



NATIONAL UNIVERSITY OF ENGINEERING
COLLEGE OF INDUSTRIAL AND SYSTEMS ENGINEERING

SYSTEMS ENGINEERING PROGRAM

GP403 – PRODUCTION SYSTEMS

I. GENERAL INFORMATION

CODE	: GP403 – Production Systems
SEMESTER	: 6
CREDITS	: 03
HOURS PER WEEK	: 04 (Theory – Practice)
PREREQUISITES	: ST113 – Operations Research I
CONDITION	: Mandatory

II. COURSE DESCRIPTION

The course prepares the student in the concepts, components of productive system, and their associativity in production chains. Applies concepts and tools of Systemic Approach and Functional Approach to analyze the production of goods and services. Helps to understand the importance of the Manufacturing Information System and introduces the Strategic Analysis of Productive Systems. Recognizes, relates to propose solutions on child labor from a gender perspective as a production factor. Works are carried out on topics of productive systems using web 2.0

III. COURSE OUTCOMES

At the end of the course the students will:

- Analyze with a systemic approach the nature of productive systems.
- Perform a functional analysis of production systems applying new technologies.
- Identify, design and apply Production Systems techniques in a context of integrated processes with the other functional areas.
- Identify information requirements of a productive system of goods and / or services with a systemic approach.
- Recognize and relate to propose solutions on child labor from a gender perspective as a factor of production.
- Assume commitment to integrity and morality in the care of the environment and social responsibility
- Communicates effectively orally, in writing and interacts with peers.
- Participate and integrate effectively in work teams aiming at the achievement of goals and objectives.

IV. LEARNING UNITS

1. SYSTEMIC APPROACH OF PRODUCTIVE SYSTEMS

Reference system of a productive system: The company system and the operations subsystem. Evolution of productive systems. Operating cycle of companies. / Productive sector and associativity: Identification of productive sectors, classification of companies. Associativity: Business networks, production chain, business cluster. Vertical integration - Horizontal integration. Local productive systems. Introduction to plant location. / Manufacturing strategy and approach. Strategy and manufacturing approach. Production system just in time. Automation of productive systems. Introduction to Computer Integrated Manufacturing (CIM and its Components: Computer Aided Design (CAD); Computer Aided Manufacturing (CAM); Robotics, Flexible Manufacturing System (FMS).

2. FUNCTIONAL APPROACH OF PRODUCTIVE SYSTEMS

Plant layout (Layout). Distribution by process. Distribution by product. Cellular distribution. / Demand: Demand identification; Generation and selection of new products. Product design. Products lifecycle. Functional deployment of systems (QFD). Forecasts. Introduction to Technological Prospect / Processes: Design of processes and types of processes. Process Selection. Production Strategy. Product – process matrix. Process flow analysis. Modeling process flows. / Capacity: Factory capacity. Determination of productivity. Nature of production systems. Intermittent and continuous unit production.

3. MANUFACTURE INFORMATION SYSTEM

Introduction to the Manufacturing Information System: Inputs and outputs. Outputs: Production subsystem, inventory subsystem, cost subsystem, quality subsystem. / Inventories: Inventory system with independent demand. Modeling and decision-making process: Buy or produce. Economic order quantity model versus production lot model. / Inventory system with dependent demand. Introduction to Material Requirements Planning (MRP). MRP types. Enterprise Resource Planning (ERP). / Aggregate Production Planning (APP). Master Production Program Logistic costs, man-hours costs, machine-hours costs.

4. STRATEGIC ANALYSIS OF PRODUCTIVE SYSTEMS

Theory of restrictions (TOC). Comparison of synchronous manufacturing with MRP and JIT. Lean manufacturing. Topics of productive systems Part I: a) Production systems and professional skills. b) Productive System from a gender perspective. c) Child labor. Topics of productive systems Part II: Dynamic systems applied to aspects of productive systems.

V. METHODOLOGY

The course takes place in theory and practice sessions. Problem cases are contextualized, to collect information and identify information requirements in productive systems. In all sessions the active participation of the student is promoted. Halfway the semester the students must submit a personal blog about a productive process and in week 14 the students must present a blog about topics of productive systems to interact with his peers and undergo a heterogeneous evaluation.

VI. EVALUATION FORMULA

The learning will be evaluated through the "F" system.

- Partial Exam (PE): Weight 1
- Final Exam (FE): Weight 1
- Average of Practices (P): Weight 1.

$$FA = \frac{PE + FE + ((P1 + P2 + P3 + P4 + P5 - \text{MIN}(P1, P2, P3, P4))/4)}{4}$$

VII. BIBLIOGRAPHY

- Fernández, E.; Avella, L. and Fernández, M. Production strategy. First edition. Madrid: McGraw-Hill, 2003.
- Heizer, Jay and Render Barry. Principles of operations management. Seventh edition. Mexico: Pearson Education, 2009
- Huamaní Huamaní, Gloria. Production systems: compilation of topics. Lima UNI, 2017.
- Ponce, Carlos. Productive systems. Lima UNI, 2017. (class notes)