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| **Identification** | **Subject**  | PETE 582: PVT – 4 credits  |
| **Department** | Petroleum Engineering |
| **Program** | Graduate |
| **Term** | Fall, 2015 |
| **Instructor** | PhD. Abbas Khaksar Manshad  |
| **E-mail:** | khaksar@put.ac.ir |
| **Phone:** | (+994 55) 671-25-34 and (+98 919) 395-18-99 |
| **Classroom/hours** | 11 Mehseti str. (Neftchilar campus), Wednesday 18:00-22:00Friday 18:00-20:00 |
|  | **Office hours** | Thursday 14:00-18:00Friday 14:00-18:00 or by appointment |
| **Prerequisites** | Consent of instructor |
| **Language**  | English |
| **Compulsory/Elective** | Required |
| **Required textbooks and course materials** | ***Core textbook:**** ***PVT and Phase Behavior of Petroleum Reservoir Fluids*** *- Danesh*
* ***Thermodynamic of Hydrocarbon Reservoir*** *- Firoozabadi*
* ***SPE Phase Behavior Monograph*** *- Whitson*
* ***SPE Papers and Lecture Notes.***

***Supplementary:**** ***Petroleum Reservoir Engineering*** *- Amyx*
* ***Reservoir Fluids*** *- Heinemann & Weinhardt*
* ***Properties of Petroleum fluids*** *- McCain*
* ***Hydrocarbon Phase Behavior*** *- Ahmad*
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| **Course website** |  |
| **Course outline** | This course is designed for the master students. Course addresses Fundamental of the Behavior of Hydrocarbon Fluids, Pure Component - Physical Properties, Properties of Natural Gases, PVT Experimental Test, Vapor-Liquid Phase Equilibrium, An Introduction to Equation of States, Phase Behavior Calculations, An Introduction to Splitting and Lumping Scheme, An Introduction to Splitting and Lumping Scheme, Interfacial Tension, Properties of formation Waters, Sampling from Oil and Gas Reservoir, PVT Data Quality Control, PVT Studies Regarding to Fluid of an Iranian Reservoir (PVT-sim software training), Asphaltene & Wax. |
| **Course objectives**  | *Generic Objective of the Course:** To develop an understanding of the basic physical properties of HC reservoirs,

*Specific Objectives of the Course:** To understand and learn the PVT modeling which includes: correlations, EOS, flash calculation, stability and criticality calculation, heavy components characterization, tunning and others.
* To apply this knowledge to simulate some of the more complex problems such as, flow assurance, MMP calculation, compositional gradient, saturation pressure, gas pseudo-pressure function and others.
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| **Learning outcomes** | By the end of the course the students should be able to learn:* Obtaining values of reservoir fluid properties from laboratory data and correlations.
* Chemical properties of hydrocarbons, conventional laboratory PVT tests and quality control.
* Learning about phase diagrams, mixing rules, EOS, EOS tunning, and fluid properties.
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| **Teaching methods** | **Lecture**  | x |
| **Group discussion** | x |
| **Experiential exercise** | x |
| **Simulation** | x |
| **Case analysis** | x |
| **Course paper** | x |
| **Others** |  |
| **Evaluation**  | **Methods** | **Date/deadlines** | **Percentage (%)** |
| **Midterm Exam** |  | 30 |
| **Case studies** |  |  |
| **Class Participation** |  | 5 |
| **Assignment and quizzes** |  | 15 |
| **Project** |  | 10 |
| **Presentation/Group Discussion** |  |  |
| **Final Exam** |  | 40 |
| **Others** |  |  |
| **Total**  |  | 100 |
| **Policy** | * **Preparation for class**

The structure of this course makes your individual study and preparation outside the class extremely important. The lecture material will focus on the major points introduced in the text. Reading the assigned chapters and having some familiarity with them before class will greatly assist your understanding of the lecture. After the lecture, you should study your notes and work relevant problems and cases from the end of the chapter and sample exam questions.Throughout the semester we will also have an assignment. * **Withdrawal (pass/fail)**

This course strictly follows grading policy of the School of Engineering and Applied Science. Thus, a student is normally expected to achieve a mark of at least 60% to pass. In case of failure, he/she will be required to repeat the course the following term or year. * **Cheating/plagiarism**

Cheating or other plagiarism during the Mid-term and Final Examinations will lead to paper cancellation. **Professional behavior guidelines**The students shall behave in the way to create favorable academic and professional environment during the class hours. Unauthorized discussions and unethical behavior are strictly prohibited. |
| **Tentative Schedule** |
| **Week** | **Date/Day****(tentative)** | **Topics** | **Textbook/Assignments**  |
| 1 | 30.09.151.10.152.10.15 | Fundamental of the Behavior of Hydrocarbon Fluids |  |
| 2 | 30.09.151.10.152.10.15 | Pure Component - Physical PropertiesProperties of Natural Gases |  |
| 3 | 14.10.1515.10.1516.10.15 | Phase Behavior of Crude Oils |  |
| 4 | 14.10.1515.10.1516.10.15 | PVT Experimental Test |  |
| 5 | 28.10.1529.10.1530.10.15 | Vapor-Liquid Phase Equilibrium |  |
| 6 | 28.10.1529.10.1530.10.15 | An Introduction to Equation of States |  |
| 7 | 12.11.1513.11.1514.11.15 | Phase Behavior CalculationsAn Introduction to Splitting and Lumping Scheme |  |
| 8 | 12.11.1513.11.1514.11.15 | **Mid-term Exam** |  |
| 9 | 26.11.1527.11.1528.11.15 | Interfacial Tension |  |
| 10 | 26.11.1527.11.1528.11.15 | Properties of formation Waters |  |
| 11 | 10.12.1511.12.1512.12.15 | Sampling from Oil and Gas Reservoir |  |
| 12 | 10.12.1511.12.1512.12.15 | PVT Data Quality Control |  |
| 13 | 24.12.1525.12.1526.12.15 | PVT Studies Regarding to Fluid of an Iranian Reservoir (PVT-sim software training) |  |
| 14 | 24.12.1525.12.1526.12.15 | Asphaltene & Wax |  |
|  | TBA | **Final Exam** |  |

This syllabus is a guide for the course and any modifications to it will be announced in advance.