COURSE SYLLABUS

1. Programme Information

1.1. Higher Education Institution	Universitatea Petrol – Gaze din Ploieşti
1.2. Faculty	Facultatea de Ingineria Petrolului și Gazelor
1.3. Department	Petroleum Geology and Reservoir Engineering
1.4. Field of University Studies	Mine, Petrol si Gaze
1.5. Cycle of University Studies	MASTER
1.6. Study Programme	Petroleum Engineering

2. Course Information

2.1. Course name	**Numerical simulation in petroleum transport and distribution**
2.2. Course lecturer	Assist. Prof. Dr. Eng. Doru Bogdan STOICA
2.3. Seminar/lab teaching assistant	Assist. Prof. Dr. Eng. Doru Bogdan STOICA
2.4. Project supervisor	
2.5, Year of study	1
2.6. Semester*	1
2.7. Evaluation type	E
2.8. Educational category** / course status***	DF/DOB

* the semester number is according to the curriculum;

** DF - Fundamental disciplines; DS - Specialization disciplines; DC - Complementary disciplines

*** mandatory/required = DOB; optional = DOP; elective = DFA

3. Estimated Total Time (hours per semester of teaching activities)

3.1. Number of hours per week	4	of which: 3.2. lecture	2	3.3. Seminar/laboratory	2	3.4. Project	
3.5. Total hours from the curriculum	56	of which: 3.6. lecture	28	3.7. Seminar/laboratory	28	3.8. Project	
3. 9. Total hours of individual study (study based on course materials, bibliography and notes, additional research in the library and on specialized electronic platforms, preparation for seminars/laboratories, homework, papers, portfolios, and essays)							94
3.10. Total hours per semester							150
3.11. ECTS							5

4. Conditions (where applicable)

4.1. by curriculum	➢ Mathematics ➢ Numerical Computation ➢ Computer Science ➢ Thermodynamics ➢ Chemistry ➢ Physics ➢ Underground Hydraulics and Hydraulic Engineering ➢ Mechanics of Materials ➢ Physical Chemistry of Hydrocarbon Reservoirs

4.2. for course delivery	➢ Lecture room featuring projection screen, video projector, PC and whiteboard ➢ Students are required to attend lectures, seminars, and laboratory sessions with their mobile phones switched off. Phone conversations during class are not permitted, nor is leaving the classroom in order to answer personal calls. ➢ Late arrival of students to lectures and seminars/laboratory sessions will not be tolerated, as it is disruptive to the educational process.
4.3. for seminar/laboratory activities	➢ Laboratory activities are conducted only in the laboratory room equipped according to the requirements of the course.

5. Specific competencies acquired and the learning outcomes* underlying them

Professional skills	**Learning Outcomes***
PS1. Apply fundamental knowledge of mathematics, physics, chemistry, and geology in petroleum and gas engineering.	**C1**: The Master's student/graduate explains the principles of numerical simulation used in oil and gas engineering. **S1**: The Master's student/graduate solves fundamental problems applicable to the oil and gas field using numerical simulation software. **RA1**: The Master's student/graduate practices logical reasoning and self-assessment of numerical simulation solutions in engineering decisions, justifying the choice of method and calculation parameters.
PS2. Applies health, safety, and environmental protection standards.	**C1**: The Master's student/graduate recognizes the importance of verifying the robustness of numerical simulations in impact and safety assessments. **S1**: The Master's student/graduate applies numerical simulation verification procedures (cross-checks) for estimates used in technical analyses. **RA1**: The Master's student/graduate demonstrates responsibility in using numerical simulation results for decisions with impact on safety and the environment.
Transversal Competencies	**Learning Outcomes**
TC1. Works effectively in multidisciplinary and international teams.	**C1**: The Master's student/graduate identifies the role of the numerical simulation specialist within a systems design team, understanding the interdependence between process data and the mathematical model. **S1**: The Master's student/graduate communicates simulation results to colleagues from other technical departments. **RA1**: The Master's student/graduate collaborates effectively as a member or coordinator for the simulation component of a project.
TC2. Professional Ethics and Social Responsibility	**C1**: The Master's student/graduate identifies professional ethics standards regarding the responsible use of numerical calculus-based simulations. **S1**: The Master's student/graduate applies ethical principles by clearly documenting the calculation assumptions and the approximation methods used.

	RA1: The Master's student/graduate demonstrates professional responsibility through the rigorous validation of process simulation results, avoiding the erroneous interpretation of data in the context of operational safety.
TC3. Autonomy and Career Management	**C1**: The Master's student/graduate identifies resources for training and transferring numerical simulation skills. **S1**: The Master's student/graduate develops calculation and simulation templates for recurring problems. **RA1**: The Master's student/graduate demonstrates autonomy and initiative in developing numerical simulation competencies.

* C – knowledge; S – skills; RA – responsibility and autonomy.

6. Course Objectives (derived from the grid of specific competencies acquired)

6.1. General Objective of the Course	✓ Acquiring knowledge regarding the numerical modeling of petroleum industry processes; learning the main types of numerical methods for solving systems of ordinary differential equations or partial differential equations.
6.2. Specific Objectives	✓ Applying acquired theoretical knowledge to meet practical requirements. ✓ Operating correctly with the entities and concepts of the studied field. ✓ Analyzing flow processes. ✓ Performing numerical simulations of processes in the oil and gas industry.

7. Contents

7.1. Course	No. of hours	Teaching methods	Remarks
1. Mathcad Overview: Numerical Matrix Calculus. Graphical Representations. Numerical Methods for Solving Equations and Systems of Equations. Numerical Differentiation and Integration. Evaluation of Sums and Products. Units of Measurement in Mathcad Documents. Data Exchange between Mathcad and Other Applications. Programming in Mathcad. Symbolic Calculus	10	Lecture, video projector, smart board	
2. Review of Numerical Methods with Applications to Engineering Problems in the Field	4		
3. Equation of State and Phase Equilibrium	2		
4. Static Flow through a Pipelin	2		
5. Dynamic Flow through a Pipeline	2		
6. Static Flow through a Pipeline Network	2		
7. Dynamic Flow through a Pipeline Network	2		
8. Energy Equation (or Energy Processes) in Transport and Storage Operations	2		

9. Control and Regulation Equipment in Natural Gas Networks	2		

Bibliography

1. Anton Hadar, Cornel Marin, Cristian Petre, Adrian Voicu - Metode numerice in inginerie, Ed. Politehnica Press, București, 2004
2. Burden R., Faires D., Numerical analysis, Pws-Kent, Boston, 1988.
3. Chapra S., Canale R., 1988, Numerical methods for engineers, Second Edition, Mcgraw-Hill Inc.,New York.
4. Corneliu Berbente, Sorin Mitran, Silviu Zancu - Metode Numerice, Editura Tehnica, 1998
5. David J. Logan, A first course in differential equations, Springer 2001.
6. Dănăilă S., Berbente C., 2003, Metode numerice în Dinamica fluidelor, Editura Acdemiei Române.
7. Dinu, F., - Bazele simulării numerice în extracția petrolului, Editura Universității ”Petrol-Gaze” din Ploiești, 2013;
8. Dinu, F., - Extracția gazelor naturale, Editura Universității ”Petrol-Gaze” din Ploiești, 2000;
9. Dinu, F., - Extracția și prelucrarea gazelor naturale, Editura Universității ”Petrol-Gaze” din Ploiești, 2013;
10. Dinu, F., - Extracția și tratarea gazelor naturale, Editura Universității ”Petrol-Gaze” din Ploiești, 2009;
11. Dinu, F., - Metode de evacuare a fazei lichide acumulată în sondele de gaze. Aplicații practice, Editura Universității ”Petrol-Gaze” din Ploiești, 2000;
12. Dinu, F., Extracția și Tratarea Gazelor Naturale, Editura Universității Petrol - Gaze din Ploiești, 2011, Fondul Social European, POSDRU, contract nr. 81/3.2/S/59102;
13. Fletcher C. A. J., 1991, Computational techniques for fluid dynamics, Vol. I & II, Second Edition,Springer-Verlag, Berlin, Heidelberg.
14. Gregor Skačej, Primož Ziherl - Solved Problems in Thermodynamics and Statistical Physics-Springer (2019)
15. Ioan RUSU - Metode numerice algoritmi în limbaj C, curs, 2006
16. M. Thirumaleshwar - Fundamentals Of Heat & Mass Transfer Includes Mathcad-based Solutions to Problems-Pearson Education (2014)
17. Marilena Popa, Romulus Militaru - Metode Numerice. Aplicații, curs, 2010
18. Michael Reimann - Thermodynamik mit Mathcad-Oldenbourg Wissenschaftsverlag (2010)
19. Mikhail V. Lurie, Emmanuil Sinaiski - Lurie Modeling of Oil Product and Gas Pipeline Transportation-Wiley-VCH (2008)
20. Minescu, F.,- Fizica zăcămintelor de hidrocarburi, Editura Universității din Ploiești, Vol. I, 1994, Vol. II, 2004;
21. Niculescu, N., Goran, N., - Tehnologia extracției gazelor - Îndrumar de laborator, Centrul de multiplicare I.P.G. Ploiești, 1990;
22. Nistor, I. - Proiectarea exploatării zăcămintelor de hidrocarburi fluide, Editura Tehnică, București, 1999;
23. Olteanu, B., Valter, P., Zgîia, I., - Hidrocarburi gazoase și lichefiate, Editura Tehnică, București, 1994;
24. Oroveanu, T.-Hidraulica si transportul produselor petroliere. Editura Didacticã și Pedagogicã, 1966.
25. Popescu, C., Coloja, M. P., - Extracția petrolului și gazelor asociate, Editura Tehnică, București, 1994;
26. Pușcoiu, N.,- Carnet tehnic gaze naturale, Editura Tehnică, București, 1994;
27. Resiga R., 2003, Mecanica fluidelor numerică, Editura Orizonturi Universitare, Timișoara.
28. Seteanu I., Broboană D., 2000, Numerical models in Hydraulics and Power Engineering, Editura BREN, București.
29. Strătulă, C., - Purificarea gazelor, Editura Ştiințifică și Enciclopedică, București, 1984;
30. Tudor, I., Dinu, F., - Protecția anticorozivă și reabilitarea conductelor și rezervoarelor, Editura Universității ”Petrol-Gaze” din Ploiești, 2007.
31. Stoica Doru, Eparu Cristian - Suport de curs - Bazele simulării în transportul, depozitarea și distribuția hidrocarburilor, Editura UPG Ploiești, 2022
32. Stoica Doru Bogdan, Suditu Silvian, Eparu Cristian, Neacsa Adrian, Fundamente teoretice și aplicații inginerești în Industria de Petrol și Gaze, Editura Universității Petrol-Gaze din Ploiești, 2025, ISBN 978-973-719-932-4

7.2. Seminar / Laboratory	No. of hours	Teaching methods	Remarks

1. Mathcad Overview: Numerical Matrix Calculus. Graphical Representations. Numerical Methods for Solving Equations and Systems of Equations. Numerical Differentiation and Integration. Evaluation of Sums and Products. Units of Measurement in Mathcad Documents. Data Exchange between Mathcad and Other Applications. Programming in Mathcad. Symbolic Calculus	10	Conversations, exercises, computer-aided practical work	
2. Review of Numerical Methods with Applications to Engineering Problems in the Field	4		
3. Equation of State and Phase Equilibrium	2		
4. Static Flow through a Pipelin	2		
5. Dynamic Flow through a Pipeline	2		
6. Static Flow through a Pipeline Network	2		
7. Dynamic Flow through a Pipeline Network	2		
8. Energy Equation (or Energy Processes) in Transport and Storage Operations	2		
9. Control and Regulation Equipment in Natural Gas Networks	2		

Bibliography

1. Anderson J. D., Degrez G., Dick E., Grundmann R., 1992, Computational fluid dynamics. an introduction, Springer-Verlag, Berlin, Heidelberg, New York.
2. Anton Hadar, Cornel Marin, Cristian Petre, Adrian Voicu - Metode numerice in inginerie, Ed. Politehnica Press, București, 2004
3. Chapra S., Canale R., 1988, Numerical methods for engineers, Second Edition, Mcgraw-Hill Inc.,New York.
4. Corneliu Berbente, Sorin Mitran, Silviu Zancu - Metode Numerice, Editura Tehnica, 1998
5. Dinu, F., - Bazele simulării numerice în extracția petrolului – Îndrumar de laborator, Editura Universității ”PetrolGaze” din Ploiești, 2013;
6. Dinu, F., - Bazele simulării numerice în extracția petrolului, Editura Universității ”Petrol-Gaze” din Ploiești, 2013;F 021.06/Ed.7 Document de uz intern
7. Dinu, F., - Extracția gazelor naturale, Editura Universității ”Petrol-Gaze” din Ploiești, 2000;
8. Dinu, F., - Extracția și prelucrarea gazelor naturale, Editura Universității ”Petrol-Gaze” din Ploiești, 2013;
9. Dinu, F., - Extracția și tratarea gazelor naturale, Editura Universității ”Petrol-Gaze” din Ploiești, 2009;
10. Dinu, F., - Metode de evacuare a fazei lichide acumulată în sondele de gaze. Aplicații practice, Editura Universității ”Petrol-Gaze” din Ploiești, 2000;
11. Dinu, F., Extracția și Tratarea Gazelor Naturale, Editura Universității Petrol - Gaze din Ploiești, 2011, Fondul Social European, POSDRU, contract nr. 81/3.2/S/59102;
12. Fletcher C. A. J., 1991, Computational techniques for fluid dynamics, Vol. I & II, Second Edition,Springer-Verlag, Berlin, Heidelberg.
13. Gregor Skačej, Primož Ziherl - Solved Problems in Thermodynamics and Statistical Physics-Springer (2019)
14. Ioan RUSU - Metode numerice algoritmi în limbaj C, curs, 2006
15. Laurence C. Evans, Partial Differential Equations, Graduate Studies in Mathematics, vol 19, AMS;
16. M. Thirumaleshwar - Fundamentals Of Heat & Mass Transfer Includes Mathcad-based Solutions to Problems-Pearson Education (2014)
17. Marilena Popa, Romulus Militaru - Metode Numerice. Aplicații, curs, 2010
18. Michael Reimann - Thermodynamik mit Mathcad-Oldenbourg Wissenschaftsverlag (2010)

19. Mikhail V. Lurie, Emmanuil Sinaiski - Lurie Modeling of Oil Product and Gas Pipeline Transportation-Wiley-VCH (2008)
20. Minescu, F.,- Fizica zăcămintelor de hidrocarburi, Editura Universității din Ploiești, Vol. I, 1994, Vol. II, 2004;
21. Nistor, I. - Proiectarea exploatării zăcămintelor de hidrocarburi fluide, Editura Tehnică, București, 1999;
22. Olteanu, B., Valter, P., Zgîia, I., - Hidrocarburi gazoase și lichefiate, Editura Tehnică, București, 1994;
23. Popescu, C., Coloja, M. P., - Extracția petrolului și gazelor asociate, Editura Tehnică, București, 1994;
24. Press W., Teukolsky S., Vetterling W., Flannery B, 1992, Numerical recipes in FORTRAN. The art of scientific computing, Second Edition, Cambridge University Press, Cambridge, New York, Oakleigh Australia.
25. Pușcoiu, N.,- Carnet tehnic gaze naturale, Editura Tehnică, București, 1994;
26. Strătulă, C., - Purificarea gazelor, Editura Ştiințifică și Enciclopedică, București, 1984;
27. Tudor, I., Dinu, F., - Protecția anticorozivă și reabilitarea conductelor și rezervoarelor, Editura Universității "Petrol-Gaze" din Ploiești, 2007.
28. Stoica Doru, Eparu Cristian - Suport de curs - Bazele simulării în transportul, depozitarea și distribuția hidrocarburilor, Editura UPG Ploiești, 2022
29. Stoica Doru Bogdan, Suditu Silvian, Eparu Cristian, Neacsa Adrian, Fundamente teoretice și aplicații inginerești în Industria de Petrol și Gaze, Editura Universității Petrol-Gaze din Ploiești, 2025, ISBN 978-973-719-932-4

7.3. Project	No. of hours	Teaching methods	Remarks
Bibliography			

8. Correlation of the course contents with the expectations of the epistemic community, professional associations and representative employers in the field related to the programme

- In order to outline the course content and select the appropriate teaching/learning methods, the course coordinators organized a meeting with: members of leading companies in the oil and gas industry, representatives of public institutions (relevant ministries, local authorities, etc.), as well as other faculty members from the same field belonging to other higher education institutions. The meeting aimed to identify the needs and expectations of employers in the industry and to ensure coordination with similar programs offered by other higher education institutions.

9. Assessment

Type of activity	9.1. Assessment criteria	9.2. Assessment methods	9.3. Weight in final grade
9.4. Course	Use of specific tools – algorithms, schemes, modelling.	Written examination	60%
	Attendance and participation during lectures	Attendance and answers to questions during lectures	15%
9.5. Seminar / Laboratory	Presentation of results	Data processing	20%
	Active seminar attendance	Correct and complete interpretation of the obtained values	5%

9.6. Project			
9.7. Minimum performance standard			
✓ Knowledge of fundamental theoretical and practical elements; solving a basic application. ✓ Attendance at laboratory sessions. ✓ Successful completion of theoretical and practical exam topics (50%).			

Date of completion	Course lecturer signature	Seminar/laboratory lecturer signature
19.09.2025	*Assist. Prof. Dr. Eng. Doru Bogdan STOICA*	*Assist. Prof. Dr. Eng. Doru Bogdan STOICA*
Date of department approval	**Head of department**	**Dean**
23.09.2025	*Assist. Prof. Dr. Eng. Alina PRUNDUREL*	*Assoc. Prof. Habil Dr. Eng. Cristian EPARU*
	___________	______________________________

COURSE SYLLABUS

1. Programme Information

1.1. Higher Education Institution	Universitatea Petrol – Gaze din Ploieşti
1.2. Faculty	Facultatea de Ingineria Petrolului și Gazelor
1.3. Department	Petroleum Geology and Reservoir Engineering
1.4. Field of University Studies	Mine, Petrol si Gaze
1.5. Cycle of University Studies	MASTER
1.6. Study Programme	Petroleum Engineering

2. Course Information

2.1. Course name	ADVANCED IN GEOLOGY AND GEOPHYSICS
2.2. Course lecturer	Prof.dr.eng. Branoiu Gheorghe-Adrian Lect.dr.eng. Neagu Daniela
2.3. Seminar/lab teaching assistant	Lect.dr.eng. Neagu Daniela
2.4. Project supervisor	
2.5, Year of study	1
2.6. Semester*	1
2.7. Evaluation type	Exam
2.8. Educational category** / course status***	DS / DOB

* the semester number is according to the curriculum;

** DF - Fundamental disciplines; DS - Specialization disciplines; DC - Complementary disciplines

*** mandatory/required = DOB; optional = DOP; elective = DFA

3. Estimated Total Time (hours per semester of teaching activities)

3.6. Number of hours per week	5	din care: 3.2. curs	2	3.3. Seminar/laborator	3	3.4. Project	-
3.5. Total hours from the curriculum	5	din care: 3.6. curs	2	3.7. Seminar/laborator	3	3.8. Project	-
3. 9. Total hours of individual study (study based on course materials, bibliography and notes, additional research in the library and on specialized electronic platforms, preparation for seminars/laboratories, homework, papers, portfolios, and essays)							80
3.10. Total hours per semester							150
3.11. ECTS							5

4. Conditions (where applicable)

4.1. by curriculum	➢ Knowledge of petroleum geology, structural geology, wells geophysics
4.2. for course delivery	➢ computer, videoprojector, interactive whiteboard
4.3. for seminar/laboratory activities	➢ videoprojector/interactive whiteboard ➢ computers for students ➢ softwares (Petrel, Interactive Petrophysics, TechLog, Surfer) ➢ datasets of petrophysical data, structural geology, wells diagraphies

5. Specific competencies acquired and the learning outcomes* underlying them”

Professional skills	Learning Outcomes*
1. Apply fundamental knowledge of mathematics, physics,	C1: The master's student/graduate is able to use fundamental methods for analyzing phenomena in the petroleum and gas industry.

chemistry, and geology in petroleum and gas engineering.	A1: The master's student/graduate applies physico-mathematical models applicable to the petroleum and gas industry. RA1: The master's student/graduate demonstrates critical thinking in evaluating engineering solutions and technological alternatives. RA2: The master's student/graduate applies optimization solutions in the hydrocarbon reservoir exploitation process and monitors results by comparing performance indicators.
2. Uses technical documentation and specialized software for petroleum planning and design.	C1: The master's student/graduate understands and uses technical documentation, design standards, scientific research standards, and educational standards specific to the Petroleum-Gas University of Ploiești. C2: The master's student/graduate uses specialized software for the design and optimization of hydrocarbon reservoir exploitation processes (operations planning, optimization, storage and distribution, flow analysis). A1: The master's student/graduate correctly interprets technical reports, scientific results obtained from tests and specialized software modeling of hydrocarbon reservoirs, as well as results from commissioning and operation tests of production processes. RA1: The master's student/graduate is able to prepare coherent and clear technical documentation for non-specialists.
3. Supervises and monitors petroleum production and operations.	C1: The master's student/graduate demonstrates knowledge of hydrocarbon reservoir design and production (petroleum operations planning, reservoir optimization). C2: The master's student/graduate develops plans for hydrocarbon reservoir design and production operations (petroleum operations planning, reservoir optimization). A1: The master's student/graduate manages and ensures the safety of hydrocarbon reservoir design and production operations (petroleum operations planning, reservoir optimization). RA1: The master's student/graduate assumes responsibility for the safe operation of hydrocarbon reservoir production equipment.
4. Supervises and monitors petroleum exploitation operations.	C1: The master's student / graduate understands the monitoring procedures for hydrocarbon reservoir exploitation equipment. S1: The master's student / graduate interprets production data and prepares compliance reports comparing plans and results. RA1: The master's student / graduate makes independent decisions in operational situations while complying with technical and safety regulations.
5. Applies health, safety, and environmental protection standards.	C1: The master's student/graduate understands the procedures for monitoring hydrocarbon reservoir production equipment. A1: The master's student/graduate interprets production data and prepares compliance reports comparing plans and results. RA1: The master's student/graduate makes independent decisions in operational situations, in compliance with technical and safety standards.
Transversal Competencies	**Learning Outcomes**
1. Works effectively in multidisciplinary and international teams.	C1: The master's student/graduate understands the dynamics of teams in the petroleum and gas engineering field (reservoir engineers, geologists, economists, contractors). A1: The master's student/graduate communicates clearly and concisely, both orally and in writing, in various professional contexts. RA1: The master's student/graduate collaborates efficiently and proactively, assuming responsibilities within the team.
2. Professional Ethics and Social Responsibility	C1: The master's student/graduate identifies the principles of professional ethics and specific legislation.

	C2: The master's student/graduate knows best practices in social responsibility. A1: The master's student/graduate applies ethical standards in professional decision-making. A2: The master's student/graduate demonstrates integrity in engineering activities. RA1: The master's student/graduate is aware of the social and environmental impact of decisions. RA2: The master's student/graduate adopts sustainable and responsible solutions.
3. Autonomy and Career Management	C1: The master's student/graduate identifies development opportunities in the petroleum industry field (reservoir engineering). C2: The master's student/graduate knows the sources for continuous learning and professional qualification. A1: The master's student/graduate develops their own professional development and career plans. A2: The master's student/graduate develops their digital and managerial competencies. RA1: The master's student/graduate shows initiative in continuous education. RA2: The master's student/graduate assumes responsibility for their own professional development. RA3: The master's student/graduate demonstrates adaptability to labor market changes.

* C – knowledge; S – skills; RA – responsibility and autonomy.

6. Course Objectives (derived from the grid of specific competencies acquired)

6.1. General objective of the discipline	To acquire knowledge regarding fundamental notions of geology and geophysics as a support for making correct decisions regarding the hydrocarbon field development plan and for reservoir engineering projects
6.2 Specific objectives	To understand the principles and applicability of geology and geophysics concepts in order to obtain reliable static and dynamic models of the reservoirs, both through singular methods and through integrated methods with the help of specialized softwares

7. Contents

7.1. Course	No. of hours	Teaching methods	Remarks
The Earth’s Structure, Global Tectonics, Sedimentary Basins and Processes	2	The mixed teaching method will be used using multimedia techniques that combine university lectures with student interactivity Online on the platform - power point presentations and discussions with students	Student-centered teaching methods and learning outcomes in relation to the development of practical skills
Petroliferous systems (source rocks, reservoir rocks, seal rocks, oil traps, migration)	2		
Petrophysical properties of the rocks (Porosity, Permeability, Saturation, Mobility)	1		
Reservoir fluid properties (Viscosity; Density; Formation Volume Factor; Compressibility; Relative Permeability; Capillary Pressure; Solution Gas–Oil Ratio; Phase Behavior (PVT); Interfacial Tension)	1		
Reservoir Drive Mechanisms during Hydrocarbon Production	1		
Introduction to integrated workflows for hydrocarbon reservoir characterization and modeling	1		
Uncertainty in geological and geophysical/petrophysical data and uncertainties in reserve estimation (OOIP and GIIP) and in production forecasts	1		

Petrophysical and seismic data preparation and data analysis (data quality control)	1		
Structural modeling (fault modeling; 3D pillar gridding; stratigraphic horizon modeling; stratification/zonation)	1		
Stratigraphic and facies modeling (sedimentary model generation, facies diagram creation, modeling of internal reservoir architecture, lithofacies modeling)	1		
Petrophysical modeling (upscaling, modeling of porosity, permeability, water saturation)	1		
Volumetric calculation and model validation (net-gross ratio (NTG) calculation, pore volume and in situ volumes (OOIP, GIIP), and model validation/control quality: consistency of correlation between geological and reservoir modeling	1		
Basic Relationships of Well Log Interpretation	1		
The Spontaneous Potential Log	1		
Gamma Ray Log	2		
Porosity Logs	2		
Resistivity Logs	1		
Magnetic Resonance Imaging Logs	1		
Log Interpretation	3		
Petrophysical Techniques	2		
Borehole Imaging	1		

Bibliography

1. Frunzescu D. Branoiu G., Geologie de zacamant, vol. 1 si vol. 2, editura UPG Ploiesti, 2003.
2. Malureanu I., Neagu D., Geofizica de sondă, lucrari practice, vol 1, editura UPG Ploiesti, 2009.
3. Malureanu Ion, Geofizica de sondă, vol. 1, Editura UPG Ploiesti, 2007;
4. Bjørlykke K., Well Logging: Principles, Applications and Uncertainties, Springer-Verlag Berlin Heidelberg, 2015;
5. Le Ravalec M., Doligez B., Lerat O., Integrated Reservoir Characterization and Modeling, IFPEN, 2014.
6. Ringrose P., Bentley M., Reservoir Model Design - A Practitioner Guide, Springer Science+Business Media B.V., 2015
7. Pyrcz, M.J., Deutsch, C.V., Geostatistical Reservoir Modeling, 2nd Edition, Oxford University Press, New York, 2014.
8. Soare Al., Creţu I., Beca C., Babskow Al., Manolescu G., Soare E., Ingineria zăcămintelor de hidrocarburi, Ed.Tehnica, București, 1981
9. Jürgen Schön - Basic Well Logging and Formation Evaluation, 2015;
10. Schlumberger – Log Interpretation Charts, 2009;
11. Asquith G., Krygowski D., Basic well log analysis, Second edition, American Association of Petroleum Geologists, 2004;

7.2. Seminar / Laboratory	No. of hours	Teaching methods	Remarks
Time Scale	1	The mixed teaching method will be used using multimedia techniques that combine university lectures with student interactivity Online on the platform - power point presentations and discussions with students	Student-centered teaching methods and learning outcomes in relation to the development of practical skills
Rocks cycle (Sedimentary, Igneous and Metamorphic Rocks)	1		
Petrophysical rock properties (Porosity, Permeability, Saturation)	2		
Reservoir fluid properties (Viscosity; Density; Formation Volume Factor; Compressibility; Relative Permeability; Capillary Pressure; Solution Gas–Oil Ratio; Phase Behavior (PVT); Interfacial Tension)	2		
Geological/geophysical/petrophysical data collection	1		
Structural and stratigraphic modeling	2		

3D grid construction (pillar gridding)	1		
Facies and Petrophysical modeling	2		
Reservoir volumetric calculation	2		
Validation of the 3D static/dynamic model	2		
Risk and uncertainty assessment of geological modeling by calibrating the 3D static/dynamic model with production data (matching production history and forecasting exploitation)	2		
Borehole Environment	2		
Formation Water Resistivity (Rw) Determination	3		
Shale Volume Calculation	3		
Flushed Zone Resistivity Logs	2		
Porosity Calculation	3		
Water Saturations: Sw and Sxo	3		
Permeability From Logs	3		
M-N and MID (Matrix Identification) Lithology Plot	3		
Borehole Image Interpretation	2		

Bibliography

1. Frunzescu D. Branoiu G., Geologie de zacamant, vol. 1 si vol. 2, editura UPG Ploiesti, 2003.
2. Malureanu I., Neagu D., Geofizica de sondă, lucrari practice, vol 1, editura UPG Ploiesti, 2009.
3. Malureanu Ion, Geofizica de sondă, vol. 1, Editura UPG Ploiesti, 2007;
4. Bjørlykke K., Well Logging: Principles, Applications and Uncertainties, Springer-Verlag Berlin Heidelberg, 2015;
5. Le Ravalec M., Doligez B., Lerat O., Integrated Reservoir Characterization and Modeling, IFPEN, 2014.
6. Ringrose P., Bentley M., Reservoir Model Design - A Practitioner Guide, Springer Science+Business Media B.V., 2015
7. Pyrcz, M.J., Deutsch, C.V., Geostatistical Reservoir Modeling, 2nd Edition, Oxford University Press, New York, 2014.
8. Soare Al., Creţu I., Beca C., Babskow Al., Manolescu G., Soare E., Ingineria zăcămintelor de hidrocarburi, Ed.Tehnica, București, 1981
9. Jürgen Schön - Basic Well Logging and Formation Evaluation, 2015;
10. Schlumberger – Log Interpretation Charts, 2009;
11. Asquith G., Krygowski D., Basic well log analysis, Second edition, American Association of Petroleum Geologists, 2004;

7.3. Project	No. of hours	Teaching methods	Remarks

Bibliography

8. Correlation of the course contents with the expectations of the epistemic community, professional associations and representative employers in the field related to the programme

- The content of the Advanced in Geology and Geophysics discipline provides graduates with the fundamental knowledge necessary to evaluate geological formations intercepted by wells/drillings and facilitates their employment in companies with a geological-geophysical activity profile, exploration for oil, gas, groundwater, geothermal water, underground storage of CO2 and useful solid mineral substances, as well as in research institutes.

9. Assessment

Type of activity	9.1. Assessment criteria	9.2. Assessment methods	9.3. Weight in final grade
9.4. Course	Use of specific tools – algorithms, schemes, modelling.	Written examination with multiple choice test	70%
	Attendance and participation during lectures	Attendance and answers to questions during lectures	5%
9.5. Seminar/laborator	Presentation of results	Data processing	20%
	Active seminar attendance	Correct and complete interpretation of the obtained values	5%
9.6. Project			
9.7. Minimum performance standard			
Carrying out laboratory work and accumulating minimal knowledge of geology and geophysics to create a static and dynamic model of a reservoir			

Date of completion	Course lecturer signature	Seminar/laboratory lecturer signature	Project supervisor signature
20.09.2025	______________________	______________________	______________________

Date of department approval	Head of department	Dean
23.09.2025	*(academic position, first name, last name)* *(Signature)* *Sef lucr.dr.ing. Prundurel Alina*	*(academic position, first name, last name)* *(Signature)* *Conf.habil.dr.ing. Eparu Cristian*

COURSE SYLLABUS

1. Programme Information

1.1. Higher Education Institution	Universitatea Petrol – Gaze din Ploieşti
1.2. Faculty	Facultatea de Ingineria Petrolului și Gazelor
1.3. Department	Petroleum Geology and Reservoir Engineering
1.4. Field of University Studies	Mine, Petrol si Gaze
1.5. Cycle of University Studies	MASTER
1.6. Study Programme	Petroleum Engineering

2. Course Information

2.1. Course name	Special Fluids in Oil and Gas
2.2. Course lecturer	Lecturer Ioana Gabriela Stan, Ph.D. Eng.
2.3. Seminar/lab teaching assistant	Lecturer Ioana Gabriela Stan, Ph.D. Eng.
2.4. Project supervisor	
2.5, Year of study	1
2.6. Semester*	1
2.7. Evaluation type	E
2.8. Educational category** / course status***	DS/DOB

* the semester number is according to the curriculum;

** DF - Fundamental disciplines; DS - Specialization disciplines; DC - Complementary disciplines

*** mandatory/required = DOB; optional = DOP; elective = DFA

3. Estimated Total Time (hours per semester of teaching activities)

3.6. Number of hours per week	3	din care: 3.2. curs	1	3.3. Seminar/laborator	2	3.4. Project	
3.5. Total hours from the curriculum	42	din care: 3.6. curs	14	3.7. Seminar/laborator	28	3.8. Project	
3. 9. Total hours of individual study (study based on course materials, bibliography and notes, additional research in the library and on specialized electronic platforms, preparation for seminars/laboratories, homework, papers, portfolios, and essays)							66
3.10. Total hours per semester							108
3.11. ECTS							5

4. Conditions (where applicable)

4.1. by curriculum	➢ Drilling fluids and well cements, Well drilling
4.2. for course delivery	➢ Classroom equipped with a screen, video projector, computer, and whiteboard. The course will be organized into learning units to support active-participatory teaching methods.
4.3. for seminar/laboratory activities	➢ Laboratory sessions will take place exclusively in an appropriately equipped laboratory room on specific stands. Laboratory works will be conducted in compliance with occupational health and safety standards. A laboratory technician will be present during the laboratory sessions

5. Specific competencies acquired and the learning outcomes* underlying them”

Professional skills	Learning Outcomes*

1. Apply fundamental knowledge of mathematics, physics, chemistry, and geology in petroleum and gas engineering.	C1: The master's student understands the chemical concepts, types of reactions, and fundamental mechanisms of productive formation damage. A1: Applies physico-mathematical models to calculate and adjust the density, viscosity, and filtration properties of completion fluids. RA1: Demonstrates critical thinking in selecting the appropriate completion and workover fluids (e.g., brines, solids-free fluids) based on specific well conditions. RA2: Applies optimization solutions for wellsite operations regarding the preparation and placement of clear fluids.
2. Uses technical documentation and specialized software for petroleum planning and design.	C1.Understands technical documentation and criteria for selecting completion fluids, additives, and bridging materials C2: Uses specialized calculation methods to formulate solids-free fluid systems and analyze their properties A1: Correctly interprets laboratory results regarding soluble salt content, turbidity, and the solubility of bridging materials in water, oil, and acids RA1: Is able to prepare clear technical documentation on the qualitative evaluation and laboratory testing of brines and completion fluids
3. Supervises and monitors petroleum production and operations.	C1: Demonstrates knowledge of wellsite operations required for well completion and workover procedures C2: Develops specific plans for the treatment, maintenance, and handling of fluid systems with or without solids A1: Manages laboratory procedures to ensure the stability and purity of completion fluids during operations RA1: Assumes responsibility for the safe operation of laboratory equipment used for measuring completion fluid properties.
4. Supervises and monitors petroleum exploitation operations.	C1: Understands the monitoring procedures for fluids with bridging materials to prevent the damage of the productive layers A1: Interprets experimental data regarding the performance of oil-based solids-free fluids and prepares laboratory reports RA1: Makes independent decisions regarding the real-time adjustment of fluid properties to match well requirements.
5. Applies health, safety, and environmental protection standards.	C1: Understands the HSE procedures for handling chemical additives, high-density brines, and oil-based fluids A1: Interprets environmental regulations regarding the treatment, recycling, and disposal of residues and fluids used for well workover RA1: Makes independent decisions regarding the safe disposal of completion fluids, in strict compliance with technical and environmental standards.
Transversal Competencies	Learning Outcomes
1. Works effectively in multidisciplinary and international teams.	C1: Understands the dynamics of teams during complex laboratory testing and wellsite operations involving completion fluids A1: Communicates clearly and concisely regarding the chemical analysis and qualitative evaluation of brines and fluids RA1: Collaborates proactively during laboratory case studies (e.g., measuring properties, adjusting filtration) assuming specific technical responsibilities.
2. Professional Ethics and Social Responsibility	C1: Identifies specific legislation regarding the environmental impact of completion fluids and chemical additives

	C2: Knows best practices for residue management in workover operations A1: Applies ethical standards when reporting laboratory data (e.g., fluid stability, extent of formation damage) RA1: Is aware of the environmental impact of decisions related to the disposal of brines and chemical residues RA2: Adopts sustainable and responsible solutions for fluid treatment and recycling.
3. Autonomy and Career Management	C1: Identifies development opportunities regarding advanced technologies for completion fluids and formation damage prevention C2: Knows the sources for continuous learning regarding new additives and smart fluid systems A1: Develops their practical skills in operating modern laboratory equipment for testing drilling and completion fluids RA1: Assumes responsibility for continuous education regarding specialized wellsite operations

* C – knowledge; S – skills; RA – responsibility and autonomy.

6. Course Objectives (derived from the grid of specific competencies acquired)

6.1. General objective of the discipline	The main objective is the acquisition of theoretical and practical knowledge regarding the selection, formulation, and laboratory testing of completion and workover fluids, in order to prevent productive formation damage and optimize wellsite operations
6.2. Specific objectives	To know the general notions, scope, and objectives of completion and workover fluids.To understand the chemical concepts, types of reactions, and mechanisms of productive formation damage. To identify the criteria for selecting solid-free fluids, bridging materials, and appropriate additives for specific wellsite operations

7. Contents

7.1. Course	No. of hours	Teaching methods	Remarks
Introduction. General notions about completion and workover fluids (scope, objectives).	1	Lecture	
Criteria for selecting completion and workover fluids.	2		
Chemical concepts, types of reactions, calculations, and chemical analysis techniques regarding completion and workover fluids.	2		
General aspects regarding the mechanisms of productive formation damage.	2		
Fluids with solids and bridging materials used for well completion and workover.	2		
Solids-free fluid systems used as completion fluids.	1		
Additives and materials used to adjust the properties of completion and workover fluids	1		
Other solids-free fluid systems used as completion fluids.	1		
Wellsite operations for the preparation and placement of clear fluids in the well.	1		
Treatment and disposal of residues and fluids used for well completion and workover	1		

Bibliography

N. Macovei, Deschiderea stratelor productive, Editura Universităţii din Ploieşti, 2008.
Bridges, K.L., Completion and Workover Fluids, Monograph, Vol. 19, SPE Inc., Richardson Texas, USA, 2000.
Patton, L.D., Well Completion and Workover, Part 5, Pet. Eng. Intl., October, 1979.
Gray, R.G., Darley, H.C.H., Composition and Properties of Oil Well Drilling Fluids, Gulf Publishing Company, Ed IV, 1981.
Spies, R.J., Field Experience Utilizing High-Density Brines as Completion Fluids, JPT, May, 1983.

7.2. Seminar / Laboratory	No. of hours	Teaching methods	Remarks

Equipment and methods for measuring the properties of completion fluids.	4	Case studies	
Determination of soluble salt content.	4		
Determination of the stability and purity (turbidity) of completion fluids.	4		
Determination of the solubility of bridging materials in water, oil, and acids.	4		
Adjusting the density, viscosity, and filtration properties of completion fluids.	4		
Qualitative evaluation and testing of brines	4		
Determination of the properties of oil-based solids-free fluids.	4		
Bibliography Popescu, M.G., Determinarea proprietatilor fluidelor de foraj, a pastelor si pietrei de ciment – Aparatura si probleme, Editura Universitatii din Ploiesti, 2002. Popescu, M.G., Manea, M., Cimenturi de sonda – indrumar de laborator, Editura Universitatii din Ploiesti, 2009. Popescu, M.G., Manea, M., Fluide de foraj – indrumar de laborator, Editura Universitatii din Ploiesti, 2008.			
7.3. Project	No. of hours	Teaching methods	Remarks
Bibliography			

8. Correlation of the course contents with the expectations of the epistemic community, professional associations and representative employers in the field related to the programme

➢ Participation in thematic exhibitions, workshops, and communication sessions in the field of mines, petroleum, and gas.Discussions with employers during company presentations in meetings with students.Using the results of scientific research contracts to complete/modify the course content.Working visits to the headquarters of the collaborating companies of the Faculty of Petroleum and Gas Engineering.

9. Assessment

Type of activity	9.1. Assessment criteria	9.2. Assessment methods	9.3. Weight in final grade
9.4. Course	Grade given at the final examination	Written test + general discussions on the subjects covered in the written test	70
	Note given for course attendance		5
9.5. Seminar/laborator	Note given for laboratory activity	Portofolio presentation	20
	Note given for test papers during the semester		5%
9.6. Project			
9.7. Minimum performance standard			
Proper preparation of laboratory reports and homework. Acquisition of the meaning of the main terms used in the field. Correct solution of 50% of the homework assignments			

Date of completion	Course lecturer signature	Seminar/laboratory lecturer signature	Project supervisor signature
20.09.2025	____________	____________	____________

Date of department approval	Head of department Şef lucr. dr.ing. Prundurel Alina	Dean Conf.dr.ing. Eparu Cristian
23.09.2025	____________	____________

COURSE SYLLABUS

1. Programme Information

1.1. Higher Education Institution	Universitatea Petrol – Gaze din Ploieşti
1.2. Faculty	Facultatea de Ingineria Petrolului și Gazelor
1.3. Department	Petroleum Geology and Reservoir Engineering
1.4. Field of University Studies	Mine, Petrol si Gaze
1.5. Cycle of University Studies	MASTER
1.6. Study Programme	Petroleum Engineering

2. Course Information

2.1. Course name	Corrosion in petroleum engineering
2.2. Course lecturer	PROF.HABIL.DR.ING. CASEN PANAITESCU
2.3. Seminar/lab teaching assistant	PROF.HABIL.DR.ING. CASEN PANAITESCU
2.4. Project supervisor	
2.5, Year of study	1
2.6. Semester*	1
2.7. Evaluation type	E
2.8. Educational category** / course status***	DS

* the semester number is according to the curriculum;

** DF - Fundamental disciplines; DS - Specialization disciplines; DC - Complementary disciplines

*** mandatory/required = DOB; optional = DOP; elective = DFA

3. Estimated Total Time (hours per semester of teaching activities)

3.6. Number of hours per week	3	din care: 3.2. curs	2	3.3. Seminar/laborator	1	3.4. Project	
3.5. Total hours from the curriculum	42	din care: 3.6. curs	28	3.7. Seminar/laborator	14	3.8. Project	
3. 9. Total hours of individual study (study based on course materials, bibliography and notes, additional research in the library and on specialized electronic platforms, preparation for seminars/laboratories, homework, papers, portfolios, and essays)							94
3.10. Total hours per semester							136
3.11. ECTS							5

4. Conditions (where applicable)

4.1. by curriculum	➢ Thermotechnics ➢ Chemistry ➢ Fluid Mechanics ➢ Strength of Materials ➢ Physicochemistry of Rocks and Fluids
4.2. for course delivery	➢ Classroom equipped with projection screen, video projector, computer, and whiteboard. ➢ Students are not allowed to attend lectures, seminars, or laboratory activities with mobile phones turned on. ➢ Telephone conversations during classes are strictly prohibited. Students are not permitted to leave the classroom in order to

	answer personal phone calls, except in special or emergency situations.
4.3. for seminar/laboratory activities	➢ The corrosion laboratory requires specialized equipment and materials for studying chemical and electrochemical corrosion processes, including corrosion testing devices, protective coatings, inhibitors, and pipeline material samples. The laboratory must also provide a safe working environment equipped with ventilation systems, safety equipment, and modern analytical instruments for monitoring and evaluating corrosion phenomena.

5. Specific competencies acquired and the learning outcomes* underlying them"

Professional skills	Learning Outcomes*
1. Apply fundamental knowledge of mathematics, physics, chemistry, and geology in petroleum and gas engineering.	C1: The master's student/graduate is able to use fundamental methods for analyzing phenomena in the petroleum and gas industry. A1: The master's student/graduate applies physico-mathematical models applicable to the petroleum and gas industry. RA1: The master's student/graduate demonstrates critical thinking in evaluating engineering solutions and technological alternatives. RA2: The master's student/graduate applies optimization solutions in the hydrocarbon reservoir exploitation process and monitors results by comparing performance indicators.
2. Uses technical documentation and specialized software for petroleum planning and design.	C1: The master's student/graduate understands and uses technical documentation, design standards, scientific research standards, and educational standards specific to the Petroleum-Gas University of Ploiești. C2: The master's student/graduate uses specialized software for the design and optimization of hydrocarbon reservoir exploitation processes (operations planning, optimization, storage and distribution, flow analysis). A1: The master's student/graduate correctly interprets technical reports, scientific results obtained from tests and specialized software modeling of hydrocarbon reservoirs, as well as results from commissioning and operation tests of production processes. RA1: The master's student/graduate is able to prepare coherent and clear technical documentation for non-specialists.
3. Supervises and monitors petroleum production and operations.	C1: The master's student/graduate demonstrates knowledge of hydrocarbon reservoir design and production (petroleum operations planning, reservoir optimization). C2: The master's student/graduate develops plans for hydrocarbon reservoir design and production operations (petroleum operations planning, reservoir optimization).

	A1: The master's student/graduate manages and ensures the safety of hydrocarbon reservoir design and production operations (petroleum operations planning, reservoir optimization). RA1: The master's student/graduate assumes responsibility for the safe operation of hydrocarbon reservoir production equipment.
4. Supervises and monitors petroleum exploitation operations.	C1: The master's student / graduate understands the monitoring procedures for hydrocarbon reservoir exploitation equipment. S1: The master's student / graduate interprets production data and prepares compliance reports comparing plans and results. RA1: The master's student / graduate makes independent decisions in operational situations while complying with technical and safety regulations.
5. Applies health, safety, and environmental protection standards.	C1: The master's student/graduate understands the procedures for monitoring hydrocarbon reservoir production equipment. A1: The master's student/graduate interprets production data and prepares compliance reports comparing plans and results. RA1: The master's student/graduate makes independent decisions in operational situations, in compliance with technical and safety standards.
Transversal Competencies	Learning Outcomes
1. Works effectively in multidisciplinary and international teams.	C1: The master's student/graduate understands the dynamics of teams in the petroleum and gas engineering field (reservoir engineers, geologists, economists, contractors). A1: The master's student/graduate communicates clearly and concisely, both orally and in writing, in various professional contexts. RA1: The master's student/graduate collaborates efficiently and proactively, assuming responsibilities within the team.
2. Professional Ethics and Social Responsibility	C1: The master's student/graduate identifies the principles of professional ethics and specific legislation. C2: The master's student/graduate knows best practices in social responsibility. A1: The master's student/graduate applies ethical standards in professional decision-making. A2: The master's student/graduate demonstrates integrity in engineering activities. RA1: The master's student/graduate is aware of the social and environmental impact of decisions.

	RA2: The master's student/graduate adopts sustainable and responsible solutions.
3. Autonomy and Career Management	C1: The master's student/graduate identifies development opportunities in the petroleum industry field (reservoir engineering). C2: The master's student/graduate knows the sources for continuous learning and professional qualification. A1: The master's student/graduate develops their own professional development and career plans. A2: The master's student/graduate develops their digital and managerial competencies. RA1: The master's student/graduate shows initiative in continuous education. RA2: The master's student/graduate assumes responsibility for their own professional development. RA3: The master's student/graduate demonstrates adaptability to labor market changes.

* C – knowledge; S – skills; RA – responsibility and autonomy.

6. Course Objectives (derived from the grid of specific competencies acquired)

Objectives	The main objective of the course is to provide knowledge of the principal corrosion processes, as well as the design, technological, and operational factors that contribute to the corrosion-related degradation of pipelines and storage tanks. It also aims to develop an understanding of passive and active protection methods for pipelines and storage tanks, as well as knowledge of the characteristics of metallic and non-metallic materials used in their construction from the perspective of corrosion resistance.

7. Contents

7.1. Course	No. of hours	Teaching methods	Remarks
Chemical corrosion of metals	4	The teaching method used includes multimedia techniques accompanied by PowerPoint presentations, alternated with explanations and demonstrations on the board. The course is conducted interactively, through the systematic	
Electrochemical corrosion of metals	4		
Corrosion processes in onshore production facilities, including microbiologically influenced corrosion (MIC). Manifestation of corrosion processes during fluid transport through pipelines.	4		
Corrosion processes in offshore production facilities. Manifestation of	4		

corrosion processes during fluid transport through pipelines.		presentation of knowledge, while certain topics are approached through problem-solving, debate, and structural analysis, with the instructor facilitating dialogue for the clarification, synthesis, and deeper understanding of the subject matter together with the students.	
Anticorrosion protection of drilling and transport facilities in onshore areas	4		
Anticorrosion protection of drilling and transport facilities in offshore areas	4		
Non-conventional corrosion inhibitors	4		

Bibliography

1. Panaitescu C., Coroziune în extracția țițeiului și gazelor,. Abordare practică, Editura UPG, ISBN 978-973-719-828-0, 2021.
2. Tudor, I., Rîpeanu, R.G., Ingineria Coroziunii, vol.I şi II, Ed. Univ. din Ploieşti, 2002;
3. Tudor, I., Zecheru, Gh., Drăghici, Gh., Ilie, E. Laţa, Rîpeanu, R.G., Petrescu, M.G., Dinu, F., Georgescu, D., Roşu, B., Protecția anticorozivă şi reabilitarea conductelor şi rezervoarelor, Ed. Univ. Petrol-Gaze din Ploieşti, 2007;
4. Heidersbach, R., Metallurgy and corrosion control in oil and gas production, John Wiley & Sons, Inc., Hoboken, New Jersey, 2011;
5. http://www.corrosion-doctors.org;
6. Rîpeanu, R.G., Tudor, I., Zecheru, Gh., Trifan, C., Drumeanu, A.C., Dinita, A., Ingineria Coroziunii şi Managementul Riscului Reţelelor Metalice de Distribuţie a Gazelor Naturale, Editura KARTA-GRAPHIC Ploieşti, 2013;
7. Rîpeanu, R.G., Coroziunea şi protecţia contra coroziunii conductelor, Editura KARTA-GRAPHIC Ploieşti, 2013;
8. Roberge, P.R., Handbook of corrosion engineering, Mc.Graw-Hill, New York, 2000

7.2. Seminar / Laboratory	No. of hours	Teaching methods	Remarks
Case studies – application of neural networks in the field of regulation in the oil and gas industry	4	Data processing. Numerical modelling with MATLAB.	
Evaluation of hydrocarbon resources. Production decline	2		
Extensions of the basic market model	4		
Solutions to inefficiencies generated by natural monopoly	4		

Bibliography

1. Panaitescu C., Coroziune în extracția țițeiului și gazelor,. Abordare practică, Editura UPG, ISBN 978-973-719-828-0, 2021.
2. Tudor, I., Rîpeanu, R.G., Ingineria Coroziunii, vol.I şi II, Ed. Univ. din Ploieşti, 2002;
3. Tudor, I., Zecheru, Gh., Drăghici, Gh., Ilie, E. Laţa, Rîpeanu, R.G., Petrescu, M.G., Dinu, F., Georgescu, D., Roşu, B., Protecția anticorozivă şi reabilitarea conductelor şi rezervoarelor, Ed. Univ. Petrol-Gaze din Ploieşti, 2007;
2. Heidersbach, R., Metallurgy and corrosion control in oil and gas production, John Wiley & Sons, Inc., Hoboken, New Jersey, 2011;
3. http://www.corrosion-doctors.org;
4. Rîpeanu, R.G., Tudor, I., Zecheru, Gh., Trifan, C., Drumeanu, A.C., Dinita, A., Ingineria Coroziunii şi Managementul Riscului Reţelelor Metalice de Distribuţie a Gazelor Naturale, Editura KARTA-GRAPHIC Ploieşti, 2013;
5. Rîpeanu, R.G., Coroziunea şi protecţia contra coroziunii conductelor, Editura KARTA-GRAPHIC Ploieşti, 2013;
6. Roberge, P.R., Handbook of corrosion engineering, Mc.Graw-Hill, New York, 2000

7.3. Project	No. of hours	Teaching methods	Remarks

Bibliography			

8. Correlation of the course contents with the expectations of the epistemic community, professional associations and representative employers in the field related to the programme

➢

9. Assessment

Type of activity	9.1. Assessment criteria	9.2. Assessment methods	9.3. Weight in final grade
9.4. Course	Use of specific tools – algorithms, schemes, modelling.	Written examination	50%...70%
	Attendance and participation during lectures	Attendance and answers to questions during lectures	15%
9.5. Seminar/laborator	Presentation of results	Data processing	0...20%
	Active seminar attendance	Correct and complete interpretation of the obtained values	5%
9.6. Project			
9.7. Minimum performance standard			

Date of completion	Course lecturer signature	Seminar/laboratory lecturer signature	Project supervisor signature
20.09.2026	____________________	____________________	____________________

Date of department approval	Head of department *(academic position, first name, last name)* *(Signature)*	Dean *(academic position, first name, last name)* *(Signature)*
23.09.2026	:ef lucr.dr.ing. Prundurel Alina	*Conf.habil.dr.ing. Eparu Cristian*

COURSE SYLLABUS

1. Programme Information

1.1. Higher Education Institution	Universitatea Petrol – Gaze din Ploieşti
1.2. Faculty	Facultatea de Ingineria Petrolului și Gazelor
1.3. Department	Petroleum Geology and Reservoir Engineering
1.4. Field of University Studies	Mine, Petrol si Gaze
1.5. Cycle of University Studies	MASTER
1.6. Study Programme	Petroleum Engineering

2. Course Information

2.1. Course name	ETHICS AND ACADEMIC INTEGRITY
2.2. Course lecturer	Assoc. Prof. PhD. Mirela Dulgheru
2.3. Seminar/lab teaching assistant	-
2.4. Project supervisor	-
2,5, Year of study	I
2.6. Semester*	I
2.7. Evaluation type	assessment
2.8. Educational category** / course status***	DC

* the semester number is according to the curriculum;

** DF - Fundamental disciplines; DS - Specialization disciplines; DC - Complementary disciplines

*** mandatory/required = DOB; optional = DOP; elective = DFA

3. Estimated Total Time (hours per semester of teaching activities)

3.6. Number of hours per week		din care: 3.2. curs		3.3. Seminar/laborator		3.4. Project	
3.5. Total hours from the curriculum		din care: 3.6. curs		3.7. Seminar/laborator		3.8. Project	
3. 9. Total hours of individual study (study based on course materials, bibliography and notes, additional research in the library and on specialized electronic platforms, preparation for seminars/laboratories, homework, papers, portfolios, and essays)							136
3.10. Total hours per semester							14
3.11. ECTS							5

4. Conditions (where applicable)

4.1. by curriculum	➢
4.2. for course delivery	➢ Classroom, projector
4.3. for seminar/laboratory activities	➢ -

5. Specific competencies acquired and the learning outcomes* underlying them”

Professional skills	Learning Outcomes*
C1. Application of research ethics principles in	Knowledge: - Knowledge of scientific research ethics and academic integrity

petroleum and gas engineering	principles in engineering; - Understanding research and technical documentation standards used in industry and academia; - Knowledge of legislation and regulations regarding research ethics and intellectual property. Skills: - Applying ethical standards in scientific and technical papers; - Critical analysis of research data and results from the perspective of integrity; - Proper use of sources and plagiarism avoidance. Responsibility and autonomy: - Assuming responsibility for data correctness; - Demonstrating integrity in research activities; - Awareness of the impact of errors on safety.
C2. Integration of ethics into engineering research and design processes	Knowledge: - Knowledge of engineering research stages and ethical requirements; - Understanding the role of ethics in technical decisions; - Knowledge of good practices in the oil and gas field. Skills: - Integrating ethical principles into engineering projects; - Evaluating ethical implications of decisions; - Preparing reports according to ethical standards. Responsibility and autonomy: - Adopting responsible decisions; - Promoting ethical behavior within teams; - Supporting transparency.
Transversal Competencies	Learning Outcomes
CT1. Professional ethics and social responsibility	Knowledge: - Understanding social and environmental impact; - Knowledge of sustainability principles. Skills: - Applying ethical standards; - Evaluating decision consequences. Responsibility and autonomy: - Professional responsibility; - Adoption of sustainable solutions.
CT2. Communication and integrity	Knowledge: - Scientific writing rules; - Transparency standards.

	Skills: - Proper academic writing; - Ethical communication. Responsibility and autonomy: - Respecting integrity principles; - Assuming responsibility.

* C – knowledge; S – skills; RA – responsibility and autonomy.

6. Course Objectives (derived from the grid of specific competencies acquired)

6.1. General objective	Familiarizing students with ethics and academic integrity concepts.
6.2. Specific objectives	• Understanding the importance of ethics and academic integrity concepts. • Understanding concepts required for preparing academic/scientific papers according to ethics and integrity principles. • Understanding the implementation of academic ethics and integrity procedures in the university environment. • Understanding the use, workflow, and limitations of anti-plagiarism software. • Presenting examples of academic staff, specialists, and scientific researchers with professional conduct aligned with ethics and academic integrity principles.

7. Contents

7.1. Course	No. of hours	Teaching methods	Remarks
1. Presentation of ethics and academic integrity concepts.	2 hours	Interactive lecture	
2. Ethics code in higher education.	2 hours		
3. Social effects of violating ethics and academic integrity principles.	2 hours		
4. Implementation of ethics and academic integrity procedures in universities.	2 hours		
5. Scientific paper writing according to ethics and academic integrity principles.	2 hours		

6. Plagiarism and self-plagiarism in academia.	2 hours		
7. Appropriate deontological behaviors and attitudes in intellectual work.	2 hours		

Bibliography

1. Ali Hassan, Julie T. Roberts – "Mine Safety Ethics and Research Integrity" (2024).
2. Aslam Constantin, Cornel Florin Moraru, Raluca Paraschiv – Course on Deontology and Academic Integrity, National University of Arts, Bucharest (2018).
3. Carlos A. Rocha – "Responsible Research and Innovation in Engineering Projects" (2022).
4. Deborah G. Johnson – "Ethical Issues in Engineering Ethics Education" (2023).
5. Dulgheru M. – Ethics and Academic Integrity, Course Notes – Internal Use, Ploiești (2018).
6. Flynn, G. – Leadership and Business Ethics, Springer (2008).
7. Jingwen Zhang, Emily Anderson – "Data Integrity and Responsible Conduct in Scientific Research" (2021).
8. Socaciu Emanuel et al. – Ethics and Academic Integrity, University of Bucharest Publishing House (2018).
9. Mohamed Allam, Riadh Altoui – "Academic Integrity in Higher Education: Trends and Challenges" (2022).
10. Mark P. Davis, Sarah L. Brown – "Ethical Challenges in the Oil & Gas Sector" (2023).
11. Natalia Petrova, Tomasz Kowalski – "Training PhD Candidates in Research Integrity" (2022).
12. Ștefan Emilia – Ethics and Academic Integrity, Pro-Universitaria Publishing House (2018).
13. Șercan Emilia – Academic Deontology. Practical Guide, Bucharest (2017).
14. Higher Education Law 199/2023, updated 2025.
15. Code of University Ethics and Deontology, Petroleum-Gas University of Ploiești, Code: R 01-01, 2024.

7.2. Seminar / Laboratory	No. of hours	Teaching methods	Remarks
Bibliography			

7.3. Project	No. of hours	Teaching methods	Remarks
Bibliography			

8. Correlation of the course contents with the expectations of the epistemic community, professional associations and representative employers in the field related to the programme

- • The course contents correspond to national and international thematic areas at this study level and contribute to the development of professional and transversal competencies.
  • Preparation of scientific papers and academic/research activities according to ethics and university deontology requirements.

9. Assessment

Type of activity	9.1. Assessment criteria	9.2. Assessment methods	9.3. Weight in final grade
9.4. Course	Knowledge and appropriate use of discipline-specific concepts. Ability to analyze, synthesize, and integrate theoretical knowledge.	Written examination	100%
9.5. Seminar/laborator			
9.6. Project			
9.7. Minimum performance standard			
The final grade must be at least 5 (five) in order to pass the course.			

Date of completion	Course lecturer signature	Seminar/laboratory lecturer signature	Project supervisor signature
__________	____________________	____________________	____________________

Date of department approval	Head of department *(academic position, first name, last name)* *(Signature)*	Dean *(academic position, first name, last name)* *(Signature)*
__________	____________	____________________

COURSE SYLLABUS

1. Programme Information

1.1. Higher Education Institution	Universitatea Petrol – Gaze din Ploieşti
1.2. Faculty	Facultatea de Ingineria Petrolului și Gazelor
1.3. Department	Petroleum Geology and Reservoir Engineering
1.4. Field of University Studies	Mine, Petrol si Gaze
1.5. Cycle of University Studies	MASTER
1.6. Study Programme	Petroleum Engineering

2. Course Information

2.1. Course name	Advanced Reservoir Engineering
2.2. Course lecturer	Assist. Prof. Dan Jacota, Assist. Prof. Liviu Dumitrache
2.3. Seminar/lab teaching assistant	Assist. Prof. Dan Jacota, Assist. Prof. Liviu Dumitrache
2.4. Project supervisor	N/A
2.5, Year of study	
2.6. Semester*	
2.7. Evaluation type	Exam
2.8. Educational category** / course status***	Written

* the semester number is according to the curriculum;

** DF - Fundamental disciplines; DS - Specialization disciplines; DC - Complementary disciplines

*** mandatory/required = DOB; optional = DOP; elective = DFA

3. Estimated Total Time (hours per semester of teaching activities)

3.6. Number of hours per week	4	din care: 3.2. curs	2	3.3. Seminar/laborator	2	3.4. Project	-
3.5. Total hours from the curriculum	56	din care: 3.6. curs	28	3.7. Seminar/laborator	28	3.8. Project	-

3. 9. Total hours of individual study (study based on course materials, bibliography and notes, additional research in the library and on specialized electronic platforms, preparation for seminars/laboratories, homework, papers, portfolios, and essays)	94
3.10. Total hours per semester	150
3.11. ECTS	5

4. Conditions (where applicable)

4.1. by curriculum	➢
4.2. for course delivery	➢ Laboratory / computer / digital blackboard
4.3. for seminar/laboratory activities	➢ Laboratory / computer / digital blackboard

5. Specific competencies acquired and the learning outcomes* underlying them”

Professional skills	Learning Outcomes*
1. Apply fundamental knowledge of mathematics, physics, chemistry, and	C1: The master's student/graduate is able to use fundamental methods for analyzing phenomena in the petroleum and gas industry. A1: The master's student/graduate applies physico-mathematical models applicable to the petroleum and gas industry.

geology in petroleum and gas engineering.	RA1: The master's student/graduate demonstrates critical thinking in evaluating engineering solutions and technological alternatives. RA2: The master's student/graduate applies optimization solutions in the hydrocarbon reservoir exploitation process and monitors results by comparing performance indicators.
2. Uses technical documentation and specialized software for petroleum planning and design.	C1: The master's student/graduate understands and uses technical documentation, design standards, scientific research standards, and educational standards specific to the Petroleum-Gas University of Ploiești. C2: The master's student/graduate uses specialized software for the design and optimization of hydrocarbon reservoir exploitation processes (operations planning, optimization, storage and distribution, flow analysis). A1: The master's student/graduate correctly interprets technical reports, scientific results obtained from tests and specialized software modeling of hydrocarbon reservoirs, as well as results from commissioning and operation tests of production processes. RA1: The master's student/graduate is able to prepare coherent and clear technical documentation for non-specialists.
3. Supervises and monitors petroleum production and operations.	C1: The master's student/graduate demonstrates knowledge of hydrocarbon reservoir design and production (petroleum operations planning, reservoir optimization). C2: The master's student/graduate develops plans for hydrocarbon reservoir design and production operations (petroleum operations planning, reservoir optimization). A1: The master's student/graduate manages and ensures the safety of hydrocarbon reservoir design and production operations (petroleum operations planning, reservoir optimization). RA1: The master's student/graduate assumes responsibility for the safe operation of hydrocarbon reservoir production equipment.
4. Supervises and monitors petroleum exploitation operations.	C1: The master's student / graduate understands the monitoring procedures for hydrocarbon reservoir exploitation equipment. S1: The master's student / graduate interprets production data and prepares compliance reports comparing plans and results. RA1: The master's student / graduate makes independent decisions in operational situations while complying with technical and safety regulations.
5. Applies health, safety, and environmental protection standards.	C1: The master's student/graduate understands the procedures for monitoring hydrocarbon reservoir production equipment. A1: The master's student/graduate interprets production data and prepares compliance reports comparing plans and results.

	RA1: The master's student/graduate makes independent decisions in operational situations, in compliance with technical and safety standards.
Transversal Competencies	Learning Outcomes
1. Works effectively in multidisciplinary and international teams.	C1: The master's student/graduate understands the dynamics of teams in the petroleum and gas engineering field (reservoir engineers, geologists, economists, contractors). A1: The master's student/graduate communicates clearly and concisely, both orally and in writing, in various professional contexts. RA1: The master's student/graduate collaborates efficiently and proactively, assuming responsibilities within the team.
2. Professional Ethics and Social Responsibility	C1: The master's student/graduate identifies the principles of professional ethics and specific legislation. C2: The master's student/graduate knows best practices in social responsibility. A1: The master's student/graduate applies ethical standards in professional decision-making. A2: The master's student/graduate demonstrates integrity in engineering activities. RA1: The master's student/graduate is aware of the social and environmental impact of decisions. RA2: The master's student/graduate adopts sustainable and responsible solutions.
3. Autonomy and Career Management	C1: The master's student/graduate identifies development opportunities in the petroleum industry field (reservoir engineering). C2: The master's student/graduate knows the sources for continuous learning and professional qualification. A1: The master's student/graduate develops their own professional development and career plans. A2: The master's student/graduate develops their digital and managerial competencies. RA1: The master's student/graduate shows initiative in continuous education. RA2: The master's student/graduate assumes responsibility for their own professional development. RA3: The master's student/graduate demonstrates adaptability to labor market changes.

* C – knowledge; S – skills; RA – responsibility and autonomy.

6. Course Objectives (derived from the grid of specific competencies acquired)

Understanding the use of fundamental engineering data and data preparation	Graduates will comprehend mechanisms of preparing, sorting and transforming from one unit of measure to another the initial data which is necessary in preparing study documentations. Also, the graduates will be able to group corresponding data to the proper category before applying fundamental calculus algorithms and phenomena analysis.
Use of software after data preparation	After preparing and grouping initial data, graduates will be able to better choose which software is fit for the desired application, with respect to software minimum requirements and expected software results since easier applications require fewer complex programs while more intense/resource consuming tasks require elaborate/niche software. Graduates will, thus, be able to elaborate technical reports, present scientific results obtained from tests and modeling of hydrocarbon reservoirs, as well as interpret results from commissioning and operation tests of production processes.
Propose production designs / workover operations / EOR applications	Graduates will be able to develop plans for hydrocarbon reservoir design and production operations (petroleum operations planning, reservoir optimization) and (where applicable), propose EOR methods for increasing oil recovery factor as well as analyzing the feasibility of such projects.

7. Contents

7.1. Course	No. of hours	Teaching methods	Remarks
Clarifying units of measure in oil and gas applications	6	Digital blackboard / Digital projector / Standard chalkboard / FreeSpeech	
Review of pVT properties, oil and gas composition, hydrocarbon systems	6		
Review of rock and flow properties, necessary for data preparation	6		
Why is data preparation important / How the simulator thinks	6		
Understanding simulation software limitations and expectations	4		
Bibliography - The Practice of Reservoir Engineering (Revised Edition), L.P. Dake, Elsevier Science & Technology, Year published 2001-05-10, ISBN 10 / 0444506713, ISBN 13 / 9780444506719 - Petroleum Reservoir Engineering, James Cameron, 2019, EAN 9781682868140, ISBN 1682868141, Publishing House Syrawood Publishing House - Petroleum Engineering Handbook Volume I, Larry Lake, 2006, ISBN 1555631088, EAN 9781555631086, Publishing House Society of Petroleum Engineers - Fizica zacamintelor de hidrocarburi: note de curs, Minescu F., Jacota D.R., Editura Universitatii Petrol-Gaze din Ploiesti, Ploiesti, 2022, ISBN 9789737198426			
7.2. Seminar / Laboratory	No. of hours	Teaching methods	Remarks
Unit Systems of Measure – implications of switching between different systems	6	Laboratory computers	
Sorting / Grouping / Preparing Data to be implemented in simulations projects	8		
Basic simulation software understanding	8		
Simulation software requirements, processes and limitations/expectations	6		
Bibliography - Reservoir Management: A Practical Guide, Steve Cannon, 2020, ISBN 978-1-119-42511-3, Wiley - Petroleum Reservoir Management: Considerations and Practices, Ashok Pathak, ISBN 978-0-367-76340-4, 2021, CRC Press			

- Integrated Reservoir Asset Management: Principles and Best Practices, John R. Fanchi, 2010, ISBN 978-0-12-382088-4, Gulf Professional Publishing - Reservoir Engineering: The Fundamentals, Simulation, and Management of Conventional and Unconventional Recoveries, 2015, ISBN 978-0-12-800219-3, 2015, Gulf Professional Publishing

7.3. Project	No. of hours	Teaching methods	Remarks
Bibliography			

8. Correlation of the course contents with the expectations of the epistemic community, professional associations and representative employers in the field related to the programme

- The content of the discipline is consistent with modern applications and prepares future graduates to transition from basic to advanced interpretation of oil and gas properties, understating and classifying hydrocarbon types (light/heavy oils , condensate, dry/rich gas)
- Also, the course intends to ensure graduates will keep up with challenges on the labor market specific to the field in accordance with employers' expectations.
- Contains theoretical benchmarks, methodologies, methods and procedures of analysis and interpretation real physical data used in simulators, which can be useful to students in the insertion process social and professional.

9. Assessment

Type of activity	9.1. Assessment criteria	9.2. Assessment methods	9.3. Weight in final grade
9.4. Course	Use of specific tools – algorithms, schemes, modelling.	Written examination	50%...70%
	Attendance and participation during lectures	Attendance and answers to questions during lectures	15%
9.5. Seminar/laborator	Presentation of results	Data processing	0...20%
	Active seminar attendance	Correct and complete interpretation of the obtained values	5%
9.6. Project			
9.7. Minimum performance standard			

Date of completion	Course lecturer signature	Seminar/laboratory lecturer signature	Project supervisor signature
20.09.2025			

Date of department approval	Head of department *(academic position, first name, last name)* *(Signature)*	Dean *(academic position, first name, last name)* *(Signature)*
23.09.2025	*Șef lucr.dr.ing. Prundurel Alina*	*Conf.habil.dr.ing. Eparu Cristian*

COURSE SYLLABUS

1. Programme Information

1.1. Higher Education Institution	Universitatea Petrol – Gaze din Ploieşti
1.2. Faculty	Facultatea de Ingineria Petrolului și Gazelor
1.3. Department	Petroleum Geology and Reservoir Engineering
1.4. Field of University Studies	Mine, Petrol si Gaze
1.5. Cycle of University Studies	MASTER
1.6. Study Programme	Petroleum Engineering-MPEZ

2. Course Information

2.1. Course name	RENEWABLE ENERGY SOURCES IN OIL AND GAS INDUSTRY
2.2. Course lecturer	Assoc prof dr ing Prundurel Alina
2.3. Seminar/lab teaching assistant	Prof.habil.dr.eng. Suditu Silvian
2.4. Project supervisor	
2,5, Year of study	I
2.6.Semester*	2
2.7. Evaluation type	V
2.8. Educational category** / course status***	DF/DOB

* the semester number is according to the curriculum;

** DF - Fundamental disciplines; DS - Specialization disciplines; DC - Complementary disciplines

*** mandatory/required = DOB; optional = DOP; elective = DFA

3. Estimated Total Time (hours per semester of teaching activities)

3.6. Number of hours per week	2	din care: 3.2. curs	1	3.3. Seminar/laborator	1	3.4. Project	-
3.5. Total hours from the curriculum	28	din care: 3.6. curs	14	3.7. Seminar/laborator	14	3.8. Project	-
3. 9. Total hours of individual study (study based on course materials, bibliography and notes, additional research in the library and on specialized electronic platforms, preparation for seminars/laboratories, homework, papers, portfolios, and essays)							122
3.10. Total hours per semester							150
3.11. ECTS							5

4. Conditions (where applicable)

4.1. by curriculum	➢ Thermotechnics and Thermal Machines ➢ Transportation of Petroleum Products
4.2. for course delivery	➢ Classroom equipped with screen, video projector, computer, and whiteboard ➢ The course will be organized into learning units designed to support active and participatory teaching methods ➢ Students' lateness to class will not be tolerated, as it is considered disruptive to the educational process
4.3. for seminar/laboratory activities	➢ Laboratory activities are conducted exclusively in the laboratory room, properly equipped according to the requirements of the discipline and using the specific laboratory stands

	➢ Laboratory activities will be carried out in compliance with occupational health and safety regulations. The laboratory session will benefit from the presence of the laboratory technician responsible for the laboratory. ➢ The deadline for submitting the laboratory report will be established by the course instructor in agreement with the students. Requests for postponement will not be accepted except for objectively justified reasons. Furthermore, late submission of laboratory reports will result in a penalty of 1 point deducted for each day of delay.

5. Specific competencies acquired and the learning outcomes* underlying them"

Professional skills	Learning Outcomes*
1. Apply fundamental knowledge of mathematics, physics, chemistry, and geology in petroleum and gas engineering.	C1 – The student explains theoretical results, experimental results, and technical documentation associated with phenomena and processes specific to petroleum and gas engineering. A1 – The student analyzes and interprets parameters. RA1 – The student selects and uses bibliographic sources specific to the field. RA2 – The student demonstrates autonomy in learning on issues specific to petroleum and gas engineering phenomena and processes.
2. Uses technical documentation and specialized software for petroleum planning and design.	C1 – The student explains theoretical results, experimental results, and technical documentation associated with specific phenomena and processes. C2 – The student identifies the types of unconventional energy sources relevant to the hydrocarbon transport and distribution sector (e.g., solar, wind, geothermal, bioenergy). A1 – The student operates investigation procedures, processes, and equipment at ground surface level. RA1 – The student selects and uses bibliographic sources specific to the field. RA2 – The student demonstrates autonomy in learning on issues specific to field-related phenomena and processes.
3. Supervises and monitors petroleum production and operations.	C1 – The student plans and organizes the specific stages of resource exploitation and utilization under sustainability and environmental protection conditions. C2 – The student applies acquired knowledge to perform a simplified energy calculation regarding consumption and renewable energy coverage potential for a hydrocarbon storage/distribution unit. A1 – The student develops occupational prevention and safety plans. A2 – The student analyzes installation performance through numerical simulations. RA1 – The student proposes pollution reduction strategies. RA2 – The student demonstrates professional responsibility in applying occupational health, safety, and environmental regulations.

4. Supervises and monitors petroleum exploitation operations.	C1 – The student plans and organizes the specific stages of resource exploitation and utilization under sustainability and environmental protection conditions. A1 – The student analyzes and interprets operational parameters. A2 – The student analyzes installation performance through numerical simulations. RA1 – The student proposes pollution reduction strategies. RA2 – The student demonstrates professional responsibility in applying occupational health, safety, and environmental regulations.
5. Applies health, safety, and environmental protection standards.	C1 – The student plans and organizes activities in compliance with sustainability and environmental protection requirements. A1 – The student develops occupational prevention and safety plans. RA1 – The student proposes pollution reduction strategies. RA2 – The student demonstrates professional responsibility in applying occupational health, safety, and environmental regulations.
Transversal Competencies	Learning Outcomes
1. Works effectively in multidisciplinary and international teams.	C1 – The student describes software systems for database management, monitoring, and modeling of specific technologies. A1 – The student operates software systems for database management, monitoring, and modeling of specific technologies. A2 – The student develops customized software tools for solving specific problems. RA1 – The student selects and uses bibliographic sources specific to the field. RA2 – The student demonstrates autonomy in learning on issues specific to the field.
2. Professional Ethics and Social Responsibility	C1 – The student identifies and describes software systems for programming, database management, graphics, and modeling of specific processes. A1 – The student uses software systems for programming, database management, graphics, and modeling of specific processes. A2 – The student adapts and uses customized software tools that solve problems in the renewable energy field. RA1 – The student selects and uses bibliographic sources specific to the field. RA2 – The student demonstrates autonomy in learning on issues specific to the field.
3. Autonomy and Career Management	C1 – The student explains theoretical results, experimental results, and technical documentation associated with specific phenomena and processes. A1 – The student analyzes the impact of unconventional energy sources on energy efficiency, operational costs, and CO_2 emissions from transport and storage systems. A2 – The student interprets phenomena and processes occurring during flow rate measurements and operates with them.

	RA1 – The student selects and uses bibliographic sources specific to the field. RA2 – The student demonstrates autonomy in learning on issues specific to the field.

* C – knowledge; S – skills; RA – responsibility and autonomy.

6. Course Objectives (derived from the grid of specific competencies acquired)

6.1. General Objective of the Course	➢ Presentation of the current state of energy resources and awareness of the need for alternative energy sources; presentation of renewable energy types, together with their specific advantages and disadvantages, complemented by current policies and trends in this field, which have the direct effect of preventing environmental pollution with greenhouse gases resulting from the combustion of fossil fuels.
6.2. Specific Objectives	➢ Presentation of the standard energy sources currently used: electrical energy; solar energy: photovoltaic and thermal panels; wind energy; water energy: hydroelectric energy, marine currents, waves, and tides; geothermal energy; biomass energy: biodiesel, bioethanol, biogas; fuel cells and hydrogen; nuclear energy; ➢ Knowledge, understanding, and appropriate use of the specific concepts related to the discipline; ➢ Explanation and interpretation of ideas, processes, as well as the theoretical and practical contents of the discipline; ➢ Application of modern design and analysis techniques and development of the skills required for solving renewable energy-related problems using integrated CAD systems; ➢ Use of the discipline as one of the important components of engineering education, alongside technical support, environmental concern, increased energy efficiency, and pollution reduction.

7. Contents

7.1. Course	No. of hours	Teaching methods	Remarks
Principles of renewable energy. Introductory notions: Energy. Renewable energy sources. Evolution of global energy production and consumption in recent decades. Problems caused by the use of fossil fuels. Energy evolution scenarios. Renewable energy and sustainable development. Technical implications. Social implications.	1	Lecture	-
Solar energy. Conversion of solar energy into electrical energy. Types of photovoltaic cells. Structure of a photovoltaic system. Design and sizing of a photovoltaic system. Solar energy conversion systems.	1		-

Fuel cells and hydrogen. Applications.	1		-
Energy generators based on hydraulic turbines.	1		-
Wind energy. Wind energy and power. Construction of wind turbines. Wind turbine power control.	1		-
Photosynthesis processes. Applications.	1		-
Sources of pollution and pollution control in the field of renewable energy. Social and environmental aspects. Institutional, economic, and legislative aspects related to renewable energy.	1		-

Bibliography

1. Dinu Fl.. Introducere în domeniul energiilor regenerabile, suport de curs în format electronic, UPG Ploieşti 2022.
2. Bandoc, G.; Degeratu, M. Utilizarea energiei valurilor. Bucureşti: Editura Matrixrom, 2007.
3. Bandoc, G.; Degeratu, M. Utilizarea energiei vântului. Bucureşti: Editura Matrixrom, 2007.
4. David Pimentel. Biofuels, Solar and Wind as Renewable Energy. Systems Benefits and Risks. Springer,2008.
5. Emanuela Colombo, Stefano Bologna Diego Masera. Renewable Energy for Unleashing Sustainable Development, Springer, 2013.
6. Emilian M. Dobrescu. Energiile regenerabile - Eficienta economica, sociala si ecologica. Ed. Sigma 2018.
7. Hermann Scheer. The Solar Economy. Renewable Energy for a Sustainable Global Future, Earthscan London, UK, 2005.
8. Maican E. – Sisteme de energii regenerabile, Ed. Printech, Bucureşti, 2015;
9. Victor Emil Lucian Resurse regenerabile subterane. Ghid de documentare si concepere a instalațiilor pentru captare si conversie. Editura: Universitară, București, 2015.
10. Victor, Emil Lucian. Resurse energetice regenerabile (Ghid practic). Editura: Universitară, București, 2011.

Virginia Câmpeanu, Sarmiza Pencea. Energiile regenerabile – Incotro? Intre „mit” si realitățile post-criza din Europa si Romania, Editura: Universitară,2014.

7.2. Seminar / Laboratory	No. of hours	Teaching methods	Remarks
1. Sustainable development using renewable energy technology. Case studies. Conclusions.	1	Discussions, exercises, and presentation of reports	-
2. Renewable energy and pollution reduction. Case studies.	1		-
3. Simulation of a solar energy-based water heating system: LMS Amesim. Analysis and conclusions.	1		-
4. Analysis of electricity cost variation through the use of renewable energy. Case study.	1		-
5. Analysis of the possibility of providing 100% renewable energy based on internal resources during the 2020–2050 period. Case studies from European countries.	1		-
6. Simulation of hybrid electrical energy generation systems: LMS Amesim. Analysis and conclusions.	1		-
7. Development opportunities for renewable energy sources in Romania.	1		-

Bibliography

1. Walls, David B., David Banks, Adrian J. Boyce, and Neil M. Burnside 2021. "A Review of the Performance of Minewater Heating and Cooling Systems" Energies 14, no. 19: 6215. https://doi.org/10.3390/en14196215
2. Chen, Sheng, and Antonio J. Conejo 2020. "Strategic-Agent Equilibria in the Operation of Natural Gas and Power Markets" Energies 13, no. 4: 868. https://doi.org/10.3390/en13040868
3. Hoayek, Anis, Hassan Hamie, and Hans Auer. 2020. "Modeling the Price Stability and Predictability of Post Liberalized Gas Markets Using the Theory of Information" Energies 13, no. 11: 3012. https://doi.org/10.3390/en13113012

4. Montero, Luis, Antonio Bello, and Javier Reneses. 2020. "A New Methodology to Obtain a Feasible Thermal Operation in Power Systems in a Medium-Term Horizon" Energies 13, no. 12: 3056. https://doi.org/10.3390/en13123056.
5. Kaufmann, Johannes, Philipp A. Kienscherf, and Wolfgang Ketter. 2020. "Modeling and Managing Joint Price and Volumetric Risk for Volatile Electricity Portfolios" Energies 13, no. 14: 3578. https://doi.org/10.3390/en13143578.
6. Sara Proença, Miguel St. Aubyn. Hybrid modeling to support energy-climate policy: Effects of feed-in tariffs to promote renewable energy in Portugal, Energy Economics, Volume 38, July 2013, Pages 176-185.
7. Subhash Mallah, Bansal N.K. Renewable energy for sustainable electrical energy system in India, Energy Policy 38 (2010) 3933–3942.
8. Vahid Arabzadeh, Jani Mikkola, Justinas Jasiunas, Peter D. Lund. Deep decarbonization of urban energy systems through renewable energy and sector-coupling flexibility strategies, Journal of Environmental Management, Volume 260, 15 April 2020, 110090.
9. Lund H., Mathiesen B.V. Energy system analysis of 100% renewable energy systems—The case of Denmark in years 2030 and 2050. Energy 34 (2009) 524–531.
10. Ahmed M.A. Haidar*, Priscilla N. John, Mohd Shawa. Optimal configuration assessment of renewable energy in Malaysia, Renewable Energy, Volume 36, Issue 2, February 2011, Pages 881-888.
11. Paul Alberg Østergaard, Neven Duic,Younes Noorollahi, Hrvoje Mikulcic, Soteris Kalogirou. Sustainable development using renewable energy technology, Renewable Energy Volume 146, February 2020, Pages 2430-2437.
12. Demiroren A., Yilmaz U. Analysis of change in electric energy cost with using renewable energy sources in Go¨kceada, Turkey: An island example. Renewable and Sustainable Energy Reviews 14 (2010) 323–333.

Liu F., Tait, S., Schellart, A., Mayfield, M., Boxall J. Reducing carbon emissions by integrating urban water systems and renewable energy sources at a community scale. Renewable and Sustainable Energy Reviews, Volume 123, May 2020, 109767.

7.3. Project	No. of hours	Teaching methods	Remarks
-	-	-	-

Bibliography

-

8. Correlation of the course contents with the expectations of the epistemic community, professional associations and representative employers in the field related to the programme

- Carrying out activities, projects, and case studies aimed at applying the competencies acquired through the study of the discipline.
- Participation in thematic exhibitions, workshops, and scientific sessions in the field of petroleum and gas engineering dedicated to renewable energy sources.
- Discussions with employers during company presentation events organized for meetings with students. Use of results obtained from scientific research contracts for the completion and updating of course content. Technical visits to the headquarters of partner companies collaborating with the Faculty of Petroleum and Gas Engineering.

9. Assessment

Type of activity	9.1. Assessment criteria	9.2. Assessment methods	9.3. Weight in final grade
9.4. Course	Use of specific tools – algorithms, schemes, modelling.	Written examination	80%
	Attendance and participation during lectures	Attendance and answers to questions during lectures	10%
9.5. Seminar/lab	Presentation of results	Data processing	5%

	Active lab attendance	Correct and complete interpretation of the obtained values	5%
9.6. Project			
9.7. Minimum performance standard			
➢ Course attendance: 10% ➢ Solving the theoretical subjects during the examination: 90%			

Date of completion	Course lecturer signature	Seminar/laboratory lecturer signature	Project supervisor signature
23.09.2025	Lecturer phd Prundurel Alina	Prof assoc phd Suditu Silvian	______________________

Date of department approval	Head of department	Dean
23.09.2025	Lecturer phd Prundurel Alina	Prof assoc phd Eparu Cristian

COURSE SYLLABUS

1. Programme Information

1.1. Higher Education Institution	Universitatea Petrol – Gaze din Ploieşti
1.2. Faculty	Facultatea de Ingineria Petrolului și Gazelor
1.3. Department	Petroleum Geology and Reservoir Engineering
1.4. Field of University Studies	Mine, Petrol si Gaze
1.5. Cycle of University Studies	MASTER
1.6. Study Programme	Petroleum Engineering

2. Course Information

2.1. Course name	ADVANCES WELL DRILLING
2.2. Course lecturer	Asst. Prof. PhD. Eng. Liviu DUMITRACHE
2.3. Seminar/lab teaching assistant	Asst. Prof. PhD. Eng. Bogdan Andrei IONETE
2.4. Project supervisor	-
2.5, Year of study	I
2.6. Semester*	2
2.7. Evaluation type	E
2.8. Educational category** / course status***	DS

* the semester number is according to the curriculum;

** DF - Fundamental disciplines; DS - Specialization disciplines; DC - Complementary disciplines

*** mandatory/required = DOB; optional = DOP; elective = DFA

3. Estimated Total Time (hours per semester of teaching activities)

3.6. Number of hours per week	3	din care: 3.2. curs	2	3.3. Seminar/laborator	1	3.4. Project	-
3.5. Total hours from the curriculum	42	din care: 3.6. curs	28	3.7. Seminar/laborator	14	3.8. Project	-
3. 9. Total hours of individual study (study based on course materials, bibliography and notes, additional research in the library and on specialized electronic platforms, preparation for seminars/laboratories, homework, papers, portfolios, and essays)							66
3.10. Total hours per semester							108
3.11. ECTS							5

4. Conditions (where applicable)

4.1. by curriculum	➢ Special Mathematics, Mechanics ➢ Strength of Materials, Numerical Methods ➢ Hydraulics, Drilling Engineering / Well Drilling
4.2. for course delivery	➢
4.3. for seminar/laboratory activities	➢

5. Specific competencies acquired and the learning outcomes* underlying them”

Professional skills	Learning Outcomes*
1. Apply fundamental knowledge of mathematics, physics, chemistry, and	C1: The master's student/graduate is able to apply advanced knowledge, methodologies, and practices specific to drilling engineering.

geology in petroleum and gas engineering.	A1: The master's student/graduate applies specialized knowledge to explain and interpret new situations encountered in drilling engineering. RA1: The master's student/graduate demonstrates critical thinking in selecting and applying advanced drilling technologies and methods. RA2: The master's student/graduate applies modern criteria and methods for evaluating drilling performance and optimizing drilling operations.
2. Uses technical documentation and specialized software for petroleum planning and design.	C1: The master's student/graduate understands and uses technical documentation, design standards, scientific research standards, and educational standards specific to drilling engineering. C2: The master's student/graduate uses specialized software and advanced models for the analysis, design, and implementation of modern drilling technologies. A1: The master's student/graduate correctly interprets technical reports, scientific studies, drilling simulations, and operational data related to drilling engineering. RA1: The master's student/graduate is able to prepare coherent technical studies, reports, and drilling projects adapted to both specialists and non-specialists.
3. Supervises and monitors petroleum production and operations.	C1: The master's student/graduate demonstrates knowledge of advanced drilling technologies, operational planning, and drilling process implementation. C2: The master's student/graduate develops and coordinates complex drilling projects and operational plans. A1: The master's student/graduate manages and ensures the safe execution of drilling operations using advanced drilling methods and technologies. RA1: The master's student/graduate assumes responsibility for the coordination and control of drilling activities and equipment.
4. Supervises and monitors petroleum exploitation operations.	C1: The master’s student/graduate understands monitoring and control procedures specific to drilling operations and equipment. S1: The master’s student/graduate analyzes operational data and evaluates drilling performance using modern assessment methods and criteria. RA1: The master’s student/graduate makes independent decisions and formulates professional judgments in drilling engineering activities while complying with technical and safety standards.
5. Applies health, safety, and environmental protection standards.	C1: The master's student/graduate understands health, safety, environmental protection, and risk assessment procedures specific to drilling engineering. A1: The master's student/graduate evaluates operational risks and applies preventive measures in drilling activities.

	RA1: The master's student/graduate makes responsible decisions in operational situations in compliance with technical, ethical, sustainability, and safety standards.
Transversal Competencies	Learning Outcomes
1. Works effectively in multidisciplinary and international teams.	C1: The master's student/graduate understands the dynamics of multidisciplinary teams involved in drilling engineering projects. A1: The master's student/graduate communicates clearly and effectively, both orally and in writing, and presents professional results in a convincing manner. RA1: The master's student/graduate collaborates efficiently within multidisciplinary teams, assuming different professional roles and responsibilities.
2. Professional Ethics and Social Responsibility	C1: The master's student/graduate identifies the principles of professional ethics and specific legislation applicable to drilling engineering. C2: The master's student/graduate understands sustainable practices and social responsibility principles in the petroleum industry. A1: The master's student/graduate applies ethical and sustainable principles in professional decision-making. A2: The master's student/graduate evaluates and applies technological solutions while respecting professional ethics and sustainability principles. RA1: The master's student/graduate is aware of the operational, social, and environmental risks associated with drilling engineering activities. RA2: The master's student/graduate adopts sustainable, responsible, and safe technological solutions.
3. Autonomy and Career Management	C1: The master's student/graduate identifies professional development opportunities in drilling engineering and related petroleum industry sectors. C2: The master's student/graduate knows the sources and methods for continuous learning and professional development. A1: The master's student/graduate develops professional and managerial competencies necessary for career advancement. A2: The master's student/graduate develops digital competencies and the ability to evaluate modern technological solutions. RA1: The master's student/graduate shows initiative in continuous education and professional improvement. RA2: The master's student/graduate assumes responsibility for personal and professional development. RA3: The master's student/graduate demonstrates adaptability to technological and labor market changes in the petroleum industry.

* C – knowledge; S – skills; RA – responsibility and autonomy.

6. Course Objectives (derived from the grid of specific competencies acquired)

6.1. General Objective of the Course	➢ The course aims to broaden the general engineering background in the field of oil and gas well drilling engineering.
6.2. Specific Objectives	➢ Understanding drilling techniques and technologies through the application of previously acquired knowledge. ➢ Developing communication feedback skills and establishing collaborative relationships with colleagues. ➢ The course also aims to deepen knowledge related to drilling technology processes through their simulation using numerical and analog simulators.

7. Contents

7.1. Course	No. of hours	Teaching methods	Remarks
Directional and Horizontal Drilling (ERD)	4	Digital blackboard / Digital projector / Standard chalkboard / Discussion	-
Advanced Drilling Fluids and Rheology	4		-
Wellbore Stability and Geomechanics	4		-
Managed Pressure Drilling (MPD) and Underbalanced Drilling (UBD	4		-
Drilling Optimization and Real-Time Data (Digital Twins)	4		-
Complex Completion and Casing Design	4		-
Subsea Drilling and Deepwater Challenges	4		-

Bibliography

1. *** Drilling Office Schlumberger, Osprey Risk, CemCade
2. N.Macovei Tehnologia Forarii Sondelor Vol1-4
3. Joshi, D. Sada.: Horizontal Well Technology, PennWell Publishing Company 1421 South Sheridan/P.O.Box 1260 Tulsa, Oklahoma 74101, 1991.
4. Macovei, N. : Forajul dirijat, Editura Universitatii din Ploiesti, 2003.
5. N.Macovei.: Hidraulica forajului, Edit Tehnica București,1983.
6. Nicolescu, S.: Tehnologia forarii sondelor, Editura Universităţii din Ploieşti, 2000.
7. ****: Drilling & Completion, Colecţia S.P.E., 2000-2014.
8. **** : Drilling Office Manual & Tutorials, Schlumberger documentation, 2006.

7.2. Seminar / Laboratory	No. of hours	Teaching methods	Remarks
Directional and Horizontal Drilling (ERD)	2	Digital blackboard / Digital projector / Standard chalkboard / Discussion	Case studies
Advanced Drilling Fluids and Rheology	2		Case studies
Wellbore Stability and Geomechanics	2		Case studies
Managed Pressure Drilling (MPD) and Underbalanced Drilling (UBD	2		Case studies
Drilling Optimization and Real-Time Data (Digital Twins)	2		Case studies
Complex Completion and Casing Design	2		Case studies
Subsea Drilling and Deepwater Challenges	2		Case studies

Bibliography

1. *** Drilling Office Schlumberger, Osprey Risk, CemCade
2. N.Macovei Tehnologia Forarii Sondelor Vol1-4
3. Joshi, D. Sada.: Horizontal Well Technology, PennWell Publishing Company 1421 South Sheridan/P.O.Box 1260 Tulsa, Oklahoma 74101, 1991.
4. Macovei, N. : Forajul dirijat, Editura Universitatii din Ploiesti, 2003.

5. N.Macovei.: Hidraulica forajului, Edit Tehnica București,1983. 6. Nicolescu, S.: Tehnologia forarii sondelor, Editura Universităţii din Ploieşti, 2000. 7. ****: Drilling & Completion, Colecţia S.P.E., 2000-2014. 8. **** : Drilling Office Manual & Tutorials, Schlumberger documentation, 2006. -

7.3. Project	No. of hours	Teaching methods	Remarks
Bibliography			

8. Correlation of the course contents with the expectations of the epistemic community, professional associations and representative employers in the field related to the programme

- In order to outline the course contents and select the teaching and learning methods, the course coordinators organized a meeting with members of OMV Petrom specialized in the field, representatives of public institutions (relevant ministries, local authorities, etc.), as well as with other academic staff members from the field teaching at other higher education institutions. The meeting aimed to identify the needs and expectations of employers in the field and to coordinate the curriculum with similar study programs offered by other higher education institutions.

9. Assessment

Type of activity	9.1. Assessment criteria	9.2. Assessment methods	9.3. Weight in final grade
9.4. Course	Use of specific tools – algorithms, schemes, modelling.	Written examination	60%
	Attendance and participation during lectures	Attendance and answers to questions during lectures	10%
9.5. Seminar/laborator	Presentation of results	Data processing	20%
	Active seminar attendance	Correct and complete interpretation of the obtained values	10%
9.6. Project			
9.7. Minimum performance standard			

- Full completion of periodic assessment tests
- Minimum course attendance: 65%
- Successful completion of the examination requirements, consisting of theoretical topics (minimum 50%) and practical applications/problems (100%)

Date of completion	Course lecturer signature	Seminar/laboratory lecturer signature	Project supervisor signature
15.09.2025		____________________	____________________

Date of department approval	Head of department *(academic position, first name, last name)* *(Signature)*	Dean *(academic position, first name, last name)* *(Signature)*
23.09.2025	*Sef lucr.dr.ing. Prundurel Alina*	*Conf.habil.dr.ing. Eparu Cristian*

COURSE SYLLABUS

1. Programme Information

1.1. Higher Education Institution	Universitatea Petrol – Gaze din Ploieşti
1.2. Faculty	Ingineria Petrolului si Gazelor
1.3. Department	Petroleum Geology and Reservoir Engineering
1.4. Field of University Studies	Mine, Petrol si Gaze
1.5. Cycle of University Studies	MASTER
1.6. Study Programme	Petroleum Engineering

2. Course Information

2.1. Course name	Advanced petroleum production
2.2. Course lecturer	Assoc.Prof.Dr.Eng Mariea Marcu
2.3. Seminar/lab teaching assistant	Assoc.Prof.Dr.Eng Mariea Marcu
2.4. Project supervisor	
2.5, Year of study	I
2.6. Semester*	II
2.7. Evaluation type	Exam
2.8. Educational category** / course status***	DS

* the semester number is according to the curriculum;

** DF - Fundamental disciplines; DS - Specialization disciplines; DC - Complementary disciplines

*** mandatory/required = DOB; optional = DOP; elective = DFA

3. Estimated Total Time (hours per semester of teaching activities)

3.6. Number of hours per week	3	din care: 3.2. curs	2	3.3. Seminar/laborator	1	3.4. Project	
3.5. Total hours from the curriculum	42	din care: 3.6. curs	28	3.7. Seminar/laborator	14	3.8. Project	
3. 9. Total hours of individual study (study based on course materials, bibliography and notes, additional research in the library and on specialized electronic platforms, preparation for seminars/laboratories, homework, papers, portfolios, and essays)							
3.10. Total hours per semester							108
3.11. ECTS							5

4. Conditions (where applicable)

4.1. by curriculum	➢ Thermotechnics, Chemistry, Physics, Mathematics, Mechanics, Hydraulics, Rock-fluids interactions, Physico-chemistry of the reservoirs
4.2. for course delivery	➢ Classroom with smart board and computers
4.3. for seminar/laboratory activities	➢ Smart board, computers, various well completion devices

5. Specific competencies acquired and the learning outcomes* underlying them"

Professional skills	Learning Outcomes*
1. Apply fundamental knowledge of mathematics, physics, chemistry, and	C1: The master's student/graduated is able to use fundamental methods for analyzing phenomena in the petroleum and gas industry.

geology in petroleum and gas engineering.	A1: The master's student/graduated applies physico-mathematical models applicable to the petroleum and gas industry. RA1: The master's student/graduated demonstrates critical thinking in evaluating engineering solutions and technological alternatives. RA2: The master's student/graduated applies optimization solutions in the petroleum production process and monitors results by comparing performance indicators.
2. Uses technical documentation and specialized software for petroleum planning and design.	C1: The master's student/graduated understands and uses technical documentation, design standards, scientific research standards, and educational standards specific to the Petroleum-Gas University of Ploiești. C2: The master's student /graduated uses specialized software for the design and optimization of petroleum production processes (operations planning, production optimization, storage and distribution, flow analysis). A1: The master's student/graduated correctly interprets technical reports, scientific results obtained from tests and specialized software modeling of production processes. RA1: The master's student/graduated is able to prepare coherent and clear technical documentation for non-specialists.
3. Supervises and monitors petroleum production and operations.	C1: The master's student/graduate demonstrates knowledge of petroleum production system design (petroleum operations planning, petroleum production system optimization). C2: The master's student/graduate develops plans for production operations (petroleum operations planning). A1: The master's student/graduate manages and ensures the safety of production operations. RA1: The master's student/graduate assumes responsibility for the safe operation of production equipment.
4. Supervises and monitors petroleum exploitation operations.	C1: The master's student / graduate understands the monitoring procedures for production equipment. S1: The master's student / graduate interprets production data and prepares compliance reports comparing plans and results. RA1: The master's student / graduate makes independent decisions in operational situations while complying with technical and safety regulations.
5. Applies health, safety, and environmental protection standards.	C1: The master's student/graduate understands the procedures for monitoring petroleum production equipment. A1: The master's student/graduate interprets production data and prepares compliance reports comparing plans and results.

	RA1: The master's student/graduate makes independent decisions in operational situations, in compliance with technical and safety standards.
Transversal Competencies	Learning Outcomes
1. Works effectively in multidisciplinary and international teams.	C1: The master's student/graduate understands the dynamics of teams in the petroleum and gas engineering field (reservoir engineers, geologists, economists, contractors). A1: The master's student/graduate communicates clearly and concisely, both orally and in writing, in various professional contexts. RA1: The master's student/graduate collaborates efficiently and proactively, assuming responsibilities within the team.
2. Professional Ethics and Social Responsibility	C1: The master's student/graduate identifies the principles of professional ethics and specific legislation. C2: The master's student/graduate knows best practices in social responsibility. A1: The master's student/graduate applies ethical standards in professional decision-making. A2: The master's student/graduate demonstrates integrity in engineering activities. RA1: The master's student/graduate is aware of the social and environmental impact of decisions. RA2: The master's student/graduate adopts sustainable and responsible solutions.
3. Autonomy and Career Management	C1: The master's student/graduate identifies development opportunities in the petroleum industry field. C2: The master's student/graduate knows the sources for continuous learning and professional qualification. A1: The master's student/graduate develops their own professional development and career plans. A2: The master's student/graduate develops their digital and managerial competencies. RA1: The master's student/graduate shows initiative in continuous education. RA2: The master's student/graduate assumes responsibility for their own professional development. RA3: The master's student/graduate demonstrates adaptability to labor market changes.

* C – knowledge; S – skills; RA – responsibility and autonomy.

6. Course Objectives (derived from the grid of specific competencies acquired)

6.1 General objective	The main objective of the course is to acquire advanced knowledge in the field of petroleum production. The secondary objective is to develop the analysis and synthesis skills necessary to optimize energy consumption and petroleum production.
6.2. Specific objectives	➢ Introducing students to the design and advanced optimization techniques of well production systems ➢ Understanding of operational aspects and petroleum production processes to perform assigned duties and various tasks required in the oil and gas industry. ➢ Providing solid knowledge for analyzing well and reservoir data, in order to make decisions regarding the appropriate well production system as well as establishing optimal operating parameters ➢ Provide solid technical knowledge to conduct bibliographic research and communicate the results through an oral presentation. ➢ Synthesizing the notions presented in the course, the correct use of the language and notions specific to petroleum production. ➢ Formulation of the opinions during the debate of a case study, correct evaluation of the application of a certain method to optimize the petroleum production systems. •

7. Contents

7.1. Course	No. of hours	Teaching methods	Remarks
1.Classification of petroleum production systems and selection criteria	2	Interactive lecture	Is recommended to read the references
2.Progressing cavity pumping and electrical submersible pumping	4		
3.Hydraulic pumping	4		
4.Subsea production systems	4		
5.Inflow Performance Relationships for vertical, slanted and horizontal wells	4		
6. Fluid flow through petroleum production systems	4		
7.Optimization methods used in petroleum industry	2		
8. Optimization of the petroleum production systems	4		

Bibliography

1. Beggs, H.D.: Production Optimization using NODAL Analysis, OGCI, 1999
2. Brown, K.E: The *Technology of Artificial Lift Methods, vol.2b ,* PennWell Books,*1982*
3. Bai, Y., Bay, Q.: Subsea Engineering Handbook, Elsevier, 2012
4. Bangert, P.:Machine Learning and Data Science in the Oil and Gas Industry, Gulf Professional Publishing, 2021
5. Gang, C., He, L.,Hengan, W. Chuang, L.: A novel methdology to simulate PCP dynamics performance under oil production condition, paper SPE 19716-MS, 2020
6. Guo, B., Lyons, W.C., Ghalambor, A.: Petroleum Production Engineering. A computer –Assisted Approach, Elsevier, Science &Technology Books, 2007.
7. Hoffman, A., Stanko, M.E.: Real- time production optimization of a production network with ESP boosted wells: a case study, paper SPE 184189-MS, 2016
8. Nguyen, T.: Artificial lift methods. Design, Practice and Applications, Springer, 2020
9. Marcu, M.: Study on Inflow Performance Relationships for multilayers formations, UPG Technical Buletin ,Vol. I. 71, 2019

10. Marcu, M., Aspects regarding influence of IPR and OPR curves on gas-lift performance, Romanian Journal of Petroleum&Gas Technology, vol I (LXXII), No.1, 2020
11. Marcu, M.:Sensitivity study of the reservoir fluids PVT properties calibration on superficial velocities and liquid holdup, Romanian Journal of Petroleum&Gas Technology, vol I (LXXII), No.2, 2020
12. Marcu, M.: Aspects regarding the calibration of the vertical lift performance curves, ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING Vol.65, Nr.2, 2022
13. Marcu, M.: Using the artificial neural network to approximate the gas-lift performance curve, ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING Vol.65, Nr.3, 2022.
14. Malatinszky,M., Marcu, M., MODEL BASED ON BOOLEAN LOGIC FOR SCREENING AND SELECTION OF THE ARTIFICIAL LIFT METHODS, Romanian Journal of Petroleum & Gas Technology VOL. III (LXXIV) • No. 2/2022
15. Marcu M. Approximation methods used to build the gas-lift performance curve based on reduced datasets: a comprehensive statistical comparison, Petroleum Science and Technology, sept 2024, DOI: 10.1080/10916466.2024.2404625
16. Ranjan, A., Verma, S., Singh, Y.: Gas lift opimization using artificial neural network, paper SPE 172610-MS, 2015
17. Zubir, M.A., Zainon, M.Z.: Two-Phase Flow Behaviour and Pattern in Vertical Pipes, Journal of Applied Sciences, p. 1491-1500, vol.11, 2011.
18. www.onepetro.org
19. www.sciencedirect.com
20. link.springer.com

7.2. Seminar / Laboratory	No. of hours	Teaching methods	Remarks
1.Selection of the petroleum production systems	2	Applications , case studies and discussions	Is recommended to read the references
2.Designing of Progressing Cavity Pumping	2		
3.Designing of Electrical Submersible Pumping	2		
3.Designing of Hydraulic Pumping	2		
5.Nodal analysis	4		

Bibliography

1. Beggs, H.D.: Production Optimization using NODAL Analysis, OGCI, 1999
2. Brown, K.E: The *Technology of Artificial Lift Methods, vol.2b ,* PennWell Books*,1982*
3. Bangert, P.:Machine Learning and Data Science in the Oil and Gas Industry, Gulf Professional Publishing, 2021
4. Gang, C., He, L.,Hengan, W. Chuang, L.: A novel methdology to simulate PCP dynamics performance under oil production condition, paper SPE 19716-MS, 2020
5. Guo, B., Lyons, W.C., Ghalambor, A.: Petroleum Production Engineering. A computer –Assisted Approach, Elsevier, Science &Technology Books, 2007.
6. Hoffman, A., Stanko, M.E.: Real- time production optimization of a production network with ESP boosted wells: a case study, paper SPE 184189-MS, 2016
7. Nguyen, T.: Artificial lift methods. Design, Practice and Applications, Springer, 2020
8. Marcu, M.: Study on Inflow Performance Relationships for multilayers formations, UPG Technical Buletin ,Vol. I. 71, 2019
9. Marcu, M., Aspects regarding influence of IPR and OPR curves on gas-lift performance, Romanian Journal of Petroleum&Gas Technology, vol I (LXXII), No.1, 2020
10. Marcu, M.:Sensitivity study of the reservoir fluids PVT properties calibration on superficial velocities and liquid holdup, Romanian Journal of Petroleum&Gas Technology, vol I (LXXII), No.2, 2020
11. Marcu, M.: Aspects regarding the calibration of the vertical lift performance curves, ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING Vol.65, Nr.2, 2022
12. Marcu, M.: Using the artificial neural network to approximate the gas-lift performance curve, ACTA TECHNICA NAPOCENSIS SERIES-APPLIED MATHEMATICS MECHANICS AND ENGINEERING Vol.65, Nr.3, 2022.
13. Malatinszky,M., Marcu, M., MODEL BASED ON BOOLEAN LOGIC FOR SCREENING AND SELECTION OF THE ARTIFICIAL LIFT METHODS, Romanian Journal of Petroleum & Gas Technology VOL. III (LXXIV) • No. 2/2022
14. Marcu M. Approximation methods used to build the gas-lift performance curve based on reduced datasets: a comprehensive statistical comparison, Petroleum Science and Technology, sept 2024, DOI: 10.1080/10916466.2024.2404625
15. Ranjan, A., Verma, S., Singh, Y.: Gas lift opimization using artificial neural network, paper SPE 172610-MS, 2015
16. Zubir, M.A., Zainon, M.Z.: Two-Phase Flow Behaviour and Pattern in Vertical Pipes, Journal of Applied Sciences, p. 1491-1500, vol.11, 2011.
17. www.onepetro.org

18 www.sciencedirect.com

19.link.springer.com

7.3. Project	No. of hours	Teaching methods	Remarks
Bibliography			

2. **Correlation of the course contents with the expectations of the epistemic community, professional associations and representative employers in the field related to the programme**

- The course topics was established in accordance with the current requirements of the oil industry.

9. Assessment

Type of activity	9.1. Assessment criteria	9.2. Assessment methods	9.3. Weight in final grade
9.4. Course	Use of specific tools – algorithms, schemes, modelling.	Written examination	70%
	Attendance and participation during lectures	Attendance and answers to questions during lectures	15%
9.5. Seminar/laborator	Presentation of results	Data processing	10%
	Active seminar attendance	Correct and complete interpretation of the obtained values	5%
9.6. Project			
9.7. Minimum performance standard			

 Correct answer to 50% of the subjects and questions on the exam tests;
2. Attendance over 60% of the course;
3. Attendance 100% of the seminar

Date of completion	Course lecturer signature	Seminar/laboratory lecturer signature	Project supervisor signature
22.09.2025	Assoc.Prof.Dr.Eng. Mariea Marcu	Assoc.Prof.Dr.Eng.Mariea Marcu	____________________

Date of department approval	Head of department *(academic position, first name, last name)* *(Signature)*	Dean *(academic position, first name, last name)* *(Signature)*
23.09.2025	*Assoc. prof.Dr.ing. Prundurel Alina*	*Conf.Dr.ing. Eparu Cristian*

COURSE SYLLABUS

1. Programme Information

1.1. Higher Education Institution	Petroleum-Gas University from Ploiesti
1.2. Faculty	Petroleum and Gas Engineering
1.3. Department	Drilling wells, Extraction and Transport of Hydrocarbons
1.4. Field of University Studies	Mines, Petroleum and Gas
1.5. Cycle of University Studies	MASTER
1.6. Study Programme	Petroleum Engineering

2. Course Information

2.1. Course name	Gas Gathering and Transmission Systems
2.2. Course lecturer	Prof. habil. dr. eng. Eparu Cristian
2.3. Seminar/lab teaching assistant	Prof. habil. dr. eng. Eparu Cristian
2.4. Project supervisor	
2.5, Year of study	1
2.6. Semester*	2
2.7. Evaluation type	E
2.8. Educational category** / course status***	DS

* the semester number is according to the curriculum;

** DF - Fundamental disciplines; DS - Specialization disciplines; DC - Complementary disciplines

*** mandatory/required = DOB; optional = DOP; elective = DFA

3. Estimated Total Time (hours per semester of teaching activities)

3.6. Number of hours per week	2	out of which: 3.2. course	2	3.3. Seminary/laboratory		3.4. Project	
3.5. Total hours from the curriculum	28	out of which: 3.6. course	28	3.7. Seminary/laboratory		3.8. Project	

3. 9. Total hours of individual study (study based on course materials, bibliography and notes, additional research in the library and on specialized electronic platforms, preparation for seminars/laboratories, homework, papers, portfolios, and essays)	94
3.10. Total hours per semester	150
3.11. ECTS	5

4. Conditions (where applicable)

4.1. by curriculum	➢ Termotechnics ➢ Fluid mechanics
4.2. for course delivery	➢
4.3. for seminar/laboratory activities	➢

5. Specific competencies acquired and the learning outcomes* underlying them”

Professional skills	Learning Outcomes*
1. Apply fundamental knowledge of mathematics, physics, chemistry in	C1: The master's student/graduate is able to use fundamental methods for analyzing phenomena in the gas gathering and transport networks. A1: The master's student/graduate applies physico-mathematical models applicable to the gas gathering and transport networks.

petroleum and gas engineering.	RA1: The master's student/graduate demonstrates critical thinking in evaluating engineering solutions and technological alternatives. RA2: The master's student/graduate applies optimization solutions in the exploitation process and monitors results by comparing performance indicators.
2. Uses technical documentation and specialized software for petroleum planning and design.	C1: The master's student/graduate understands and uses technical documentation, design standards, scientific research standards, and educational standards specific to the gas gathering and transport network. C2: The master's student/graduate uses specialized software for the design and optimization of gas gathering and transport networks. A1: The master's student/graduate correctly interprets technical reports, scientific results obtained from tests and specialized software modeling, as well as results from commissioning and operation tests of operation processes. RA1: The master's student/graduate is able to prepare coherent and clear technical documentation for non-specialists.
3. Supervises and monitors gas gathering and transport design.	C1: The master's student/graduate demonstrates knowledge of gas gathering and transport networks design and operation. C2: The master's student/graduate develops plans for gas gathering and transport network operations. A1: The master's student/graduate manages and ensures the safety of gas gathering and transport operations. RA1: The master's student/graduate assumes responsibility for the safe operation of gas gathering and transport equipment.
4. Supervises and monitors gas gathering and transport operations.	C1: The master’s student / graduate understands the monitoring procedures for hydrocarbon transport equipment. A1: The master’s student / graduate interprets simulation data and prepares compliance reports comparing plans and results. RA1: The master’s student / graduate makes independent decisions in operational situations while complying with technical and safety regulations.
5. Applies health, safety, and environmental protection standards.	C1: The master's student/graduate understands the procedures for monitoring gas gathering and transport equipment. A1: The master's student/graduate interprets production data and prepares compliance reports comparing plans and results. RA1: The master's student/graduate makes independent decisions in operational situations, in compliance with technical and safety standards.
Transversal Competencies	Learning Outcomes
1. Works effectively in multidisciplinary and international teams.	C1: The master's student/graduate understands the dynamics of teams in the gas engineering field. A1: The master's student/graduate communicates clearly and concisely, both orally and in writing, in various professional contexts. RA1: The master's student/graduate collaborates efficiently and proactively, assuming responsibilities within the team.

2. Professional Ethics and Social Responsibility	C1: The master's student/graduate identifies the principles of professional ethics and specific legislation. C2: The master's student/graduate knows best practices in social responsibility. A1: The master's student/graduate applies ethical standards in professional decision-making. A2: The master's student/graduate demonstrates integrity in engineering activities. RA1: The master's student/graduate is aware of the social and environmental impact of decisions. RA2: The master's student/graduate adopts sustainable and responsible solutions.
3. Autonomy and Career Management	C1: The master's student/graduate identifies development opportunities in the petroleum industry field (reservoir engineering). A1: The master's student/graduate develops their own professional development and career plans. A2: The master's student/graduate develops their digital and managerial competencies. RA1: The master's student/graduate shows initiative in continuous education. RA2: The master's student/graduate assumes responsibility for their own professional development.

* C – knowledge; S – skills; RA – responsibility and autonomy.

6. Course Objectives (derived from the grid of specific competencies acquired)

General objective	Using based methods to calculate fluid flow through pipes and the phenomena that occur.
Specific objectives	➢ to apply to the theoretical knowledge acquired in the conditions of the practical requirements ➢ to operate correctly with the entities of the studied field ➢ analyse, calculate and design gas gathering and transport systems ➢ To simulate the processes in the fluid transport systems through pipes using numerical simulators

7. Contents

7.1. Course	No. of hours	Teaching methods	Remarks
Gas properties	2	Interactive presentation	
Hydraulics in gas gathering and transport	4		
Capacity, linepack, storage	4		
Compression and expansion	2		
Technological losses	2		
Planning, monitoring and operating gas networks	4		
Regulatory in gathering and transport	2		
Main problems that occur in gathering and transport network operations	4		

Numerical simulators	4		

Bibliography

1. Burden R., Faires D., *Numerical analysis*, Pws-Kent, Boston, 1988.
2. Chapra S., Canale R., 1988, *Numerical methods for engineers*, Second Edition, Mcgraw-Hill Inc.,New York.
3. David J. Logan, *A first course in differential equations*, Springer 2001.
4. Dănăilă S., Berbente C., 2003, *Metode numerice în Dinamica fluidelor*, Editura Acdemiei Române.
5. Eparu C. – *Managementul sistemelor de distributie gaze naturale*, Editura Universității Petrol-Gaze din Ploieşti, ISBN 978-973-719-775-7, Ploieşti, 2019
6. FLetcher C. A. J., 1991, *Computational techniques for fluid dynamics*, Vol. I & II, Second Edition,Springer-Verlag, Berlin, Heidelberg.
7. Oroveanu, T.-*Hidraulica si transportul produselor petroliere.* Editura Didacticã şi Pedagogicã, 1966.
8. Oroveanu, T. David, V., Stan, Al., Trifan, C. - *Colectarea, transportul, depozitarea şi distribuţia produselor petroliere şi gazelor*, Editura Didactică şi Pedagogică, Bucureşti 1985
9. Resiga R., 2003*, Mecanica fluidelor numerică*, Editura Orizonturi Universitare, Timişoara.
10. Seteanu I., Broboană D., 2000, *Numerical models in Hydraulics and Power Engineering*, Editura BREN, Bucureşti.
11. Stan, AL., Creţu, I. - *Transportul fluidelor prin conducte*, Editura Tehnică, Bucureşti 1984
12. C. Eparu, S. Neacşu, D. Stoica - *The use of numerical simulators to determine the daily balance of the natural gas distribution network,* Journal of Eastern Europe Research in Business and Economics, IBIMA Publishing, ISSN 2169-0367, Vol. 2013 (2013), DOI: 10.5171/2013. 404582, p 1-13

7.2. Seminar / Laboratory	No. of hours	Teaching methods	Remarks
Presentation of the topic	1	Presentation, calculus, simulation	
Regulatory in gathering and transport	1		
Gas properties calculation	2		
Gas gathering system design	6		
Gas transport system design	6		
Planning, monitoring and operating gas networks	4		
Management of gathering/transport network systems	4		
Project management presentation	4		

Bibliography

1. Burden R., Faires D., *Numerical analysis*, Pws-Kent, Boston, 1988.
2. Chapra S., Canale R., 1988, *Numerical methods for engineers*, Second Edition, Mcgraw-Hill Inc.,New York.
3. David J. Logan, *A first course in differential equations*, Springer 2001.
4. Dănăilă S., Berbente C., 2003, *Metode numerice în Dinamica fluidelor*, Editura Acdemiei Române.
5. Eparu C. – *Managementul sistemelor de distributie gaze naturale*, Editura Universității Petrol-Gaze din Ploieşti, ISBN 978-973-719-775-7, Ploieşti, 2019
6. FLetcher C. A. J., 1991, *Computational techniques for fluid dynamics*, Vol. I & II, Second Edition,Springer-Verlag, Berlin, Heidelberg.
7. Oroveanu, T.-*Hidraulica si transportul produselor petroliere.* Editura Didacticã şi Pedagogicã, 1966.
8. Oroveanu, T. David, V., Stan, Al., Trifan, C. - *Colectarea, transportul, depozitarea şi distribuţia produselor petroliere şi gazelor*, Editura Didactică şi Pedagogică, Bucureşti 1985
9. Resiga R., 2003*, Mecanica fluidelor numerică*, Editura Orizonturi Universitare, Timişoara.
10. Seteanu I., Broboană D., 2000, *Numerical models in Hydraulics and Power Engineering*, Editura BREN, Bucureşti.
11. Stan, AL., Creţu, I. - *Transportul fluidelor prin conducte*, Editura Tehnică, Bucureşti 1984
12. C. Eparu, S. Neacşu, D. Stoica - *The use of numerical simulators to determine the daily balance of the natural gas distribution network,* Journal of Eastern Europe Research in Business and Economics, IBIMA Publishing, ISSN 2169-0367, Vol. 2013 (2013), DOI: 10.5171/2013. 404582, p 1-13

7.3. Project	No. of hours	Teaching methods	Remarks
Bibliography			

8. Correlation of the course contents with the expectations of the epistemic community, professional associations and representative employers in the field related to the programme

- The course syllabus was developed in cooperation with representatives of (oil and gas) engineering companies (from Romania and abroad) in Ploiești and Bucharest that have hired graduates of similar master programs

9. Assessment

Type of activity	9.1. Assessment criteria	9.2. Assessment methods	9.3. Weight in final grade
9.4. Course	Use of specific tools – algorithms, schemes, modelling.	Written examination	70%
	Attendance and participation during lectures	Attendance and answers to questions during lectures	15%
9.5. Seminar/laborator	Presentation of results	Data processing	10%
	Active seminar attendance	Correct and complete interpretation of the obtained values	5%
9.6. Project			
9.7. Minimum performance standard			
➢ Course frequency 50% Solving the theoretical subjects for the exam (50%)			

Date of completion	Course lecturer signature	Seminar/laboratory lecturer signature	Project supervisor signature
20.09.2025	Prof. habil. dr. Eng. Cristian Eparu	Prof. habil. dr. Eng. Cristian Eparu	____________________

Date of department approval	Head of department	Dean
20.09.2025	Assoc. Prof.. dr. Eng. Alina Prundurel	Prof. habil. dr. Eng. Cristian Eparu

COURSE SYLLABUS

1. Programme Information

1.1. Higher Education Institution	Petroleum – Gas University from Ploieşti
1.2. Faculty	Faculty of Petroleum and Gas Engineering
1.3. Department	Well Drilling, Extraction and Transport of Hydrocarbons
1.4. Field of University Studies	Mines, Oil and Gas
1.5. Cycle of University Studies	Master
1.6. Study Programme	Petroleum Engineering

2. Course Information

2.1. Course name	Gas Production and Storage
2.2. Course lecturer	Assoc. Prof. Dr. Eng. Iuliana Ghețiu
2.3. Seminar/lab teaching assistant	
2.4. Project supervisor	Senior Lecturer, Dr. Eng. Rami Doukeh
2.5, Year of study	1
2.6. Semester*	2
2.7. Evaluation type	E
2.8. Educational category** / course status***	DS / O

* the semester number is according to the curriculum;

** DF - Fundamental disciplines; DS - Specialization disciplines; DC - Complementary disciplines

*** mandatory/required = DOB; optional = DOP; elective = DFA

3. Estimated Total Time (hours per semester of teaching activities)

3.6. Number of hours per week	3	din care: 3.2. curs	2	3.3. Seminar/laborator	1	3.4. Project	0
3.5. Total hours from the curriculum	42	din care: 3.6. curs	28	3.7. Seminar/laborator	14	3.8. Project	0
3. 9. *Total hours of individual study (study based on course materials, bibliography and notes, additional research in the library and on specialized electronic platforms, preparation for seminars/laboratories, homework, papers, portfolios, and essays)*							108
3.10. Total hours per semester							150
3.11. ECTS							5

4. Conditions (where applicable)

4.1. by curriculum	➢ Thermotechnics ➢ Chemistry ➢ Fluid Mechanics ➢ Strength of Materials ➢ Physicochemistry of Rocks and Fluids ➢ Underground Hydraulics and Hydrotechnical Engineering ➢ Reservoir Engineering
4.2. for course delivery	➢ Classroom equipped with projection screen, video projector, computer, and whiteboard. ➢ Students are not allowed to attend lectures, seminars, or laboratory activities with mobile phones turned on.

	➢ Telephone conversations during classes are strictly prohibited. Students are not permitted to leave the classroom in order to answer personal phone calls, except in special or emergency situations.
4.3. for seminar/laboratory activities	

5. Specific competencies acquired and the learning outcomes* underlying them”

Professional Competencies	Learning Outcomes*
1. Understanding the principles and fundamental processes of natural gas extraction	C1 – Understands the physicochemical properties of natural gases and the operating principles of extraction equipment. A1 – Can explain and analyze gas separation, drying, and treatment processes using theoretical models and practical examples. RA1 – Demonstrates responsibility in the correct application of engineering concepts for optimizing extraction processes.
2. Design and evaluation of surface and subsurface technological installations	C2 – Understands the structural and functional characteristics of equipment used in gas wells and surface installations. A2 – Can develop and evaluate technological schemes for natural gas exploitation, separation, and compression. RA2 – Demonstrates autonomy and rigor in selecting appropriate technical solutions, while complying with safety and environmental protection standards.
3. Application of modern techniques for calculation and simulation of extraction and treatment processes	C3 – Understands the basic principles of numerical modeling of flow regimes and transport processes. A3 – Uses simulation software (e.g., PIPESIM, OFM) for analyzing the performance of wells and gathering systems. RA3 – Can work independently or within a team to optimize technological parameters, assuming responsibility for obtained results.
4. Integration of extraction, treatment, and storage processes within a complete energy system	C4 – Understands the technological interconnections between extraction, treatment, and storage of natural gases. A4 – Can evaluate and propose technical solutions for efficient management of produced gases, including underground storage and liquefaction methods. RA4 – Demonstrates analytical capacity and an integrative vision in the design and operation of installations in the natural gas industry.
Transversal Competencies	Learning Outcomes
1. Professional communication and use of technical terminology specific to the field	C1 – Understands the terminology specific to gas extraction, treatment, and storage. A1 – Can prepare technical documentation and present scientific reports in a clear and coherent manner. RA1 – Demonstrates confidence and autonomy in presenting technical arguments and professional conclusions
2. Teamwork and adaptation to the requirements of the professional environment	C2 – Understands the structure and dynamics of project teams within the petroleum industry. A2 – Actively participates in the development and implementation of engineering projects, respecting the roles and responsibilities of each team member. RA2 – Demonstrates cooperation skills, professional ethics, and respect for safety regulations.
3. Continuous learning and professional development	C3 – Understands modern sources of scientific and technological information in the field of gas extraction and processing. A3 – Uses updated scientific information for professional improvement and applied research activities. RA3 – Demonstrates initiative and autonomy in the learning process and applied scientific research.

* C – knowledge; S – skills; RA – responsibility and autonomy.

6. Course Objectives (derived from the grid of specific competencies acquired)

6.1. General Objective of the Course	➢ Identification and proper evaluation of the fundamental theoretical characteristics of natural gas extraction processes (definitions, theories, equations, and laws governing natural gases, extraction models, and the specific features of each extraction method). ➢ Development of students' interest in the field of natural gas extraction and in the educational activities related to the discipline. ➢ Development of professional interpersonal relationships required for conducting the educational process under optimal conditions. ➢ Proper use of the technical terminology specific to natural gas extraction and processing engineering. ➢ Study and analysis of the different types of equipment commonly used in natural gas well operations and field practice. ➢ Integration of modern calculation techniques and process simulation tools for the correct determination of natural gas extraction regimes, with the aim of achieving maximum operational efficiency. ➢ Development of critical thinking through participation in scientific communication and academic activities.
6.2. Specific Objectives	➢ The main objective of the discipline is to provide advanced specialized training for petroleum and gas engineering students enrolled in the first year of the Master's program, specialization in Petroleum Extraction. ➢ The course content is continuously updated, including recent technological developments regarding natural gas extraction, gathering, treatment, compression, transportation, distribution, and underground storage processes. ➢ Through practical and laboratory activities, students consolidate the theoretical concepts presented during lectures and acquire practical skills related to the use of engineering software and process simulators (e.g., PIPESIM, OFM) available in the laboratory infrastructure.

7. Contents

7.1. Course	No. of hours	Teaching methods	Remarks
Physicochemical properties of natural gases, gas-condensate systems, liquid hydrocarbon mixtures and natural gas mixtures containing impurities (CO_2, N_2, H_2S).	4	Conventional teaching methods combined with modern multimedia techniques (computer network, video projector, digital whiteboard, internet resources, etc.).	
Types of equations of state; comparative analysis of models used for describing liquid and gaseous phases and physicochemical parameters.	2		
Natural gas humidity and gas condensates. Methods for determining natural gas humidity presented in the specialized literature.	4		
Gas hydrates. Determination of hydrate formation temperature and pressure in natural gas mixtures from gas fields. Prevention and control of hydrate formation.	2		
Comparative study of natural gas reservoir exploitation methods and description of the technological operation of gas separation and condensate recovery installations used nationally and internationally.	4		
Selection and sizing of natural gas exploitation equipment: selection of downhole equipment according to well production conditions;	4		

characteristics and operation principles of extraction systems; well tubing and sucker rod strings; operation of multi-layer gas-producing wells.			
Functional characteristics and operating principles of surface installations and equipment used in natural gas and gas-condensate exploitation.	2		
Comparative analysis of natural gas measurement and regulation systems. Construction and operating principles, operating conditions, accuracy classes. Computer-based models for gas flow calculation and volumetric gas recording diagrams according to ISO 5167.	4		
Natural gas compression and storage. Determination of operational parameters and evaluation of compression processes using compressors with pistons, centrifugal compressors, or other gas compression equipment.	4		
Underground storage of natural gas and liquefied natural gas storage. Description of underground storage and gas liquefaction processes, including imposed safety measures.	4		
Advanced methods used nationally and internationally for removing liquid accumulations from gas wells. Determination of optimal gas flow regimes according to the selected liquid removal method.	2		
Use of utility fluids and corrosion inhibitors in natural gas wells (foam injection for liquid unloading, removal of accumulated water from wells, fluid injection in gas wells, etc.).	2		
Natural gas dehydration processes. Presentation of components and operating principles of natural gas dehydration installations based on molecular sieves, silica gel, glycol absorption systems (DEG, TEG), etc.	2		
Natural gas sweetening processes. Presentation of components and operating principles of natural gas sweetening installations. Natural gas purification processes containing impurities such as CO_2 and H_2S. Natural gas odorization processes and installations.			

Bibliography

1. Rami Doukeh, Iuliana Ghețiu, Ion Pană, Alina Prundurel, HIDROGEN - OBȚINERE. STOCARE. TRANSPORT, Editura Universității Petrol- Gaze din Ploiești, 2025, 153 pag. ISBN 978-973-719-922-5
2. Jianjun Liu, Yuewu Liu, Zhengming Yang, Yiqiang Li, Fuquan Song, Rui Song and Yun Yang, Porous Flow of Energy & CO2 Transformation and Storage Deep Formations, Published in Journals: Applied Sciences, Energies, Geosciences, Minerals and Water. 2024, https://doi.org/10.3390/books978-3-7258-1384-1
3. Jun Liu, Gan Feng and Peng Zhao, Application and Optimization of CCUS Technology in Shale Gas Production and Storage. Energies, 2025, https://doi.org/10.3390/books978-3-7258-5130-0
4. Bing Bai, Geo-Environmental Problems Caused by Underground Construction, Applied Sciences, 2024, https://doi.org/10.3390/books978-3-7258-0041-4
5. Doukeh, Rami, Iuliana Veronica Ghețiu, Timur Vasile Chiș, Doru Bogdan Stoica, Gheorghe Brănoiu, Ibrahim Naim Ramadan, Ștefan Alexandru Gavrilă, Marius Gabriel Petrescu, and Rami Harkouss.

2025. "Hydrogen–Rock Interactions in Carbonate and Siliceous Reservoirs: A Petrophysical Perspective" Applied Sciences 15, no. 14: 7957. https://doi.org/10.3390/app15147957.

6. Eparu, Cristian Nicolae, Alina Petronela Prundurel, Rami Doukeh, Doru Bogdan Stoica, Iuliana Veronica Ghețiu, Silviu Suditu, Ioana Gabriela Stan, and Renata Rădulescu. 2024. "Optimizing Underground Natural Gas Storage Capacity through Numerical Modeling and Strategic Well Placement" Processes 12, no. 10: 2136. https://doi.org/10.3390/pr12102136.
7. Eparu, Cristian Nicolae, Silvian Suditu, Rami Doukeh, Doru Bogdan Stoica, Iuliana Veronica Ghețiu, Alina Prundurel, Ioana Gabriela Stan, and Liviu Dumitrache. 2024. "Software for CO2 Storage in Natural Gas Reservoirs" Energies 17, no. 19: 4984. https://doi.org/10.3390/en17194984.
8. Dinu, F., - Extracţia gazelor naturale, Editura Universităţii ”Petrol-Gaze” din Ploieşti, 2000;
9. Dinu, F., - Extracţia și tratarea gazelor naturale, Editura Universităţii ”Petrol-Gaze” din Ploieşti, 2009;
10. Dinu, F., - Bazele simulării numerice în extracția petrolului, Editura Universităţii ”Petrol-Gaze” din Ploieşti, 2013;
11. Dinu, F., - Bazele simulării numerice în extracția petrolului – Îndrumar de laborator, Editura Universităţii ”Petrol-Gaze” din Ploieşti, 2013;
12. Dinu, F., - Metode de evacuare a fazei lichide acumulată în sondele de gaze. Aplicaţii practice, Editura Universităţii ”Petrol-Gaze” din Ploieşti, 2000;
13. Dinu, F., - Extracţia și prelucrarea gazelor naturale, Editura Universităţii ”Petrol-Gaze” din Ploieşti, 2013;
14. Dinu, F., Extracţia şi Tratarea Gazelor Naturale, Editura Universităţii Petrol - Gaze din Ploieşti, 2011, Fondul Social European, POSDRU, contract nr. 81/3.2/S/59102;
15. Minescu, F.,- Fizica zăcămintelor de hidrocarburi, Editura Universităţii din Ploieşti, Vol. I, 1994, Vol. II, 2004;
16. Niculescu, N., Goran, N., - Tehnologia extracţiei gazelor - Îndrumar de laborator, Centrul de multiplicare I.P.G. Ploieşti, 1990;
17. Olteanu, B., Valter, P., Zgîia, I., - Hidrocarburi gazoase şi lichefiate, Editura Tehnică, Bucureşti, 1994;
18. Popescu, C., Coloja, M. P., - Extracţia petrolului şi gazelor asociate, Editura Tehnică, Bucureşti,1994;
19. Puşcoiu, N.,- Carnet tehnic gaze naturale, Editura Tehnică, Bucureşti, 1994;
20. Nistor, I. - Proiectarea exploatării zăcămintelor de hidrocarburi fluide, Editura Tehnică, Bucureşti, 1999;
21. Tudor, I., Dinu, F., - Protecţia anticorozivă şi reabilitarea conductelor şi rezervoarelor, Editura Universităţii ”Petrol-Gaze” din Ploieşti, 2007.

7.2. Seminar / Laboratory	No. of hours	Teaching methods	Remarks
Bibliography			

7.3. Project	No. of hours	Teaching methods	Remarks
Bibliography			

8. Correlation of the course contents with the expectations of the epistemic community, professional associations and representative employers in the field related to the programme

➢ In order to outline the course contents and select the appropriate teaching and learning methods, the course coordinators organized meetings with representatives of OMV Petrom SNP, TRANSGAZ S.A., and ROMGAZ S.A., specialized in the field, as well as with representatives of public institutions (relevant ministries, local authorities, etc.) and academic staff members from other higher education institutions. These meetings aimed to identify the needs and expectations of employers in the field and to ensure coordination with similar study programs offered by other universities.

9. Assessment

Type of activity	9.1. Assessment criteria	9.2. Assessment methods	9.3. Weight in final grade
9.4. Course	Use of specific tools – algorithms, schemes, modelling.	Written examination	90
	Attendance and participation during lectures	Attendance and answers to questions during lectures	10
9.5. Seminar/laborator	Presentation of results	Data processing	
	Active seminar attendance	Correct and complete interpretation of the obtained values	
9.6. Project			
9.7. Minimum performance standard			

For successful completion of the course, the student must demonstrate the acquisition of essential knowledge regarding the principles, processes, and equipment used in the extraction, treatment, and storage of natural gases.

- ✓ The minimum performance level is achieved when the student:
- ✓ Understands the fundamental physicochemical properties of natural gases and explains the role of the main equipment and installations used in gas extraction and treatment;
- ✓ Correctly identifies and describes the basic technological processes, including gas separation, compression, dehydration, and gasoline recovery;
- ✓ Applies the fundamental equations used for determining technological parameters (pressure, flow rate, temperature, flow gradient) and interprets the obtained results in a logical and coherent manner;
- ✓ Demonstrates the ability to correlate extraction, storage, and treatment processes, presenting an integrated understanding of the natural gas technological flow;
- ✓ Uses specialized technical terminology and formulates clear, technically supported explanations during oral and written evaluations;
- ✓ Demonstrates responsibility and professional conduct while complying with industrial safety regulations and environmental protection requirements.

Course completion is achieved by obtaining a minimum grade of 5 (five), confirming the acquisition of basic competencies and the achievement of the minimum standards related to knowledge (C), skills (A), and responsibility and autonomy (RA).

Date of completion	Course lecturer signature	Seminar/laboratory lecturer signature	Project supervisor signature
22.09.2025	____________________	____________________	____________________

Date of department approval	Head of department *Assoc. Prof. Dr. Eng. Alina Prundurel*	Dean *Prof. Habil. Dr. Eng. Cristian Eparu*
23.09.2025	______________	____________________

COURSE SYLLABUS

1. Programme Information

1.1. Higher Education Institution	Universitatea Petrol – Gaze din Ploieşti
1.2. Faculty	Ingineria Petrolului si Gazelor
1.3. Department	Petroleum Geology and Reservoir Engineering
1.4. Field of University Studies	Mine, Petrol si Gaze
1.5. Cycle of University Studies	MASTER
1.6. Study Programme	Petroleum Engineering MPEZ

2. Course Information

2.1. Course name	Well Completion
2.2. Course lecturer	S l dr. ing. Doru Bârsan
2.3. Seminar/lab teaching assistant	S l dr. ing. Doru Bârsan
2.4. Project supervisor	
2.5, Year of study	II
2.6. Semester*	3
2.7. Evaluation type	E
2.8. Educational category** / course status***	DS/DOB

* the semester number is according to the curriculum;

** DF - Fundamental disciplines; DS - Specialization disciplines; DC - Complementary disciplines

*** mandatory/required = DOB; optional = DOP; elective = DFA

3. Estimated Total Time (hours per semester of teaching activities)

3.6. Number of hours per week	3	din care: 3.2. curs	2	3.3. Seminar/laborator	1	3.4. Project	
3.5. Total hours from the curriculum	42	din care: 3.6. curs	28	3.7. Seminar/laborator	14	3.8. Project	
3. 9. Total hours of individual study (study based on course materials, bibliography and notes, additional research in the library and on specialized electronic platforms, preparation for seminars/laboratories, homework, papers, portfolios, and essays)							78
3.10. Total hours per semester							
3.11. ECTS							4

4. Conditions (where applicable)

4.1. by curriculum	➢
4.2. for course delivery	➢
4.3. for seminar/laboratory activities	➢

5. Specific competencies acquired and the learning outcomes* underlying them”

Professional skills	Learning Outcomes*
CP1. Applies the fundamental concepts of well completion technologies.	C1 – The student/graduate knows the principles of well completion technologies. C2 – The student/graduate understands their advantages, disadvantages and fields of application. A1 – The student/graduate analyses reservoir conditions and selects the appropriate completion method. RA1 – The student/graduate critically evaluates technological solutions and justifies the selection of the optimal method in context.
2. Uses technical documentation and specialized software for petroleum planning and design.	C1: The master's student/graduate understands and uses technical documentation, design standards, scientific research standards, and educational standards specific to the Petroleum-Gas University of Ploiești. C2: The master's student/graduate uses specialized software for the design and optimization of hydrocarbon reservoir exploitation processes (operations planning, optimization, storage and distribution, flow analysis).

	A1: The master's student/graduate correctly interprets technical reports, scientific results obtained from tests and specialized software modeling of hydrocarbon reservoirs, as well as results from commissioning and operation tests of production processes. RA1: The master's student/graduate is able to prepare coherent and clear technical documentation for non-specialists.
3. Supervises and monitors petroleum production and operations.	C1: The master's student/graduate demonstrates knowledge of hydrocarbon reservoir design and production (petroleum operations planning, reservoir optimization). C2: The master's student/graduate develops plans for hydrocarbon reservoir design, drilling and production operations (petroleum operations planning, reservoir optimization). A1: The master's student/graduate manages and ensures the safety of hydrocarbon reservoir design and production operations (petroleum operations planning, reservoir optimization). RA1: The master's student/graduate assumes responsibility for the safe operation of hydrocarbon reservoir production equipment.
4. Supervises and monitors petroleum exploitation operations.	C1: The master’s student / graduate understands the monitoring procedures for hydrocarbon reservoir exploitation equipment. S1: The master’s student / graduate interprets drilling and production data and prepares compliance reports comparing plans and results. RA1: The master’s student / graduate makes independent decisions in operational situations while complying with technical and safety regulations.
5. Applies health, safety, and environmental protection standards.	C1: The master's student/graduate understands the procedures for monitoring hydrocarbon reservoir drilling and production equipment. A1: The master's student/graduate interprets production data and prepares compliance reports comparing plans and results. RA1: The master's student/graduate makes independent decisions in operational situations, in compliance with technical and safety standards.
Transversal Competencies	Learning Outcomes
1. Works effectively in multidisciplinary and international teams.	C1: The master's student/graduate understands the dynamics of teams in the petroleum and gas engineering field (reservoir engineers, geologists, economists, contractors). A1: The master's student/graduate communicates clearly and concisely, both orally and in writing, in various professional contexts. RA1: The master's student/graduate collaborates efficiently and proactively, assuming responsibilities within the team.
2. Professional Ethics and Social Responsibility	C1: The master's student/graduate identifies the principles of professional ethics and specific legislation. C2: The master's student/graduate knows best practices in social responsibility. A1: The master's student/graduate applies ethical standards in professional decision-making. A2: The master's student/graduate demonstrates integrity in engineering activities. RA1: The master's student/graduate is aware of the social and environmental impact of decisions. RA2: The master's student/graduate adopts sustainable and responsible solutions.
3. Autonomy and Career Management	C1: The master's student/graduate identifies development opportunities in the petroleum industry field (reservoir engineering).

	C2: The master's student/graduate knows the sources for continuous learning and professional qualification. A1: The master's student/graduate develops their own professional development and career plans. A2: The master's student/graduate develops their digital and managerial competencies. RA1: The master's student/graduate shows initiative in continuous education. RA2: The master's student/graduate assumes responsibility for their own professional development. RA3: The master's student/graduate demonstrates adaptability to labor market changes.

* C – knowledge; S – skills; RA – responsibility and autonomy.

6. Course Objectives (derived from the grid of specific competencies acquired)

6.1. General objective	Through the developed project, students consolidate their skills in well completion design.
6.2. Specific objectives	• Knowledge of completion-specific equipment and optimal selection of well completion methods. Providing communication feedback and establishing collaborative relations with colleagues. Using modern communication and presentation tools in analysis and learning.

7. Contents

7.1. Course	No. of hours	Teaching methods	Remarks
Open-hole and cased-hole completions.	6	Interactive lecture	
Multiple completion (multi-zone completion).	8		
Multilateral completions.	8		
Other special-purpose completions.	6		
Bibliography 1. Macovei, N., Opening of Productive Formations, Petroleum–Gas University Publishing House, Ploiești, 2008. 2. Macovei, N., Well Drilling, Vol. 3, Petroleum–Gas University Publishing House, Ploiești, 1998.			
7.2. Seminar / Laboratory	No. of hours	Teaching methods	Remarks
Selection of well completion method.	6	Group-based experimentation	
Analysis of special-purpose completions.	8	Case study	
Multiple and multilateral completions.	8		
Expandable tubulars.	8		
Bibliography 1. Macovei, N., Opening of Productive Formations, Petroleum–Gas University Publishing House, Ploiești, 2008. 2. Macovei, N., Well Drilling, Vol. 3, Petroleum–Gas University Publishing House, Ploiești, 1998.			
7.3. Project	No. of hours	Teaching methods	Remarks

Bibliography

8. Correlation of the course contents with the expectations of the epistemic community, professional associations and representative employers in the field related to the programme

Participation in thematic exhibitions, workshops and communication sessions in mining, petroleum and gas. Discussions with employers during company presentation events and meetings with students. Use of results from scientific research contracts to supplement/adjust course contents. Field visits to the premises of the faculty's partner companies in Petroleum and Gas Engineering.

9. Assessment

Type of activity	9.1. Assessment criteria	9.2. Assessment methods	9.3. Weight in final grade
9.4. Lecture	Periodic tests	Periodic knowledge checks	10%
9.4. Lecture	Final examination grade	Written exam (summative assessment)	80%
9.5. Seminar/Laboratory	Laboratory activity	Periodic knowledge checks	10%
9.5. Seminar/Laboratory			
9.6. Project	Project activity	Stage review (milestone check)	100%
9.7. Minimum performance standard			

Date of completion	Course lecturer signature	Seminar/laboratory lecturer signature	Project supervisor signature
22.09.2025	S l dr. ing. Doru Bârsan	S l dr. ing. Doru Bârsan	________________

Date of department approval	Head of department *(academic position, first name, last name)* *(Signature)*	Dean *(academic position, first name, last name)* *(Signature)*
23.09.2025	Sef lucr. Dr. ing. Alina Prundurel	*Conf. univ. habil. Dr. ing. Cristian Eparu*

F I Ş A   D I S C I P L I N E I

1. Date despre program

1.1. Instituția de învățământ superior	Universitatea „Petrol – Gaze” din Ploieşti
1.2. Facultatea	Facultatea de Ingineria Petrolului și Gazelor
1.3. Departamentul	Petroleum Geology and Reservoir Engineering
1.4. Domeniul de studii universitare	Mine, Petrol și Gaze
1.5. Ciclul de studii universitare	Master
1.6. Programul de studii universitare	Petroleum Engineering - MPEZ

2. Date despre disciplină

2.1. Denumirea disciplinei	ADVANCED PETROLEUM TRANSPORT
2.2. Titularul activităților de curs	Prof.habil.dr.eng. Timur-Vasile CHIȘ
2.3. Titularul activităților seminar/laborator	Prof.habil.dr.eng. Timur-Vasile CHIȘ
2.4. Titularul activității proiect	
2.5. Anul de studiu	II
2.6. Semestrul *	I
2.7. Tipul de evaluare	Examen
2.8. Categoria formativă** / regimul*** disciplinei	DS/DOB

* numărul semestrului este conform planului de învățământ;

** DF - Discipline fundamentale; DS - discipline de specializare; DC - discipline complementare

*** obligatorie/impusă = DOB; opțională = DOP; facultativă = DFA

3. Timpul total estimat (ore pe semestru al activităților didactice)

3.1. Număr de ore pe săptămână	3	din care: 3.2. curs	1	3.3. Seminar/laborator	2	3.4. Proiect	
3.5. Total ore din planul de învățământ	42	din care: 3.6. curs	14	3.7. Seminar/laborator	28	3.8. Proiect	
3. 9. Total ore studiu individual (studiu după suport de curs, bibliografie și notițe, documentare suplimentară în bibliotecă, pe platformele electronice de specialitate, pregătire seminarii/laboratoare, teme, referate, portofolii și eseuri)							
3.10. Total ore pe semestru							78
3.11. Numărul de credite							4

4. Condiții (acolo unde este cazul)

4.1. by curriculum	➢ Thermotechnics and Thermal Machines Transportation of Petroleum Products
4.2. for course delivery	➢ Classroom equipped with screen, video projector, computer, and whiteboard ➢ The course will be organized into learning units designed to support active and participatory teaching methods Students' lateness to class will not be tolerated, as it is considered disruptive to the educational process
4.3. for seminar/laboratory activities	➢ Laboratory activities are conducted exclusively in the laboratory room, properly equipped according to the requirements of the discipline and using the specific laboratory stands

	➢ Laboratory activities will be carried out in compliance with occupational health and safety regulations. The laboratory session will benefit from the presence of the laboratory technician responsible for the laboratory. The deadline for submitting the laboratory report will be established by the course instructor in agreement with the students. Requests for postponement will not be accepted except for objectively justified reasons. Furthermore, late submission of laboratory reports will result in a penalty of 1 point deducted for each day of delay.

5. Specific competencies acquired and the learning outcomes* underlying them”

Professional skills	Learning Outcomes*
1. Apply fundamental knowledge of mathematics, physics, chemistry, and geology in petroleum and gas engineering/ Aplicarea cunoștințelor fundamentale de matematică, fizică, chimie și geologie în ingineria petrolului și gazelor	C1: The master's student/graduate is able to use fundamental methods for analyzing phenomena in the oil, petroleum products suply, storage and transport. A1: The master's student/graduate applies physico-mathematical models applicable to the oil, petroleum products suply, storage and transport. RA1: The master's student/graduate demonstrates critical thinking in evaluating engineering solutions and technological alternatives about oil, petroleum products suply, storage and transport. RA2: The master's student/graduate applies optimization solutions in the oil, petroleum products suply, storage and transport process and monitors results by comparing performance indicators.
2. Designs and manages the exploitation process and oil and gas processing systems./ Supervises and monitors petroleum production and operations/ Proiectează și gestionează procesul de exploatare și sistemele de procesare a petrolului și gazelor./ Supervizează și monitorizează producția și operațiunile de petrol.	C1: The master's student/graduate demonstrates knowledge of oil, petroleum products suply, storage and transport (operations planning and process optimization). C2: The master's student/graduate develops plans for oil, petroleum products suply, storage and transport design. A1: The master's student/graduate manages and ensures the safety of oil, petroleum products suply, storage and transport . RA1: The master's student/graduate assumes responsibility for the safe operation of oil, petroleum products suply, storage and transport.
5. Applies health, safety, and environmental protection standards/ Aplică standarde de sănătate, siguranță și protecție a mediului.	C1: The master's student/graduate understands the procedures for monitoring oil, petroleum products suply, storage and transport. A1: The master's student/graduate interprets production data and prepares compliance reports comparing plans and results to the oil, petroleum products suply, storage and transport. RA1: The master's student/graduate makes independent decisions in operational situations, in compliance with technical and safety standards of the oil, petroleum products suply, storage and transport.
Competențe transversale/ Transversal Competencies	Learning Outcomes *
1. / Works effectively in multidisciplinary and international teams/Lucrează eficient în echipe multidisciplinare și internaționale.	C1: The master's student/graduate understands the dynamics of teams in the oil, petroleum products suply, storage and transport (mechanical engineers, chemical engineering, economists, contractors). A1: The master's student/graduate communicates clearly and concisely, both orally and in writing, in various professional contexts.

	RA1: The master's student/graduate collaborates efficiently and proactively, assuming responsibilities within the team.
3. Autonomy and Career Management/Autonomie și managementul carierei.	C1: The master's student/graduate identifies development opportunities in the oil, petroleum products suply, storage and transport. C2: The master's student/graduate knows the sources for continuous learning and professional qualification. A1: The master's student/graduate develops their own professional development and career plans. A2: The master's student/graduate develops their digital and managerial competencies. RA1: The master's student/graduate shows initiative in continuous education. RA2: The master's student/graduate assumes responsibility for their own professional development. RA3: The master's student/graduate demonstrates adaptability to labor market changes.

* C – cunoștințe; A – aptitudini; RA – responsabilitate și autonomie.

6. Course Objectives (derived from the grid of specific competencies acquired)

6.1. Obiectivul general al disciplinei/ The general objective of the discipline	Through the issues addressed, this course provides a thorough understanding of the phenomena that define the processes in oil, petroleum products supply, storage and transport.. The course presents the theoretical and practical elements related to the statics, dynamics and kinematics of petroleum fluids. The rheological characteristics of fluids are also analyzed, as well as their behavior in their movement through various stationary or dynamic fields. The course provides basic information for specialists in the field addressed, which will allow them to solve problems encountered in specific industrial activity and especially their development as future researchers in the field of oil, petroleum products supply, storage and transport
6.2. Obiectivele specifice/ The specific objectives	Completion of the course will ensure the development of skills in the field of: - Teamwork and emotional stability of the working group, - Organizing and planning brainstorming teams and meeting working conditions, - Management of oil facilities rehabilitation projects, - Providing the necessary software for pipeline rehabilitation projects and related facilities, - Organizing and planning intervention and proactive maintenance teams, in order to obtain an increased quality of the work performed. After completing the course, students will be able to: - Analyze elements of petroleum fluid statics; - Choose optimal solutions for ensuring the transport of petroleum fluids (fluid kinematics); - Synthesize details regarding different methods of researching the movement of constituent particles of petroleum fluids. - Evaluate how technically appropriate the modes of transport of petroleum fluids are (fluid dynamics). - Be able to solve problems regarding the statics, dynamics and kinematics of fluids.

7. Contents

7.1. Course	No. of hours	Teaching methods	Remarks
1. Concepte şi modele de bază în depozitarea, prelucrarea și transportul produselor petroliere și a țițeiului/Basic concepts and models in the storage, processing and transportation of petroleum products and crude oil.	2	Prelegere şi discuţii, cu participarea interactivă a studenţilor. Lecture and discussions, with interactive student participation.	
2. Ecuaţiile generale ale dinamicii fluidelor reale/ General equations of real fluid dynamics.	2	Prelegere şi discuţii, cu participarea interactivă a studenţilor. Lecture and discussions, with interactive student participation.	
3. Elemente de statica fluidelor și depozitarea produselor petroliere și a țițeiului/ Elements of fluid statics and storage of petroleum products and crude oil.	2	Prelegere şi discuţii, cu participarea interactivă a studenţilor. Lecture and discussions, with interactive student participation.	
4. Mişcari unidimensionale ale fluidelor compresibile. Noțiuni privind pierderile de produse petroliere/ One-dimensional motions of compressible fluids. Notions regarding petroleum product losses.	2	Prelegere şi discuţii, cu participarea interactivă a studenţilor. Lecture and discussions, with interactive student participation.	
5. Miscari efluente permanente. Analiza curgerii produselor petroliere și a țițeiului prin pompe și conducte. Poluarea mediului ambiant cu produse petroliere și/sau țiței.	2	Prelegere şi discuţii, cu participarea interactivă a studenţilor. Lecture and discussions, with interactive student participation.	
6. Dinamica fluidelor reale / Permanent effluent movements. Analysis of the flow of petroleum products and crude oil through pumps and pipelines. Pollution of the environment with petroleum products and/or crude oil.	2	Prelegere şi discuţii, cu participarea interactivă a studenţilor. Lecture and discussions, with interactive student participation.	
7. Calculul hidraulic al conductelor de transport a produselor petroliere și a țițeiului/ Hydraulic calculation of pipelines for transporting petroleum products and crude oil	2	Prelegere şi discuţii, cu participarea interactivă a studenţilor. Lecture and discussions, with interactive student participation.	
Bibliografie: 1. Timur Chiș, Mecanica fluidelor, Editura Universitatii Petrol-Gaze, 2025, 2. Timur Chis, Modelarea proceselor tehnologice îndrumar de laborator, Editura Pim, 2022, 3. Mihai Albulescu, Timur Chis, Renata Radulescu, Procese hidrodinamice-Îndrumar de lucrări de laborator, aplicații numerice, Editura Pim, 2021, 4. Timur Chiş-Mecanica fluidelor-Îndrumar de laborator, Editura Pim, 2010, 5. Renata Radulescu, Timur Chis, Transportul și depozitarea hidrocarburilor, Suport de curs, Editura Universității Petrol-Gaze Ploiești, 2023.			
7.2. Seminar / laborator	Nr. ore	Metode de predare	Observații
Lucrarea nr. 1. Mărimi fizice şi unităti de măsură folosite în mecanica fluidelor. Paper no. 1. Physical quantities and units of measurement used in fluid mechanics.	1	Prelegere şi discuţii, cu participarea interactivă a studenţilor. Lecture and discussions, with interactive student participation.	
Lucrarea nr. 2. Noțiuni de prelucrare a datelor experimentale. Paper no. 2. Notions of experimental data processing.	1	Prelegere şi discuţii, cu participarea interactivă a studenţilor. Lecture and discussions, with interactive student participation.	

Lucrarea nr. 3. Determinarea vâscozităţii lichidelor cu viscozimetrul Rheotest. Paper no. 3. Determination of the viscosity of liquids with the Rheotest viscometer.	1	Prelegere şi discuţii, cu participarea interactivă a studenţilor. Lecture and discussions, with interactive student participation.	
Lucrarea nr. 4. Echilibrul relativ al lichidelor în cazul mişcării de rotaţie. Paper no. 4. Relative equilibrium of liquids in the case of rotational motion.	1	Prelegere şi discuţii, cu participarea interactivă a studenţilor. Lecture and discussions, with interactive student participation.	
Lucrarea nr. 5.Bilanţul energetic în cazul mişcării unui lichid. Consideraţii teoretice. Paper no. 5. Energy balance in the case of the movement of a liquid. Theoretical considerations.	1	Prelegere şi discuţii, cu participarea interactivă a studenţilor. Lecture and discussions, with interactive student participation.	
Lucrarea nr. 6.Măsurarea debitelor de gaze cu tubul Venturi. Paper no. 6. Measurement of gas flow rates with the Venturi tube.	1	Prelegere şi discuţii, cu participarea interactivă a studenţilor. Lecture and discussions, with interactive student participation.	
Lucrarea nr. 7.Impulsul unei vâne de fluid asupra unui perete plan. Paper no. 7. Impulse of a fluid jet on a plane wall.	1	Prelegere şi discuţii, cu participarea interactivă a studenţilor. Lecture and discussions, with interactive student participation.	
Lucrarea nr. 8. Mișcarea lichidelor prin ajutaje. Paper no. 8. Movement of liquids through nozzles.	1	Lecture and discussions, with interactive student participation.	
Lucrarea nr. 9.Mişcarea gazelor prin orificii şi ajutaje. Paper no. 9. Movement of gases through holes and nozzles.	1	Prelegere şi discuţii, cu participarea interactivă a studenţilor. Lecture and discussions, with interactive student participation.	
Lucrarea nr. 10.Vizualizarea mişcării fluidelor. Paper no. 10. Visualization of fluid movement.	1	Prelegere şi discuţii, cu participarea interactivă a studenţilor. Lecture and discussions, with interactive student participation.	
Lucrarea nr. 11.Mişcarea laminară a lichidelor.Experienţa Hagen-Poiseuille. Paper no. 11. Laminar motion of liquids. Hagen-Poiseuille experiment. Paper no. 12. Turbulent motion of liquids. Nikuradse's experiment of liquids	1	Prelegere şi discuţii, cu participarea interactivă a studenţilor. Lecture and discussions, with interactive student participation.	
Lucrarea nr.12.Mişcarea turbulentă a lichidelor.Experienţa lui Nikuradse a lichidelor Paper no. 12. Turbulent motion of liquids. Nikuradse's experiment of liquids	1	Prelegere şi discuţii, cu participarea interactivă a studenţilor. Lecture and discussions, with interactive student participation.	
Aplicații și probleme 1. Calculul unei conducte de transport lichide 2. Calculul stocării produselor petroliere 3. Calculul pierderilor de produse petroliere. Applications and Problems 1. Calculation of a liquid transport pipeline 2. Calculation of petroleum product storage 3. Calculation of petroleum product losses.	6	Prelegere şi discuţii, cu participarea interactivă a studenţilor. Lecture and discussions, with interactive student participation.	
Bibliografie: 1. Mihai Albulescu, Timur Chis, Renata Radulescu, Procese hidrodinamice-Îndrumar de lucrări de laborator, aplicații numerice, Editura Pim, 2021,			

2. Timur Chiş-Mecanica fluidelor-Îndrumar de laborator, Editura Pim, 2010.			
7.3. Proiect	Nr. ore	Metode de predare	Observații
Bibliografie.			

8. Coroborarea conținuturilor disciplinei cu așteptările reprezentanților comunității epistemice, asociaților profesionale și angajatori reprezentativi din domeniul aferent programului

- Disciplina este în concordanță cu cerințele industriei de petrol și gaze și cu disciplinele predate în universități asemănătoare, programa de studii fiind evaluată de către cercetători din Academia Română și Academia de Științe Tehnice din România,
- Cerințele disciplinei au fost elaborate în coordonare cu specialiștii din cercetare și proiectare din industria de petrol și gaze, fiind prezentate rezultatele învățării specialiștilor din companii de renume ca TRANSGAZ S.A. și CONPET S.A.,
- Necesarul de cunoștințe dobândite prin finalizarea acestui curs sunt utile în cercetarea hidro-dinamică a proceselor din industria petrolieră și a energiilor regenerabile.

- The discipline is in line with the requirements of the oil and gas industry and with the disciplines taught in similar universities, the curriculum being evaluated by researchers from the Romanian Academy and the Academy of Technical Sciences of Romania,
- The requirements of the discipline were developed in coordination with research and design specialists from the oil and gas industry, presenting the learning results of specialists from renowned companies such as TRANSGAZ S.A. and CONPET S.A.,
- The necessary knowledge acquired by completing this course are useful in hydro-dynamic research of processes in the oil industry and renewable energies.

9. Evaluare

Tip activitate **Activity type**	9.1. Criterii de evaluare **Evaluation criteria**	9.2. Metode de evaluare **Evaluation methods**	9.3. Pondere din nota finală **Weight of final grade**
9.4. Curs **Course**	Corectitudinea şi completitudinea cunoştinţelor asimilate **Correctness and completeness of the acquired knowledge**	Evaluarea scrisa (in sesiunea de examene si pe parcursul semestrului). **Written evaluation (in the exam session and throughout the semester).**	30 %

	Coerenţa logică **Logical coherence**	Evaluarea scrisa (in sesiunea de examene si pe parcursul semestrului). **Written evaluation (in the exam session and throughout the semester).**	20 %
9.5. Seminar/laborator **Seminar/laboratory**	Capacitatea de a utiliza în aplicaţii cunoştinţele teoretice; **Ability to use theoretical knowledge in applications**	Prezentarea unui proiect de cercetare. **Presentation of a research project.**	30 %
	Capacitatea de a interpreta corect rezultatele aplicaţiilor efectuate; **Ability to correctly interpret the results of the applications performed**	Participare activă la şedinţele de laborator, având parcurse noţiunile de la curs. **Active participation in laboratory sessions, having covered the concepts from the course**	20 %
9.6. Proiect			
9.7. Standard minim de performanță:Cunoaşterea conceptelor teoretice fundamentale ale disciplinei (aşa numitele concepte teoretice de bază). **Minimum performance standard: Knowledge of the fundamental theoretical concepts of the discipline (the so-called basic theoretical concepts).**			
Curs: O familiaritate satisfăcătoare cu subiectele la curs, utilizarea satisfăcătoare a limbajului de specialitate. Laborator+Seminar:participarea la efectuarea experimentelor + rezolvarea problemelor. **Course: Satisfactory familiarity with the course topics, satisfactory use of specialized language.** **Laboratory+Seminar: participation in conducting experiments + solving problems.**			

Data completării Date of completion 20.09.2025	Semnătura titularului de curs Signature of the course holder *Prof. habil. dr. ing. Timur Chiș*	Semnătura titularului de seminar/laborator Signature of the seminar/laboratory holder *Prof. habil. dr. ing. Timur Chiș*	Semnătura titularului de proiect Signature of the project owner

Data avizării în departament Date of approval in the department 23.09.2025	Director de departament Department Director Associate Professor Dr. Eng. Alina Prundurel	Decan Dean *Conf.habil.dr.ing. Cristian Eparu*

COURSE SYLLABUS

1. Programme Information

1.1. Higher Education Institution	Petroleum-Gas University from Ploiesti
1.2. Faculty	Petroleum and Gas Engineering
1.3. Department	Drilling wells, Extraction and Transport of Hydrocarbons
1.4. Field of University Studies	Mines, Petroleum and Gas
1.5. Cycle of University Studies	MASTER
1.6. Study Programme	Petroleum Engineering

2. Course Information

2.1. Course name	GAS DISTRIBUTION MANAGEMENT
2.2. Course lecturer	Prof. habil. dr. eng. Eparu Cristian
2.3. Seminar/lab teaching assistant	Prof. habil. dr. eng. Eparu Cristian
2.4. Project supervisor	
2,5, Year of study	2
2.6. Semester*	3
2.7. Evaluation type	E
2.8. Educational category** / course status***	DS

* the semester number is according to the curriculum;

** DF - Fundamental disciplines; DS - Specialization disciplines; DC - Complementary disciplines

*** mandatory/required = DOB; optional = DOP; elective = DFA

3. Estimated Total Time (hours per semester of teaching activities)

3.6. Number of hours per week	2	out of which: 3.2. course	1	3.3. Seminary/laboratory	1	3.4. Project	
3.5. Total hours from the curriculum	28	out of which: 3.6. course	14	3.7. Seminary/laboratory	14	3.8. Project	
3. 9. Total hours of individual study (study based on course materials, bibliography and notes, additional research in the library and on specialized electronic platforms, preparation for seminars/laboratories, homework, papers, portfolios, and essays)							92
3.10. Total hours per semester							120
3.11. ECTS							4

4. Conditions (where applicable)

4.1. by curriculum	➢ Termotechnics ➢ Fluid mechanics
4.2. for course delivery	➢
4.3. for seminar/laboratory activities	➢

5. Specific competencies acquired and the learning outcomes* underlying them”

Professional skills	Learning Outcomes*
1. Apply fundamental knowledge of mathematics, physics, chemistry in	C1: The master's student/graduate is able to use fundamental methods for analyzing phenomena in the gas distribution networks. A1: The master's student/graduate applies physico-mathematical models applicable to the gas distribution networks.

petroleum and gas engineering.	RA1: The master's student/graduate demonstrates critical thinking in evaluating engineering solutions and technological alternatives. RA2: The master's student/graduate applies optimization solutions in the exploitation process and monitors results by comparing performance indicators.
2. Uses technical documentation and specialized software for petroleum planning and design.	C1: The master's student/graduate understands and uses technical documentation, design standards, scientific research standards, and educational standards specific to the gas distribution network. C2: The master's student/graduate uses specialized software for the design and optimization of gas distribution networks. A1: The master's student/graduate correctly interprets technical reports, scientific results obtained from tests and specialized software modeling, as well as results from commissioning and operation tests of operation processes. RA1: The master's student/graduate is able to prepare coherent and clear technical documentation for non-specialists.
3. Supervises and monitors gas distribution design.	C1: The master's student/graduate demonstrates knowledge of gas distribution networks design and operation. C2: The master's student/graduate develops plans for gas distribution network operations. A1: The master's student/graduate manages and ensures the safety of gas distribution operations. RA1: The master's student/graduate assumes responsibility for the safe operation of gas distribution equipment.
4. Supervises and monitors gas distribution operations.	C1: The master's student / graduate understands the monitoring procedures for gas distribution equipment. A1: The master's student / graduate interprets simulation data and prepares compliance reports comparing plans and results. RA1: The master's student / graduate makes independent decisions in operational situations while complying with technical and safety regulations.
5. Applies health, safety, and environmental protection standards.	C1: The master's student/graduate understands the procedures for monitoring gas distribution equipment. A1: The master's student/graduate interprets production data and prepares compliance reports comparing plans and results. RA1: The master's student/graduate makes independent decisions in operational situations, in compliance with technical and safety standards.
Transversal Competencies	Learning Outcomes
1. Works effectively in multidisciplinary and international teams.	C1: The master's student/graduate understands the dynamics of teams in the gas engineering field. A1: The master's student/graduate communicates clearly and concisely, both orally and in writing, in various professional contexts. RA1: The master's student/graduate collaborates efficiently and proactively, assuming responsibilities within the team.

2. Professional Ethics and Social Responsibility	C1: The master's student/graduate identifies the principles of professional ethics and specific legislation. C2: The master's student/graduate knows best practices in social responsibility. A1: The master's student/graduate applies ethical standards in professional decision-making. A2: The master's student/graduate demonstrates integrity in engineering activities. RA1: The master's student/graduate is aware of the social and environmental impact of decisions. RA2: The master's student/graduate adopts sustainable and responsible solutions.
3. Autonomy and Career Management	C1: The master's student/graduate identifies development opportunities in the gas distribution field. A1: The master's student/graduate develops their own professional development and career plans. A2: The master's student/graduate develops their digital and managerial competencies. RA1: The master's student/graduate shows initiative in continuous education. RA2: The master's student/graduate assumes responsibility for their own professional development.

* C – knowledge; S – skills; RA – responsibility and autonomy.

6. Course Objectives (derived from the grid of specific competencies acquired)

General objective	Using based methods to calculate fluid flow through pipes and the phenomena that occur.
Specific objectives	➢ to apply to the theoretical knowledge acquired in the conditions of the practical requirements ➢ to operate correctly with the entities of the studied field ➢ analyse, calculate and design distribution systems ➢ To simulate the processes in the gas distribution systems through pipes using numerical simulators

7. Contents

7.1. Course	No. of hours	Teaching methods	Remarks
Gas properties	1	presentation	
Hydraulics in gas distribution	2		
Capacity, linepack, storage	2		
Gas expansion	1		
Technological losses	1		
Planning, monitoring and operating gas distribution networks	2		
Regulatory in gas distribution	1		
Main problems that occur in gas distribution network operations	2		

Numerical simulators	2		

Bibliography

1. Burden R., Faires D., *Numerical analysis*, Pws-Kent, Boston, 1988.
2. Chapra S., Canale R., 1988, *Numerical methods for engineers*, Second Edition, Mcgraw-Hill Inc.,New York.
3. David J. Logan, *A first course in differential equations*, Springer 2001.
4. Dănăilă S., Berbente C., 2003, *Metode numerice în Dinamica fluidelor*, Editura Acdemiei Române.
5. Eparu C. – *Managementul sistemelor de distributie gaze naturale*, Editura Universității Petrol-Gaze din Ploieşti, ISBN 978-973-719-775-7, Ploieşti, 2019
6. FLetcher C. A. J., 1991, *Computational techniques for fluid dynamics*, Vol. I & II, Second Edition,Springer-Verlag, Berlin, Heidelberg.
7. Oroveanu, T.-*Hidraulica si transportul produselor petroliere.* Editura Didacticã şi Pedagogicã, 1966.
8. Oroveanu, T. David, V., Stan, Al., Trifan, C. - *Colectarea, transportul, depozitarea şi distribuţia produselor petroliere şi gazelor*, Editura Didactică şi Pedagogică, Bucureşti 1985
9. Resiga R., 2003*, Mecanica fluidelor numerică*, Editura Orizonturi Universitare, Timişoara.
10. Seteanu I., Broboană D., 2000, *Numerical models in Hydraulics and Power Engineering*, Editura BREN, Bucureşti.
11. Stan, AL., Creţu, I. - *Transportul fluidelor prin conducte*, Editura Tehnică, Bucureşti 1984
12. C. Eparu, S. Neacşu, D. Stoica - *The use of numerical simulators to determine the daily balance of the natural gas distribution network,* Journal of Eastern Europe Research in Business and Economics, IBIMA Publishing, ISSN 2169-0367, Vol. 2013 (2013), DOI: 10.5171/2013. 404582, p 1-13

7.2. Seminar / Laboratory	No. of hours	Teaching methods	Remarks
Presentation of the topic	1	Presentation, calculus, simulation	
Regulatory in gathering and transport	1		
Gas properties calculation	1		
Gas gathering system design	3		
Gas transport system design	3		
Planning, monitoring and operating gas networks	2		
Management of gathering/transport network systems	2		
Project management presentation	1		

Bibliography

13. Burden R., Faires D., *Numerical analysis*, Pws-Kent, Boston, 1988.
14. Chapra S., Canale R., 1988, *Numerical methods for engineers*, Second Edition, Mcgraw-Hill Inc.,New York.
15. David J. Logan, *A first course in differential equations*, Springer 2001.
16. Dănăilă S., Berbente C., 2003, *Metode numerice în Dinamica fluidelor*, Editura Acdemiei Române.
17. Eparu C. – *Managementul sistemelor de distributie gaze naturale*, Editura Universității Petrol-Gaze din Ploieşti, ISBN 978-973-719-775-7, Ploieşti, 2019
18. FLetcher C. A. J., 1991, *Computational techniques for fluid dynamics*, Vol. I & II, Second Edition,Springer-Verlag, Berlin, Heidelberg.
19. Oroveanu, T.-*Hidraulica si transportul produselor petroliere.* Editura Didacticã şi Pedagogicã, 1966.
20. Oroveanu, T. David, V., Stan, Al., Trifan, C. - *Colectarea, transportul, depozitarea şi distribuţia produselor petroliere şi gazelor*, Editura Didactică şi Pedagogică, Bucureşti 1985
21. Resiga R., 2003*, Mecanica fluidelor numerică*, Editura Orizonturi Universitare, Timişoara.
22. Seteanu I., Broboană D., 2000, *Numerical models in Hydraulics and Power Engineering*, Editura BREN, Bucureşti.
23. Stan, AL., Creţu, I. - *Transportul fluidelor prin conducte*, Editura Tehnică, Bucureşti 1984
24. C. Eparu, S. Neacşu, D. Stoica - *The use of numerical simulators to determine the daily balance of the natural gas distribution network,* Journal of Eastern Europe Research in Business and Economics, IBIMA Publishing, ISSN 2169-0367, Vol. 2013 (2013), DOI: 10.5171/2013. 404582, p 1-13

7.3. Project	No. of hours	Teaching methods	Remarks
Bibliography			

8. Correlation of the course contents with the expectations of the epistemic community, professional associations and representative employers in the field related to the programme

- The course syllabus was developed in cooperation with representatives of gas engineering companies (from Romania and abroad) in Ploiești and Bucharest that have hired graduates of similar master programs

9. Assessment

Type of activity	9.1. Assessment criteria	9.2. Assessment methods	9.3. Weight in final grade
9.4. Course	Use of specific tools – algorithms, schemes, modelling.	Written examination	70%
	Attendance and participation during lectures	Attendance and answers to questions during lectures	15%
9.5. Seminar/laborator	Presentation of results	Data processing	10%
	Active seminar attendance	Correct and complete interpretation of the obtained values	5%
9.6. Project			
9.7. Minimum performance standard			
- Course frequency 50% Solving the theoretical subjects for the exam (50%)			

Date of completion	Course lecturer signature	Seminar/laboratory lecturer signature	Project supervisor signature
20.09.2025	Prof. habil. dr. Eng. Cristian Eparu	Prof. habil. dr. Eng. Cristian Eparu	______________________

Date of department approval	Head of department	Dean
23.09.2025	Assoc. Prof.. dr. Eng. Alina Prundurel	Prof. habil. dr. Eng. Cristian Eparu

COURSE SYLLABUS

1. Programme Information

1.1. Higher Education Institution	Universitatea Petrol – Gaze din Ploieşti
1.2. Faculty	Facultatea de Ingineria Petrolului și Gazelor
1.3. Department	Petroleum Geology and Reservoir Engineering
1.4. Field of University Studies	Mine, Petrol si Gaze
1.5. Cycle of University Studies	MASTER
1.6. Study Programme	Petroleum Engineering

2. Course Information

2.1. Course name	Environmental aspects in petroleum engineering
2.2. Course lecturer	PROF.HABIL.DR.ING. CASEN PANAITESCU
2.3. Seminar/lab teaching assistant	LECTURER.DR.ING. STOICA MONICA
2.4. Project supervisor	
2.5, Year of study	1
2.6. Semester*	1
2.7. Evaluation type	E
2.8. Educational category** / course status***	DS

* the semester number is according to the curriculum;

** DF - Fundamental disciplines; DS - Specialization disciplines; DC - Complementary disciplines

*** mandatory/required = DOB; optional = DOP; elective = DFA

3. Estimated Total Time (hours per semester of teaching activities)

3.6. Number of hours per week	2	din care: 3.2. curs	1	3.3. Seminar/laborator	1	3.4. Project	
3.5. Total hours from the curriculum	28	din care: 3.6. curs	14	3.7. Seminar/laborator	14	3.8. Project	
3. 9. Total hours of individual study (study based on course materials, bibliography and notes, additional research in the library and on specialized electronic platforms, preparation for seminars/laboratories, homework, papers, portfolios, and essays)							92
3.10. Total hours per semester							106
3.11. ECTS							4

4. Conditions (where applicable)

4.1. by curriculum	➢ Thermotechnics ➢ Chemistry ➢ Fluid Mechanics ➢ Strength of Materials ➢ Physicochemistry of Rocks and Fluids
4.2. for course delivery	➢ Classroom equipped with projection screen, video projector, computer, and whiteboard. ➢ Students are not allowed to attend lectures, seminars, or laboratory activities with mobile phones turned on. ➢ Telephone conversations during classes are strictly prohibited. Students are not permitted to leave the classroom in order to

	answer personal phone calls, except in special or emergency situations.
4.3. for seminar/laboratory activities	➢ The corrosion laboratory requires specialized equipment and materials for studying chemical and electrochemical corrosion processes, including corrosion testing devices, protective coatings, inhibitors, and pipeline material samples. The laboratory must also provide a safe working environment equipped with ventilation systems, safety equipment, and modern analytical instruments for monitoring and evaluating corrosion phenomena.

5. Specific competencies acquired and the learning outcomes* underlying them”

Professional skills	Learning Outcomes*
1. Apply fundamental knowledge of mathematics, physics, chemistry, and geology in petroleum and gas engineering.	C1: The master's student/graduate is able to use fundamental methods for analyzing phenomena in the petroleum and gas industry. A1: The master's student/graduate applies physico-mathematical models applicable to the petroleum and gas industry. RA1: The master's student/graduate demonstrates critical thinking in evaluating engineering solutions and technological alternatives. RA2: The master's student/graduate applies optimization solutions in the hydrocarbon reservoir exploitation process and monitors results by comparing performance indicators.
2. Uses technical documentation and specialized software for petroleum planning and design.	C1: The master's student/graduate understands and uses technical documentation, design standards, scientific research standards, and educational standards specific to the Petroleum-Gas University of Ploiești. C2: The master's student/graduate uses specialized software for the design and optimization of hydrocarbon reservoir exploitation processes (operations planning, optimization, storage and distribution, flow analysis). A1: The master's student/graduate correctly interprets technical reports, scientific results obtained from tests and specialized software modeling of hydrocarbon reservoirs, as well as results from commissioning and operation tests of production processes. RA1: The master's student/graduate is able to prepare coherent and clear technical documentation for non-specialists.
3. Supervises and monitors petroleum production and operations.	C1: The master's student/graduate demonstrates knowledge of hydrocarbon reservoir design and production (petroleum operations planning, reservoir optimization). C2: The master's student/graduate develops plans for hydrocarbon reservoir design and production operations (petroleum operations planning, reservoir optimization). A1: The master's student/graduate manages and ensures the safety of hydrocarbon reservoir design and production operations (petroleum operations planning, reservoir optimization).

	RA1: The master's student/graduate assumes responsibility for the safe operation of hydrocarbon reservoir production equipment.
4. Supervises and monitors petroleum exploitation operations.	C1: The master’s student / graduate understands the monitoring procedures for hydrocarbon reservoir exploitation equipment. S1: The master’s student / graduate interprets production data and prepares compliance reports comparing plans and results. RA1: The master’s student / graduate makes independent decisions in operational situations while complying with technical and safety regulations.
5. Applies health, safety, and environmental protection standards.	C1: The master's student/graduate understands the procedures for monitoring hydrocarbon reservoir production equipment. A1: The master's student/graduate interprets production data and prepares compliance reports comparing plans and results. RA1: The master's student/graduate makes independent decisions in operational situations, in compliance with technical and safety standards.
Transversal Competencies	Learning Outcomes
1. Works effectively in multidisciplinary and international teams.	C1: The master's student/graduate understands the dynamics of teams in the petroleum and gas engineering field (reservoir engineers, geologists, economists, contractors). A1: The master's student/graduate communicates clearly and concisely, both orally and in writing, in various professional contexts. RA1: The master's student/graduate collaborates efficiently and proactively, assuming responsibilities within the team.
2. Professional Ethics and Social Responsibility	C1: The master's student/graduate identifies the principles of professional ethics and specific legislation. C2: The master's student/graduate knows best practices in social responsibility. A1: The master's student/graduate applies ethical standards in professional decision-making. A2: The master's student/graduate demonstrates integrity in engineering activities. RA1: The master's student/graduate is aware of the social and environmental impact of decisions. RA2: The master's student/graduate adopts sustainable and responsible solutions.
3. Autonomy and Career Management	C1: The master's student/graduate identifies development opportunities in the petroleum industry field (reservoir engineering).

	C2: The master's student/graduate knows the sources for continuous learning and professional qualification. A1: The master's student/graduate develops their own professional development and career plans. A2: The master's student/graduate develops their digital and managerial competencies. RA1: The master's student/graduate shows initiative in continuous education. RA2: The master's student/graduate assumes responsibility for their own professional development. RA3: The master's student/graduate demonstrates adaptability to labor market changes.

* C – knowledge; S – skills; RA – responsibility and autonomy.

6. Course Objectives (derived from the grid of specific competencies acquired)

Objectives	The course aims to provide advanced knowledge regarding environmental protection practices and sustainable technologies used in the oil and gas industry. It also focuses on developing the ability to assess environmental impacts, manage industrial risks, and apply modern pollution prevention and remediation methods in petroleum operations.

7. Contents

7.1. Course	No. of hours	Teaching methods	Remarks
Environmental Impact of the Oil and Gas Industry	2	The teaching method used includes multimedia techniques accompanied by PowerPoint presentations, alternated with explanations and demonstrations on the board. The course is conducted interactively, through the systematic presentation of knowledge, while certain topics are approached through problem-solving, debate, and structural analysis, with the instructor facilitating dialogue for the clarification, synthesis, and deeper understanding of the	
Prevention and Environmental Monitoring in Onshore and Offshore Operations	2		
Waste Management and Remediation Technologies in Petroleum Engineering	4		
Sustainable Technologies and Carbon Emission Reduction in the Oil and Gas Sector	4		
Environmental Risk Management, Regulations, and Safety in Petroleum Operations	2		

		subject matter together with the students.	

Bibliography

1. Ahmed, A., & Smith, J. (2025). *Environmental sustainability in the oil and gas industry: Modern technologies and management practices*. Springer.
2. Brown, T. R., & Wilson, P. D. (2025). *Pollution prevention and environmental protection in petroleum engineering*. Elsevier.
3. Johnson, M. E. (2026). *Carbon management and decarbonization in oil and gas operations*. CRC Press.
4. Lee, S., & Carter, R. (2025). *Environmental risk assessment for offshore and onshore petroleum activities*. Wiley.
5. Martinez, F., & Green, K. (2026). *Waste management and remediation technologies in the petroleum industry*. Taylor & Francis.
6. Roberts, L. H., & Evans, D. (2025). *Sustainable energy transition in the oil and gas sector*. Cambridge University Press.
7. Thompson, B., & Clark, N. (2026). *Environmental monitoring and control in hydrocarbon production systems*. Elsevier.
8. Walker, J., & Young, P. (2025). *Climate change, emissions reduction, and environmental policies in the petroleum industry*. Routledge.

7.2. Seminar / Laboratory	No. of hours	Teaching methods	Remarks
Case studies	6	Data processing.	
Environmental Risk Management	4		
Emission Reduction in the Oil and Gas Sector	4		

Bibliography

1. Ahmed, A., & Smith, J. (2025). *Environmental sustainability in the oil and gas industry: Modern technologies and management practices*. Springer.
2. Brown, T. R., & Wilson, P. D. (2025). *Pollution prevention and environmental protection in petroleum engineering*. Elsevier.
3. Johnson, M. E. (2026). *Carbon management and decarbonization in oil and gas operations*. CRC Press.
4. Lee, S., & Carter, R. (2025). *Environmental risk assessment for offshore and onshore petroleum activities*. Wiley.
5. Martinez, F., & Green, K. (2026). *Waste management and remediation technologies in the petroleum industry*. Taylor & Francis.
6. Roberts, L. H., & Evans, D. (2025). *Sustainable energy transition in the oil and gas sector*. Cambridge University Press.
7. Thompson, B., & Clark, N. (2026). *Environmental monitoring and control in hydrocarbon production systems*. Elsevier.
8. Walker, J., & Young, P. (2025). *Climate change, emissions reduction, and environmental policies in the petroleum industry*. Routledge.

7.3. Project	No. of hours	Teaching methods	Remarks

Bibliography			

8. Correlation of the course contents with the expectations of the epistemic community, professional associations and representative employers in the field related to the programme

➢

9. Assessment

Type of activity	9.1. Assessment criteria	9.2. Assessment methods	9.3. Weight in final grade
9.4. Course	Use of specific tools – algorithms, schemes, modelling.	Written examination	50%...70%
	Attendance and participation during lectures	Attendance and answers to questions during lectures	15%
9.5. Seminar/laborator	Presentation of results	Data processing	0...20%
	Active seminar attendance	Correct and complete interpretation of the obtained values	5%
9.6. Project			
9.7. Minimum performance standard			

Date of completion	Course lecturer signature	Seminar/laboratory lecturer signature	Project supervisor signature
20.09.2025	____________________	____________________	____________________

Date of department approval	Head of department *(academic position, first name, last name)* *(Signature)*	Dean *(academic position, first name, last name)* *(Signature)*
23.09.2025	*Șef lucr.dr.ing. Prundurel Alina*	*Conf..habil.dr.ing. Eparu Cristian*

COURSE SYLLABUS

1. Programme Information

1.1. Higher Education Institution	Universitatea Petrol – Gaze din Ploieşti
1.2. Faculty	Facultatea de Ingineria Petrolului și Gazelor
1.3. Department	Petroleum Geology and Reservoir Engineering
1.4. Field of University Studies	Mine, Petrol si Gaze
1.5. Cycle of University Studies	MASTER
1.6. Study Programme	Petroleum Engineering

2. Course Information

2.1. Course name	DRILLING LAB - SIMULATION
2.2. Course lecturer	Asst. Prof. PhD. Eng. Bogdan Andrei IONETE
2.3. Seminar/lab teaching assistant	Asst. Prof. PhD. Eng. Liviu DUMITRACHE
2.4. Project supervisor	-
2.5, Year of study	II
2.6. Semester*	3
2.7. Evaluation type	V
2.8. Educational category** / course status***	DS

* the semester number is according to the curriculum;

** DF - Fundamental disciplines; DS - Specialization disciplines; DC - Complementary disciplines

*** mandatory/required = DOB; optional = DOP; elective = DFA

3. Estimated Total Time (hours per semester of teaching activities)

3.6. Number of hours per week	3	din care: 3.2. curs	1	3.3. Seminar/laborator	2	3.4. Project	-
3.5. Total hours from the curriculum	42	din care: 3.6. curs	14	3.7. Seminar/laborator	28	3.8. Project	-
3. 9. Total hours of individual study (study based on course materials, bibliography and notes, additional research in the library and on specialized electronic platforms, preparation for seminars/laboratories, homework, papers, portfolios, and essays)							66
3.10. Total hours per semester							108
3.11. ECTS							5

4. Conditions (where applicable)

4.1. by curriculum	➢ Special Mathematics, Mechanics ➢ Strength of Materials, Numerical Methods ➢ Hydraulics, Drilling Engineering / Well Drilling
4.2. for course delivery	➢
4.3. for seminar/laboratory activities	➢

5. Specific competencies acquired and the learning outcomes* underlying them”

Professional skills	Learning Outcomes*
1. Apply fundamental knowledge of mathematics, physics, chemistry, and	C1: The master's student/graduate is able to apply advanced knowledge, methodologies, and practices specific to drilling engineering.

geology in petroleum and gas engineering.	A1: The master's student/graduate applies specialized knowledge to explain and interpret new situations encountered in drilling engineering. RA1: The master's student/graduate demonstrates critical thinking in selecting and applying advanced drilling technologies and methods. RA2: The master's student/graduate applies modern criteria and methods for evaluating drilling performance and optimizing drilling operations.
2. Uses technical documentation and specialized software for petroleum planning and design.	C1: The master's student/graduate understands and uses technical documentation, design standards, scientific research standards, and educational standards specific to drilling engineering. C2: The master's student/graduate uses specialized software and advanced models for the analysis, design, and implementation of modern drilling technologies. A1: The master's student/graduate correctly interprets technical reports, scientific studies, drilling simulations, and operational data related to drilling engineering. RA1: The master's student/graduate is able to prepare coherent technical studies, reports, and drilling projects adapted to both specialists and non-specialists.
3. Supervises and monitors petroleum production and operations.	C1: The master's student/graduate demonstrates knowledge of advanced drilling technologies, operational planning, and drilling process implementation. C2: The master's student/graduate develops and coordinates complex drilling projects and operational plans. A1: The master's student/graduate manages and ensures the safe execution of drilling operations using advanced drilling methods and technologies. RA1: The master's student/graduate assumes responsibility for the coordination and control of drilling activities and equipment.
4. Supervises and monitors petroleum exploitation operations.	C1: The master’s student/graduate understands monitoring and control procedures specific to drilling operations and equipment. S1: The master’s student/graduate analyzes operational data and evaluates drilling performance using modern assessment methods and criteria. RA1: The master’s student/graduate makes independent decisions and formulates professional judgments in drilling engineering activities while complying with technical and safety standards.
5. Applies health, safety, and environmental protection standards.	C1: The master's student/graduate understands health, safety, environmental protection, and risk assessment procedures specific to drilling engineering. A1: The master's student/graduate evaluates operational risks and applies preventive measures in drilling activities.

	RA1: The master's student/graduate makes responsible decisions in operational situations in compliance with technical, ethical, sustainability, and safety standards.
Transversal Competencies	Learning Outcomes
1. Works effectively in multidisciplinary and international teams.	C1: The master's student/graduate understands the dynamics of multidisciplinary teams involved in drilling engineering projects. A1: The master's student/graduate communicates clearly and effectively, both orally and in writing, and presents professional results in a convincing manner. RA1: The master's student/graduate collaborates efficiently within multidisciplinary teams, assuming different professional roles and responsibilities.
2. Professional Ethics and Social Responsibility	C1: The master's student/graduate identifies the principles of professional ethics and specific legislation applicable to drilling engineering. C2: The master's student/graduate understands sustainable practices and social responsibility principles in the petroleum industry. A1: The master's student/graduate applies ethical and sustainable principles in professional decision-making. A2: The master's student/graduate evaluates and applies technological solutions while respecting professional ethics and sustainability principles. RA1: The master's student/graduate is aware of the operational, social, and environmental risks associated with drilling engineering activities. RA2: The master's student/graduate adopts sustainable, responsible, and safe technological solutions.
3. Autonomy and Career Management	C1: The master's student/graduate identifies professional development opportunities in drilling engineering and related petroleum industry sectors. C2: The master's student/graduate knows the sources and methods for continuous learning and professional development. A1: The master's student/graduate develops professional and managerial competencies necessary for career advancement. A2: The master's student/graduate develops digital competencies and the ability to evaluate modern technological solutions. RA1: The master's student/graduate shows initiative in continuous education and professional improvement. RA2: The master's student/graduate assumes responsibility for personal and professional development. RA3: The master's student/graduate demonstrates adaptability to technological and labor market changes in the petroleum industry.

* C – knowledge; S – skills; RA – responsibility and autonomy.

6. Course Objectives (derived from the grid of specific competencies acquired)

6.1. General Objective of the Course	➢ The course aims to broaden the general engineering background in the field of oil and gas well drilling engineering.
6.2. Specific Objectives	➢ Understanding drilling techniques and technologies through the application of previously acquired knowledge. ➢ Developing communication feedback skills and establishing collaborative relationships with colleagues. ➢ The course also aims to deepen knowledge related to drilling technology processes through their simulation using numerical and analog simulators.

7. Contents

7.1. Course	No. of hours	Teaching methods	Remarks
Simulation of Drill Bit Operation	2	Lecture	-
Simulation of Drill String Operation	2		-
Simulation of Stresses Applied to Casing Strings	2		-
Simulation of Casing Cementing Operations	2		-
Simulation of Well Trajectory Control	2		-
Simulation of Special Drilling Operations	2		-
Simulation of Drilling Operational Risks	2		-

Bibliography

1. *** Drilling Office Schlumberger, Osprey Risk, CemCade
2. N.Macovei Tehnologia Forarii Sondelor Vol1-4
3. Joshi, D. Sada.: Horizontal Well Technology, PennWell Publishing Company 1421 South Sheridan/P.O.Box 1260 Tulsa, Oklahoma 74101, 1991.
4. Macovei, N. : Forajul dirijat, Editura Universitatii din Ploiesti, 2003.
5. N.Macovei.: Hidraulica forajului, Edit Tehnica București,1983.
6. Nicolescu, S.: Tehnologia forarii sondelor, Editura Universităţii din Ploieşti, 2000.
7. ****: Drilling & Completion, Colecţia S.P.E., 2000-2014.
8. **** : Drilling Office Manual & Tutorials, Schlumberger documentation, 2006.

7.2. Seminar / Laboratory	No. of hours	Teaching methods	Remarks
Simulation of Drill Bit Operation – Applications	4	Lecture, Modeling	-
Simulation of Drill String Operation – Applications	4		-
Simulation of Stresses Applied to Casing Strings – Applications	4		-
Simulation of Casing Cementing Operations – Applications	4		-
Simulation of Well Trajectory Control – Applications	4		-
Simulation of Special Drilling Operations – Applications	4		-
Simulation of Drilling Operational Risks – Applications	4		-
Bibliography -			

7.3. Project	No. of hours	Teaching methods	Remarks

Bibliography			

8. Correlation of the course contents with the expectations of the epistemic community, professional associations and representative employers in the field related to the programme

➢ In order to outline the course contents and select the teaching and learning methods, the course coordinators organized a meeting with members of OMV Petrom specialized in the field, representatives of public institutions (relevant ministries, local authorities, etc.), as well as with other academic staff members from the field teaching at other higher education institutions. The meeting aimed to identify the needs and expectations of employers in the field and to coordinate the curriculum with similar study programs offered by other higher education institutions.

9. Assessment

Type of activity	9.1. Assessment criteria	9.2. Assessment methods	9.3. Weight in final grade
9.4. Course	Use of specific tools – algorithms, schemes, modelling.	Written examination	60%
	Attendance and participation during lectures	Attendance and answers to questions during lectures	10%
9.5. Seminar/laborator	Presentation of results	Data processing	20%
	Active seminar attendance	Correct and complete interpretation of the obtained values	10%
9.6. Project			
9.7. Minimum performance standard			
➢ Full completion of periodic assessment tests ➢ Minimum course attendance: 65% ➢ Successful completion of the examination requirements, consisting of theoretical topics (minimum 50%) and practical applications/problems (100%)			

Date of completion	Course lecturer signature	Seminar/laboratory lecturer signature	Project supervisor signature
20.09.2025	____________________	____________________	____________________

Date of department approval	Head of department *(academic position, first name, last name)* *(Signature)*	Dean *(academic position, first name, last name)* *(Signature)*
23.09.2025	Sef lucr.dr.ing. Prundurel Alina	___*Conf.dr.ing. Eparu Cristian*