UNIVERSITY OF NICOSIA
School of Sciences & Engineering

Απάντηση στην

Έκθεση Εξωτερικής Αξιολόγησης

του Εξ Αποστάσεως Μεταπτυχιακού Προγράμματος Σπουδών «Μηχανική Πετρελαίου, Φυσικού Αερίου και Ενέργειας» του Πανεπιστημίου Λευκωσίας

Σεπτέμβριος 2016

21η Σεπτέμβριου, 2016

Μέλη Επιτροπής Εξωτερικής Αξιολόγησης (ΕΕΑ)

Θέμα: Απάντηση στην Έκθεση της ΕΕΑ για την Αξιολόγηση του Εξ Αποστάσεως Μεταπτυχιακού Προγράμματος Σπουδών (ΜΠΣ) «Μηχανική Πετρελαίου, Φυσικού Αερίου και Ενέργειας»

Έντιμα μέλη της ΕΕΑ,

Θα θέλαμε να σας ευχαριστήσουμε για την εποικοδομητική συζήτηση που είχαμε στις 13 Σεπτεμβρίου, 2016, όσον αφορά το εξ αποστάσεως μεταπτυχιακό πρόγραμμα σπουδών (ΜΠΣ) στην Μηχανική Πετρελαίου, Φυσικού Αερίου και Ενέργειας του Πανεπιστημίου Λευκωσίας.

Ιδιαίτερα, επισημαίνουμε τα θετικά σχόλιά σας όσον αφορά τους επαρκείς και σύγχρονους μαθησιακούς πόρους του πανεπιστημίου (υλικοτεχνικές υποδομές, εγκαταστάσεις, βιβλιοθήκη, φοιτητική μέριμνα, κ.α.), το πολύ καλό γενικό σύστημα μηχανισμών που υπάρχει (π.χ. στήριξη φοιτητών, διαχείριση παραπόνων, επικοινωνία φοιτητών με διδακτικό προσωπικό, κ.α.), τις σύγχρονες εκπαιδευτικές τεχνολογίες που χρησιμοποιούνται στην διδασκαλία και συνάδουν με διεθνή πρότυπα, την ηλεκτρονική πλατφόρμα υποστήριξης μάθησης, τα επαρκή ακαδημαϊκά προσόντα του διδακτικού προσωπικού, τις ρυθμίσεις και τους μηχανισμούς που ακολουθούνται από το πανεπιστήμιο για την διασφάλιση της ποιότητας του ΜΠΣ, την διαχείριση του ΜΠΣ, το καλό υπάρχον γενικό σύστημα/πρόγραμμα ανταλλαγών φοιτητών και καθηγητών, τις διαδικασίες εκμάθησης, τους διοικητικούς μηχανισμούς και την εμπειρία του ιδρύματος στις διαδικασίες εξ αποστάσεως εκπαίδευσης.

Όπως ήταν φυσικά αναμενόμενο, η ΕΕΑ έχει προτείνει βελτιωτικές αλλαγές οι οποίες στόχο έχουν να καλύψουν συγκεκριμένες ελλείψεις και να ενδυναμώσουν το εν λόγω πρόγραμμα σπουδών ώστε να ανταποκρίνεται στις διεθνείς προδιαγραφές και στις ανάγκες της βιομηχανίας πετρελαίου και φυσικού αερίου. Με βάση αυτές τις εισηγήσεις, το Τμήμα Μηχανικής έχει προχωρήσει στις εξής αλλαγές:

1. Ο τίτλος και το περιεχόμενο του μαθήματος OGEE-510DL Petroleum Geology and Geomechanics έχουν αλλάξει. Συγκεκριμένα το μάθημα έχει μετονομαστεί σε OGEE-510DL Petroleum Geology και το περιεχόμενο του - το οποίο έχει διευρυνθεί σημαντικά - αντανακλά τον τίτλο του μαθήματος. Με βάση τις εισηγήσεις της ΕΕΑ, οι γεωλογικές

διεργασίες ιζηματογένεσης και πετρελαιογένεσης εξετάζονται σε γενικότερο πλαίσιο και όχι αποκλειστικά στην περιοχή της Ανατολικής Μεσογείου.

2. Ο τίτλος, το περιεχόμενο, οι στόχοι και τα μαθησιακά αποτελέσματα του μαθήματος OGEE-526DL Production Process Engineering έχουν αλλάξει. Το μάθημα έχει μετονομαστεί σε OGEE-526DL Production Engineering και το περιεχόμενό του τώρα περιλαμβάνει θέματα όπως, reservoir performance, tubing performance, well deliverability, flow regimes in the tubing, production from different types of reservoirs, perforations, hydraulic fracturing, erosion mechanisms, etc. Το συγκεκριμένο μάθημα έχει διατηρηθεί στο πρόγραμμα σπουδών.

3. Έχει δημιουργηθεί ένα καινούριο μάθημα με τίτλο OGEE-524DL Well Engineering το οποίο διαφοροποιείται από το OGEE-526DL Production Engineering και περιλαμβάνει θέματα όπως formation damage, well testing, well testing interpretation, vertical lift, artificial lift, pressure build up tests, κ.ο.κ. Το τμήμα θεώρησε καλό τα δύο μαθήματα, Production Engineering και Well Engineering, να είναι υποχρεωτικά στο ΜΠΣ. Ως αποτέλεσμα οι φοιτητές θα πρέπει να πάρουν 9 υποχρεωτικά μαθήματα και 3 μαθήματα επιλογής.

4. Το μάθημα OGEE-520DL Drilling Methods and Well Testing, το οποίο περιείχε ύλη που ανήκει σε διαφορετικά γνωστικά αντικείμενα, έχει μετονομαστεί σε OGEE-520DL Drilling Engineering και τώρα περιλαμβάνει θέματα όπως drilling rig types, rotary drilling process, drilling fluids, drill bits, mud logging, casing, cementing, drilling hydraulics, well control, drilling cost analysis, etc. Τα θέματα σε well testing και well test interpretation, τα οποία έχουν ήδη συμπεριληφθεί στο μάθημα Well Engineering, έχουν διαγραφεί από το μάθημα Drilling Engineering.

5. Το περιεχόμενο του μαθήματος OGEE-521DL Reservoir Engineering έχει αναθεωρηθεί πλήρως συμπεριλαμβανομένων των στόχων και μαθησιακών αποτελεσμάτων του μαθήματος σύμφωνα με τα διεθνή πρότυπα.

6. Το περιεχόμενο και ο τίτλος του μαθήματος OGEE-542DL Safety and Risk Management έχουν αλλάξει με βάση τις διαπιστώσεις και εισηγήσεις της ΕΕΑ. Συγκεκριμένα, το πρώτο μέρος του περιεχομένου καταπιάνεται με την γενικότερη διαχείριση κινδύνων και το δεύτερο μέρος του μαθήματος επικεντρώνεται στους τομείς Πετρελαίου, Φυσικού Αερίου και Ενέργειας. Το στοιχείο της «Υγείας» έχει ενσωματωθεί στο περιεχόμενο του μαθήματος με αποτέλεσμα την μετονομασία του σε OGEE-542DL Health, Safety and Risk Management.

7. Κατόπιν εισήγησης της ΕΕΑ και για σκοπούς εμπλουτισμού του ΜΠΣ έχουμε εντάξει στα μαθήματα επιλογής ένα καινούργιο μάθημα, το OGEE-525DL Petroleum Refining

Processes το οποίο δίνει την ευκαιρία στους φοιτητές να αποκτήσουν εξειδικευμένες γνώσεις σχετικά με την διύλιση του αργού πετρελαίου και των κλασμάτων του.

8. Η ύλη του μαθήματος OGEE-560DL Geophysical Methods έχει διαμορφωθεί σε αναλογία 50/50 μεταξύ exploration geophysics and well logging.

9. Το περιεχόμενο του μαθήματος OGEE-550DL Environmental Impact Assessment έχει διαφοροποιηθεί με βάση τις εισηγήσεις της ΕΕΑ.

10. Τα μαθήματα OGEE-524DL GIS System for Energy, OGEE-544DL Smart Power Grid Management, και OGEE-525DL LPG Systems έχουν αφαιρεθεί από το ΠΣ.

11. Το τροποποιημένο ΜΠΣ, όπου τα μαθήματα κατατάσσονται σε υποχρεωτικά και επιλογής, εμφανίζεται στο **Παράρτημα 1**.

12. Κατόπιν εισήγησης της ΕΕΑ, τα μαθήματα του ΜΠΣ θα προσφέρονται με βάση συγκεκριμένη ακολουθία ώστε να εξασφαλίζεται μία συνεκτική δομή και να εξυπηρετούνται οι σκοποί του ΜΠΣ. Μαθήματα όπως το Reservoir Engineering, Well Engineering, και Production Engineering θα έχουν ως προ-απαιτούμενο (prerequisite) μάθημα το Drilling Engineering. Η προτεινόμενη ακολουθία μαθημάτων (semester breakdown) εμφανίζεται στο **Παράρτημα 2**.

13. Όλα τα μαθήματα του ΜΠΣ που έχουν διαφοροποιηθεί μετά από εισηγήσεις της ΕΕΑ εμφανίζονται στο **Παράρτημα 3**.

Εκτός από τις σημαντικές αλλαγές που έχουν γίνει όσο αφορά την δομή και το περιεχόμενο των μαθημάτων του ΜΠΣ, υπάρχουν επιπρόσθετα σημεία τα οποία χρήζουν βελτίωσης ή περεταίρω διευκρίνισης. Συγκεκριμένα:

1. Έχουν αναθεωρηθεί οι γενικοί και ειδικοί στόχοι καθώς και τα αναμενόμενα μαθησιακά αποτελέσματα του ΜΠΣ. Οι αναθεωρημένοι στόχοι και μαθησιακά αποτελέσματα εμφανίζονται στο **Παράρτημα 4**.

2. Παρόλο που έχει αναφερθεί ότι ο συνολικός αριθμός φοιτητών ανά εξάμηνο υπολογίζεται στους 100, η πρακτική που ακολουθείται στο πανεπιστήμιο όσο αφορά προγράμματα εξ αποστάσεως είναι ο αριθμός των φοιτητών ανά τμήμα να μην υπερβαίνει τους 30.

3. Ο μεγαλύτερος αριθμός φοιτητών στο εν λόγω πρόγραμμα σπουδών αναμένεται από χώρες τις Αφρικής όπως Νιγηρία, Γκάνα, Καμερούν, Αίγυπτο, κ.α.

4. Όσον αφορά το διδακτικό προσωπικό που υποστηρίζει το ΜΠΣ, η ΕΕΑ θεωρεί ότι ο αριθμός του ακαδημαϊκού προσωπικού είναι περιορισμένος. Συγκεκριμένα, η ΕΕΑ πιστεύει ότι το ακαδημαϊκό προσωπικό πλήρους και αποκλειστικής απασχόλησης υποστηρίζει σε μικρό βαθμό τα υποχρεωτικά βασικά μαθήματα του ΜΠΣ ενώ τα μαθήματα επιλογής υποστηρίζονται σε ικανοποιητικό βαθμό. Η θέση και επιδίωξη του Τμήματος Μηχανικής είναι η πρόσληψη και απασχόληση περαιτέρω συνεργατών με εξειδίκευση σε βασικά μαθήματα του ΠΣ (upstream courses). Δέσμευσή μας είναι ο αριθμός των διδασκόντων συνεργατών να αναλογεί στον συνολικό αριθμό των εγγεγραμμένων φοιτητών.

5. Όσο αφορά τα θέματα της εξ αποστάσεως εκπαίδευσης, το Τμήμα Μηχανικής συμφωνεί απόλυτα με την παρατήρηση ότι το μαθησιακό υλικό που προορίζεται για τους φοιτητές να είναι διαμορφωμένο κατάλληλα ώστε να τους εμπλέκει και να τους υποστηρίζει στη μαθησιακή τους εμπειρία. Οι διδάσκοντες σε προγράμματα Distance Learning επιμορφώνονται μέσω παρακολούθησης μαθήματος που καταπιάνεται με παιδαγωγικές πρακτικές ώστε η διδασκαλία να είναι αποτελεσματική. Το συγκεκριμένο μάθημα προσφέρεται για το διδακτικό προσωπικό δωρεάν και σε τακτά χρονικά διαστήματα. Επίσης προσφέρονται αρκετά εκπαιδευτικά σεμινάρια κατά την διάρκεια του ακαδημαϊκού έτους όσον αφορά την χρήση της ηλεκτρονικής πλατφόρμας και των διαφόρων εγχειριδίων που χρησιμοποιούνται.

6. Το Τμήμα συμφωνεί με την θέση της ΕΕΑ ότι η υφιστάμενη διαδικασία επιμόρφωσης των διδασκόντων στην εξ αποστάσεως εκπαίδευση θα πρέπει να θεσμοθετηθεί και να προαπαιτείται γι' αυτούς που πρόκειται να διδάξουν και να αναλάβουν θέσεις ευθύνης στο ΠΣ.

Πιστεύουμε ακράδαντα ότι οι πιο πάνω βελτιώσεις που έγιναν - όσο αφορά το περιεχόμενο του προγράμματος σπουδών, την ακολουθία των μαθημάτων, τους στόχους και τα μαθησιακά αποτελέσματα του κάθε μαθήματος - έχουν ως αποτέλεσμα τη δημιουργία ενός ισορροπημένου, αξιόλογου, και ολοκληρωμένου ακαδημαϊκού προγράμματος που συνάδει με τα διεθνή πρότυπα και προδιαγραφές. Φυσικά, είμαστε πάντα δεκτικοί σε περεταίρω βελτιωτικές προτάσεις και αναπροσαρμογές του προγράμματος ειδικά όταν αυτό θα έχει τρέξει για μερικά χρόνια με τους πρώτους μεταπτυχιακούς απόφοιτους.

Προσβλέπουμε σε μία θετική απάντηση σχετικά με την έγκριση του προγράμματος «Master of Science in Oil, Gas and Energy Engineering – Distance Learning». Η άμεση ανταπόκρισή σας, όσον αφορά τις αλλαγές που έχουν υιοθετηθεί και τα απαντητικά μας σχόλια στην έκθεση αξιολόγησης της ΕΕΑ, θα ήταν επιθυμητή ώστε το πρόγραμμα να μπορέσει να τρέξει κανονικά το προσεχές εξάμηνο (Φθινοπωρινό 2016) το οποίο ξεκινά την ερχόμενη βδομάδα.

Με εκτίμηση,

Δρ. Γιώργος Γρηγορίου
Κοσμήτορας της Σχολής Επιστημών και Μηχανικής

Παράρτημα 1

Τροποποιημένο Πρόγραμμα Σπουδών

DL - MSc in Oil, Gas and Energy Engineering (September 2016)

PROGRAM REQUIREMENTS	ECTS
Compulsory courses (9)	67.5
Elective courses (3)	22.5
Total ECTS	**90**

A/A	Course Type*	Course Code	Course Title	Teaching Periods/Week	ECTS
A. MAJOR REQUIRED COURSES					
1	Required	OGEE-510DL	Petroleum Geology	3	7.5
2	Required	OGEE-520DL	Drilling Engineering	3	7.5
3	Required	OGEE-521DL	Reservoir Engineering	3	7.5
4	Required	OGEE-522DL	LNG Systems	3	7.5
5	Required	OGEE-524DL	Well Engineering	3	7.5
6	Required	OGEE-526DL	Production Engineering	3	7.5
7	Required	OGEE-542DL	Health, Safety & Risk Management	3	7.5
8	Required	OGEE-545DL	Oil and Gas Transport Networks	3	7.5
9	Required	OGEE-560DL	Geophysical Methods	3	7.5
B. MAJOR ELECTIVE COURSES					
10	Elective	OGEE-525DL	Petroleum Refining Processes	3	7.5
11	Elective	OGEE-530DL	Energy Security & Geopolitics	3	7.5
12	Elective	OGEE-531DL	Energy Efficiency	3	7.5
13	Elective	OGEE-532DL	Solar, Wind & Biomass Energy	3	7.5
14	Elective	OGEE-540DL	Energy Markets & Economics	3	7.5
15	Elective	OGEE-543DL	Project Management	3	7.5
16	Elective	OGEE-550DL	Environmental Impact Assessment	3	7.5

Παράρτημα 2

Τροποποιημένη Ακολουθία Μαθημάτων

DL MSc in Oil, Gas and Energy Engineering – Semester Breakdown (September 2016)

A/A	Course Type	Course Name	Course Code	Number of ECTS
A' Semester				
1.	R	Petroleum Geology	OGEE-510DL	7.5
2.	R	Drilling Engineering	OGEE-520DL	7.5
3.	R	Geophysical Methods	OGEE-560DL	7.5
4.	E	Major Elective		7.5
B' Semester				
5.	R	Reservoir Engineering	OGEE-521DL	7.5
6.	R	Well Engineering	OGEE-524DL	7.5
7.	R	Oil & Gas Transport Networks	OGEE-545DL	7.5
8.	E	Major Elective		7.5
C' Semester				
9.	R	LNG Systems	OGEE-522DL	7.5
10.	R	Production Engineering	OGEE-526DL	7.5
11.	R	Health, Safety and Risk Management	OGEE-542DL	7.5
12.	E	Major Elective		7.5

Παράρτημα 3

Περιγραφή Μαθημάτων που Έχουν Τροποποιηθεί

University of Nicosia, Cyprus

Course Code	**Course Title**	**ECTS Credits**
OGEE-510DL	Petroleum Geology	7.5
Department	**Semester**	**Prerequisites**
Engineering	Fall, Spring	None
Type of Course	**Field**	**Language of Instruction**
Required	Oil, Gas and Energy Engineering	English
Level of Course	**Year of Study**	**Lecturer(s)**
2nd Cycle	1st	Dr Ernestos Sarris
Mode of Delivery	**Work Placement**	**Co-requisites**
Distance Learning	N/A	None

Objectives of the Course:

The main objectives of the course are to:

- Introduce the students to the geologic processes that created the Earth system.
- Explain the theory of plate tectonics and how the three major families of rocks are created (Igneous, Sedimentary and Metamorphic).
- Identify how sediments convert to sedimentary rocks and what types of sedimentary rocks host hydrocarbons.
- Define the basic concepts of basin analysis.
- Differentiate carbonate rocks (chemical and biological sedimentary rocks) from sandstones (siliciclastic sedimentary rocks).
- Distinguish conventional from non-conventional geological reserves.
- Illustrate the conditions of conventional petroleum accumulation.
- Provide technical knowledge for understanding the mechanisms of hydrocarbon generation and migration.
- Examine how the tectonic stress field creates petroleum traps.
- Underline the importance of cap/seal rocks and their importance in petroleum exploration.
- Define the concepts of the two main petrological parameters of a reservoir (Porosity and Permeability-Darcy fluid flow law).
- Demonstrate the concept of the petroleum system in sedimentary basins.
- Introduce the students to volumetric analysis and perform preliminary calculations for insitu reserves.
- Practice basic stress analysis so that students will understand the link between rocks types and drilling.

Learning Outcomes:

After completion of the course students are expected to:

- Know how the earth system works.
- Explain the geologic processes that created the three major families of rocks.

- Identify which types of rocks are major hosts of oil and gas.
- Categorize the main characteristics of a conventional petroleum reservoir.
- State the mechanisms of hydrocarbon generation from parent rocks and migration to the petroleum trap.
- Specify the importance of the cap and seal rocks in the petroleum system.
- Distinguish the petrophysical parameters of reservoirs such as porosity (storage) and permeability (Darcy fluid flow law).
- Perform volumetric calculations for estimating in-situ reserves.
- Understand the concepts of stress analysis for drilling engineering.

Course Contents:

- Basic concepts and terms.
- The earth system.
- Igneous rocks (processes of magma solidification).
- Sedimentary rocks (formation of rocks by surface processes).
- Metamorphic rocks (alterations of rocks by temperature and pressure increase).
- Sedimentology of carbonate rocks (chemical and biological sediments).
- Sedimentology of sandstone rocks (siliciclastic sediments).
- Basic concepts of basin analysis.
- Introduction conventional petroleum reservoirs.
- Generation of Hydrocarbons in the parent rock.
- Migration of Hydrocarbons to the reservoir.
- Creation of hydrocarbon Traps from tectonic processes.
- Seal and Cap rocks on top of reservoirs.
- Reservoir major characteristics (Porosity, Permeability and Pressure).
- Reserves preliminary calculations.
- The petroleum system (a time depended physical process).
- Basic stress analysis.

Learning Activities and Teaching Methods:

Lectures, Online Questions, Quizzes, Demonstration Videos and Forum Discussions.

Assessment Methods:

Assignments, Online Exercises, Projects, and Final Exam.

Required Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
Selley R.C. and S.A. Sonnenberg	Elements of Petroleum Geology (3rd ed.)	Academic Press	2015	978-0-12-386031-6

Recommended Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN

Mitchell R.F. and S. Z. Miska	Fundamentals of Drilling Engineering	SPE	2011	978-1-55563-207-6

University of Nicosia, Cyprus

Course Code	**Course Title**	**ECTS Credits**
OGEE-520DL	Drilling Engineering	7.5
Department	**Semester**	**Prerequisites**
Engineering	Fall, Spring	None
Type of Course	**Field**	**Language of Instruction**
Required	Oil, Gas and Energy Engineering	English
Level of Course	**Year of Study**	**Lecturer(s)**
2nd Cycle	1st	Dr Nicolas Kokkinos
Mode of Delivery	**Work Placement**	**Co-requisites**
Distance Learning	N/A	OGEE-510DL

Objectives of the Course:

The main objectives of the course are to:

- Introduce to the principles and the role of drilling.
- Present comprehensively the various types of drilling rigs and drilling systems.
- Facilitate the selection of the proper drilling rig and drilling technique.
- Provide technical knowledge related to a typical drilling process and discriminate the various drilling stages.
- Distinguish and evaluate all the components in a drilling string.
- Define the drilling cost.
- Provide technical knowledge for choosing suitable drilling bits.
- Evaluate the types of drilling fluids (oil based and water based).
- Assess mud performance through mud logs.
- Solve practical drilling problems.
- Perform drilling hydraulics calculations.
- Analyze casing and cementing design.
- Control well.
- Underline the importance of directional and horizontal drilling.

Learning Outcomes:

After completion of the course students are expected to:

- Know the basic concepts of drilling and deeply understand rotary drilling technique.
- Demonstrate solid knowledge of the drilling rig systems.
- Calculate drilling costs (onshore and offshore) in terms of investment in petroleum engineering.
- Choose the suitable drilling bit type and calculate replacements.
- Choose the proper drilling joints.
- Differentiate the types of drilling fluids.

- Demonstrate use of mud engineering techniques.
- Determine the mud cake building mechanisms (emulsion separation).
- Specify mud properties and their performance through mud logs.
- Solve first-hand calculations related to drilling hydraulics and understand the hydraulic behavior of the drilling fluids in the drilling string.
- Interpret correctly data accrued from drilled cuttings.
- Design and develop the drilling, casing and cementing plan.
- Identify and solve problems related with the drilling-casing-cementing.
- Respond appropriately to emergencies on avoiding “kicks”.
- Obtain basic knowledge in directional and horizontal drilling.

Course Contents:

- Drilling engineering overview.
- Drilling rig types and systems.
- Typical drilling rig organization.
- The rotary drilling process (onshore and offshore).
- Drilling fluids.
- Basics on mud logging.
- Rotary drilling bits.
- Casing and cementing.
- Drilling hydraulics.
- Well control.
- Drilling field problems and solutions.
- Basic drilling engineering computations.
- Drilling cost analysis.
- Introduction to directional and horizontal drilling.

Learning Activities and Teaching Methods:

Lectures, Videos, Online Questions, Quizzes and Forum Discussions.

Assessment Methods:

Assignments, Online Exercises, Projects, and Final Exam.

Required Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
Mitchell R.F. and S.Z. Miska	Fundamentals of Drilling Engineering	SPE	2011	978-1-55563-338-7

Recommended Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
Azar J.J. and G.R.	Drilling Engineering	PennWell	2007	1-59370-

Samuel				072-5

University of Nicosia, Cyprus

Course Code	**Course Title**	**ECTS Credits**
OGEE-521DL	Reservoir Engineering	7.5
Department	**Semester**	**Prerequisites**
Engineering	Fall, Spring	OGEE-520DL
Type of Course	**Field**	**Language of Instruction**
Required	Oil, Gas and Energy Engineering	English
Level of Course	**Year of Study**	**Lecturer(s)**
2nd Cycle	1st	Dr Nicolas Kokkinos
Mode of Delivery	**Work Placement**	**Co-requisites**
Distance Learning	N/A	None

Objectives of the Course:

The main objectives of the course are to:

- Introduce the principles and the role of reservoir engineering.
- Outline the basic concepts of reserve/resource categorization.
- Delineate the fundamentals of reservoir behaviour.
- Explain comprehensively the use of equation-of-states in reservoir engineering.
- Familiarise students with all aspects of reservoir classification.
- Present fluid flow in porous media under various conditions.
- Appreciate the changes in reservoir behaviour as reservoir pressure drops.
- Identify primary, secondary and tertiary recovery.
- Assess the development potential of oil and gas reservoirs.
- Underline the importance of improved and enhanced oil recovery methods.

Learning Outcomes:

After completion of the course students are expected to:

- Recognise reservoir behaviour and its properties.
- Be aware of deterministic and probabilistic methods of hydrocarbon reserves estimation.
- Illustrate the use of equation-of-states.
- Carry out simple phase-equilibrium calculations.
- Characterise and classify correctly an oil or gas reservoir.
- Identify the principal drive mechanisms in a reservoir.
- Determine the best overall recovery strategy for a reservoir.
- Understand displacement processes.
- Employ improved and enhanced oil recovery methods.

Course Contents:

- Introduction to reservoir engineering.

- Hydrocarbon reserves and resources estimation.
- Reservoir fluid behaviour and properties.
- Fundamentals of rock properties.
- Use of Cubic Equation of States (CEoS).
- PVT analysis.
- Classification of reservoirs.
- Development of material balance technique.
- Fluid flow in porous media under steady-state, semi-steady state and unsteady state conditions.
- Darcy's law and its applications.
- Determination of oil well/gas well performance.
- Description of drive mechanisms.
- Water Influx.
- Displacement of oil and gas.
- Basics on improved and enhanced oil recovery methods.

Learning Activities and Teaching Methods:

Lectures, Online Questions, Projects, Video Demonstrations, Discussion.

Assessment Methods:

Assignments, Online Exercises, Quizzes, Final Exam.

Required Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
L. P. Dake	Fundamental of Reservoir Engineering, Vol. 8 (Developments in Petroleum Science)	Elsevier Science	1978	978-0444418302

Recommended Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
Revised by R. E. Terry and J. B. Rogers	Applied Petroleum Reservoir Engineering	Prentice Hall (Pearson Education Inc.)	2015	978-0133155587
Tarek Ahmed	Reservoir Engineering Handbook	Gulf Professional Publishing	2010	978-1-85617-803-7
L. P. Dake	The Practice of Reservoir Engineering (Revised Edition)	Elsevier Science	2001	978-0080574448

University of Nicosia, Cyprus

Course Code	**Course Title**	**ECTS Credits**
OGEE-524DL	Well Engineering	7.5
Department	**Semester**	**Prerequisites**
Engineering	Fall, Spring	OGEE-520DL
Type of Course	**Field**	**Language of Instruction**
Required	Oil, Gas and Energy Engineering	English
Level of Course	**Year of Study**	**Lecturer(s)**
2nd Cycle	1st/2nd	Dr Ernestos Sarris
Mode of Delivery	**Work Placement**	**Co-requisites**
Distance Learning	N/A	None

Objectives of the Course:

The main objectives of the course are to:

- Review the basic principles of fluid flow in porous media.
- Enhance knowledge to gas flow in porous media and understand the Klingenberg effect.
- Explain the extent of the rock damage after drilling.
- Identify the implications of damage on the underestimated permeability (skin problems) of the reservoir.
- Understand the artificial lift methodology to access vertical lift performance of the wells.
- Provide solid knowledge on designing artificial lift to optimize well performance.
- Examine the gas lift method for optimizing well performance.
- Provide solid understanding of well testing methods.
- Explain the pressure transient regimes and the build-up test.
- Familiarize the students with other well testing methods (Multi-rate test).
- Examine well testing through “type curves” methodology (Ramey’s curves, McKinley curves and Gringarden et al. curves).
- Complete the knowledge by examining the flow-after-flow gas wells testing.
- Provide basic understanding of the pseudo-pressure in gas well test analysis.

Learning Outcomes:

After completion of the course students are expected to:

- Distinguish the parameters that govern single and multiphase flows in porous media.
- Discriminate between actual and damaged permeability and its importance in the prediction of the well deliverability for well testing.
- Understand the damage mechanisms from well drilling and stress

concentrations around wellbores.

- Perform calculations for evaluation and designing vertical lift to access the performance of the wells.
- Use knowledge to apply artificial lift to enhance well performance.
- Identify the important parameters that govern gas lift for optimization of tube performance and well deliverability.
- Identify the mechanisms that provide energy to lift oil from bottom-hole to surface.
- Comprehend what are testing methods and their importance.
- Comprehend how to sustain or enhance oil and gas production rates.
- Identify problems that compromise oil and gas production rate prediction.
- Obtain first-hand experience from solution of practical problems with real well data.
- Perform calculations from transient pressure build up test data.
- Manipulate calculations to reach estimations from data obtained from multi-rate tests.
- Understand the importance of empirical relations in well testing (Ramey's curves, McKinley curves and Gringarden et al. curves).
- Comprehend the flow-after-flow gas well testing.
- Review the pseudo-pressure in gas well design.
- Solve well production problems utilizing the decline analysis so as to predict well performance and deliverability.

Course Contents:

- The fluid flow in porous media.
- Formation damage after drilling.
- Selection of artificial lift to enhance well performance.
- Design of artificial lift to optimize well performance.
- The gas lift methodology for optimum well performance.
- Pressure build up tests for production performance prediction.
- The ideal and the actual build up tests.
- Pressure drawdown test.
- Multi-rate test.
- Production decline analysis.
- Analysis of well using type curves.
- Ramey's curves.
- McKinley curves.
- Gringarden et al. curves.
- Gas wells testing.
- Flow-after-flow tests.
- Pseudopressure in gas well test analysis.

Learning Activities and Teaching Methods:

Lectures, Online Questions, Quizzes, Demonstration Videos and Forum Discussions.

Assessment Methods:

Assignments, Online Exercises, Projects, and Final Exam.

Required Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
Chaudhry A.U	Oil Well Testing Handbook	Elsevier, Gulf Professional Publishing	2004	0-7506-7706-6

Recommended Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
Guo B., W.C. Lyons and A. Ghalambor.	Petroleum Production Engineering, A computer-Assisted Approach	Elsevier, Gulf Professional Publishing	2007	978-0-7506-8270-1
Lee J.	Well Testing	SPE	1982	978-089520-317-5

University of Nicosia, Cyprus

Course Code	**Course Title**	**ECTS Credits**
OGEE-525DL	Petroleum Refining Processes	7.5
Department	**Semester**	**Prerequisites**
Engineering	Fall/Spring	None
Type of Course	**Field**	**Language of Instruction**
Elective	Oil, Gas and Energy Engineering	English
Level of Course	**Year of Study**	**Lecturer**
2nd Cycle	1st/2nd	Dr Constantinos Hadjistassou
Mode of Delivery	**Work Placement**	**Co-requisites**
Distance Learning	N/A	None

Objectives of the Course:

The main objectives of the course are to:

- Introduce students to refining processes and refinery configurations;
- Familiarise attendees with refinery stocks and products;
- Detail the physical and thermal properties of petroleum fractions;
- Explain the processes of crude oil distillation and catalytic reforming;
- Help attendees understand thermal cracking and coking;
- Present the process of hydro-conversion and fluidised catalytic cracking;
- Elaborate on petroleum product blending and alkylation;
- Outline the process of hydrogen production as well as clean fuels;
- Explain the purpose of residue upgrading;
- Overview the safety record of refineries;
- Appreciate the environmental aspects of refining plants.

Learning Outcomes:

After completion of the course students are expected to:

- Demonstrate knowledge of the chemical (engineering) aspects of petroleum refining;
- Know the composition of crude oils and products;
- Recognise the thermo-physical attributes of petroleum fractions;
- Explain the processes of crude oil distillation and catalytic reforming;
- Explain thoroughly coke formation and thermal cracking;
- Identify hydro-conversion and fluidised catalytic cracking;
- Explain the mechanics of product blending and alkylation;
- Describe and provide information on clean fuels and residue upgrading;
- Identify safety hazards in refineries;

- Undertake basic refinery economic calculations;
- Identify the types of wastes in refinery plants and waste management;
- Familiarise with the environmental issues pertaining to refinery operations.

Course Contents:

- Overview of physical separation and chemical catalytic conversion processes;
- Composition of crude oils and petroleum products such as paraffins, gasoline, diesel fuel and characterisation of their physical properties;
- Basic input data, pseudo-components and determination of thermos-physical properties;
- Crude distillation, oil desalting, crude distillation material balance, catalytic reforming, reforming reactions, reaction kinetics and isomerisation;
- Visbreaking, delayed coking, and thermodynamics of coking;
- Hydro-treating, hydrocracking, fluidisation, thermodynamics of fluidised catalytic cracking;
- Product blending, flash point, vapour point, and alkylation processes;
- Upgrading options, non-catalytic and catalytic processes;
- Hazards in refinery plants, risk assessment and risk mitigation;
- Refining costs, refining margins, and economic analysis;
- Wastes, such as effluent water and gas waste, and waste management in refineries.

Learning Activities and Teaching Methods:

Lectures, Online Questions, Projects, Demonstration Videos and Discussion.

Assessment Methods:

Assignments, Online Exercises, Final Exam

Required Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
Fahim, M. A., Alsahhaf, T. A., & Elkilani, A. S.	Fundamentals of petroleum refining	Elsevier	2010	978-0-444-52785-1

Recommended Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
Gary, J. H., Handwerk, G. E., & Kaiser, M. J.	Petroleum refining: technology and economics	CRC Press	2007	978-0-203-90792-4
Parkash, S.	Refining processes handbook	Elsevier	2003	978-0-750-67721-9

University of Nicosia, Cyprus

Course Code	**Course Title**	**ECTS Credits**
OGEE-526DL	Production Engineering	7.5
Department	**Semester**	**Prerequisites**
Engineering	Fall, Spring	OGEE-520DL
Type of Course	**Field**	**Language of Instruction**
Required	Oil, Gas and Energy Engineering	English
Level of Course	**Year of Study**	**Lecturer(s)**
2nd Cycle	1st /2nd	Dr Ioannis Bakouros
Mode of Delivery	**Work Placement**	**Co-requisites**
Distance Learning	N/A	None

Objectives of the Course:

The main objectives of the course are to:

- Introduce the students to conventional completions.
- Explain the reservoir performance.
- Understand tubing performance.
- Provide solid knowledge of production from undersaturated oil reservoirs.
- Discuss production from two-phase reservoirs (oil-water, gas-oil).
- Complete the knowledge of production technology by examining production from natural gas reservoirs.
- Examine perforated well completions and their significance in reservoir performance.
- Provide basic understanding of reservoir stimulation.
- Interpret the methodology of matrix acidizing for overcoming skin problems.
- Present the hydraulic fracturing technique to enhance fluid flow.
- Understand unstable formations that eventually end up producing sand particles (erosion phenomena).

Learning Outcomes:

After completion of the course students are expected to:

- Distinguish the bottom-hole completion techniques for different types of reservoirs.
- Discriminate between production and injection wells so as to understand optimum production/injection performance.
- Select the types of production conduits based on their technology in order to optimize production from reservoirs.
- Perform calculations for evaluation of well performance productivity and injectivity.
- Identify the equipment inserted in the completion string and their purpose of usage (Jewellery).

- Perform calculations for the reservoir performance (undersaturated, two-phase and natural gas).
- Obtain first-hand experience from handling calculations with the Darcy fluid flow law accounting for compressibility, rate dependent skin and total skin factors.
- Perform inflow performance evaluation (reservoir deliverability).
- Handle intake pressure calculations and estimate the IPR (inflow performance relationship) and TCP (Tubing performance curve) for optimum estimation of production rate.
- Understand the importance of Vogel and Fetkovich equations to estimate the reservoir performance.
- Compute the tubing outflow performance and understand the different flow regimes in the tube.
- Comprehend the Nodal Analysis methodology for assessment of well deliverability.
- Solve optimum production problems utilizing the gradient curves methodology.
- Review well construction methodologies and completion designs.
- Discriminate between un-perforated wells and perforated wells.
- Obtain basic knowledge of well stimulation techniques like the matrix acidizing and hydraulic fracturing to enhance production from reservoirs (permeability increase).
- Analyze production problems from unstable formations so as to avoid unwanted solids production.

Course Contents:

- Types of well completions.
- Selection of the type of conduit.
- Conventional completions.
- Well equipment (Jewellery).
- Reservoir performance.
- IPR (inflow performance relationship).
- Tubing performance.
- Well deliverability.
- TCP (Tubing performance curve).
- Flow regimes in the tubing.
- Nodal analysis.
- Gradient curve analysis.
- Production from undersaturated reservoirs.
- Production from two-phase reservoirs.
- Production from natural gas reservoirs.
- Commingled fluids.
- Perforations.

- Reservoir stimulation.
- Hydraulic fracturing.
- Unstable formations.
- Erosion mechanisms (sand control).

Learning Activities and Teaching Methods:

Lectures, Online Questions, Quizzes, Demonstration Videos and Forum Discussions.

Assessment Methods:

Assignments, Online Exercises, Projects, and Final Exam.

Required Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
Guo B., W.C. Lyons and A. Ghalambor.	Petroleum Production Engineering, A computer-Assisted Approach	Elsevier, Gulf Professional Publishing	2007	978-0-7506-8270-1

Recommended Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
Economides M.J., A.D. Hill, C.E. Economides and D. Zhu.	Petroleum Production Systems 2nd edition	Prentice Hall	2013	0-13-703158-0
Bellarby J.	Well completion design	Elsevier	2009	978-0-444-53210-7

University of Nicosia, Cyprus

Course Code	**Course Title**	**ECTS Credits**
OGEE-542DL	Health, Safety and Risk Management	7.5
Department	**Semester**	**Prerequisites**
Engineering	Fall, Spring	None
Type of Course	**Field**	**Language of Instruction**
Required	Oil, Gas and Energy Engineering	English
Level of Course	**Year of Study**	**Lecturer(s)**
2nd Cycle	1st/2nd	Dr Ioannis Bakouros
Mode of Delivery	**Work Placement**	**Co-requisites**
Distance Learning	N/A	None

Objectives of the Course:

The main objectives of the course are to:

- Help attendees recognize the importance of health and safety in the petroleum domain;
- Introduce students to hazards as well as risk management;
- Cover the principles and methods of risk management;
- Explain the attributes of process safety management and failure modes;
- Present pressure and control system designs in the process industries;
- Overview health and safety related regulations and standards;
- Teach attendees the main lessons learnt from incidents;
- Provide solid knowledge on the fundamentals and principles of systems reliability and life cycle aspects of process plants in the petroleum industry;
- Analyse the aspects and risk mitigation strategies;
- Develop the tools for quantitative and qualitative performance analysis of risk management.

Learning Outcomes:

After completion of the course students are expected to:

- Appreciate the role of health and safety matters in the oil & gas industry;
- Explain the main characteristics of energy safety and environmental hazards and risk management;
- Gain an understanding of risk related decision-making under uncertainty;
- Use engineering tools and practices in order to analyse and evaluate the performance of risk management;
- Recognise different pressure and control system designs and the risk they may pose;
- Identify the causes of major incidents;
- Appraise aspects and the reduction of risk of engineering components and

equipment;
- Describe various types of systems reliability, failure and life cycle aspects in the petroleum industry;
- Become accustomed to the elements of safety and environmental management systems.

Course Contents:

- Hazard identification (HAZID) and hazard identification during operation (HAZOP);
- Risk acceptance, decision making under uncertainty, concept of "as low as reasonably practicable (ALARP);
- Elements of health and safety, scope of guidelines, acceptable level of risk;
- Personal Protection Equipment (PPE);
- Process functions and reliability metrics;
- Pressure vessels, pipeworks and valves, heat exchangers, pressure relief, flare systems, instrument failure, fault-tolerance, automation;
- Failure of systems and components, importance of maintenance;
- Life-cycle aspects of process plants, start-up and shutdowns, pollution containment;
- Accident modelling and risk simulation.
- Lessons learnt from major incidents: Piper Alpha, Exxon Valdez, Gullfaks C, Deepwell Horizon, Montara, Bhopal.
- Fire, explosion characteristics, blowouts, gas leakage, chemical and gaseous explosions, induced earthquakes;
- Organisational health, safety and risk culture, contingency planning and emergency response;
- Types of regulations, enforcement, regulation agencies, industry organisations and engineering standards;
- Elements of, design and implementation of safety and environmental management systems.

Learning Activities and Teaching Methods:

Lectures, Online Questions, Projects, Demonstration Videos and Discussion.

Assessment Methods:

Assignments, Online Exercises, Final Exam

Required Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
Chandrasekaran S.	Health, Safety and Environmental Management in Offshore and Petroleum	Wiley	2016	978-1-119-22142-5

	Engineering			

Recommended Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
Sutton I.	Offshore Safety Management Implementing a SEMS Program	Elsevier	2014	978-0-323-26206-4
Wise Global Training	Introduction to Oil and Gas Operational Safety	Routledge	2015	978-1-315-84992-8
Narayan V.	Effective Maintenance: Risk & Reliability Strategies of Optimizing Performance, 2nd edition	Industrial Press	2012	978-0-8311-3444-0

University of Nicosia, Cyprus

Course Code	**Course Title**	**ECTS Credits**
OGEE-550DL	Environmental Impact Assessment	7.5
Department	**Semester**	**Prerequisites**
Engineering	Fall, Spring	None
Type of Course	**Field**	**Language of Instruction**
Elective	Oil, Gas and Energy Engineering	English
Level of Course	**Year of Study**	**Lecturer(s)**
2nd Cycle	1st/2nd	Dr Costas Papastavros
Mode of Delivery	**Work Placement**	**Co-requisites**
Distance Learning	N/A	None

Objectives of the Course:

The main objectives of the course are to:

- Enable students to understand the nature of the Environmental Impact Assessment (EIA) process and to be able to select and use suitable techniques;
- Explain the basic concepts, approaches and technical components of an EIA;
- Record the state of the environment prior and after operations i.e., oil and gas or civil works;
- Discuss the sources of waste, environmental hazards and risks to flora and fauna;
- Describe the ways an EIA and a Strategic Environmental Assessment (SEA) are conducted within the framework of onshore and offshore exploration and production;
- Identify the environmental parameters involved throughout all stages of onshore and offshore oil and gas exploration and exploitation;
- Appreciate atmospheric, land and offshore impacts from man-made activities;
- Outline strategies for tackling solid and liquid waste, oil spills and containment of hazardous substances;
- Provide training in policies, methods and applications of EIA using case studies.

Learning Outcomes:

After completion of the course students are expected to:

- Be familiar with the European, UK, and Cyprus legal basis on environmental assessment;
- Describe all the activities that take place during prospecting, exploration and exploitation;
- Identify and analyse the environmental issues with asset development, infrastructure, and oil exploration and production (E&P);
- Be able to conduct a baseline study and evaluate the environmental impact of E&P activities;
- Have a clear understanding of the operation of EIA and SEA within the planning

process;
- Critically review the EIA process explaining the different stages and types of activity involved;
- Suggest effective ways for minimising and managing solid and liquid waste and confront oil spills;
- Discuss the role of EIA in contributing to sustainable Development;

Course Contents:

- Origins and development of EIA;
- Legislative background of EIA in the EU, UK, Cyprus;
- The EIA process and its stages;
- Impact prediction, evaluation and mitigation measures;
- Participation, presentation and review; monitoring and auditing; stakeholder involvement;
- Environmental impacts during prospecting (effects of airgun noise, vessel traffic and towed streamers, effluent discharges, air pollutant emissions, sea floor disturbance);
- Environmental impacts during exploration: effects of drilling installation and removal, of drilling rig presence, of drilling discharges, of effluent discharges, of marine debris, of air pollutant emissions, of well testing, and of support activities;
- Environmental impacts during exploitation (development and production): effects of facility installation, of the presence of structures, of drilling discharges, of operational discharges, of marine debris, of air pollutant emissions, of support activities and of structure removal;
- Causes of marine oil spills, impacts, causes frequency; booms, skimmers, sorbents, spill-treating agents;
- Lessons learned from onshore and offshore incidents e.g., Kuwait oil spills, Exxon Valdez, Deepwell Horizon, Canada's tar sands, gas flaring, etc.;
- Case studies of EIA in Cyprus and other countries.

Learning Activities and Teaching Methods:

Lectures, Online Questions, Quizzes, Demonstration Videos and Forum Discussions.

Assessment Methods:

Weekly exercises, assignment, final exam.

Required Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
John Glasson, Riki Therivel, and Andrew Chadwick	Introduction to Environmental Impact Assessment (3rd edition)	Routledge	2005	978-0-415-33836-3
International Finance Corporation, World	Environmental, Health, and Safety Guidelines: Offshore Oil And Gas		2007	

Bank Group	Development			

Recommended Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
Orszulik T. Stefan	Environmental Technology in the Oil Industry.	Springer	2008	978-1-4020-5472-3

University of Nicosia, Cyprus

Course Code	**Course Title**	**ECTS Credits**
OGEE-560DL	Geophysical Methods	7.5
Department	**Semester**	**Prerequisites**
Engineering	Fall, Spring	None
Type of Course	**Field**	**Language of Instruction**
Required	Oil, Gas and Energy Engineering	English
Level of Course	**Year of Study**	**Lecturer(s)**
2nd Cycle	1st	Dr. Paul Featherstone
Mode of Delivery	**Work Placement**	**Co-requisites**
Distance Learning	N/A	OGEE-510DL

Objectives of the Course:

The main objectives of the course are to:

- Introduce the students to the concepts of wave theory and seismic waves.
- Explain the difference between deep seismic and near surface survey analysis.
- Teach the students to handle basic calculations with refracted and reflected seismic waves.
- Evaluate and analyze data of recorded seismic waves from the field so as to interpret the position of possible hydrocarbon reserves in sedimentary basins.
- Review the concepts of gravitational methods in geophysical exploration.
- Discuss explorational methods that rise from the magnetic anomalies of the earth's geodynamic system.
- Manage numerical calculations with geo-electrical methods.
- Illustrate formation evaluation from well logging.
- Compute parameters from the various electric logs (Normal, lateral, later, induction, spontaneous potential and micro logs).
- Introduce the students to radioactivity logging (Natural gamma radiation, gamma-ray density and neutron-gamma-ray) and extract parameters for calculations.
- Compare the level of accuracy of the log methods (electric, radioactivity and sonic).
- Conduct Software/numerical simulations.

Learning Outcomes:

After completion of the course students are expected to:

- Classify the basic types of seismic waves (Compressional, Shear, Rayleigh and Love).
- Perform calculations utilizing Snell's law and understand the importance of transmission and reflection coefficients.
- Explain the reflection and refraction of waves from single and multi-layer

structures in horizontal and dipping configurations.

- Compute parameters like velocity, layer thickness and dip angle of layers from reflection and refraction analysis.
- Practice numerical calculations of the following methods: plus minus, normal moveout, root mean square velocities (RMS) and travel two way times.
- State the concept of stacking for data enhancement, seismic migration, 3D seismic reflections and filtering of seismic data.
- Examine the Bouguer gravity and the concepts of gravitational attraction of structures with simplified geometry (Sphere, Cylinder, Plate).
- Perform calculations and understand the concepts of anomalies caused by magnetized structures (horizontal and inclined plates).
- Compute data with the following methods: Dipole models, irregular 2D models and compound 3D models so as to gain knowledge in interpreting magnetic anomalies.
- Estimate with geo-electrical methods the depth of targets (hydrocarbons). The output of these methods basically includes the analysis of electrical resistivity of measurements obtained with the following methods: Barnes parallel resistor method, cumulative resistivity inversion method, characteristic curves method and electromagnetic surveying.
- Understand the methods of electric logging and radioactivity logging for formation evaluation. Specifically the students will identify the lithology of the well, bed thickness, porosity, water/hydrocarbon saturation and permeability of the formation from the various logs (electric, radioactivity and sonic).

Course Contents:

- Introduction to wave theory.
- Seismic waves and how they can be measured (seismometers).
- Recording of seismograms.
- The Refracted seismic waves.
- The Reflected seismic waves.
- Data processing from seismograms
- Interpretation of processed data.
- General description of other geophysical methods (gravitational, magnetic and geo-electrical).
- Introduction to formation evaluation.
- Different types of well logging.
- Electrical logging (Normal logs, lateral logs, later logs, induction logs, spontaneous potential logs and micro logs).
- Radioactivity logging (Natural gamma radiation logs, gamma-ray density logs and neutron-gamma-ray logs).
- Sonic logging.

Learning Activities and Teaching Methods:

Lectures, Online Questions, Quizzes, Demonstration Videos and Forum Discussions.

Assessment Methods:

Assignments, Online Exercises, Projects, and Final Exam.

Required Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
Robinson S. Edwin and Coruh Cahit	Basic Exploration Geophysics	Wiley	1998	047187941X

Recommended Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
Kearey Philip, Brooks Mike and Hill Ian	An Introduction to Geophysical Exploration	Wiley	2013	1118698932
Milsom John	Field Geophysics 3rd Edition	Wiley	2003	0470843470

Παράρτημα 4

Αναθεωρημένοι Στόχοι και Μαθησιακά Αποτελέσματα του ΜΠΣ

ΓΕΝΙΚΟΙ ΣΤΟΧΟΙ

The *general objectives* of the MSc programme in Oil, Gas and Energy Engineering – Distance Learning are to:

- Prepare graduate students to succeed in a constantly growing, demanding, and highly competitive technological world;
- Provide specialisation and extensive knowledge in the area of oil and gas engineering;
- Offer dedicated understanding to students associated with all phases of oil and gas fields, namely, exploration, appraisal, development, production and decommissioning;
- Help attendees appreciate the technical, scientific, social, environmental, economic and geopolitical matters related to the oil industry;
- Create an academic environment conducive to learning new oil, gas and energy engineering concepts and technologies;
- Introduce graduate students to research on advanced oil and gas energy engineering topics;
- Cultivate analytical skills and critical thinking;
- Promote engineering ethics and moral practices.

ΕΙΔΙΚΟΙ ΣΤΟΧΟΙ

The *specific objectives* of the programme are to:

- Provide specialised advanced knowledge and tools to our graduates in order to cope successfully in a technologically challenging environment;
- Delve into specific subjects such as geological processes, petroleum formation, basin analysis, reserves estimation, formation evaluation, and enhanced oil and gas recovery techniques;
- Explain the principles of petroleum geology, geophysics, drilling and well engineering, reservoir engineering, production engineering, pipeline transmissions networks, oil refining, gas treatment and transportation;
- Facilitate learning in areas of oil, gas and energy engineering that are directly linked to the industry and state-of-the-art technology;
- Provide the theoretical and computational skills necessary for the solution of both theoretical and practical engineering problems;
- Prepare graduates to work alone or in groups in order to provide engineering solutions;

- Prepare graduates to design/implement systems and processes towards the solution of engineering problems;
- Promote research, develop research skills and provide fundamental knowledge to support a successful career in research and development;
- Develop the ability of graduates to draft technical reports and scientific papers as well as to present their work before an audience;
- Provide graduates with the opportunity to develop a greater technical competence in their area and become successful professionals throughout their lifetime;
- Prepare graduates so that they may be admitted to and successfully complete a PhD programme in oil, gas and energy engineering or related fields.

ΜΑΘΗΣΙΑΚΑ ΑΠΟΤΕΛΕΣΜΑΤΑ

Upon successful completion of this programme, students should be able to:

- Utilise knowledge and understanding of oil and gas science and engineering and apply safety and risk management techniques;
- Propose specific tools and methods for oil and gas exploration, well drilling and completion, flow assurance, refining and pipeline networks;
- Use specialised knowledge on geology, geophysics, drilling, subsurface recovery, production, modelling, processing and transportation of oil & gas necessary for participating in actual oil & gas field projects;
- Identify, formulate and solve complex oil, gas, and energy engineering problems;
- Devise and conduct experiments, as well as analyse and interpret data;
- Assess the health, safety, risk, and environmental aspects of energy operations;
- Analyse and evaluate the economics and geopolitical aspects of the oil and gas industry and energy markets;
- Develop solutions that meet the desired needs within the economic, manufacturing and sustainability borders;
- Use the techniques, skills, and modern engineering tools necessary for engineering practice and research;
- Function and communicate effectively in multi-disciplinary teams.