Syllabus
Course Program

Operations Management

Specialty	**Institute**
All specialties	Institute of Education and Science in Economics, Management and International Business
Specialization	**Department**
-	Department of Management (204)
Educational program	**Course type**
All programmes	Elective
Level of education	**Form of study**
First (bachelor's level)	Full-time
Semester	**Language of instruction**
6	English

Lecturers and course developers

Olena Prokhorenko

Olena.Prokhorenko@khpi.edu.ua
PhD in Economic Sciences, Associate Professor, Professor of Department of Management

Authored and co-authored over 70 scientific and methodological publications. Senior lecturer of courses "Strategic Change Management", "Self-Management", "Operations management", "Quality management"

More about the lecturer on the department's website
https://web.kpi.kharkov.ua/mto/about/staff/prokhorenko-2/

General information

Summary

The course develops the knowledge and skills necessary to effectively manage operations of companies. During the course, students will learn how to organize, plan, control and improve manufacturing and service-providing processes, effectively achieve strategic objectives of the company, ensure product quality, and satisfy customer needs

Course objectives and goals

Mastering theoretical knowledge and practical skills in the field of operational management. Formation of understanding of theoretical principles, categories, modern concepts and practical methods of managing the operational activities of companies, improving operational strategies, using production management tools as a basis for attaining business goals.
The course tasks are following:
-

Format of classes

Lectures, practical classes (seminars), consultations, self-study. Final control in the form of an exam / differentiated grading.

Competencies

GC04. The ability to apply knowledge in practical situations.
GC10 The ability to conduct research at an appropriate level

Learning outcomes

LO 06. To show skills of search, collecting, and analysis of information.
LO 17 To conduct researches individually and/or in a group under the supervision.

Student workload

 The total volume of the course is 120 hours (4 ECTS credits): Lectures - 24 hours, Workshops - 24 hours, self-study - 72 hours.

Course prerequisites

Features of the course, teaching and learning methods, and technologies

Presentations, discussions, workshops, case-based learning, individual and teamwork, research work, independent research. Study materials are available to students through OneDrive, Teams

Program of the course

Academic classes

Lectures

Topics of the lectures	Hours
Topic 1. Introduction. Operations and Processes 1.Evolution of operations management: Background 2. Definitions of Operations management 3. Operations and processes: the elements and participants 4. Products and services: IHIP analysis	2
Topic 2. Operations strategy 1. Operations strategic impact 2. Perspectives of Operation strategy 3. Operations decisions 4. Operations management system	2
Topic 3. Operations Supply Network and Supply Chains 1.Operations supply network: scope and structure 2. Scope: Integration and Outsourcing 3. Structure of Supply network 4. Basic concept of Supply Chain Management 5. Supply Chain configuration 6. Supplier selection	4
Topic 4. Operations and Process design – Positioning 1. Operations&Processes Layout 2. Processes Technologies 3. Job design	2
Topic 5. Operations and Process design - Analysis	2

National Technical University "Kharkiv Polytechnic Institute"

1. Process performance
2. Process mapping
3. Theory of constraints
4. Process networks analysis: critical path method

Topic 6. Capacity management	2
1. The Role of Capacity Management in Operations Strategy	
2. Managing Demand	
3. Capacity Assessment and Planning	
4. Capacity managerial decisions	
Topic 7. Resource management	2
1. Resource planning mechanism	
2. Controlling operations system.	
3. Materials requirements planning (MRP)	
4. Manufacturing resource planning (MRP II) and Enterprise resource planning (ERP)	
Topic 8. Inventory management	2
1. The essence and types of inventories	
2. Inventory costs and Inventory profiles	
3. Inventory priorities – the ABC system	
4. Inventory information systems	
Topic 9. Performance improvement.	2
1.The Provisions of Control	
2. Key performance indicators	
3. KPI setting process	
4. The DMAIC cycle	
5. The business process re-engineering approach.	
Topic 10. Quality management and control.	2
1. The essence of Quality	
2. The 'costs of quality' concept	
3. ISO Quality Approach	
4. Quality control tools	
Topic 11. Project management basics.	2
1. Project Manager vs. Operations Manager.	
2. Project planning process	
3. MEAL approach.	
Total hours	**24**

Workshops

Topics for workshops/seminars	Hours	Weighting coefficients *a*
Topic 1. Introduction. Operations and Processes SIPOC diagram. IHIP analysis. Case -study Servitisation	2	0,08
Topic 2. Operations strategy Stakeholders of operations. Case-study 4Vs analysis. Case-study Performance objectives	2	0,08
Topic 3. Operations Supply Network and Supply Chains Case-study. Break-even point. Case-study. Outsourcing and integration	2	0,08
Topic 3. Operations Supply Network and Supply Chains	2	0,08

National Technical University "Kharkiv Polytechnic Institute"

Case-study. Supplier selection.

Topic 4. Operations and Process design – Positioning Case study Job design. JDOT methodology	2	0,08
Topic 5. Operations and Process design - Analysis Case study Little's Law. Process networks analysis: critical path method	2	0,12
Topic 6. Capacity management Case study. Overall equipment effectiveness Case study. Methods of adjusting capacity	2	0,08
Topic 7. Resource management Case study. Sequencing Case study Gantt chart.	2	0,08
Topic 8. Inventory management Case study ABC system& EOQ model Case study The bullwhip effect	2	0,08
Topic 9. Performance improvement. ENAPS approach Case study KPI setting process Case study DMAIC cycle	2	0,08
Topic 10. Quality management and control. Case study Fisfbone (Ishicava diagram)	2	0,08
Topic 11. Project management basics. Case study WBS structure. PERT assessment	2	0,08
Total hours	**24**	$\sum_{i=1}^{n} a_i = 1$

Laboratory classes

no laboratory classes

Control works

Students are offered 4 questionnaires of 10 test questions per each, randomly generated from the proposed list. Each question contains only one correct answer.

Topics for control works	Weighting coefficients *b*
Quiz 1	0,25
Quiz 2	0,25
Quiz 3	0,25
Quiz 4	0,25
Total	$\sum_{i=1}^{m} b_i = 1$

Self-study

 Self-study includes processing of materials provided in lectures (24h), preparation for practical classes (24h), as well as completion of an individual assignments (research paper) (16 h) and preparation for the final assessment (8 h).

Individual assignment

National Technical University
"Kharkiv Polytechnic Institute"

The individual assignment represents a research paper up to 10 pages long, written on one of the topics below.

The research paper should consist of two main parts: 1) theoretical background and 2) practical application.

Theoretical background represents a literature review with the following sections: problem definition; options or classification of approaches, approaches "for" or advantages, and approaches "against" or limitations.

Practical application is a study of the situation based on real companies, or a situation modeled by the author based on a specific organization (process).

The paper should end with the author's brief conclusions on the considered issue.

Providing a list of sources used with references in the text is mandatory.

The results of the research paper should be presented at the seminar in the form of a short report with demonstration material.

Topics of the research paper

1.Processes in non-operations functions
2.Quantitative and qualitative decision-making in operations. 'Behavioural' operations
3.The product/service life cycle influence on performance objectives
4.The idea of the 'business ecosystem'
5.Approaches to demand forecasting
6.Little's law and Little's flaw
7. Sustainability criteria in supplier selection
8. ERP types and application
9. Lean in resource management. Barriers to lean synchronisation
10. The sandcone model of improvement; applicability and limitations

---

Total hours   **16**

Non-formal education

Non-formal education includes professional courses/training, civic education, online education, professional internships, etc. The recognition of learning outcomes acquired in non-formal education applies to both mandatory and elective academic courses/educational components. The elements of non-formal education recommended in the syllabus can be recognized through a simplified procedure without additional validation of the results (without creation of a subject committee).

Recommended training courses, internships

1. Operations Management https://www.coursera.org/learn/fia-operations-management Obtaining a certificate allows partial recognition of the course. To receive a final score, an final assessment is required

2. Diploma in Operations Management (Ops) https://alison.com/course/diploma-in-operations-management-ops Obtaining a certificate allows partial recognition of the course. To receive a final score, an final assessment is required

3. Fundamentals of Operations Management https://alison.com/course/fundamentals-of-operations-management. Obtaining a certificate allows partial recognition of the course. To receive a final score, an individual assignment is required

Literature, training materials, and information resources

Main literature

1. Nigel Slack, Alistair Brandon-Jones, Nicola Burgess (2022) Operations Management (10-th edition) https://en1.pdfdrive.to/dl/operations-management-30?utm_source

2. Operations & Supply Chain Management (2025) Rotterdam School of Management, Erasmus University, Netherlands https://arxiv.org/pdf/2503.05749

3. New Trends in Production and Operations Management (2024) https://mdpi-res.com/bookfiles/book/9003/New_Trends_in_Production_and_Operations_Management.pdf?v=1726535128

4. Operations Management and Management Science http://dx.doi.org/10.5772/intechopen.96833 Edited by Fausto Pedro García Márquez Burke, W. W. (2023).

5. Навчальний посібник «Операційний менеджмент (частина 1)» / Л.Я. Балаш, О.В. Лисюк, А.В. Саміло, О.І. Ковальчук – Львів: видавництво Репроцентр захід, 2023 – 194 с. ISBN 978-617-7990-57-

6. Methodical guidelines for practical classes for the course "Operations management" for students of specialty 073 "Management" / V.I. Kovshik. - Kharkiv: NTU "KhPI". – 2024 - 10 p.

.

Additional materials

1. ISO 9001:2015 Quality management systems — Requirements. INTERNATIONAL STANDARD ISO 9001

2 ISO 9000:2015 Quality management systems — Fundamentals and vocabulary

3. Операційний менеджмент : конспект лекцій. Луцьк : Волинський національний університет імені Лесі Українки, 2022. 110 с.

4. Прохоренко, О., Брінь, П., & Ковшик, В. (2023). ЗАБЕЗПЕЧЕННЯ РЕЗУЛЬТАТИВНОСТІ ОРГАНІЗАЦІЇ ПРИ ПЕРЕХОДІ НА ДИСТАНЦІЙНУ ФОРМУ ПРАЦІ. Mechanism of an Economic Regulation, (3(101), 32-39. https://doi.org/10.32782/mer.2023.101.05

5. MEAL DPro https://mealdprostarter.org/

6. Rathi, R., Garza-Reyes, J., Kaswan, M. S., & Singh, M. (Eds.). (2023). Lean Six Sigma 4.0 for Operational Excellence Under the Industry 4.0 Transformation. CRC Press.

7. Critical_Path_Method_-CPM_Template_ProjectManager-WLNK-FD.xlsx

8. PERT_Chart-_Template_ProjectManager-WLNK-FD.xlsx

9. A work health and safety handbook PRINCIPLES OF GOOD WORK DESIGN https://www.safeworkaustralia.gov.au/system/files/documents/1702/good-work-design-handbook.pdf

10. E-Book by MRPeasy https://www.mrpeasy.com/blog/

11. JOB DESIGN OPTIMIZATION TOOL https://s3.amazonaws.com/he-product-images/multimedia/JDOT/welcome.html

Grading system

The final grade for the educational component is determined by the lecturer and is based on topics, types of activities, etc., in accordance with the syllabus. It is an integrated assessment of the results of all types of student learning activities. The final grade should reflect all the grades for the different parts of the educational process, taking into account their weighting coefficients k:

Continuous assessment (during workshops) k_1	Control works, k_2	Individual assignment, k_3	Final assessment k_4
0,3	0,3	0,3	0,1

The sum of the coefficients must be equal to one: $k_1 + k_2 + k_3 + k_4 = 1$. The weighting coefficients for the final assessment are decided by the course developer.

The final grade is calculated using the following formula:

$$G = C \cdot k_1 + K \cdot k_2 + I \cdot k_3 + E \cdot k_4$$

where: C – weighted average score for the continuous assessment

I – individual assignment grade

K – weighted average score for the continuous assessment

E – final assessment (exam) grade

$$C = \frac{C_1 \cdot a_1 + C_2 \cdot a_2 + \ldots + C_n \cdot a_n}{\sum_{i=1}^{n} a_i}$$

where: a_i - weighting coefficient for each workshop.

National Technical University "Kharkiv Polytechnic Institute"

$$K = \frac{K_1 \cdot b_1 + K_2 \cdot b_2 + \ldots + K_m \cdot b_m}{\sum_{i=1}^{m} b_i}$$

where: b_i - weighting coefficient for each control work.

The assessments for each component (C, K, I, etc.) are based on a 100-point scale in line with the provisions of the "Criteria and System for Assessing Knowledge and Skills, and Rating of Higher Education Students" of the National Technical University "Kharkiv Polytechnic Institute."

The final grade is finalized as the calculated value of G, rounded up to the nearest integer.

Grading scale

Total points	National	ECTS
90–100	Excellent	A
82–89	Good	B
75–81	Good	C
64–74	Satisfactory	D
60–63	Satisfactory	E
35–59	Unsatisfactory (requires additional learning)	FX
1–34	Unsatisfactory (requires repetition of the course)	F

Norms of academic integrity and course policy

Students must adhere to the Code of Ethics of Academic Relations and Integrity of NTU "KhPI": to demonstrate discipline, good manners, kindness, honesty, and responsibility. Conflict situations should be openly discussed in academic groups with a lecturer, and if it is impossible to resolve the conflict, they should be brought to the attention of the Institute's management.

Regulatory and legal documents related to the implementation of the principles of academic integrity at NTU "KhPI" are available on the website: http://blogs.kpi.kharkov.ua/v2/nv/akademichna-dobrochesnist/

Approval

Approved by   30.08.2025   **Head of the department**
Nataliia SHMATKO

National Technical University "Kharkiv Polytechnic Institute"