



**NATIONAL UNIVERSITY OF ENGINEERING**  
**COLLEGE OF CHEMICAL AND TEXTILE ENGINEERING**  
**CHEMICAL ENGINEERING PROGRAM**

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**PA136 – PRODUCTION PLANNING AND CONTROL**

**I. GENERAL INFORMATION**

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| <b>CODE</b>           | : PA136 Production Planning and Control                    |
| <b>SEMESTER</b>       | : 10   |
| <b>CREDITS</b>        | : 4  |
| <b>HOURS PER WEEK</b> | : 5 (Theory – Practice)                                    |
| <b>PREREQUISITES</b>  | : PA113 Methods Engineering I, PA714 Operations Research I |
| <b>CONDITION</b>      | : Compulsory   |

**II. COURSE DESCRIPTION**

This course is designed to strain students in the employment of techniques for designing, planning, programming and controlling basic processes and operations of goods and services, from the supplier and to the customer, calculating and optimizing the use of the different resources of an organization.

**III. COURSE OUTCOMES**

1. Identify and analyze the importance of the operation in the entrepreneurial operation to adopt new attitudes that allow a responsible assumption of modern management techniques.
2. Become familiar with the use of techniques that allow analyzing the product and the different operators unavailable for selecting processes establishing break-even points.
3. Create production systems integrating the different management functions that allow an accurate solution to basic aspects about: forecasting, plant location, capacity and distribution, work designs, planning and programming.
4. Establish priorities in the analysis and assignment of human resources and materials through a good use of production system operators that allow meeting customers' requirements seeking efficiency and improve in the organizational performance.

**IV. LEARNING UNITS**

**1. OPERATION AND GLOBAL MARKET / 4 HOURS**

Introduction to the course, concepts and definitions, operations as functions, operations as a set of decisions, manufactures, services, differences and similarities, tendency to use of the management of operations, productivity, output measures, global competition, competition based on quality, time, technologies, operations and the organizations.

**2. OPERATIONS STRATEGIES / 4 HOURS**

Definitions, selection of strategies, global strategies, market analysis, competitive priorities: cost, quality, time and flexibility, selection of competitive priorities, flow strategies. Strategies.

**3. MARKET EQUILIBRIUM AND SUPPLY THEORIES / 12 HOURS**

Functional analysis, value analysis, QFD (Quality Function Deployment), failure mode and effects analysis, Taguchi method, factorial design technique, cost-oriented design.

**4. SELECTION OF PROCESSES AND TECHNOLOGIES / 5 HOURS**

Definition, main decisions about processes, process and project selection, intermittent, batch, in-line, continuous, vertical integration, resources flexibility, process design, process improvement, flow charts, process map, significance and function of technology, creation and application of technology, technology strategy.

**5. JUST-IN-TIME PRODUCTION SYSTEMS / 5 HOURS**

Just-in-time philosophy, basic structure, approximation to the JIT concepts, environment for the application of JIT. Just-in-time and traditional production, new perspectives for measuring performance, perception of the JIT before new production standards, competitive advantage, application cost-benefit, Just-in-time strategy, factory operation, operative advantages.

## **6. CAPACITY, LOCATION AND PHYSICAL DISTRIBUTION / 5 HOURS**

Capacity planning, measurements of capacity, economy, diseconomy of scale, capacity strategies, link of capacity with other decisions, systematic method for capacity decisions, location, factors that influence location, localization of only one facility, distribution planning, types of distribution, process distribution design, product distribution design.

## **7. FORECASTING / 4 HOURS**

Characteristics of the demand, demand patterns, factors that influence demand, forecasting system design, qualitative methods, linear regression, time series method, seasonal pattern, forecasting error.

## **8. INVENTORY ADMINISTRATION / 5 HOURS**

Concept, types of inventories, ABC analysis, economic order quantity, inventory control system, continuous check, periodic check, non-instantaneous re-supply, quantity discount, decisions for a period.

## **9. AGGREGATED PLAN / 5 HOURS**

Purpose, accumulation, product family, workforce, time, administrative importance of aggregated plans, reactive alternatives, aggressive alternatives, strategies planning, determination of demand requirements, level strategies with extra hours and abbreviated hours, chase strategies with hiring and firing, mixed strategies.

## **10. MATERIALS REQUIREMENT PLANNING AND PROGRAMMING / 7 HOURS**

Dependant demand, materials list, production sampling program, inventories registry, gross requirement, scheduled receptions, on hand scheduled inventory, planned receptions, delivery time planning, regulations about batch size, fixed order quantity, periodic order quantity, batch-by-batch, materials requirement explosion, Gantt chart, performance measurement, release procedure – Intermittent production, operation sequences for a machine, regulations for multiple dimensions, operation sequences for a production plant, two-season intermittent, theory of constraints.

## **V. LABORATORIES AND PRACTICAL EXPERIENCES**

Practice 1: Inventory module, production floor.

Practice 2: Engineering module, planning.

Practice 3: Sales module, quotation.

Practice 4: Sales module.

## **VI. METHODOLOGY**

This course is carried out in theory, practical and lab sessions. In theory sessions, the instructor introduces theoretical concepts and applications. In practical sessions, different cases, exercises and problems are solved. In lab sessions, projects related to work measurement are carried out. At the end of the course, students must hand over the prototype design and expose a paper. In all sessions, students' active participation is encouraged.

## **VII. EVALUATION FORMULA**

The average grade PF is calculated as follows:

$$PF = 0.20EP + 0.30EF + 0.10P1 + 0.10P2 + 0.10P3 + 0.10P4 + 0.10TFI$$

EP: Mid-Term Exam

EF: Final Exam

P#: Quizzes

FI: Final research paper

## **VIII. BIBLIOGRAPHY**

1. **KRAJEWSKI LEE J. RITZMAN LARRY P.**  
Operations Administration. Strategies and Analysis (Spanish)  
Pearson Education, Mexico (2009)
2. **CHASE, RICHARD B; AQUILANO, NICHOLAS J.**  
Operations Administration: Strategies and Analysis (Spanish)  
Prentice Hall, Mexico (2008)