



**GRADUATE STUDY: ITS AND LOGISTICS**

**SEMESTER (I)**

**Syllabus**

Academic year 2023/2024

Course:		<b>Quality Management</b>			
Head of course: Asst. Prof. <b>Diana Božić</b> , Ph.D.					
Co-lecturers:					
Semester: <b>I</b>	Course code: <b>171782</b>	Lectures: <b>30</b>	Auditory exercises: <b>30</b>	Laboratory exercises:	ECTS credits: <b>6</b>
Group for lectures: <b>30 students</b>			Group for auditory and laboratory exercises: <b>30 students</b>		

**Objective of the course:**

- Provide the knowledge and information needed to understand the quality management
- Adopting approaches, methods and procedures in designing and implementing quality management systems, and the way of auditing and measuring the quality level

**Learning outcomes:**

After the completion of the course the students will be able to:

1. Explain the basic concept, terminology and the relevant legislative framework in the area of quality, quality control and quality management system.
2. Show the ways of the organization and link the basic elements of the quality management system in the organization.
3. Design and categorize processes within the organization.
4. Analyse work process abilities and quality impact.
5. Create the quality management system documentation, checklist, and audit plan.



**LECTURES and EXERCISES**

Week	Syllabus	Form of classes	Performed by	Lessons	Remark
1.	<ul style="list-style-type: none"> <li>▪ Introduction: Presentation of the subject, execution plan, student obligations and exams.</li> <li>▪ Historical background of quality development.</li> <li>▪ Conceptual definition of quality</li> </ul>	L	Diana Božić	4	
2.	<ul style="list-style-type: none"> <li>▪ Development of quality as a scientific discipline.</li> <li>▪ Quality control, quality assurance and quality management.</li> <li>▪ The effects of standpoint, substitution and transformation</li> </ul>	L	Diana Božić	3	
	<ul style="list-style-type: none"> <li>▪ <b>Division and development of seminar assignments.</b></li> </ul>	AE	<b>Diana Božić</b>	<b>1</b>	
3.	<ul style="list-style-type: none"> <li>▪ Standards and standardization;</li> <li>▪ International and national standards</li> <li>▪ Normisation bodies, Trading Associations, regions and normisation,</li> </ul>	L	Diana Božić	2	
	<ul style="list-style-type: none"> <li>▪ ISO norm: applicability, basic principles of ISO norm,</li> <li>▪ ISO ff 9001</li> </ul>	L	Diana Božić	2	
4.	<ul style="list-style-type: none"> <li>▪ Quality System Documentation</li> <li>▪ Concepts of continuous improvement</li> </ul>	L	Diana Božić	2	
	<ul style="list-style-type: none"> <li>▪ <b>Solving problem example - create quality system documentation sample</b></li> </ul>	AE	<b>Diana Božić</b>	<b>2</b>	
5.	<ul style="list-style-type: none"> <li>▪ Audit <ul style="list-style-type: none"> <li>○ auditing standards</li> <li>○ principles of audit</li> </ul> </li> </ul>	L	Diana Božić	2	



	<ul style="list-style-type: none"> <li>• Solving problem example - Create audit documentation (plan, check list, list of reference standards)</li> </ul>	AE	Diana Božić	2	
6.	Basic Tools, Methods and Quality Management Techniques (Defining Data Display, Data Sources, Analysis Methods, Comparative Methods, Creative Methods)	L	Diana Božić	4	
7.	<ul style="list-style-type: none"> <li>▪ Discussion about seminar topics               <ul style="list-style-type: none"> <li>○ the relevance of the literature</li> <li>○ critical review of the task and possible solutions</li> </ul> </li> </ul>	AE	Diana Božić	3	
	<ul style="list-style-type: none"> <li>▪ Partial test I</li> </ul>	AE		1	
8.	<ul style="list-style-type: none"> <li>▪ Practical problem examples solved with quality management techniques for Manufacturing Operations and for Service Operations,</li> </ul>	AE	Diana Božić	4	
9.	<ul style="list-style-type: none"> <li>▪ Process approaches and processes</li> </ul>	L	Diana Božić	2	
	<ul style="list-style-type: none"> <li>▪ Record and graphical representation of the process               <ul style="list-style-type: none"> <li>○ Flow diagram</li> <li>○ EPC</li> <li>○ - BPMN</li> </ul> </li> </ul>	AE	Diana Božić	2	
10.	<ul style="list-style-type: none"> <li>▪ Solving problem example               <ul style="list-style-type: none"> <li>○ process mapping</li> <li>○ determining end to end points in the process</li> <li>○ determining process inputs and outputs</li> <li>○ -determining process errors</li> </ul> </li> </ul>	AE	Diana Božić	4	
11.	<ul style="list-style-type: none"> <li>▪ Six sigma</li> </ul>	L	Diana Božić	2	
	<ul style="list-style-type: none"> <li>• Solving problem example               <ul style="list-style-type: none"> <li>○ Calculating sigma level</li> </ul> </li> </ul>	AE	Diana Božić	2	





12.	<ul style="list-style-type: none"> <li>▪ Statistical process control</li> <li>▪ Loss Function (Taguchi)</li> <li>▪ Process capability index</li> <li>▪ Precision and Consistency</li> </ul>	L	Diana Božić	2	
	<ul style="list-style-type: none"> <li>▪ Problem solving               <ul style="list-style-type: none"> <li>○ Process variation</li> </ul> </li> </ul>	AE	Diana Božić	2	
13.	<ul style="list-style-type: none"> <li>▪ Planning control charts. Estimating parameters: mean, standard deviation, control charts based on multi-item sampling.</li> </ul>	L	Diana Božić	2	
	<ul style="list-style-type: none"> <li>• Solving case study (batteries). Building control charts, multi-item sampling. X-bar control charts, R-bar control charts.</li> </ul>	AE	Diana Božić	2	
14.	<ul style="list-style-type: none"> <li>▪ Control charts based on single-item sampling of quantitative data. X and Rm control charts, comments.</li> <li>▪ Quality control based on attributes, statistical basis for attribute sampling.</li> </ul>	L	Diana Božić	2	
	<ul style="list-style-type: none"> <li>• Solving case study (food product). Building control charts, single-item sampling. X-bar control charts, Rm-bar control charts.</li> <li>• Estimating. Testing for process control p charts. Case study-application of process control charts on real business example</li> </ul>	AE	Diana Božić	2	
15.	<ul style="list-style-type: none"> <li>▪ Partial test II</li> </ul>	L	Diana Božić	1	
	<ul style="list-style-type: none"> <li>▪ Presentation of seminar</li> </ul>	AE	Diana Božić	3	

L = Lectures; AE = Auditory Exercises; LE = Laboratory Exercises; S = Seminars





## STUDENT OBLIGATIONS AND EXAMS

### Conditions for obtaining signatures:

The student acquires the right to get a signature for  $\geq 80\%$  of attendance during the lectures (5 credits from Table 1), attendance at  $\geq 80\%$  of exercises (5 credits from Table 1) and accepted seminar paper (10 credits from Table 1). There are no pre-conditions from other courses except basic knowledge of descriptive statistics. If part-time students attend consultations, this is regarded as attendance in class, if absence from class has been excused and announced to teachers. Students that do not achieve those points have to take course once again.

**Written exam:** written evaluation of the cognitive skills of applying theoretical knowledge, as well as logical thinking in analytical tasks, with the aim of achieving learning outcomes from 1 to 5.

### There are two ways of passing the exam:

- a) **Partial test** – consist of written tests twice during the semester. Each test consists of numerical and theoretical questions (or their combinations) in which it is possible to achieve a maximum of 80 credits. The first test can be attended by all students enrolled in the course in the current academic year. The second test at the end of the semester can be attended by the students who have acquired minimum 20 credits at the 1<sup>st</sup> test. Students that do not achieve minimum of 20 points have to take the written exam. From the positively graded both tests it is possible to acquire 40 to 80 credits (each test – maximum 40 credits).
- b) **Written test** – consists of a written exam at regular examination periods. The written exam can be attended by students who are eligible for signature. For successful completion of the written part of the exam it is possible to obtain 80 credits. To pass the written exam it is necessary to correctly answer 51% of questions.

**Oral exam:** verbal evaluation of the cognitive skills of applying empirical facts and theoretical knowledge, as well as logical thinking, with the aim of achieving learning outcomes from 1 to 5. After positive grade of the written part of the exam (minimum 40 credits) students attends the oral part of the examination.

**Seminar works** (mandatory): All students must participate in the seminar. Following the adoption of the basis of the quality students receive the topic of seminar work, which is done in teams. The team usually contains 3 to 5 students, depending on the number of students who are listening the course. During the course, students have to prepare and present critical review of relevant literature, scientific article about the seminar topics.

At the end of the semester, students present the work with the aim of achieving learning outcomes 2, 3, 4 and 5, and submit the documentation used in the work (activity plan, list of searched databases, reading literature, articles and the like). Evaluation is formed for the entire team of students and forms an integral part of the overall assessment.





## LITERATURE

### a) Obligatory literature:

1. J.M.Juran; F.M.Gryna: Quality Planning and Analysis; McGraw Hill, 1993
2. D.Božić, M.Jurčević: Authorised lectures and exercises, Internet site of Faculty of transport and traffic sciences (e-student),

### b) Recommended literature:

1. Juran, J.M., Blanton Godfrey, A.: Juran s Quality Handbook, Mc Graw Hill, 1999.
2. Lawrence, J.A., Pasternack, B.A.: Applied Management Science, Wiley, 2002.
3. T. Pyzdek: Quality Engineering Handbook, Marceel Dekker, 2003.





## METHODOLOGY OF THE IMPLEMENTATION OF THE COURSE PLAN

### 1. LECTURES

Lectures mostly follow the content of a textbook Quality Planning and Analysis (compulsory literature) and Juran's Quality Handbook but are tailored to meet basic needs for understanding quality. Lectures are performed using Power Point presentation (can be on English). The use of a textbook and recommended literature allows students to prepare the lecture topics in advance. The students are encouraged to read the topic of the forthcoming lecture in advance and to take part in the pro-active discussion.

### 2. AUDITORIAL EXERCISES

Students solve case studies and numerical problems and perform practical exercises that enable them to better understand elements and measurement of quality. Students solve problems by themselves or in group. Students must make assumptions, estimate economics, and reach conclusions from incomplete facts. Students have to present their solutions.

#### **Note: Individual and/or group viewing negative written test**

Individual at the time of consultation or a designated period after each colloquium and/or written exam.





### 3. DOCUMENTATION

Kept electronic records of presence in lectures and exercises (students carry out records using student cards). In Excel, the leading communications Tabulation registers earned points for attendance at lectures and exercises, making compulsory seminar paper, as well as to partially pass the written exam over two colloquia (partial tests). All tests are kept in lecturers file for one year.

### 4. SCORING SYSTEM

**Table 1** - The scoring system for the monitoring of students and explained credit values in ECTS credits

no	Segment:	Required credits to be achieved:		Remark:	ECTS credits
		Min.	Max.		
1.	Presence in lectures:	5	5	Presence $\geq$ 80%	<b>1</b>
2.	Presence at the training:	5	5	Presence $\geq$ 80%	<b>1</b>
3.	Seminar paper (mandatory)	10	10		<b>1</b>
4.	Colloquies (written 2x per semester)	40	80	<i>Replacement items 5..</i>	<b>2</b>
5.	Written exam (terms):	40	80	<i>Replacement items 4.</i>	<b>2</b>
8.	The verbal part of the exam:	/	/	Theoretical part with lectures	<b>1</b>
$\Sigma$	Overall points:	$\Sigma$ <b>60</b>	$\Sigma$ <b>100</b>	Overall ETCS points:	$\Sigma$ <b>6</b>







**Table 2** - Explanation of the credit values in evaluations

CREDITS:	The final score [6 ECTS]:
60 - 70	Sufficient (2)
71 - 80	Good (3)
81 - 90	Very good (4)
91 - 100	Excellent (5)

**Information for students** (scoring system, implementation plan, learning outcomes, syllabus, literature, consulting teachers, announcement of results of examinations or colloquium, and all other information):

- <https://moodle.srce.hr/2022-2023/>
- <http://www.fpz.unizg.hr>

**Student assistants:**

Additional individual work with the students through individual consultations.

