



UNDERGRADUATE STUDY: **ITS AND LOGISTICS**

SEMESTER (III)

Syllabus

Academic year 2024/2025

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|--|-------------------------------|-----------------------------|---|------------------------------------|---------------------------|
| Course: | | Inventory Management | | | |
| Head of course: Prof. Mario Šafran , Ph.D. | | | | | |
| Co-lecturers: Asst. Prof. Diana Božić , Ph.D. | | | | | |
| Semester: W/S | Course code: 172545 | Lectures: 30 | Auditory exercises: 20 | Laboratory exercises: 10 | ECTS credits: 6 |
| Group for lectures: 70 students | | | Group for auditory and laboratory exercises: AE 70 students; LE 20 students | | |

Objective of the course:

- The course is divided into three main parts. Part I covers introduction to inventory management with fundamental inventory division and review of the characteristics of each inventory class. Part II covers determination and calculation of the value of inventory, inventory management in distribution chain and its optimization. Real life examples for inventory optimization taken from automotive industry are covered in this part. Part III encompasses control of inventory quantity, designing the system of acquiring materials, control of the assets, the application of inventory classification (ABC and XYZ) methods in managing stocks of goods - management by exception, purchase and distribution logistics as part of the transport logistics of inventory management, safety stock, Pareto diagram, and economic quantity order.

Learning outcomes:

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

1. Citing basic terms of inventory management
2. Explain the methods of valuing quantity and cost-effectiveness of inventory.
3. Apply data for calculating factors that influence inventory management.
4. Comment on the existing inventory management system on the basis of the calculation of turnover coefficient and service level.
5. Analyse data for the purpose of applying the inventory categorization method.
6. Categorisation of inventory on the basis of applied methods.





LECTURES and EXERCISES

| Week | Syllabus | Form of classes | Performed by | Lessons | Remark |
|------|--|-----------------|--------------|---------|--------|
| 1. | <ul style="list-style-type: none"> First lecture with introduction note will inform the students about the importance of supply management, providing knowledge about the thematics, basic terminology used, and definition of the subject. Also, the lecture informs students about the functioning of the supply chain and the supply management. | L | Mario Šafran | 3 | |
| | <ul style="list-style-type: none"> As following to the introduction lectures, students will see specific issues regarding supply management when researching the field. Researches are based on calculations, statistics and measuring activities of performance. Student will know the difference and the right way to examine the field of supply management. | AE | Diana Božić | 1 | |
| 2. | <ul style="list-style-type: none"> Lecture will define the structure and basic division of supplies in the supply chain. It will include the appearance and the negative and positive aspect of each type of supplies, terminology and definitions of each supply group. | L | Mario Šafran | 3 | |
| | <ul style="list-style-type: none"> As following to the lectures, practicum will include calculating the amounts of supplies in distribution chain. Part 1 | AE | Diana Božić | 1 | |
| 3. | <ul style="list-style-type: none"> Lecture will propose the characteristics of supply types, with possible reasons of appearance and ways to reduce them. Every supply type will be presented in an industry group, with positive and negative influence on the buissnes. | L | Mario Šafran | 2 | |



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| | <ul style="list-style-type: none"> As following to the lectures, practicum will include calculating the amounts of supplies in distribution chain. Part 2 | AE | Diana Božić | 2 | |
| 4. | <ul style="list-style-type: none"> Lecture will provide certain knowledge about the importance of constant determining value of supplies in the companies. It will include possible effect of false planning and the amounts of supplies that are losing the value according to wrong procurement. | L | Mario Šafran | 2 | |
| | <ul style="list-style-type: none"> Practicum will contain calculation of wrong procurement and their effect on the supply management. Also will present the possible directing of supplies in the supply chain. | AE | Diana Božić | 2 | |
| 5. | <ul style="list-style-type: none"> Lecture will propose certain knowledge about specificities regarding supply management in supply chains. It will include organizational structure, information systems, importance of human resources, etc. | L | Mario Šafran | 2 | |
| | <ul style="list-style-type: none"> In practicum, there will be presented researches regarding supply management issues, benefits of changing organisational structure and other possible impacts on supply management. | AE | Diana Božić | 2 | TEST 1 |
| 6. | <ul style="list-style-type: none"> Categorization of the inventory (ABC), policy models in inventory management, Pareto law, deterministic and stochastic demand | L | Mario Šafran | 2 | |
| | <ul style="list-style-type: none"> Solving problems by calculating inventory categorization and creating Pareto diagram, calculating basic EOQ, inventory cycle, lead time, reorder point, time cycle. | AE | Diana Božić | 2 | |



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| 7. | <ul style="list-style-type: none"> Introduction to applied software environment (excell, winqsb). Solving inventory problems with software: Economic Order Quantity, inventory cycle, lead time with continues demand, reorder point. | LE | Diana Božić | 4 | |
| 8. | <ul style="list-style-type: none"> Solving inventory problems for planning inventory in lot-size production, deterministic demand. | LE | Diana Božić | 4 | |
| 9. | <ul style="list-style-type: none"> Solving problems for determination of service level and safety stock, inventory models with amount discount. | LE | Diana Božić | 4 | |
| 10. | <ul style="list-style-type: none"> Lecture will include basic knowledge about procurement of supplies, amounts of products and materials. It will propose certain methods that will effect on in time procurement. Also, planning methods and division will be presented | L | Mario Šafran | 2 | |
| | <ul style="list-style-type: none"> As following to the lectures, practicum will propose calculating the needed ampunt of supplies and benefits by reducing the amount for suggested percentage. Also calculations will include overhead expenses, equipment etc. | AE | Diana Božić | 2 | |
| 11. | <ul style="list-style-type: none"> Lecture will include presentation of supply management from the aspect of automotive industry, the complexity of ordering in this industry, effects of recession and financial solvency of consumers. Also, it will include overview on basic supply division and appearance of each supply type in automotive industry. | L | Mario Šafran | 2 | |
| | <ul style="list-style-type: none"> Practicum will include calculating the presented optimisation of supply management in automotive industry, including interest and planning the demand. | AE | Diana Božić | 2 | |



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|-----|--|----|--------------|---|--------|
| 12. | <ul style="list-style-type: none"> The lectures will provide knowledge regarding supply management in production, basic levels of production and materials needed. It will include terminology used as gross and neto amounts and definitions in production. | L | Mario Šafran | 2 | |
| | <ul style="list-style-type: none"> As following to the lectures, students will learn to calculate procurement of needed material for orders made, calculating the dates of delivery, procurement and expenses. | AE | Diana Božić | 2 | |
| 13. | <ul style="list-style-type: none"> The lecture will include basic knowledge about the control of the assets, used terminology and definitions. It will include observations on current assets and fixed assets, sales, price, and effects on supply management. | L | Mario Šafran | 2 | |
| | <ul style="list-style-type: none"> As following to the lectures, the practicum will include asset calculations. Calculation are resulting with return of the assets after minimizing the amount of supplies in the company. | AE | Diana Božić | 2 | TEST 2 |
| 14. | <ul style="list-style-type: none"> The lecture will include basic knowledge about the control of the assets, used terminology and definitions. It will include observations on current assets and fixed assets, sales, price and effects on supply management. | L | Mario Šafran | 3 | |
| | <ul style="list-style-type: none"> As following to the lectures, the practicum will include asset calculations. Calculation are resulting with return of the assets after minimizing the amount of supplies in the company | AE | Diana Božić | 1 | |
| 15. | <ul style="list-style-type: none"> Seminar | AE | Diana Božić | 3 | |

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





STUDENT OBLIGATIONS AND EXAMS

Conditions for obtaining signatures:

During the semester students have the option of taking two tests. Each test consists of numerical and theoretical questions (or their combination) in which it is possible to achieve a maximum of 80 points. Students that achieve a total of 20 points or more have an option of taking the second test. Students that achieve a total of 20 points or more on the second test are exempted from a written exam. Students that do not achieve minimum of 20 points have to take a written exam. The written and oral exam is provided for all students, regardless. To pass the written exam it is necessary to answer 51% of questions correctly, and the grading system is shown in paragraph 4 (Course gradation). Students are required to attend lectures and exercises. Students that at the end of semester have minimum of 80% of attendance get 20 points (10 points for lectures and 10 points for exercises attendance). Students that do not achieve those points have to take course once again. In the case of justified absences (for more than 3 times during lectures and more than 3 times for exercises), students have to submit medical records or other official records (which are subject of verification). After successful verification process students get 20 points.

LITERATURE

a) Obligatory literature:

1. Jacobs, R. F.: Operations and Supply Chain Management, Indiana University, University of Southern California, 2013
2. Piasecki, D.J.: Inventory Management Explained: A focus on Forecasting, Lot Sizing, Safety Stock, and Ordering Systems, Ops Publishing, ISBN 0972763112, 2009.
3. Waters, D.: Logistics-An Introduction to Supply Chain Management, Palgrave Macmillan, Great Britain, 2003
4. M.Šafran, D.Božić: Authorised lectures and exercises, Internet site of Faculty of transport and traffic sciences (e-student),
5. Wild, T.; Best practice in inventory management, Elsevier Science, Oxford 2002

b) Recommended literature:

1. Shapiro, J. F.: Modeling the Supply Chain, Wadsworth Group, Thomson Learning Inc., Duxbury, 2001.
2. Chopra, S., Meindl, P.: Supply Chain Management, Pearson Education Inc., New Jersey, 2004.





METHODOLOGY OF THE IMPLEMENTATION OF THE COURSE PLAN

1. LECTURES

Lectures follow specific topics from compulsory literature and are performed using Power Point presentation (can be in English). The use of a textbook and recommended literature allows students to prepare the lecture topics in advance. Authorized lectures are published on student's portal on the Faculty internet site (e-student). 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 problems by calculating inventory policies using applied methods. During working in PC laboratory students solve problems using MS Excel. During exercises, students are required to have: description and elaboration of the problem which is done during the lecture.

3. LABORATORY EXERCISES

During working in PC laboratory students solve problems using MS Excel.





4. DOCUMENTATION

The student's attendance record is kept during the semester. Achievements of goals are recorded by continuous monitoring on information system ISVU. All tests are kept in lecturer's file for one year.

5. 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. | Lectures attendance | 10 | 10 | Presence \geq 70% | 1 |
| 2. | Exercise attendance | 10 | 10 | Presence \geq 70% | 1 |
| 3. | Test 1 | 20 | 40 | <i>50% minimum</i> | (1) |
| 4. | Test 2 | 20 | 40 | 50% minimum | (1) |
| 5. | Written exam | 40 | 80 | <i>50% minimum</i> | 2 |
| 6. | Oral exam | | | | 2 |
| Σ | | 60 | 100 | | 6 |





Table 2 - Explanation of the credit values in evaluations

| CREDITS: | Estimate based on attendance, seminar paper and two colloquies (or written exam) - [4 ECTS]: | The final score [5 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/2024-2025/>
- <http://www.fpz.unizg.hr>

Student assistants:

Additional individual work with the students through individual consultations.

