



**KUWAIT UNIVERSITY
COLLEGE OF ENGINEERING & PETROLEUM
PETROLEUM ENGINEERING DEPARTMENT**

*PE GRADUATE PROGRAM
POLICIES AND PROCEDURES*

September 2002

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1. INTRODUCTION

The petroleum industry is the backbone of the State of Kuwait economy. Kuwait has about 10 percent of known oil world reserves. Maintaining large hydrocarbon reserves to enhance the economy of Kuwait requires developing additional petroleum reserves. This additional development will be either in the form of exploration and drilling, or in the form of developing new technologies to increase extraction from known domestic reserves. The broad goal of the graduate program in petroleum engineering is to define these technologies. Petroleum engineers with a postgraduate training are needed to make this goal possible.

Graduates of the program can also fill the demand for instructors in the educational system at various levels and help institutions of higher education develop their programs in both basic and applied research.

2. ADMISSION

2.1 Requirements for Regular Admission

1. A Bachelor's Degree or its equivalent in Petroleum Engineering or closely related field conferred by Kuwait University or by another academic institution recognized by Kuwait University.
2. A minimum overall grade point average of 2.67 points on a scale of 4.00 or its equivalent, and an average in the field of specialization of not less than 3.00 points on a scale of 4.00 or its equivalent .
3. A good command of English Language.
4. A written consent from the place of work confirming that there is no objection to joining the graduate program for an employed applicant.
5. The applicant must fulfill any additional conditions approved by the College of Graduate School and required by the program to which he/she wants to join, including any additional courses.
6. An applicant who had taken graduate courses at Kuwait University may be exempted from the grade point average requirements provided he/she satisfies the following conditions :
 - a) Successful completion of at least 12 credits.
 - b) Passing the graduate courses with a minimum overall average of 3.00 points.

2.2 Provisional Admission

An applicant is given a provisional admission status if he/she does not satisfy one or more of the requirements for regular admission and a decision may be made to admit him/her on exceptional basis if:

1. The applicant does not satisfy the required level of English language proficiency.
2. The PE Program Committee recommends admission on condition that the applicant passes some additional courses for a maximum of 15 credit hours. The credits of these additional courses shall not be counted as part of the requirements for the study program, and the grades obtained shall not be included in the calculation of the overall grade point average.
3. The grade point average of the major courses is between 2.67 and 2.99 or their equivalent.

3. ENROLLMENT REGULATIONS

3.1 Registration and Withdrawal

All graduate students are required to maintain continuous enrollment by registering during the periods specified by the College of Graduate Studies, and observe the relevant regulations governing study load. Students may stop registering for a period not exceeding a total of two semesters during their studies. Enrolled students who fail to register for more than two semesters or new students who fail to register during the semester in which they are admitted and do not request postponement of admission, will be considered to have withdrawn from the study program and their enrollment shall be cancelled.

A student may be allowed to withdraw from one or more courses during the periods specified by the College of Graduate Studies. There should be no withdrawal from courses after the specified periods except in cases of emergency or for compelling reasons, and upon the approval of the Course Instructor, the Program Director, and the College of Graduate Studies.

3.2 Payment of Fees

Students enrolled in the College of Graduate Studies shall pay the following fees (as of September 1998):

1. Registration fee of KD 40 for each semester.
2. Study fee of KD 10 for each registered credit hour.
3. Research fee of KD 30 for registration of thesis in each semester.

4. M.Sc. PROGRAM REQUIREMENTS

The Department of Petroleum Engineering (College of Engineering and Petroleum) offers a Master of Science Program in Petroleum Engineering. Part-time and full-time students are admitted to this program. Research requirements include either thesis or non-thesis options. The program is a balanced combination of the theoretical and practical aspects of petroleum engineering with enough flexibility to allow for interaction with the ever developing sciences and technologies and with the changing needs of the region. The program is designed to deepen and broaden the scientific and engineering skills in one of the following two areas:

- Reservoir Management
- Drilling Engineering

The general research interests in the department are focused in these two areas.

Program Requirements

The program requirements are (non-thesis option in parenthesis):

24 (33) TOTAL COURSE CREDITS

-- (3) COMPLUSORY (credit in parenthesis)

- 0650-592 Seminar (non-credit)
- 0650-593 Project (3)--(non-thesis option only)

9 (9) CORE ELECTIVE COURSES (3 credits each)

- 0600-502 Engineering Analysis II
- 0600-504 Numerical Analysis and Computation
- 0650-501 Advanced Petrophysics
- 0650-505 Transport Phenomena in Petroleum Engineering
- 0650-507 Introduction to Enhanced Oil Recovery

9 (12) SUBDISCIPLINE COURSES (3 credits each)

a) Reservoir Management

- 0650-509 Advanced Enhanced Oil Recovery
- 0650-521 Numerical Reservoir Simulation
- 0650-525 Advanced Fluid Flow in Porous Media
- 0650-531 Natural Gas Engineering

- 0650-539 Advanced Well Testing
- 0650-547 Characterization of Naturally Fractured Reservoirs

b) Drilling Engineering

- 0650-511 Formation Damage and Well Stimulation
- 0650-523 Production Well Logging
- 0650-527 Directional and Horizontal Drilling
- 0650-529 Well Completions and Workovers
- 0650-537 Drilling in Abnormal Pressure Zones

6 (9) FREE ELECTIVE COURSES

- 0650-545 Economic Evaluation of Petroleum Reservoirs
- 0650-549 Geostatistics
- 0650-551 Phase Behavior of Reservoir Fluids
- 0650-557 Advanced Log Evaluation Techniques
- 0650-559 Geological Applications of Wireline Logs
- 0650-561 Computer Processed Well Log Interpretation
- 0650-591 Special Topics in Petroleum Engineering

A maximum of 6 credit hours may be taken from any graduate program in the Faculty of Engineering and/or the Faculty of Science subject to the approval of the academic advisor and the program director.

NC COMPULSORY (Non-credit)

- 0650-597 Thesis

5. ACADEMIC SUPERVISION

5.1 Degree Students (thesis and non-thesis options)

An academic supervisor shall be nominated no later than the end of the second semester of the student admission to the program. For transfer students, an academic supervisor shall be nominated no later than the end of the second semester of the student's admission to the program or upon completing 12 hours of graduate course work, whichever comes first. It is the responsibility of the student to find an academic supervisor for his/her thesis or project from the PE faculty. Students will not be permitted to register for graduate courses in their third semester of graduate study unless he/she has selected an academic supervisor. The student must obtain the signature of his/her academic supervisor before registration.

5.2 Non-Degree Students

A new student shall be advised by the PE graduate program director for the first semester of study. A member of the graduate program committee shall be assigned for advising the student before the end of the first semester.

6. M.Sc. COMPREHENSIVE EXAMINATION

The by-laws of the College of Graduate Studies require that each student must take a comprehensive examination before completing 18 credit hours (Article 22). The comprehensive examination consists of both written and oral parts conducted by an examining committee formed by the program committee, and the examination is administered as follows:

1. The student should register for comprehensive examination at the beginning of the term during which he/she intends to take the examination. During this registration, the student should choose three areas from among the following five areas: Enhanced Oil Recovery (PE 507, PE 509), Advanced Petrophysics (PE 501), Transport Phenomena (PE 505), Formation Damage and Well Stimulation (PE 511).
2. A comprehensive examination committee consisting of at least three faculty members is nominated by the Program Committee and approved by the Dean of the College of Graduate Studies.
3. The examining committee prepares and conducts the written examination the date of which is announced at least one month earlier.
4. The student must appear for an oral examination offered no later than one week from the day the written examination results are posted.
5. Based on the evaluation of both written and oral examination, the committee decides with simple majority whether he/she passes the comprehensive examination.
6. A student who fails the examination for the first time must repeat it during the next semester. If he/she fails for the second time he/she is academically dismissed from the Master's Degree Program.

7. PROGRAM REGULATIONS

7.1 Program Regulations for Graduate Independent Study Courses

1. Only one independent study course is considered for credit.
2. Must be recommended by thesis or project supervisor and approved by the department graduate committee.
3. The instructor must submit to the graduate committee the following:
 - i. a course plan similar to the **ABET** Format indicating the topics with hours.
 - ii. a copy of the grading system which is given to the student.

7.2 Program Regulations for Selection of Examining Committee for M.Sc. Thesis

1. The selection of the examining committee must follow article 24 of the by-laws of the College of Graduate Studies.
2. The thesis supervisor nominates at least four names to be members in the examining committee, in addition to the supervisor who will be the chair of the committee.
3. The thesis supervisor also submits four names to be possible external examiner.
4. The PE Graduate Program Committee selects the names of members of the examining committee from among the nomination list prepared by the student supervisor. The committee should consist of at least three members and can be up to five members.
5. The PE Graduate Program Committee recommends three names to the College of Graduate Studies for possible external examiner from among the list provided by the student supervisor.
6. The Program Director sends the lists of the examining committee and the external examiner to the College of Graduate Studies for approval.

8. GRADUATION REQUIREMENTS

8.1 Requirements for Master's Degree with Thesis

1. Successfully completing all necessary course work.
2. Obtaining an overall average of 3.00 points on a scale of 4.00.
3. Passing the Comprehensive and Thesis Examinations.

Thesis Examination

1. The student in consultation with his/her thesis supervisor prepares a thesis proposal and submits it to the program committee.
2. If the program committee approves the proposal, then, a comprehensive examination committee is formed consisting of the thesis supervisor, and at least two other faculty members, nominated by the program committee and approved by the Dean of the College of Graduate Studies.
3. The student presents the proposal to the examination committee in a public seminar.
4. Following the presentation, the examining committee evaluates the student's maturity and understanding of fundamentals and decides with simple majority whether he/she passes the comprehensive examination.
5. A student who fails the examination for the first time must repeat it during the next semester. If the student fails for the second time he/she is academically dismissed from the Master's Degree Program.

8.2 Requirements for Master's Degree with Project

1. Successfully completing all necessary course work.
2. Obtaining an overall average of 3.00 points on a scale of 4.00.
3. Passing the Comprehensive Examination.

8.3 Graduate Diploma

A student who does not fulfill all the requirements for Master's Degree may be awarded a Graduate Diploma by the College of Graduate Studies, provided that he/she has passed a minimum of twenty one (21) credits of graduate courses (500 level or above). The Comprehensive Examination and the thesis are not required for the Diploma, but the student must have an overall average of at least 2.67 points.

9. TIME LIMIT FOR COMPLETION OF STUDY

9.1 Minimum Time Limit

The minimum time limit for completing the requirements of Master's Degree is twelve months.

9.2 Maximum Time Limit

1. Full-Time Students

The normal period for completing all the requirements of Master's Degree Program is two years of study and research. The student may, upon the approval of the Program Committee and the College of Graduate Studies, have the opportunity to maintain enrollment in the program for one additional academic year. In exceptional cases, a student, upon the approval of the Program Committee and College of Graduate Studies, may be given a chance to maintain his/her enrollment in the program for a maximum of one or two semesters after the three years.

2. Part-Time Students

The normal period for completing all the requirements for Master's Degree, in the case of part-time students, is three years of study and research. A student may, upon the approval of the Program Committee and College of Graduate Studies, have the opportunity to maintain enrollment in the program for one additional academic year. In exceptional cases, a student, upon the approval of the Program Committee and the College of Graduate Studies, may be given a chance to maintain his/her enrollment in the program for maximum of one or two semesters after the four years.

- 3.** In the case of students who are admitted after having successfully completed graduate courses at Kuwait University or at other academic institution, one semester will be deduced from the normal time limit for completing Master's degree requirements for every six (6) transferred course credits and time fractions are ignored.

10. FINANCIAL SUPPORT

10.1 Scholarships

The College of Graduate Studies may award scholarships to regular full-time Kuwaiti students who have no other sources of income. Successful applicants for scholarship must adhere to the relevant terms and conditions in the Graduate College by-laws.

10.2 Teaching Assistantships

Graduate students may be employed as part-time Teaching Assistants. The availability of these positions depend on actual needs of the department.

10.3 Research Grants

Limited amounts of money can be made available to support the research of graduate students and cover the cost of typing their theses.

10.4 Scientific Missions

A graduate student may attend one scientific mission during the period of his/her study for the degree in accordance with the following conditions:

1. The student has to be continuously registered on a regular full-time basis in a graduate program.
2. The student's grade point average should not be less than 3.5 on a scale of 4.00.
3. The student must have successfully completed at least 15 course credits.
4. The academic supervisor has to recommend the student for the scientific mission and the College of Graduate studies has to approve that recommendation.

During the scientific mission, the daily traveling allowance of (K.D. 30), the participation expenses, and the cost of economy class air ticket will be paid to the student.

11. NON-DEGREE STUDENTS

These are students who are allowed to study graduate level courses without being enrolled for an academic degree.

11.1 Conditions for Registration

Any applicant who wishes to register for graduate courses as a non-degree student is required to satisfy the following conditions:

1. Must have a Bachelor's degree or its equivalent conferred by Kuwait University or by an academic institution recognized by Kuwait University.
2. Must have a minimum overall GPA of at least 2.33.

11.2 Fees and Certificate

1. A non-degree student is required to pay a study fee of (K.D. 50) for each registered course credit.
2. The College of Graduate Studies will issue a certificate showing the grades obtained by the student in each course.

11.3 Conditions for Transfer to M.Sc. Degree Status

Non-degree students may transfer to the degree status upon satisfying the following conditions:

1. The applicant must have a B.S. degree in Petroleum Engineering conferred by Kuwait University or by another academic institution recognized by Kuwait University.
2. Pass the course ENG-501 "Engineering Analysis I" with grade "B" or better, not more than two years prior to the date of transfer to the degree status.
3. Pass at least three other courses from the PE Graduate Program with an average grade of "B" or better and with each course to be passed not more than two years prior to the date of transfer to degree status.
4. Students holding a B.S. degree in disciplines other than Petroleum Engineering conferred by Kuwait University or by another academic institution recognized by Kuwait University may be granted provisional degree status subject to the fulfilment of items 2 and 3 above. They may be transferred to regular degree status upon completion of any remedial undergraduate course(s) (not to exceed five) recommended by the graduate program committee.
5. Fulfil any other requirements set by the College of Graduate Studies.

12. ENGINEERING TECHNOLOGY STUDENTS

An applicant holding a degree of Bachelor in Engineering Technology can be considered for possible admission as a non-degree student if all requirements of the College of Graduate studies are satisfied on condition that :

- a) he/she has a minimum GPA of 3.0/4.0 in the Bachelor in Engineering Technology degree, and
- b) he/she has passed a minimum of 5 undergraduate courses (15 credits) in petroleum engineering at Kuwait University within a period of two years with a minimum GPA of 3.0. These five courses are the following:

		<u>Credits</u>
0650-221	Reservoir Rock Properties	3
0650-323	Phase Behaviour	3
0650-324	Reservoir Engineering	3
0650-341	Drilling Engineering	3
0650-411	Production Engineering	3

13. FACULTY MEMBERS

13.1 Rules

Professors and Associate Professors are automatically qualified to teach graduate courses and supervise or co-supervise graduate theses and dissertation. Assistant Professors are automatically qualified to be co-supervisors but their participation in teaching and supervision is based on nomination by the Program Committee and approval by the Dean of the College of Graduate Studies.

13.2 Faculty Members

Abbas Alikhan, Assistant Professor, Ph.D., 1973, University of Pennsylvania, Thermal Recovery.

Abdullah F. Alajmi, Assistant Professor, Ph.D., 2003, Pennsylvania State University, Petroleum and Natural Gas Engineering.

Abdullah S. Ebrahim, Assistant Professor, Ph.D., 1998, Colorado School of Mines, Drilling Engineering.

Adel M. Elsharkawy, Associate Professor, Ph.D., 1991, Colorado School of Mines, Phase Behavior.

Adel Malallah, Assistant Professor, Ph.D., 2001, Texas A&M, Geostatistics.

Ali Garrouch, Associate Professor, Ph.D., 1992, University of Texas at Austin, Petrophysics.

Eissa M. Al-Safran, Assistant Professor, Ph.D., 2001, The University of Tulsa, Production Engineering.

Fuad H. Qasem, Assistant Professor, Ph.D., 1996, University of Southern California, Fractured Reservoirs.

Ibrahim S. Nashawi, Associate Professor, Ph.D., 1989, Louisiana Tech. University, Well Testing.

Jalal F. Owayed, Assistant Professor, Ph.D., 2001, Tulsa University, Well Testing.

Mabkhout M. Al-Dousari, Assistant Professor, Ph.D., 2003, Colorado School of Mines, Petroleum Engineering.

Meshal K. Algharaib, Assistant Professor, Ph.D., 2002, Pennsylvania State University, Reservoir Simulation

Osamah Al-Omair, Assistant Professor, Ph.D., 2001, Colorado School of Mines, Reservoir Engineering.

Ridha Gharbi, Associate Professor, University of Texas at Austin, Ph.D., 1993, Enhanced Oil Recovery.

Salah M. Almudhhi, Assistant Professor, Ph.D., 2003, Colorado School of Mines, Formation Evaluation.

Yousef S. Khalaf, Assistant Professor, Ph.D., 1998, Colorado School of Mines, Reservoir Simulation.

14. FACILITIES

14.1 Computer Facility

The current computer facility in the department of Petroleum Engineering consists of two computer Labs. The first computer lab is mainly for undergraduate students use. It consists of 15 IBM-compatible PC's. Each PC consists of a Pentium IV 1.7 G Hz processor with 500 Mb of memory and 45 Gb hard disk, high-density floppy drives, a super VGA color monitor and an ethernet communication card. Four network color and black and white printers are available for student use. The second computer lab is for graduate students research applications. It consists of 2 SUN workstations (ultra-80), and a SUN server (4000 ENTERPRISE). This lab is also currently equipped with 3 Eclipse 100, 200 and 300 reservoir simulators, and Geoframe which is a geological modeling software. This particular research lab has also 4 modules of CMG reservoir simulator. These are:

1. IMEX which is a black oil simulator
2. GEM which is a compositional simulator
3. STAR which is a thermal simulator
4. WINPROP which is a phase behavior package.

This lab is also equipped with a CANON CLC-1150 color printer/copier and scanner.

Computers in both labs are connected to a computer network on Kuwait University campus that permits communication with virtually any computer system in the world. These computers, networked to the university mainframe computers, provide the major computing capabilities for scientific applications. The computer network allows not only user communication with other users on the network, but also servicing of requests from other computer systems in the department to promote the sharing of resources. As an example, PC-based systems in the department are able to share disk and printer resources with the University VAX mainframe (VAX 9000) and other machines on campus in other departments through the use of network connections. Kuwait University has at present an IBM (ES 9121/440) mainframe and a VAX (9000/420 VP) super mainframe. The department is connected to them by a Microsoft Windows NT 4.0 Local Area Network (LAN) via a Cisco Router connected to the backbone. The LAN includes, IBM-compatible PC(s), Compaq desktops and servers, Macintosh and SUN Workstations. KU Network is connected to international networks through Internet service provided by the National Science Foundation (NSF) in the USA. The department provides copies of Microsoft Word, Microsoft Excel, Microsoft Power Point, Visual Fortran and other related software.

14.2 Library Facilities

The Petroleum Engineering Department library is an integrated part of the main library of the College of Engineering and Petroleum. Petroleum books and related material occupy three shelves, and are arranged according to the Library of Congress classification. Our library contains petroleum engineering books, a variety of petroleum periodicals from the US, Canada, European and other countries, reports, video tape films for short courses and

CD ROM for all SPE papers. The library is located within the premises of the College of Engineering and is open from 8 AM to 9 PM from Saturday to Wednesday and from 8 AM to 1 PM on Thursday. It provides petroleum engineering students and staff with inter-library loans, CD-ROM services, conferences and meetings indexes. It also provides an on-line search services and access to databases such as LOCKHEAD (Dialog), whereby literature search of various bibliographic files are accessed upon request. Document delivery is provided from the database vendor when material is not available at Kuwait University.

The department is currently building a reading room which is located inside the department. This reading room makes a small collection of basic books, journals, reports, conference proceedings, theses, and specialized petroleum dissertations from various universities from around the world. The department is also connected online to the SPE OIL library so that faculty members can have instantaneous literature search feedback.

Flooding, Surfactant Flooding, Micellar-Polymer Flooding (MP), CO₂ Flooding, Alkaline Flooding, Miscible Flooding

0650-511 FORMATION DAMAGE AND WELL STIMULATION (3-0-3)
(Prerequisites: Graduate standing)

Types of formation damage, Diagnosis of formation damage, Remedies of formation damage, Water Injection Problems, Stimulation Methods, Decision and Planning of Stimulation Operations, Sand control, Gravel Packing.

0650-521 NUMERICAL RESERVOIR SIMULATION (3-0-3)
(Prerequisites: Graduate standing)

Steps involved in the development and application of numerical reservoir simulator models to primary and secondary recovery processes in reservoir engineering. Model Formulation, General Material Balances, Single Phase Flow, Overall Program Structure, Finite Difference Approximations, Boundary and Initial Conditions, Well Model, Anisotropy, Truncation Error, Grid Selection, Stability Analysis, Non-linear Problems, Multiphase Flow FDEs, Reservoir Framework, Relative Permeability, Capillary-Gravity Equilibrium, Model Initialization, Reservoir Characterization.

0650-523 PRODUCTION WELL LOGGING (3-0-3)
(Prerequisites: Graduate standing)

Fullbore Spinner Flowmeter, Manometer, Radioactive Tracer Survey, Temperature Surveys, Cement Bond Log, Noise Log, Multi-phase Flow in Pipes.

0650-525 ADVANCED FLUID FLOW IN POROUS MEDIA (3-0-3)
(Prerequisites: Graduate standing)

Traditional ways to describe flow through porous media, Classical view of two-phase flow, Introduction to Network Models, Effective Medium Theory, Monte-Carlo Simulations, Recent advances using Percolation Theory.

0650-527 DIRECTIONAL AND HORIZONTAL DRILLING (3-0-3)
(Prerequisites: Graduate standing)

Planning Directional Well Trajectory, Calculating the Trajectory of a Well, Planning the Kickoff and Trajectory Change, Directional Drilling Measurements, Deflection Tools, Principles of BHA, Deviation Control.

0650-529 WELL COMPLETIONS AND WORKOVERS (3-0-3)
(Prerequisites: Graduate standing)

Data Requirements for Completion Workover or Workover Planning, Selection of the Best Completion, Selection of Well completion and Workover Fluids, Perforation: Selection and Design, Well System Behavior: Principles and Testing, Well Inflow System Applications, Well Outflow System: Tubing Performance, Tubing and Packer Systems: Types, Selection Considerations, Movement and Forces in Tubing Packer Systems, Wireline Completions, Squeeze Cementing, Sand Control, Workover Planning and Evaluation.

0650-531 NATURAL GAS ENGINEERING (3-0-3)
(Prerequisites Graduate standing)

Types of Reservoir Fluids, Composition and Physical Properties, Phase Behavior, Equations of State, Flash & Differential Calculations, Gas Reserve Estimate, Gas Flow in Porous Media, Gas Well Testing, Hydrate, Types, Formation, Prediction and Preventions, Gas Flow in Pipes, Estimation of Bottom-Hole Pressures, Unloading Gas Wells, Gas Composition, Analyzing Performance of Gas Wells, Underground Storage of Natural Gas.

0650-537 DRILLING IN ABNORMAL PRESSURE ZONES (3-0-3)
(Prerequisites: Graduate standing)

Methods for Estimating Pore Pressure and Formation Fracture Resistance, Special Well Control Problems: Applications using Digitran ADS 9800 Drilling Simulator, Underbalanced Drilling. Rock Stability Analysis.

0650-539 ADVANCED WELL TESTING (3-0-3)
(Prerequisites: Graduate standing)

Well Test Analysis, Naturally Fractured Reservoirs, Use of Transient Tests to Determine Fractured Systems, Transient Rate Analysis and Constant Pressure Production, Computer – Aided Interpretation.

0650-545 ECONOMIC EVALUATION OF PETROLEUM (3-0-3)
RESERVOIRS

(Prerequisites: Graduate standing)

Review of Principles of Economics, Cash Flow Analysis, Oil and Natural Gas Reserve Estimates, Decline Curve Analysis, Profitability Criteria for Investment in Petroleum Industry, Project Analysis in Terms of the Interrelation of Technical and Economic Factors, Investment Analysis in the Presence of Uncertainty and Project Planning.

0650-547 CHARACTERIZATION OF NATURALLY FRACTURED (3-0-3)
RESERVOIRS

(Prerequisites: Graduate standing)

Origin of Fracture, Classification of Fractures, Petrophysical Properties of Fractured Reservoirs, Well Testing in Fractured Reservoirs, Well Testing Equations, Detection and Identification of Fractured Reservoirs, Reservoirs Processes, Modeling Fractured Reservoirs.

0650-549 GEOSTATISTICS (3-0-3)

(Prerequisites: Graduate standing)

Distribution Types, Statistics of Distributions, Parameter Estimators, Optimal Estimation, Bias and Precision, Covariance and Correlation and Associated Models, Application of Covariance to Dispersion, Variogram Models, Kriging, Co-Kriging, Uncertainty Assessment, Conditional Simulation, Simulated Annealing.

0650-551 PHASE BEHAVIOR OF RESERVOIR FLUIDS (3-0-3)

(Prerequisites: Graduate standing)

Quantitative representation of two-phase equilibria, Two-phase and Three-phase ternary Equilibria, Ternary diagrams for EOR processes, Composition and properties of reservoir fluids, Characterization of undefined fractions, EOS(s) types and mixing rules, Solvent phase behavior experiments, Surfactant-brine oil phase behavior, ternary diagrams and composition paths for micellar-polymer system, Simulation of PVT experiments, Thermodynamics of wax and asphaltene precipitation.

0650-557 ADVANCED LOG EVALUATION TECHNIQUES (3-0-3)

(Prerequisites: Graduate standing)

Log Evaluation in Shaly Sandstones, Log Evaluation in Carbonate Reservoirs.

0650-559 GEOLOGICAL APPLICATIONS OF WIRELINE LOGS (3-0-3)

(Prerequisites: Graduate standing)

Stratigraphic Interpretation, Dipmeter Log and Faciologs and Formation Microscanner Logs, Electrofacies, Recognition of Major Depositional Environments Logs, Structural Interpretation, Dipmeter and Microscanner Logs Dip Patterns of Folds, Interpretation of Faults, Scat Plots, Stereographic Plotting Techniques.

0650-561 COMPUTER PROCESSED WELL LOG INTERPRETATION (3-0-3)

(Prerequisites: Graduate standing)

Three Phases of Computer Processed Log Interpretation, Data Input, Parameter Estimation and Log Evaluation, Data Transfer: Las (Log Ascii Standard) Format, Log Digitization and Writing a Digitizer Program, Parameter Estimation, Log Evaluation, With Complex Lithologies, Generation of Cross Plots.

0650-591 SPECIAL TOPICS IN PETROLEUM ENGINEERING (3-0-3)

0650-592 SEMINAR (3-0-3)

0650-597 THESIS

**16. APPENDIX A: TYPING
FORMAT FOR M.Sc.
THESIS/PROJECT**

**KUWAIT UNIVERSITY
COLLEGE OF GRADUATE STUDIES
DEPARTMENT OF PETROLEUM ENGINEERING**

WATER FLOODING IN FRACTURED RESERVOIRS

**A THESIS
APPROVED FOR THE DISCIPLINE OF
PETROLEUM ENGINEERING**

**By
Ahmed Shamsi**

Submitted in Partial Fulfillment of the Requirements for the Degree of
Master of Science

March 2002

17. APPENDIX B: FORMS

KUWAIT UNIVERSITY
College of Engineering and Petroleum
Department of Petroleum Engineering

M. Sc. Project
Examination Results and Course Grade

Title:

Student:

Exam Date:

Location:

	Dr. X	Dr. Y	Dr. Z	Average
Written Report	/20	/20	/20	/20
Oral Exam	/20	/20	/20	/20

Approved

Dr. X:.....

Dr. Y:.....

Dr. Z:.....

Semester Work (supervisor)	Report (Average)	Oral (Average)	Total	Grade
/60	/20	/20	/100	

Supervisor:

**KUWAIT UNIVERSITY
 PETROLEUM ENGINEERING DEPARTMENT
 PE GRADUATE PROGRAM**

MASTERS PROGRAM OF STUDY

Student Name:..... Computer No.....

Expected Date for Graduation:

	Course No. & Title	Cr.	Semester/Yr.	Grade
COMPULSORY				
1.	0650-592 Seminar	0
2.	0650-593 Project(for non thesis only)	3
CORE ELECTIVE (9)				
1.
2.
2.
SUBDISCIPLINE ELECTIVE (9 cr.)				
1.
2.
3.
FREE ELECTIVE (9-15 cr.)				
1.
2.
3.
4.
5.
Total:			

Thesis/Project Title:

Supervisor's Name and Signature:

Date:

**KUWAIT UNIVERSITY
PETROLEUM ENGINEERING DEPARTMENT
PE GRADUATE PROGRAM**

**APPLICATION FOR M. Sc. COMPREHENSIVE EXAMINATION
For Thesis Option Students Only**

Semester/Year:

Student Name:

Student Number:

Contact Tel and Fax:

Number of hours completed:

Thesis Title:

Name of advisor:

Name of the Co-Supervisor:

Proposal Attached: **Yes.....** **No.....**

Student Signature: **Date:**

Supervisor Signature: **Date:**

For Graduate Program Committee Use Only

Examination Committee:

.....

.....

.....

.....

Exam Date:

**KUWAIT UNIVERSITY
PETROLEUM ENGINEERING DEPARTMENT**

PE GRADUATE PROGRAM

**APPLICATION FOR M.Sc COMPREHENSIVE EXAMINATION
For Non-Thesis Option Students Only**

Semester/Year: _____

Student Name: _____

Student Number: _____

Contact Tel and Fax: _____

Number of hours completed: _____

Name of the advisor: _____

Areas of Examination (Select/circle only three from the list):

- | | |
|---------------------|---------------------|
| 1. Petrophysics | 4. Advanced EOR |
| 2. Trans. Phenomena | 5. Formation Damage |
| 3. Intro. to EOR | |

Student Signature: _____ Date: _____

Advisor Signature: _____ Date: _____

For Graduate Program Committee use only

Examination Committee:

Subject	Faculty Member
1. _____	_____
2. _____	_____
3. _____	_____

Written Exam Date: _____ Oral Exam Date and Time: _____

**KUWAIT UNIVERSITY
PETROLEUM ENGINEERING DEPARTMENT**

PE GRADUATE PROGRAM

PETITION FORM

Student Name: **Computer No.**.....

Address:
.....

Phone: **Fax:**..... **Email:**.....

No. of Credit Hours Completed:..... **GPA:**.....

Petition:.....
.....
.....
.....
.....

Student Signature: **Date:**.....

Supervisor Signature: **Date:**.....

Committee Decision: **Approved** **Declined**

Comments:.....
.....

Graduate Committee Signatures:
.....
..... **Date:**.....