رؤية القسم:

هندسة النفط الرافد الاساس في تهيئة خريجين مؤهلين لتطوير صناعة النفط والغاز في العراق ويسعى قسم هندسة النفط في جامعة المعقل الى تحقيق الريادة والتميز في مجال تخصصه محليا واقليميا.

رسالة القسم:

تكمن رسالة قسم هندسة النفط في تعليم واعداد المتخصصين من مهندسين النفط الذين يمكن ان يتقلدوا المراكز المختلفة في الدولة والقطاع الخاص وفي نفس الوقت اعدادهم كمواطنين صالحين مؤمنين بالقيم الانسانية والاخلاقية ومدركين لمسؤوليتهم تجاه دينهم ووطنهم وشعبهم.

الاهداف

١. تخريج كوادر هندسية ذات مهارات واخلاقيات مهنية عالية في مجال هندسة النفط.
٢. تجويد العملية التعليمية والادارية وبما يتناسب ومعايير الاعتماد الدولية لتحقيق رؤيا ورسالة القسم.
٣. تحسين قدرات الهيئة التدريسية وجذب الكفاءات الجيدة للكلية.
٤. تعزيز ثقة المجتمع والمؤسسات الخارجية بمخرجاتها.
٥. التعاون العلمي والتدريبي لطلبتنا مع الشركات الحكومية والاجنبية العاملة في الحقول النفطية في البصرة.

مخرجات القسم

يمكن لخريج البكالوريوس في هندسة النفط ان يكون مهندس حفريات وتنقيب نفطي، والعمل مع الجيولوجيين والمقاولين في التصميم والاشراف على عمليات الحفر، العمل كمهندس إنتاج، وتطوير العمليات والمعدات لتحسين إنتاج النفط والغاز. يمكن ايضا ان يصبح مهندس مكامن نفطية ويساعد على تحديد عمليات لإنعاش المثالي، ويقدر عدد الابار التي يمكن حفرها اقتصاديا، ومحاكاة الاداء في المستقبل باستخدام نماذج حاسوبية متطورة.

كمهندس نفط قد تضطر الى العيش في العديد من البلدان المختلفة حيث السفر يمكن ان يكون جزءا هاما من حياتك المهنية. يمكنك تطوير مهاراتك في شركة متعددة الجنسيات او شركة صغيرة، او ان تصبح عامل مستقبل ورئيس شركة خاصة بك. مستقبلك يمكن ان يكون ما تريده لها ان يكون.

أعضاء الهيئة التدريسية في قسم هندسة النفط

ت	الاسم الكامل	الشهادة	الدولة المانحة	اللقب العلمي	الايميل
1	بدر نعمه عكاش البدران	دكتوراه	فرنسا	أستاذ	Badir.Akash@almaaqal.edu.iq
2	فلحي عبد الحسن علي	دكتوراه	العراق	أستاذ	Falhy.Ali@almaaqal.edu.iq
3	نور الدين عبدالله طعمه	دكتوراه	بريطانيا	استاذ	nooraldeenaljabiri@yahoo.com
4	حسين علي باقر	دكتوراه	العراق	مدرس	Hussain.Baker@almaaqal.edu.iq
5	ندى صباح سلمان	دكتوراه	العراق	مدرس	nadaszubaidi@yahoo.com
6	صائب عبدالله يوسف	دكتوراه	العراق	مدرس	saib.yousif@almaaqal.edu.iq
7	عبدالستار حامد شنيت	ماجستير	العراق	م. مساعد	abdulsattar.almaliki@almaaqal.edu.iq
8	سجى عبدالحسين طالب	ماجستير	العراق	م. مساعد	Saja.Talib@almaaqal.edu.iq
9	منة الله محمد هاتف	ماجستير	العراق	م. مساعد	mina.muhammed@almaaqal.edu.iq
10	عباس احمد هاشم	ماجستير	العراق	م. مساعد	abbas.ahmed@almaaqal.edu.iq
11	اية علي عبود	ماجستير	العراق	م. مساعد	ayaali9494@yahoo.com
12	فاطمة علي حسن	ماجستير	العراق	م. مساعد	Fatiat9547@gmail.com

المحور العلمي/ السنة الدراسية الاولى								
ت	المرحلة	الفصل	المادة	المادة باللغة العربية	تقسيم الساعات الدراسية			الوحدة
					نظري	مناقشة	عملي	
1	الاولى	الاول	chemistry	كيمياء عامة ١	2	0	2	3
2	الاولى	الاول	Calculus I	التفاضل والتكامل ١	3	1	0	3
3	الاولى	الاول	English I	اللغة الانكليزية ١	2	0	0	2
4	الاولى	الاول	General physics	فيزياء عامة ١	2	0	2	3
5	الاولى	الاول	Arabic language	اللغة العربية	2	0	0	2
6	الاولى	الاول	Human Rights	حقوق الانسان	2	0	0	2
7	الاولى	الاول	General Geology I	جيولوجيا عامة ١	2	0	2	3
8	الاولى	الاول	Fundamentals of Computer science	مبادئ علوم الحاسبات	1	0	2	2
مجموع الساعات (نظري – مناقشة – عملي)					16	1	8	-
عدد الساعات – الوحدات الكلي للفصل					25			20
1	الاولى	الثاني	Introduction to petroleum engineering	مقدمة في هندسة النفط	3	1	0	3
2	الاولى	الثاني	Engineering drawing and descriptive Geometry	الرسم الهندسي	1	0	2	2
3	الاولى	الثاني	General Geology II	جيولوجيا عامة II	2	0	2	3
4	الاولى	الثاني	Computer programming	برمجة حاسبات	2	0	2	3
5	الاولى	الثاني	English II	اللغة الانكليزية II	2	0	0	2
6	الاولى	الثاني	Calculus II	التفاضل والتكامل II	3	1	0	3
7	الاولى	الثاني	Petroleum chemistry and properties	خواص النفط	2	0	2	3
مجموع الساعات (نظري – مناقشة – عملي)					15	2	8	-
عدد الساعات – الوحدات الكلي للفصل					25			19
					مجموع وحدات المرحلة الاولى			39

المحور العلمي/ السنة الدراسية الثانية

ت	المرحلة	الفصل	المادة	المادة باللغة العربية	تقسيم الساعات الدراسية			الوحدة
					نظري	مناقشة	عملي	
1	الثانية	الاول	Fluid Mechanics I	ميكانيك مواقع I	2	1	0	2
2	الثانية	الاول	Statics and dynamics	ميكانيك الحركة والسكون	3	1	0	3
3	الثانية	الاول	Petroleum Geology	جيولوجي النفط	2	0	2	3
4	الثانية	الاول	Calculus III	التفاضل والتكامل III	3	1	0	3
5	الثانية	الاول	Thermodynamics	الديناميك الحراري	3	1	0	3
6	الثانية	الاول	Technical report writing	اعداد التقارير الفنية	2	0	0	2
7	الثانية	الاول	Reservoir rock properties	خواص المكمنية	2	0	2	3
مجموع الساعات (نظري – مناقشة – عملي)					17	4	4	-
عدد الساعات – الوحدات الكلي للفصل					25			19
1	الثانية	الثاني	Strength of materials	مقاومة المواد	2	1	0	2
2	الثانية	الثاني	Health , safety and envioronment	السلامة الصناعية	2	1	0	2
3	الثانية	الثاني	Elementary differential equations	المعادلات التفاضلية	3	1	0	3
4	الثانية	الثاني	Fluid mechanics II	ميكانيك المواقع II	2	1	2	3
5	الثانية	الثاني	Drilling fluid	مواقع الحفر	2	0	2	3
6	الثانية	الثاني	Reservoir fluid properties	خواص الموانع المكمنية	2	0	2	3
7	الثانية	الثاني	Electrical technology	مبادئ الهندسة الكهربائية	2	0	2	3
مجموع الساعات (نظري – مناقشة – عملي)					15	4	8	-
عدد الساعات – الوحدات الكلي للفصل					27			19
					مجموع وحدات المرحلة الثانية			38

المحور العلمي/ السنة الدراسية الثالثة

ت	المرحلة	الفصل	المادة	المادة باللغة العربية	تقسيم الساعات الدراسية			الوحدة
					نظري	مناقشة	عملي	
1	الثالثة	الاول	Numerical methods	طرق التحليل العددي	2	0	2	3
2	الثالثة	الاول	Formation evaluation & well logging I	تقييم التكوين والجس البئري ١	2	0	2	3
3	الثالثة	الاول	Exploration Geophysics	الجيوفيزياء الاستكشافية	2	0	2	3
4	الثالثة	الاول	Reservoir engineering I	هندسة المكامن I	3	1	0	3
5	الثالثة	الاول	Engineering economics analysis	تحليل الاقتصاد الهندسي	2	1	0	2
6	الثالثة	الاول	Communication skills	مهارات التواصل	2	0	0	2
7	الثالثة	الاول	Drilling engineering I	هندسة الحفر I	2	0	2	3
مجموع الساعات (نظري – مناقشة – عملي)					15	2	8	-
عدد الساعات – الوحدات الكلي للفصل					25			19
1	الثالثة	الثاني	Formation evaluation & well logging II	تقييم التكوين والجس البئري II	2	0	2	3
2	الثالثة	الثاني	Subsurface production engineering	هندسة الانتاج تحت السطحي	3	1	0	3
3	الثالثة	الثاني	Drilling engineering II	هندسة الحفر II	2	0	2	3
4	الثالثة	الثاني	Reservoir engineering II	هندسة المكامن II	3	1	0	3
5	الثالثة	الثاني	Well testing	فحص الابار	2	1	2	3
6	الثالثة	الثاني	Probability& statistics for engineers	الاحتمالية والاحصاء الهندسي	2	1	0	2
7	الثالثة	الثاني	Research methodology	طرائق بحث	1	0	0	مستوفي
مجموع الساعات (نظري – مناقشة – عملي)					15	4	6	-
عدد الساعات – الوحدات الكلي للفصل					25			17
					مجموع وحدات المرحلة الثالثة			36

المحور العلمي/ السنة الدراسية الرابعة

ت	المرحلة	الفصل	المادة	المادة باللغة العربية	تقسيم الساعات الدراسية			الوحدة
					نظري	مناقشة	عملي	
1	الرابعة	الاول	Horizontal and directional drilling	الحفر الافقي والاتجاهي	2	0	2	3
2	الرابعة	الاول	Stimulation operations and artificial lift	عمليات الانعاش والرفع الصناعي	3	1	0	3
3	الرابعة	الاول	Engineering project I	مشروع هندسي I	1	0	2	2
4	الرابعة	الاول	Reservoir simulation	محاكاة المكامن	2	0	3	4
5	الرابعة	الاول	Elective 1	اختياري ١	2	0	0	2
6	الرابعة	الاول	Reservoir description	وصف المكامن	3	1	0	3
7	الرابعة	الاول	Production facilities design	تصميم معدات الانتاج	3	1	0	3
مجموع الساعات (نظري – مناقشة – عملي)					16	3	7	-
عدد الساعات – الوحدات الكلي للفصل					26			20
1	الرابعة	الثاني	Enhanced oil recovery	استخلاص النفط المدعم	3	1	0	3
2	الرابعة	الثاني	Petroleum economics	اقتصاديات النفط	2	0	0	2
3	الرابعة	الثاني	Reservoir management	ادارة المكامن	2	0	3	4
4	الرابعة	الثاني	Natural gas engineering	هندسة الغازي الطبيعي	2	0	2	3
5	الرابعة	الثاني	Elective 2	اختياري ٢	3	1	0	3
6	الرابعة	الثاني	Engineering project II	مشروع هندسي II	1	0	2	2
7	الرابعة	الثاني	Project management	ادارة المشاريع	2	0	0	2
مجموع الساعات (نظري – مناقشة – عملي)					15	2	7	-
عدد الساعات – الوحدات الكلي للفصل					24			19
					مجموع وحدات المرحلة الرابعة			39

	مجموع الوحدات لجميع المراحل			152
مجموع عدد الساعات الكلي (١٥ اسبوع لكل فصل دراسي)	3030			
مجموع عدد الساعات النظري	1860	-	-	
مجموع عدد الساعات للمناقشة	-	330	-	
مجموع عدد الساعات العملي	-	-	840	
نسبة العملي الى النظري (ساعات)	45%			

المنـــــاهـج:

ادناه عرض تفصيلي للمناهج المقترحة مبوبة حسب السنة الدراسية والفصل الدراسي مع بيان توزيع الساعات الدراسية وعدد الوحدات لكل مادة .

السنة الدراسية الاولى

subject	General chemistry	Theoretical	2	Hour/week
Code	**1st semester**	Practical	2	Hour/week
class	**1st year**	Tutorial	0	Hour/week
Pre-requisite	**None**	Units	3	

- Review Of Basic Concepts
- Stoichiometry
- Chemical Reaction And Heat
- Organic Chemistry
- Fuels
- Various Batteries And Electronic Cells
- Principles Of Corrosion
- Water For Domestic Uses
- Industrial Water
- Atmospheric Pollution .

subject	Calculus I	Theoretical	3	Hour/week
Code	**1st semester**	Practical	0	Hour/week
class	**1st year**	Tutorial	1	Hour/week
Pre-requisite	**None**	Units	3	

- -functions : graph of a function , domain and rang of a function , some important functions (absolute – value function , sign function , greatest integer function).
- -limits : basic limits, infinite limits , limits at infinity , continuity of functions .
- -differentiation : derivative from definition , laws of a derivative , first and second order derivatives, relation between continuity and differentiation , implicit differentiation, chain rule , rolle's theorem , mean-value theorem.
- Integrations : indefinite integration , definite integration .
- -trigonometric functions : graphs, domain and range, limits, derivatives, integrations .
- -inverse trigonometric functions : graphs, domain and range, identities involving inverse trigonometric functions , derivatives , integrals leading to inverse trigonometric functions.
- -logarithm function : general and natural logarithm functions, graphs , domain and range, derivatives, integrals leading to natural logarithms.
- Exponential functions: general and natural Exponential functions, graphs , domain and range, derivatives , integrations.
- -hyperbolic functions : graphs , domain and range, derivatives , integrations.
- -inverse of hyperbolic functions : graphs , domain and range, derivatives , integrals leading to inverse hyperbolic functions.
- -l'hopital's rule : limits of undetermined forms.

subject	English I	Theoretical	2	Hour/week
Code	**1st semester**	Practical	0	Hour/week
class	**1st year**	Tutorial	0	Hour/week
Pre-requisite	**None**	Units	2	

- Parts of speech (nouns, pronouns, verbs ,adverbs , prepositions , conjunctions , interjections)
- kinds of sentences (simple , compound , complex).

subject	General physics	Theoretical	2	Hour/week
Code	**1st semester**	Practical	2	Hour/week
class	**1st year**	Tutorial	0	Hour/week
Pre-requisite	**None**	Units	3	

- Energy and its conservation : energy , work , power , gravitational potential energy , kinetic energy ,conservation of energy .
- Fluids : density , pressure, pascal's principle , Archimedes principle , equation of continuity, bemoulli's theorem , viscosity, stress and strain .
- Surface tension : interfacial tension , contact angle , wetting phenomena , capillary pressure.
- Heat transfer: convection, conduction, and radiation. Coulomb's law and the electric field , flux, gauss's law , electric potential

subject	Human rights	Theoretical	2	Hour/week
Code	**1st semester**	Practical	0	Hour/week
class	**1st year**	Tutorial	0	Hour/week
Pre-requisite	**None**	Units	2	

- تعريف وخصائص حقوق الانسان
- حقوق الانسان في الشريعة الاسلامية
- اشكال وصور حقوق الانسان
- الحقوق المدنية (الفردية)
- حقوق الانسان السياسية الحقوق والحريات ذات المضمون الاقتصادي والاجتماعي والثقافي
- الحقوق والحريات في الحقوق الجماعية او لا دور الدولة في مجال حقوق الانسان انتهاكات حقوق الانسان
- الحماية الدولية لحقوق الانسان
- الحقوق السياسية
- حقوق المرأة في الاسلام
- ضمانات حقوق الانسان
- الضمانات القانونية
- الضمانات القضائية والسياسية

subject	Arabic language	Theoretical	2	Hour/week
Code	**1st semester**	Practical	0	Hour/week
class	**1st year**	Tutorial	0	Hour/week
Pre-requisite	**None**	Units	مستوفي	

-

subject	General geology I	Theoretical	2	Hour/week
Code	**1st semester**	Practical	2	Hour/week
class	**1st year**	Tutorial	0	Hour/week
Pre-requisite	**None**	Units	3	

- Understanding of the earth including geological time scale .
- minerals , their crystal lattice, composition , physical and chemical properties .
- Rocks : rock cycle in nature .
- ligneous rocks including volcanoes , sedimentary rocks including weathering , erosion , transportation and deposition.
- Metamorphic rocks.

subject	Fundamentals of computer science	Theoretical	1	Hour/week
Code	**1st semester**	Practical	2	Hour/week
class	**1st year**	Tutorial	0	Hour/week
Pre-requisite	**None**	Units	2	

- Elements of a computer
- Linux OS (history, elements, functions, applications, special types)
- Windows OS (history, elements, functions, applications, special types)
- Microsoft office (Word, Excel, Power Point)
- Internet (types of networks, search tools, method of search, E-mail; Web page).

subject	Introduction to petroleum Eng.	Theoretical	3	Hour/week
Code	**2nd semester**	Practical	0	Hour/week
class	**1st year**	Tutorial	1	Hour/week
Pre-requisite	**None**	Units	3	

- Elements of petroleum engineering
- origin of petroleum
- reservoir rock properties and fluid distribution
- volumetric calculations of oil in place
- natural forces in oil and gas reservoirs
- oil exploration
- rotary drilling
- rig components
- casing
- cementing and well completion
- well logging
- surface equipment
- Iraqi oil fields.

subject	Engineering drawing and descriptive geometry.	Theoretical	1	Hour/week
Code	**2nd semester**	Practical	3	Hour/week
class	**1st year**	Tutorial	0	Hour/week
Pre-requisite	**None**	Units	3	

- Introduction, selection of instruments
- engineering lettering, geometry
- fundamentals of dimension on engineering drawing
- Computer Aided Drafting (CAD) fundamentals: Open, (and close), CAD application, Open multiple drawings and switch between them, Create a new drawing.
- Roaming facilities: Use zooming tools, Panning a drawing, Create named views & recall them.
- Create new drawings: Understand & use Absolute, Relative and Polar coordinate system, Drawing commands, Draw rectangle, polygon, ellipse.
- Modifying Commands: Erase & oops, Copy and Move objects, Rotate, Scale, Stretch Extend & Offset, Mirror and array, Apply Chamfers and Fillets.
- Layers: different fonts, Understand the text alignment abbreviations.
- Isometric: Changing to isometric mode, Switching between isoplanes (top, right & left views), Isometric ellipses, Isometric fillets, Writing in isometric mode
- Plotting: Understand between Model and Paper space, Add a new title block, Create a viewports with different scales, Select plotter/ printer, Plot all, part of drawing to scale.
- Create layers and assign properties as line weights, line types, colour, Modify status, Modify layer attributes.
- Text and Dimensions: Create and set text styles with Descriptive
- Geometry: Representation of points, lines, and planes
- types of planes
- application of lines and planes
- development of surfaces

• determination of true lengths of straight lines by revolution and auxiliary planes • traces of planes • finding line of intersection of planes by traces and projections.

subject	General geology II	Theoretical	2	Hour/week
Code	**2nd semester**	Practical	2	Hour/week
class	**1st year**	Tutorial	0	Hour/week
Pre-requisite	**None**	Units	3	
• Geological Maps. • Structural Geology. • Plate Tectonics Including Earthquakes. • Keys To The Past.				

subject	Computer programming	Theoretical	2	Hour/week
Code	**2nd semester**	Practical	2	Hour/week
class	**1st year**	Tutorial	0	Hour/week
Pre-requisite	**None**	Units	3	
• Introduction to programming using Matlab • Variables • Arrays • conditional statements • loops • functions and plots are covered in addition to GUI				

subject	English II	Theoretical	2	Hour/week
Code	**2nd semester**	Practical	0	Hour/week
class	**1st year**	Tutorial	0	Hour/week
Pre-requisite	**None**	Units	2	

- Subordinate clauses
- change of sentences from simple to compound and vice versa
- Tenses
- passive and active
- direct and indirect speech.

subject	Calculus II	Theoretical	3	Hour/week
Code	**2nd semester**	Practical	0	Hour/week
class	**1st year**	Tutorial	1	Hour/week
Pre-requisite	**None**	Units	3	

- Methods of Integrations: Trigonometric Substitutions, Integration by Parts, Integration of Rational Functions by Partial Fractions, Powers of Trigonometric Functions, The substitution * .
- Improper Integrals.
- Areas: Area under a Curve, Area between Curves.
- Volumes of Solids of Revolutions: Volumes by Disk Method, Volumes by Cylindrical Shells.
- Lengths of Plame curves: Length of a Curve y =f (x), Length of a Curve x =g (y), Length of a Parametric Curve.
- Areas of Surfaces of Revolution.
- Polar Coordinates and Polar Curves: Areas, Volumes and Arc lengths of Polar Curves.
- Matrices: Algebra of Matrices, Determinant of a matrix, Inverse of a Matrix, Solutions of Systems of Linear Equations (Inverse of a Matrix Method, Cramer's Method).

subject	Petroleum chemistry and properties	Theoretical	2	Hour/week
Code	**2nd semester**	Practical	2	Hour/week
class	**1st year**	Tutorial	0	Hour/week
Pre-requisite	**None**	Units	3	

- Crude Oils (Chemical Composition, Classification, Properties)
- Density
- Specific Gravity And Coefficient Of Expansion
- Viscosity
- Molecular Weight
- Vapor Pressure
- Specific Heat
- Laten Heat
- Heat Of Combustion
- Boiling Range
- Flash Point
- Pour Point
- Sulfur Content
- Aniline Point
- Penetration Umber
- Softening Point
- Crude Oil Evaluation
- Fractional Distillation And Tbp Curve
- Analysis Of Fraction
- Dehydration Of Crude Oil
- Natural Gas Properties
- Oilfield Water Properties.

السنة الدراسية الثانية:

subject	Fluid mechanics I	Theoretical	2	Hour/week
Code	**1st semester**	Practical	0	Hour/week
class	**2nd year**	Tutorial	1	Hour/week
Pre-requisite	**None**	Units	2	

- Dimensions & units
- Process variables
- Physical state
- Fluid statics
- Newtonian and non newtonian fluids
- Overall mass balance
- Overall energy balance
- Overall momentum balance
- Flow measurements
- Flow of incompressible fluids
- Friction losses in pipes and fittings and Fluid machinery.

subject	Static and dynamic	Theoretical	3	Hour/week
Code	**1st semester**	Practical	0	Hour/week
class	**2nd year**	Tutorial	1	Hour/week
Pre-requisite	**None**	Units	3	

- Static & dynamic principles
- resultant of forces
- Friction
- center of gravity: moment of inertia rectilinear motion; curvilinear motion rotation
- energy &work
- mechanical vibration.

subject	Petroleum geology	Theoretical	2	Hour/week
Code	**1st semester**	Practical	2	Hour/week
class	**2nd year**	Tutorial	0	Hour/week
Pre-requisite	**None**	Units	3	

- Origin of petroleum
- Source rocks
- Maturation of organic matter: Timing of oil generation and expulsion
- Reservoir rocks; Cap rocks (seal rocks)
- Migration of petroleum
- Petroleum traps
- Petroleum composition
- Exploration and Mapping Techniques
- Oil fields in Iraq.

subject	Calculus III	Theoretical	3	Hour/week
Code	**1st semester**	Practical	0	Hour/week
class	**2nd year**	Tutorial	1	Hour/week
Pre-requisite	**None**	Units	3	

- Polar coordinates
- polar curves
- area in polar coordinates.
- Vectors ,lines, planes and surfaces.
- Cylindrical and spherical coordinates.
- Functions of two and three variables, limits and continuity.
- Partial derivatives, directional derivatives.
- Extrema of functions of two variables.
- Double integrals, double integrals in polar coordinates.
- Triple integrals, triple integrals in cylindrical and spherical coordinates.

subject	Thermodynamics	Theoretical	3	Hour/week
Code	**1st semester**	Practical	0	Hour/week
class	**2nd year**	Tutorial	1	Hour/week
Pre-requisite	**None**	Units	3	

- Temperature and heat: temperature, heat, specific heat, calorimetry, change of phase, thermal equilibrium.
- Volume expansion of liquid and gases, Charles's law, Boyle's law, the ideal gas law, kinetic theory of gases, real gases, equations of state.
- Application of the concept of work to a thermodynamic system, heat added and removed first law of thermodynamics, some special cases of the first law (the gasoline engine, the ideal heat engine, the Carnot cycle).
- The second law of thermodynamics: heat engine and the second law, refrigeration and the second law, reversibility, entropy, statistica interpretation of entropy.
- Binary system, multi-component system, bubble point, dew point, phase envelop, critical pressure-critical temperature.

subject	Technical report writing	Theoretical	2	Hour/week
Code	**1st semester**	Practical	0	Hour/week
class	**2nd year**	Tutorial	0	Hour/week
Pre-requisite	**None**	Units	2	

- Research Skills (using primary and library research to discover information)
- Correspondence Skills (learning the generic conventions of each)
- Explanatory or Demonstrative
- Writing Skills (to disseminate technical information to either nontechnical or technical readers, such as descriptions, instructions, informational handouts, FAQs
- Visual Communication Skills (may appear as separate assignments or as components of other assignments).

subject	Reservoir rock properties	Theoretical	2	Hour/week
Code	**1st semester**	Practical	2	Hour/week
class	**2nd year**	Tutorial	0	Hour/week
Pre-requisite	**None**	Units	3	

- Types of Reservoir Rocks
- Definitions & Measurements of Porosity
- Packing & Particle Size
- Porosity of Complex Porous Media
- Definitions & Measurements of Saturations
- Definitions & Measurements of Permeability,
- Klinkenberg Effects
- Permeability & Flow rates - Darcy's Law,
- Linear & Radial System,
- Relative Permeability,
- Hysteresis-Drainage & Imbibition,
- Correlations of Relative Permeability,
- Mobility concepts
- Definitions & Measurements of Capillary Pressure
- Capillary Pressures Curves,Interfacial Tension & Wettability.
- Measurements of Wettability. , Formation Resistivity/Conductivity,
- Compressibility. ,Pressure Gradients, ,Geothermmal Gradients.

subject	Strength of material	Theoretical	2	Hour/week
Code	**2nd semester**	Practical	0	Hour/week
class	**2nd year**	Tutorial	1	Hour/week
Pre-requisite	**None**	Units	2	

- Stress: simple stress, shearing stress, bearing stress
- thin wall cylinders
- strain
- stress diagram
- Hook law
- Poisson's ratio
- thermal stress
- Torsion
- torsion formula
- flanged bolt
- coupling helical springs
- shear and bending moments diagrams
- analytical and graphical deflection
- Buckling
- special topics.

subject	Health, safety and environment	Theoretical	2	Hour/week
Code	**2nd semester**	Practical	0	Hour/week
class	**2nd year**	Tutorial	1	Hour/week
Pre-requisite	**None**	Units	2	

- Introduction to safety
- health and environmental management
- Combustion and Fire Dynamics
- The fire triangle
- Solids, liquids and gases,
- Fire spread
- convection,
- Conduction
- Radiation
- Causes of fire
- Accidental
- Deliberate
- Electrical fire safety.
- Fire action procedures.
- Fire action notice
- Fighting Fire
- Fire classification
- Fire extinguisher types
- number and location
- Practical firefighting.
- Hazard Spotting
- Hazard spotting
- Recording
- Prioritizing.

subject	Elementary differential equations	Theoretical	3	Hour/week
Code	**2nd semester**	Practical	0	Hour/week
class	**2nd year**	Tutorial	1	Hour/week
Pre-requisite	**None**	Units	3	

- First order and first degree equations.
- The homogeneous differential equations with constant coefficients.
- The methods of undetermined coefficients
- Reduction of order and variation of parameters.
- The Cauchy-Euler equation.
- Series solutions.
- Systems of linear differential equations.
- Applications.

subject	Fluid mechanics II	Theoretical	2	Hour/week
Code	**2nd semester**	Practical	2	Hour/week
class	**2nd year**	Tutorial	1	Hour/week
Pre-requisite	**None**	Units	3	

- Review for fundamentals of fluid mechanics
- Navier - Stokes Equation
- Flow of compressible fluids
- Two-phase flow
- Dimensional analysis
- Pumps:Types of pumps
- performance of pumps.

subject	Drilling fluids	Theoretical	2	Hour/week
Code	**2nd semester**	Practical	2	Hour/week
class	**2nd year**	Tutorial	0	Hour/week
Pre-requisite	**None**	Units	3	

- Introduction to drilling
- Basic drilling operations
- Functions of Drilling Fluids
- Rheology of Drilling Fluids
- types of drilling fluids [WBM,OBM &NAF]
- Mud circulation system
- Drilling Mud Calculation Clay Chemistry.
- Mud Additives
- Principles Of Solids Removal
- Solids Control Methods
- Drilling Hydraulics in Deviated & Horizontal Wells
- Contamination and Treatment of WBM

subject	Electrical technology	Theoretical	2	Hour/week
Code	**2nd semester**	Practical	2	Hour/week
class	**2nd year**	Tutorial	0	Hour/week
Pre-requisite	**None**	Units	3	

- D.C. circuits
- A.C. circuits
- Magnetic circuits
- D.C. Machines
- Transformers &induction motors
- Measuring instruments
- Voltage
- Current
- Resistance Power and Temperature

subject	Reservoir fluid properties	Theoretical	2	Hour/week
Code	**2nd semester**	Practical	2	Hour/week
class	**2nd year**	Tutorial	0	Hour/week
Pre-requisite	**None**	Units	3	

- Phase Behaviour of Pure Substance
- Phase Behaviour of Multi Component System
- Reservoir Fluids Identification
- Classification of Reservoirs According to the Phase Diagram to Five Reservoir Fluid Types
- Fluid Sampling
- PVT Analysis (API, Gas Specific Gravity, Separator Gas Composition, GOR, Constant-Composition Expansion - CCE, Differential Liberation, Constant-Volume Depletion - CVD, Separator Test, FVF of oil, FVF of Gas, Total FVF, Solution Gas Oil Ratio, Coefficient of Isothermal Compressibility, Thermal Expansion, Viscosity Measurements, Compositional Measurements, Special Studies: e.g.Interfacial Tension)
- Properties of Black Oil, Properties of Dry Gases (Critical Pressure and Temperature, Compressibility Factor-Z factor, Viscosity, Isothermal Compressibility)
- Equation of State
- Properties of Formation Water.

السنة الدراسية الثالثة:

subject	Numerical methods	Theoretical	2	Hour/week
Code	**1st semester**	Practical	2	Hour/week
class	**3rd year**	Tutorial	0	Hour/week
Pre-requisite	**None**	Units	3	

- Interpolation: (Linear; Lagrange)
- Matrices :Review of matrix properties
- Determinants
- inverse of matrix
- Solution of system of linear equations (Gaussian elimination, Gauss Jordan method, Jacobi method, Gauss-Seidel method)
- Least square method (Linear equations; Polynomial equations).

subject	Formation evaluation & well logging I	Theoretical	2	Hour/week
Code	**1st semester**	Practical	2	Hour/week
class	**3rd year**	Tutorial	0	Hour/week
Pre-requisite	**None**	Units	3	

- Basic rock properties
- petrophysics: SP log: conventional resistivity log.
- induction log: lateral log, macro resistivity log, sonic log, density log.

subject	Exploration geophysics	Theoretical	2	Hour/week
Code	**1st semester**	Practical	2	Hour/week
class	**3rd year**	Tutorial	0	Hour/week
Pre-requisite	**None**	Units	3	

- Definition of Geophysics.
- Homogenous and Isotropic rock media
- Geophysics of solid materials and illustrates a table showing the different Geophysical methods
- Acquisition
- processing and interpretation of Geophysical data

- Reflection Seismic method: Elasticity theory and the material deformation stages.
- Types of Seismic waves and their velocities
- Factors affecting the velocity of seismic waves
- Acoustic Impedance (Z) and Reflection Coefficient
- Seismic waves propagation and dispersion.
- Rules and physical laws (Huygens principle ,Fermat's principle, Snell's law)
- Sources of seismic wave in the field.
- Techniques used in seismic field surveys
- Derivation of horizontal and inclined reflector.
- Signal to Noise Ratio (S/N)
- Multiple reflections (Noise).
- Seismic to do what?. Why do we need Seismics?, When do we need Seismics?, Seismic line and seismic section.
- How to plot a depth map for a reflector (case study).

subject	Reservoir engineering I	Theoretical	3	Hour/week
Code	**1st semester**	Practical	0	Hour/week
class	**3rd year**	Tutorial	1	Hour/week
Pre-requisite	**None**	Units	3	

- Introduction to Reservoir Engineering (Types of Reservoirs, Review for Reservoir Rocks | Properties, Review for Fluid properties)
- Concept of Reserve.
- Classification of Reserves
- Estimation of Original Oil and Gas in Place by Volumetric Methods (Undersaturated Reservoirs, Saturated Reservoir with Gas Cap).
- Recovery Factor, Fluid pressures regimes.
- Steady State Flow through Porous Media (Types of Fluids and Flow Regimes, Linear Flow of Incompressible Slightly Compressible and Compressible fluids, Radial flow of Incompressible, Slightly Compressible and Compressible Fluids).
- Unsteady State Flow in Porous Media (Linear Flow of Slightly Compressible and Compressible Fluids, Radial Flow of Slightly Compressible and Compressible Fluids).
- Diffusivity Equation, Solutions of Diffusivity Equation, Pseudo Steady State Flow.

subject	Engineering economics analysis	Theoretical	2	Hour/week
Code	**1st semester**	Practical	0	Hour/week
class	**3rd year**	Tutorial	1	Hour/week
Pre-requisite	**None**	Units	2	

- Time value of money
- types of interest rates
- rate tum methods engineering decisions
- depreciation
- depletion
- armortization
- taxation
- inflation
- Expenditure and Net present value
- sensitivity analysis of engineering projects
- risk analysis production decline curves
- evaluation of future production of oil and gas well sand.

subject	Communication skills	Theoretical	2	Hour/week
Code	**1st semester**	Practical	0	Hour/week
class	**3rd year**	Tutorial	0	Hour/week
Pre-requisite	**None**	Units	2	

- Develop an understanding of and be able to overcome many of the obstacles to effective business and professional communication.
- Hone both speaking and listening skills.
- Enhance interpersonal communication skills and develop self-confidence, Improve writing and increase basic knowledge of the rules of writing professional, English, Understand how the audience and context influence message construction and delivery.
- Learn and apply different types of presentation skills.

subject	Drilling engineering I	Theoretical	2	Hour/week
Code	**1st semester**	Practical	2	Hour/week
class	**3rd year**	Tutorial	0	Hour/week
Pre-requisite	**None**	Units	3	

- Introduction to Rotary drilling: Rotary Drilling Process, Basic component of Rotary drilling Equipment [Select drilling equipment: components, description, operation]
- Drill String Design Basics [Drilling string and Accessories :DP, DC, HWDP & types of bits].
- Casing of oil wells [Types & functions]
- BHA design
- Cementing of oil wells [Design well cementing: equipment, methods. and calculations].
- Bit Selections
- Computer lab material: [Petrel/Drilling Engineering from SLB Co.] and [Well Cost Software from Landmark Halliburton]

subject	Formation evaluation & well logging II	Theoretical	2	Hour/week
Code	**2nd semester**	Practical	2	Hour/week
class	**3rd year**	Tutorial	0	Hour/week
Pre-requisite	**None**	Units	3	

- Neutron log
- gamma ray log
- TDT log
- CBL log and quick method in (HC) detection and Production logs.

subject	Subsurface production engineering	Theoretical	3	Hour/week
Code	**2^{nd} semester**	Practical	0	Hour/week
class	**3^{rd} year**	Tutorial	1	Hour/week
Pre-requisite	**None**	Units	3	

- Study of the fundamentals and applications of completion and work over operations including various completion designs
- reservoir and mechanical considerations
- basic tubing design
- subsurface equipment
- completion and work over fluids
- perforating
- sand control and remedial cementing
- Horizontal well completion technology

subject	Drilling engineering II	Theoretical	2	Hour/week
Code	**2^{nd} semester**	Practical	2	Hour/week
class	**3^{rd} year**	Tutorial	0	Hour/week
Pre-requisite	**None**	Units	3	

- Casing design [methods, procedure, and calculations],
- Casing landing (landing as cemented, landing in tension at the freeze point, landing in compression at the freeze point)
- Wellbore Stability theory
- Drilling Problems [buckling phenomenon .pipe sticking, surge and swab pressure, hole deviation].
- Drilling Optimization [Hydraulics(Mud weight, Pressure Drop), ROP WOB, Economical Cost]
- Drilling Cost Analysis.
- Design well completion method.
- Computer lab material:[Casing Seat from Landmark Halliburton] and [Stress Check from Landmark Halliburton]

subject	Reservoir engineering II	Theoretical	3	Hour/week
Code	**2^{nd} semester**	Practical	0	Hour/week
class	**3^{rd} year**	Tutorial	1	Hour/week
Pre-requisite	**None**	Units	3	

- Performance of Reservoirs under Different Types Drive Mechanisms
- Material Balance Equations
- MBE: General MBE Derivation, Basic assumptions in MBE, Volumetric MBE for Undersaturated Reservoirs and Saturated Reservoirs, Reservoir Drive Indices, MBE for Gas Reservoirs
- Models Used to Estimate Water Influx (Steady State, Pseudo-Steady State, and Unsteady State Models, Edge Water Drive and Bottom Water Drive)
- Decline Curve Analysis (Introduction: Forms of Production Data, Exponential Decline, Hyperbolic Decline, Harmonic Decline, Determination of Type of Decline)
- Displacement Mechanisms
- Sweep Efficiency
- Immiscible Displacement (Fractional Flow Theory)
- Displacement in Stratified Reservoirs
- Miscible Displacement

subject	Well testing & pressure transient analysis	Theoretical	2	Hour/week
Code	**2^{nd} semester**	Practical	2	Hour/week
class	**3^{rd} year**	Tutorial	1	Hour/week
Pre-requisite	**None**	Units	3	

- Description of a well test
- Types of tests
- Why we do transient testing
- Flow States
- Development of Flow Equations for Flow in Porous Media[Diffusivity Equation]
- Initial & Boundary Conditions
- Solutions of the Diffusivity Equation
- Dimensional Group
- Skin Development

- Wellbore Storage (WBS)
- Radius of Investigation (ROI)
- Pseudo Steady-State
- Flow Regime Duration Calculations - Dimensionless Time
- Shape Factors
- Principle of Superposition [Multiple producing wells, Bounded Reservoir & Variable Producing Rate].
- Hormer's Approximation [Pseudo producing Time].
- Type curve analysis [log-log Analysis, Semi-Log Analysis, Derivative Analysis].
- Computer lab material: [Pansys from Weatherford Co. Alternatively, PIE from BP Co.]
- Decline Curve Analysis (Introduction: Forms of Production Data, Exponential Decline, Hyperbolic Decline, Harmonic Decline, Determination of Type of Decline)
- Displacement Mechanisms
- Sweep Efficiency
- Immiscible Displacement (Fractional Flow Theory)
- Displacement in Stratified Reservoirs
- Miscible Displacement

subject	Probability & statistics for engineers	Theoretical	2	Hour/week
Code	**2^{nd} semester**	Practical	0	Hour/week
class	**3^{rd} year**	Tutorial	1	Hour/week
Pre-requisite	**None**	Units	2	

- Importance of statistics
- descriptive and inferential statistics
- pictorial description of data
- random sample selection
- data classifications
- frequency distributions: cumulative frequency distributions
- graphical representation of data histograms: frequency polygon; measures of probability variation and the binomial distributions
- Poisson distribution
- normal distribution
- correlation and regression analysis.

subject	Research methodology	Theoretical	1	Hour/week
Code	**2^{nd} semester**	Practical	0	Hour/week
class	**3^{rd} year**	Tutorial	0	Hour/week
Pre-requisite	**None**	Units	مستوفي	

- Introduction: research in engineering and research methods, Choosing a viable research topic, relationships with supervisors and proposal writing, Managing a research project, Academic standards for undergraduate research, including originality.
- Using research resources
- Internet based research
- Conducting a computer based literature search
- Ethics of research: Honesty and integrity (proper referencing, writing style).
- Publication of research output.

السنة الدراسية الرابعة:

subject	Horizontal and directional drilling	Theoretical	2	Hour/week
Code	**1st semester**	Practical	2	Hour/week
class	**4th year**	Tutorial	0	Hour/week
Pre-requisite	**None**	Units	3	

- Fundamental of DD
- Historical Development of DD
- Directional Well Profiles
- DW Applications
- Well Profile Terminology & Well Trajectory Planning [Components of a Well Plan, Impact of Kick of Point Depth, Shallow Kick off Point, J type Vs S type, Well Planning Tips, DLS Planning].
- Steering DLS control
- Wellbore Kick off Techniques
- Methods of calculations of DD wells factors affecting hole inclination of directional wells.
- Manual Profile Design
- DD Tools
- All BHA design
- Computer lab material: [COMPASS from Landmark Halliburton] and [WELLPLAN from Landmark - Halliburton].

subject	Stimulation operations and artificial lift	Theoretical	3	Hour/week
Code	**1st semester**	Practical	0	Hour/week
class	**4th year**	Tutorial	1	Hour/week
Pre-requisite	**None**	Units	3	

- Artificial lift methods: electrical and submersible pumps, sucker-rod pumping, gas lift operations, stimulation operations-matrix-acidizing, fracturing and acid-fracturing.

subject	Engineering Project I	Theoretical	1	Hour/week
Code	**1st semester**	Practical	2	Hour/week
class	**4th year**	Tutorial	0	Hour/week
Pre-requisite	**None**	Units	2	

- Course includes a proposal
- literature review and methadology at a multi-disciplinary design that integrates fundamentals and design concepts in geological
- geophysical and petroleum engineering.
- Students work in integrated teams from each of the disciplines.
- Open-ended design problems are assigned including the development of a prospect in an exploration play and a detailed engineering field study.
- Detailed reports are required for the prospect evaluation and engineering field study.

subject	Reservoir simulation	Theoretical	2	Hour/week
Code	**1st semester**	Practical	3	Hour/week
class	**4th year**	Tutorial	0	Hour/week
Pre-requisite	**None**	Units	4	

- Types of Simulation Models.
- Principles of Finite Difference (Discretization Method, Forward. Backward, Central, Estimation Using Taylor's Expansion, Truncation Error, Stability, Consistency and Convergence).
- Application of Finite Difference (Summary of Various Finite Difference, Discretization of a Single Phase System, Block-Centered and Point-Centered Grids, Dirichlet and Neumann Boundary Conditions. Explicit and Implicit Methods, Matrices from Discretised System, Important Factors to Choice Finite Different Schemes, Matrix Solvers, Effects of Simulation Parameters on the Performance of a Simulator, Numerical Dispersion, Black Oil Simulation Model, Discretization of Two Phase Flow System. IMPES and Fully Implicit Methods. Pseudo functions and Upscaling).
- Introduction to Compositional Simulators (Uses, Advantages and Disadvantages, Governing equations, Comparison between Black Oil and Compositional Simulation Models).
- Computer Lab Material: Practical Use of Black-Oil Commercial Simulation Software.

subject	Elective 1	Theoretical	2	Hour/week
Code	**1st semester**	Practical	0	Hour/week
class	**4th year**	Tutorial	0	Hour/week
Pre-requisite	**None**	Units	2	
•				

subject	Reservoir characterization	Theoretical	3	Hour/week
Code	**1st semester**	Practical	0	Hour/week
class	**4th year**	Tutorial	1	Hour/week
Pre-requisite	**None**	Units	3	

- General Principles & Techniques of Petroleum Reservoir Description, Introduction to Geostatistics (Experiment, Sample Space, Event, Probability, Probability Laws, Univariate Data Analysis, Estimation, Ordinary Kriging Technique, Semivariogram, Kriging Variance, Multivariate Data Analysis).
- Subsurface Data from Geological and Engineering Sources (Data Reconciliation, Integrating Data from Reports of Routine Core Analysis, SCAL, Logs and Well Testing, Permeability-Porosity Correlation, Averaging Permeability Data, Determination of Permeability Cutoffs, Analyzing Relative Permeability Data, Determination of the Average Relative-Permeability, Methods of Determining Connate Water Saturation, Determination of the Average Capillary-Pressure, Wettability Measurements, Pay Thickness and Fluid Contacts, Net Pay Cutoffs, Data of PVT Reports)
- Reservoir Heterogeneity (Microscopic Heterogeneity, Macroscopic Heterogeneity, Megascopic Heterogeneity, Gegascopic Heterogeneity, Vertical-to-Horizontal Permeability Ratio, Anisotropy Index. Dykstra-Parsons Coefficient)
- Concept of Flow Units (Reservoir Quality Index, Flow Zone Indicator, Free Fluid Index).
- Statistical Zonation Technique, Reserve Estimation by Monte Carlo Simulation.
- Testing Validity of the Reservoir Model by History Matching
- (Performance Data to Be Matched. General Strategy for History Matching, Judging the Acceptability of a Model, Parameters that can Be

Changed to Match History Examples of Adjustments,Required in History Matching, Concept of Automatic History Matching).
- Computer Lab Material: Practical Use of Reservoir Characterization Commercial Software

subject	Production facilities design	Theoretical	3	Hour/week
Code	**1^{st} semester**	Practical	0	Hour/week
class	**4^{th} year**	Tutorial	1	Hour/week
Pre-requisite	**None**	Units	3	

- Overview of petroleum surface operations including types
- Applications and design of two and three-phase separators
- oil treatment equipment
- vapor recovery processes: gas treatment processes and equipment
- produced-water treatment and disposal
- flow lines: gathering lines and transportation
- oil, water and gas metering.
- Laboratory sessions cover design principles of production facilities leading to the complete design of one basic production unit.

subject	Enhanced oil recovery	Theoretical	3	Hour/week
Code	**2^{nd} semester**	Practical	0	Hour/week
class	**4^{th} year**	Tutorial	1	Hour/week
Pre-requisite	**None**	Units	3	

- Introduction (Definition of EOR, Past and Current Applications of EOR, Potential Role of EOR)
- Water flooding (Characteristics of Immiscible Processes, Mobility Ratios, Sweeping Efficiencies, Recovery Efficiencies, Trapped Oil Saturation, Frontal Displacement Theory, Buckley-Leverett, Welge Method, Effects of Heterogeneity and Wettability, Dysktra-Parson Method, Injection Patterns, Estimation of Recoveries for 5 Spot Pattern, Inverted 5 Spot and Line Drive)
- Immiscible Gas Injection (Sweep Efficiency and Its Monitoring. Application of Frontal Displacement Theory, Miscible Gas Drive (Miscible Drive Methods, Diffusion and Dispersion Mechanisms, The Temary Diagram, Minimum Miscibility Pressure (MMP) Correlations and Estimation, Instability Phenomena, Performance Evaluation)

- Thermal Recovery Methods (Cyclic and Continuous Steam Injection, Thermal Properties of Fluids and Solids, Temperature Effect on Reservoir and Fluid Properties)
- Recovery Mechanisms: Viscosity Reduction and Thermal Expansion, Prediction of Steam Flood Performance, Steam Injection Facilities, In-Situ Combustion
- Chemical Recovery Methods (Types of CEOR, Properties of Injectants, Loss of Chemicals, HSE Issues, Performance Evaluation)

subject	Petroleum economics	Theoretical	2	Hour/week
Code	**2^{nd} semester**	Practical	0	Hour/week
class	**4^{th} year**	Tutorial	0	Hour/week
Pre-requisite	**None**	Units	2	

- Introduction to the standards and practices of economic analysis in the petroleum industry
- Oil and gas reserve
- organizations of petroleum exporting and importing countries
- international supply and demand of petroleum classification of petroleum, petroleum pricing
- alternative energy
- international strategy of energy.
- typical decision making situations including risk analysis alternative reservoir depletion
- evaluation of future production of oil and gas well sand.
- Petroleum contracts.

subject	Reservoir management	Theoretical	2	Hour/week
Code	**2^{nd} semester**	Practical	3	Hour/week
class	**4^{th} year**	Tutorial	0	Hour/week
Pre-requisite	**None**	Units	4	

- Introduction to the Integrated Reservoir Management
- Appraisal of Oil and Gas Fields(Comparison of Laboratory and Field PVT data, Field Unitization/Equity Determination, Joint Operating Agreement (JOA)
- Comparison of Fluid Contacts from Pressure-Depth Measurements with Fluid Pressure Gradients from PVT Lab Data
- Appraisal Well Testing. Extended Well Testing)
- Analysis of Reservoir Performance (Applying Material Balance
- Well Testing and Decline Curve Analysis to Field Cases)
- Reservoir Management Economics (Economic Criteria, Economic Evaluation, Risk and Uncertainties, Economic Optimization)
- Reservoir Management Case Studies.
- Computer Lab Material: Practical Use of Reservoir Management Commercial Software.

subject	Natural gas engineering	Theoretical	2	Hour/week
Code	**2^{nd} semester**	Practical	2	Hour/week
class	**4^{th} year**	Tutorial	0	Hour/week
Pre-requisite	**None**	Units	3	

- Introduction (World Consumption of Natural Gas, Physical Properties of Natural Gas
- Field Handling of Natural Gas
- Natural Gas Processing)
- Gas Reserves Estimation
- Gas Flow Measurement (Measurement Fundamentals, Selection of Measurement Devices, Orifice Meters, Critical Flow Prover. Choke Nipple. Pitot Tube)
- Gas Well Deliverability Tests (Flow after-Flow Tests, Isochronal Tests, Modified Isochronal tests, Well Head Deliverability, Time to Stabilization, Radius of Investigation, Classifications, Limitations and Use of Deliverability Tests, Gas Well Performance(Gas Well

Performance Fundamentals, Determination of Static Bottom-Hole Pressure, Determination of Flowing Bottom-Hole Pressure) • Gas Field Development (Gas Reservoir Performance, Optimum Field Development Planning, Reservoir | Deliverability, Well Spacing. Equipment Capacity Limitation. Tubing or Casing Capacity. Flow Line Capacity, Compressor Capacity, Pipeline Capacity).

subject	Elective	Theoretical	3	Hour/week
Code	**2^{nd} semester**	Practical	0	Hour/week
class	**4^{th} year**	Tutorial	1	Hour/week
Pre-requisite	**None**	Units	3	
• To be elected from the available elective courses				

subject	Engineering Project II	Theoretical	1	Hour/week
Code	**2^{nd} semester**	Practical	2	Hour/week
class	**4^{th} year**	Tutorial	0	Hour/week
Pre-requisite	**None**	Units	2	
• multi-disciplinary design course that integrates fundamentals and design concepts in geological • geophysical and petroleum engineering. • Students work in integrated teams from each of the disciplines. • Open-ended design problems are assigned including the development of a prospect in an exploration play and a detailed engineering field study. • Detailed reports are required for the prospect evaluation and engineering eld study.				

subject	Project management	Theoretical	2	Hour/week
Code	**2^{nd} semester**	Practical	0	Hour/week
class	**4^{th} year**	Tutorial	0	Hour/week
Pre-requisite	**None**	Units	2	

- Course Overview
- Basic Concepts
- Self-Awareness
- PM as a Leader and Manager
- Contracts and agreements
- Risk Management
- Quality Control/Assurance
- Safety/Customer Service
- Chartering and Endorsement Concepts
- Work Breakdown Structures
- Costing and pricing a project
- Project Execution Plans
- Cost and Schedule controls
- The Hoover Dam construction or onsite campus project site visit and Earned Value Management.

المناهج الاختيارية:

subject	Well control	Theoretical	2	Hour/week
Code		Practical	2	Hour/week
class	**4th year**	Tutorial	0	Hour/week
Pre-requisite	**None**	Units	2	

- Fundamental Principles of Well Control
- Causes of Kicks
- Kick Indicators
- Shit-in Procedures
- Methods of Well Control [Kill Methods General,Constant Bottom Hole Pressure Kill Methods,the Driller's Method,the Wait and Weight, Method Volumetric Well Control].
- Well Control Equipment
- Kick Detection and Well Control Problems on Deviated and Horizontal Wells, Kick Tolerance.
- Computer lab material: [WELLPLAN from Landmark Halliburton]

subject	Well surveying and anti-collision	Theoretical	2	Hour/week
Code		Practical	3	Hour/week
class	**4th year**	Tutorial	0	Hour/week
Pre-requisite	**None**	Units	3	

- Fundamental of Geodesy and Coordinate Systems [Shape of the Earth, Geodetic Datum]
- Grid Coordinate System
- Map Projection
- Universal Transverse Mercator (UTM) Projection
- UTM Zone Configuration
- Grid Convergence
- UTM (Convergence & Hemispheres).
- Local Coordinate Systems Define a Survey
- Survey Calculations[Tangential, Average Angle. Radius of Curvature, Minimum Curvature industry standard]

- Wellbore Surveying [Surveying Tools, Field Acceptance Criteria] Survey Uncertainty[Survey Tool Errors and Propagation, Surveyed Position Uncertainty]
- Anti-Collision [Analysis, Scanning Methods, Drill Ahead Rules, Anti-Collision Rules, Traveling Cylinder Plot A Graphical AC Tool].
- Computer lab material: [COMPASS from Landmark_ Halliburton]

subject	Advanced well test	Theoretical	2	Hour/week
Code		Practical	2	Hour/week
class	**4th year**	Tutorial	0	Hour/week
Pre-requisite	**None**	Units	3	

- Identify Flow regimes
- Reservoir Modules: Double Porosity Model, Double Porosity Model (Pseudo Steady State) [Effect of Omega, Effect of Lambda & Effect of Wellbore Storage],Double Permeability.
- Two Layers with Crossflow Radial Composite Linear Composite, Two Dual Porosity Layers, Multiple Porosity Behavior.
- Reservoir Boundary Models
- Linear Boundary
- Mirror Image of the well
- "Large-Volume" Tests
- Sealing Fault and Constant Pressure Boundary
- Superposition Limit Effect on Buildup Curves Parallel Faults or Channel,
- Intersecting Faults
- External Wedge Behavior
- Discontinuous Sealing Fault.
- Leaky Fault
- Composite Rectangle
- Closed Circle Boundary.
- Computer lab material: [Pansys from Weatherford Co. Alternatively, PIE from BP Co.] and [Saphir by Kappa Col]

subject	Storage and transportation of oil and gas	Theoretical	2	Hour/week
Code	**1^{st} semester**	Practical	0	Hour/week
class	**4^{th} year**	Tutorial	0	Hour/week
Pre-requisite	**None**	Units	3	

- Export Pipeline System (General Description, Types and Functions of Facility and Pipeline Systems, Principle of Pipeline Design, Piping Standards, Stress-Based Design of Pipelines, Gas Pipelines, Compressor and Valve Stations, Liquid Pipelines, Pump and valve Stations, Pipeline Management, Control and Safety)
- Metallic Pipes (Ferrous Metal Piping and Nonferrous Metal Piping)
- Non Metallic Pipes
- Tubing & Pipe Designation (Piping, Fittings, Valves, Connections and Miscellaneous)
- Welding and Pipeline Repair (Weld Joint Design, Weld Metal Composition)
- Pigging Operation (Reason and Frequency of Pigging, Pig Selection, Pipeline Pigging Equipment, Pig Tracking. Preparation for Operation, Pigging Operation, Pig Troubleshooting and Maintenance)
- Corrosion Control(Corrosion Process, Types of Corrosion, Atmospheric Corrosion, Corrosion in Soil, Corrosion in Fresh and Industrial Waters, Corrosion in Seawater, Corrosion Prevention, Corrosion Prevention Techniques, Corrosion Inhibitors, Cathodic Protection, High Temperature Corrosion, Internal Corrosion in Oil and Gas Industry. Painting and Coating).
- Material Selection in Oil and Gas Industry (Stress-Based and Corrosion-Based Selection)
- Liquid /Gas Leaks Detection Techniques (Liquid leaks and Gas Releases Definition and Sources, Leak Detection Methods, Leaks Repairs and Testing methods).
- Types of Storage and design codes. Hydrate problems in production

subject	Fractured reservoirs	Theoretical	3	Hour/week
Code	**2^{nd} semester**	Practical	0	Hour/week
class	**4^{th} year**	Tutorial	1	Hour/week
Pre-requisite	**None**	Units	3	

- Geological Condition of Fracturing
- Geological Model for the Simulation of Fracturing.
- Influence of Stylolitization and Jointing
- Quantitative Evaluation of Fracturing
- Field Examples of Fractured Reservoirs (Fractured Carbonate Reservoirs, Fractured Silt/Sand Reservoirs, Fractured Shale Reservoirs, Fractured Basement Reservoirs)
- Physical Rock Properties of Fractured Reservoirs (Porosity, Permeability, Compressibility, Relative Permeability and Capillary Pressure Curve).
- Logging versus Fracture Evaluation (Lithology Logs, Caliper Logs, Temperature Logs, Resistivity Logs, Dipmeter Logs, Porosity Logs, Flow of Fluids Towards a Well in Non-Porous Fractured Rock, Flow Towards a Well in Fractured Rock of Double Porosity).
- Special Problems of Flow Towards a Well
- Fluid Displacement in a Single Matrix Block
- Production Mechanism of the Fractured Reservoir
- Field Examples of Fractured Reservoirs