

# Course Syllabus

## Quality Management

### Basic Information

This is a course, which contributes to MSc award in Petroleum Chemistry and Refining

<b>Title of the Academic Program</b>	Master's Degree Programs in English "Petroleum Chemistry and Refining"
<b>Type of the course</b>	Core
<b>Course period</b>	1 term (17 weeks)
<b>Study credits</b>	4 ECTS credits
<b>Duration</b>	144 hours
<b>Language of instruction</b>	English
<b>Academic requirements</b>	<ul style="list-style-type: none"><li>- BSc degree in Petroleum Engineering, Engineering, Chemistry, Environmental Sciences or equivalent (transcript of records),</li><li>- Good command of English (certificate or other official document)</li></ul>

### Course Description

Ever since the first oil well in 1857 and the first oil pipeline in 1864, the oil and gas industry has not only embraced innovation, but has often led the way. Rapid technological advances have enabled both the discovery and extraction of oil and gas in difficult environments — from the deserts of the Middle East, to deep water oil fields around the globe and finally to the harsh Arctic region.

With the recent focus on energy independence all over the world, as well as the added scrutiny that comes with it, Quality management in the oil and gas industry is quickly becoming a necessity.

Quality management is the act of overseeing all activities and tasks needed to maintain a desired level of excellence. This includes the determination of a quality policy, creating and implementing quality planning and assurance, and quality control and quality improvement. The main idea of this course is to introduce the main principles of business and social excellence, to generate knowledge and skills of students to use models and quality management methodology for the implementation of total quality management in Oil and Gas industry.

## Special Features of the Course

The course puts a strong attention to Quality assurance and Quality improvement tools, including Statistical Process Control (SPC) implementation.

## Course Aim

To let students develop their knowledge and professional skills in field of implementing Quality Management Systems (including SPC techniques) in order to assurance quality of oil and gas products.

## Course Objectives

1. Give students a general idea about how to improve quality of goods and services.
2. To ensure that students know tools of Quality Management.
3. To give students an understanding of SPC techniques.
4. To make students familiar with differences between Common and Special causes of variations and their influence to technological processes outcomes.
5. To explain and show in practice the benefits of teamwork for getting better results.

## Learning Outcomes of the Course

By the end of the course, students will be able:

1. Identify concepts of quality management and improvement.
2. Develop an understanding of the role of technology, managers, employees, and customers in developing a quality-based workplace.
3. Develop abilities to apply tools and techniques of Quality Improvement including, Statistical Process Control techniques and Business Process Modelling (BPM).
4. Understand and implement the requirements of ISO standards 9000 series.

## Teaching and Learning Methods

Lecturing, demonstrating and practice (classroom discussion, business games, action analyzing, reflection).

## Course Structure

Learning Activities	Hours
Lectures	24
Practice sessions / Seminars,	44
Self-study Assignments	72
Final Exam (including preparation)	4
<b>Total study hours</b>	<b>144</b>

## Course Outline

Week	Lectures	Practice sessions / Seminars	Assignments	Hours
<b>Chapter 1</b> <b>«Introduction to Quality Management (QM)»</b>				
1-2	Introduction to Quality Management. History of Quality. Basic QM-principles. Implementing QM in Oil and Gas industry.	- Classroom discussion 1 «The main reasons of Quality Management concept arising after WWII». Teamwork - Classroom discussion 2 «The necessity of implementing Quality Management in Oil and Gas industry». Teamwork - Chapter comprehension check	- Home assignment - Home reading	12
<b>Chapter 2</b> <b>«Quality Gurus, Quality Concepts»</b>				
2-3	The overview of Quality Gurus and their concepts: Joseph Juran, Kaoru Ishikawa, Philip Crosby, W. Edwards Deming.	- Classroom discussion 1 «Rapid growth of Japanese goods quality after WWII». Teamwork - Classroom discussion 2 «The role of quality gurus for the world-wide quality improvement». Teamwork - Classroom discussion 3 «Can we buy quality by money? Quality is free». Teamwork - Chapter comprehension check	- Home assignment - Home reading - Essay	12
<b>Chapter 3</b> <b>«Deming's 14 Points of Quality»</b>				
4-5	Introduction to Deming's 14 Points of Quality. Seven Deadly Diseases. Red Bead Experiment.	- Classroom discussion 1 «Implementation of 14 Points of Quality in Oil and Gas industry». . Teamwork Teamwork - Classroom discussion 2 «Affect of Seven Deadly Diseases to Oil and Gas	- Home assignment - Home reading	20

Week	Lectures	Practice sessions / Seminars	Assignments	Hours
		industry». Teamwork - Chapter comprehension check		
<b>Chapter 4</b> <b>«International Organization for Standardization (ISO)»</b>				
5-6	History of International Organization for Standardization. ISO members. ISO standards and rules.	- Classroom discussion 1 «How ISO furthers the development of international trade». Teamwork - Chapter comprehension check	- Home assignment - Home reading - Essay	10
<b>Chapter 5</b> <b>«ISO 9000. Quality management systems - Fundamentals and vocabulary»</b>				
7-8	History of ISO 9001. BS 5750. QM principles. QM vocabulary.	- Classroom discussion 1 «Implementation of QM principles in Oil and Gas industry» - Classroom discussion 2 «Why an industrial engineer should know QM vocabulary?». Teamwork - Chapter comprehension check	- Home assignment - Home reading	18
<b>Chapter 6</b> <b>«ISO 9001. Quality management systems - Requirements»</b>				
9-11	History of ISO 9001. The main requirements of ISO 9001. The additional requirements for Oil and Gas Industry (API 29001, ISO/TS 29001)	- Classroom discussion 1 «Risk oriented thinking». Teamwork - Practice session 1 «Determination of organizational interested parties». Teamwork. Discussion. - Practice session 2 «Risk determination and assessment». Teamwork. Discussion - Chapter comprehension check	- Home assignment - Home reading	24
<b>Chapter 7</b> <b>«Statistical Process Control (SPC)»</b>				
11-14	Story of Carl Friedrich Gauss. Normal	- Classroom discussion 1 «Normal distribution in	- Home assignment - Home reading	24

Week	Lectures	Practice sessions / Seminars	Assignments	Hours
	distribution. Variability theory. "Common" and "special" sources of variation. Seven Simple Quality Tools.	everyday life». Teamwork. - Practice session 1 «3 Sigma Game». Teamwork. Discussion - Practice session 2 «Data Visualization and Analysis by using Seven Simple Quality Tools». Teamwork. Discussion - Chapter comprehension check		
<b>Chapter 8</b> <b>«Business process modeling (BPM) in Quality Management»</b>				
15-16	History of BPM. Business model. Business process. SADT (IDEF) method. Block diagram. Swim-line diagram. Qualigramme method.	- Practice session 1 «Visualization of business processes using SADT». Teamwork. Discussion - Practice session 2 «Visualization of business processes using Block Diagram». Teamwork. Discussion - Practice session 3 «Visualization of business processes using Qualigramme method». Teamwork. Discussion - Chapter comprehension check	- Home assignment - Home reading	20
17	<b>Final Exam</b>			4
			<b>Total</b>	<b>144</b>

## Course Instructor, Contact information



### **Alexander Drozdov**

Deputy director of “Toyota Engineering Corporation”  
Training Center

### **Core competencies**

- 1) Authorized Lector Toyota Engineering Corporation (Japan).
- 2) Lead Auditor TÜV (Germany). Quality Management Systems (ISO 9001)
- 3) Authorized Lector TÜV (Germany). Lean Production. ISO 9001, ISO 14001, OHSAS 18001, ISO 19011, ISO 50001
- 4) Business consultant

### **Contacts**

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### **Roman A. Vaganov**

Assistant of Chemical Technology of Natural Energy and  
Carbon Materials Department

### **Core competencies**

- Deep oil refining;
- Catalysis;
- Cutting-edge binder types for metallurgy

### **Contacts**

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## **Assessment**

The course assessment assignments includes:

- Chapter comprehension checks (eight)
- Written examination (full course)

Student's grades are based on the following parts:

- 60 % Chapter comprehension checks
- 40 % Final Examination

## **Attendance Policy**

Students are expected to attend and participate in classes and should notify instructor of excused absences in advance, where possible. Students who have an excused absence are expected to make arrangements with instructor for alternative assignment.

Every chapter of the course has home reading and assignment that should be done till the next lesson.

### **Web page of the course**

The webpage of the course [Quality Management](http://www.e.sfu-kras.ru) is available through E-learning SibFU web site: [www.e.sfu-kras.ru](http://www.e.sfu-kras.ru). Student should be logged-in to access the course. Course Guide and all additional materials are also available at the course web-page.

### **Core reading**

- ISO 9000:2015 Quality management systems - Fundamentals and vocabulary
- ISO 9001:2015 Quality management systems - Requirements
- Berger C., Guillard S. Qualigramme method. Business Mapping Methodology.
- Crosby, P.B. Quality is Free, The New American Library Inc., New York, USA.
- Deming, W. Edwards. Out of the Crisis. MIT Press.
- Deming, W. Edwards. The New Economics for Industry, Government, Education. MIT Press.
- Feigenbaum, A.V. Total Quality Control, McGraw-Hill, New York, USA.
- Imai, M. Kaizen—The Key to Japan’s Competitive Success, The Kaizen Institute Ltd, London.
- Ishikawa, K. Guide to Quality Control, Asian Productivity Organization, Tokyo, Japan.
- Juran, J.M. and Gryna, F.M. Quality Planning and Analysis—From Product Development through Use, McGraw-Hill, New York, USA.
- Kondo, Y. Human Motivation: A Key Factor for Management, 3A Corporation, Tokyo, Japan.
- Marca, D.A., and C.L. McGowan. SADT: Structured analysis and design technique. McGraw-Hill Book Co., Inc.: New York, NY.
- Neave, Henry R. The Deming Dimension. SPC Press, Inc.
- Scherkenback, W.W. The Deming Route to Quality and Productivity, CEE Press Books Washington, DC, USA.
- Shewhart, W.A. Economic Control of Quality and Manufactured Products, D. van Nostrand & Co., Inc., New York, USA.
- Taguchi, G. Introduction to Quality Engineering, American Supplier Institute, Dearborn, Michigan, USA.

### **Facilities, Equipment and Software**

The course is held at the Toyota Engineering Corporation training center, using training videos, special training lines and equipment. All course presentations and additional visual aids are demonstrated by using modern multimedia equipment.