of proper grid orientation	Week 6-7	4
7	Mid-term exam		Week 8	2
	Geostatistical Simulation	Simulation versus Estimation <ul style="list-style-type: none"> o Sequential Indicator Simulation o Object Modelling 	Week 9	4
	Up-gridding & Up-scaling	Simple averages, Pressure solver	Week 10	2
	Integrated Reservoir Characterization	Case Study	Week 11	2
	Demo of Industry Software for Reservoir Characterization & Modelling	Petrel from Schlumberger (if time)	Week 12	2
	Introduction & Overview of reservoir simulation	Definition, Objectives and applications	Week 13	2
	History Matching	Validity of the Reservoir Model, Strategy & Plans, Adjustment of parameters, Pressures, Pressure gradients, GOR-WOR behavior Automatic History Matching.	Week 14	2
	Forecasting Future Performance	Planning prediction cases, Preparation of input data, Making a smooth transition from history to predictions, Review & Analysis of predicted performance, Evaluating & Monitoring predicted performance	Week 15	2
	Final exam	▪	Week 16	2

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عدد الأسابيع والساعات الفعلية Number of Weeks /and Contact Hours Per Semester	16	32
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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	Data Sources, Quality and Analysis	Week 1	4
2	Introduction to Petrel Data Import, Input Data Editing	Week 2	4
3	Well Correlation	Week 3	4
4	Fault Modeling	Week 4	4
5	Pillar Gridding, Vertical Layering	Week 5	4
6	Geometrical Property Modeling	Week 6	4
7	Mid-term exam	Week 7	2
8	Upscaling in the Vertical Direction	Week 8	4
9	Facies Modeling	Week 9-10	8
10	Petrophysical Modeling	Week 10-11	8
11	Defining Fluid Contacts	Week 12	4
12	Reservoir simulation	Week 13	4
13	Final exam	Week 14	2
اجمالي الأسابيع والساعات الفعلية Number of Weeks /and Contact Hours Per Semester		14	56

Teaching Strategies استراتيجيات التعليم والتعلم	
<ul style="list-style-type: none"> ▪ Interactive Lectures ▪ Discussion ▪ Brain storm ▪ Problem solving ▪ Tutorials & practical classes, ▪ Computer based teaching ▪ Seminars 	

Tasks and Assignments الأنشطة والتكليفات			
م No	التكليف/ الواجب Assignments	نوع التكليف (فردى/ تعاوني)	الدرجة المستحقة Mark
1	n/a		
إجمالي الدرجة Total Score			15/150 10/ 100

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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	Project	Week 13	40	20%
2	Written test 1	Week 8	30	15%
3	Participations	all	10	5%
4	Practical test	Week 7	20	10%
5	Final exam theory	Week16	70	35%
6	Final exam practical	Week14	30	15%
المجموع Total			200	100 %

Learning Resources مصادر التعلم

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

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

1. Deutsch, C., 2002, Geostatistical Reservoir Modelling, Oxford University Press
2. J. Fanchi, 2001. Principles of applied reservoir simulation, Elsevier,

المراجع المساندة Essential References

1. Schlumberger (2015). Petrel software Manual.
2. J. H. Abou-Kassem et al., 2006 Petroleum reservoir simulation – A basic Approach, GPC, Houston
3. Jensen, J., 2000, Statistics for Petroleum Engineers and Geoscientists (2nd edition) Elsevier
4. Cosentino I., 2001 Integrated Reservoir Studies, IFP Editions Technip

المصادر الإلكترونية ومواقع الإنترنت Electronic Materials and Web Sites etc.

1. www.spe.com
2. www.aapg.com
3. www.Springer.com
4. www.schlumberger.com

Course Policies الضوابط والسياسات المتبعة في المقرر

1	Class Attendance حضور الفعاليات التعليمية <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 الحضور المتأخر <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 ضوابط الامتحان

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	- According to the rules the student gets absent in the exam of the course.
4	<u>Assignments & Projects</u> التعيينات والمشاريع - Papers survey or projects should be submitted by the time detriment by the professor.
5	<u>Cheating</u> الغش - 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	<u>Plagiarism</u> الانتحال - 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	<u>Other policies</u> سياسات أخرى - 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.