[MLA103] Analysis of Process Variability

GENERAL INFORMATION

Studies	UNIVERSITY MASTER'S DEGREE IN PRODUCTIVE LOGISTICS OPERATIONS MANAGEMENT			**Subject**	?
Semester	2	**Course**	1	**Mention / Field of specialisation**	
Character	COMPULSORY				
Plan	2025	**Modality**	Face-to-face	**Language**	EUSKARA/CASTELLANO
Credits	6	**Hours/week**	0	**Total hours**	84 class hours + 66 non-class hours = **150 total hours**

2030 AGENDA GOALS

PROFESSORS

EGUREN EGUIGUREN, JOSE ALBERTO
ZENIGAONAINDIA MURUAMENDIARAZ, NEREA
BARREIRO BUEZO, UNAI

REQUIRED PREVIOUS KNOWLEDGE

Subjects	Knowledge
(No specific previous subjects required)	*(No previous knowledge required)*

LEARNING RESULTS

LEARNING RESULTS	KC	SK	AB	ECTS
ML161 - Identifies and describes the appropriate methodologies, techniques and tools for the analysis and control of the variability of production processes using advanced tools for data management	x			3,6
ML162 - Applies improvement methodologies focused on reducing variability in product processes (Green belt six sigma)		x		1,8
ML301 - Works in multidisciplinary teams, without distinction, with a cooperative and participative attitude and efficiently communicates the results obtained orally and in writing in different languages. Without any limitation of accessibility to achieve the established objectives.	x		x	0,3
ML302 - Understands the impact of their profession on the environment in order to practice with social responsibility	x			0,3
			Total:	6

KC: Knowledge or Content / SK: Skills / AB: Abilities

SECONDARY LEARNING RESULTS

RML127 **[!]** ***Identifica y describe las metodologias, técnicas y herramientas adecuadas para el analisis y el dominio de la variabilidad de los procesos productivos utilizando herramientas avanzadas para la gestión de datos***

LEARNING ACTIVITIES	CH	NCH	TH
Development and writing of records, reports, presentations, audiovisual material, etc. on projects/work experience/challenges/case studies/experimental investigations carried out individually and/or in teams	10 h.	10 h.	20 h.
Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams	10 h.	19 h.	29 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	25 h.		25 h.
Carrying out exercises and solving problems individually and/or in teams	6 h.	10 h.	16 h.

EVALUATION SYSTEM	W
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	30%
Individual written and/or oral tests or individual coding/programming tests	70%

MAKE-UP MECHANISMS

Presentation and defence of exercises, case studies, computer practical work, simulation practical work, laboratory practical work, term projects, end of degree project, master's thesis, challenges and problems

Individual written and/or oral tests or individual coding/programming tests

CH - Class hours: 51 h.
NCH - Non-class hours: 39 h.
TH - Total hours: 90 h.

RML301 **[!]** ***Trabaja en equipos multidisciplinares, sin distinción ninguna, con actitud cooperativa, participativa y comunica eficiente los resultados obtenidos de forma oral y escrita en distintos idiomas. Sin ninguna limitación de accesibilidad para alcanzar lo***

LEARNING ACTIVITIES	CH	NCH	TH
Development and writing of records, reports, presentations, audiovisual material, etc. on projects/work experience/challenges/case studies/experimental investigations carried out individually and/or in teams	3 h.	1,5 h.	4,5 h.
Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams	2 h.	1 h.	3 h.

EVALUATION SYSTEM	W	MAKE-UP MECHANISMS
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	100%	Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems

CH - Class hours: 5 h.
NCH - Non-class hours: 2,5 h.
TH - Total hours: 7,5 h.

RML128 **[!]** ***Aplica metodologías de mejora enfocadas a la reducción de la variabilidad de los procesos productos (Green belt seis sigma)***

LEARNING ACTIVITIES	CH	NCH	TH
Development and writing of records, reports, presentations, audiovisual material, etc. on projects/work experience/challenges/case studies/experimental investigations carried out individually and/or in teams	5 h.	5 h.	10 h.
Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams	10,5 h.	7 h.	17,5 h.
Presentation by the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	5 h.	5 h.	10 h.
Carrying out exercises and solving problems individually and/or in teams	2,5 h.	5 h.	7,5 h.

EVALUATION SYSTEM	W	MAKE-UP MECHANISMS
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	70%	Presentation and defence of exercises, case studies, computer practical work, simulation practical work, laboratory practical work, term projects, end of degree project, master's thesis, challenges and problems
Presentation and defence of exercises, case studies, computer practical work, simulation practical work, laboratory practical work, term projects, end of degree project, master's thesis, challenges and problems	30%	Individual written and/or oral tests or individual coding/programming tests

CH - Class hours: 23 h.
NCH - Non-class hours: 22 h.
TH - Total hours: 45 h.

RML302 **[!]** ***Entiende el impacto de su profesión en el entorno para ejercer con responsabilidad social***

LEARNING ACTIVITIES	CH	NCH	TH
Development and writing of records, reports, presentations, audiovisual material, etc. on projects/work experience/challenges/case studies/experimental investigations carried out individually and/or in teams	3 h.	1 h.	4 h.
Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams	2 h.	1,5 h.	3,5 h.

EVALUATION SYSTEM	W	MAKE-UP MECHANISMS
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	100%	Presentation and defence of exercises, case studies, computer practical work, simulation practical work, laboratory practical work, term projects, end of degree project, master's thesis, challenges and problems

CH - Class hours: 5 h.
NCH - Non-class hours: 2,5 h.
TH - Total hours: 7,5 h.

CONTENTS

1. TOPIC 0: Introduction to the variability of industrial processes.

2. TOPIC 1: 6 sigma methodology

3. TOPIC 2: Define stage

1.Clarify the purpose

2. Map of high level processes (SIPOC)

3.Voice of the customer (VOC) Character. Reviews (CC)

4.Business impact5.Formalization: IP Sheet

4. TOPIC 3: Measuring stage

1. Diagram process

2. Process capacity. Descriptive statistics

3. Elements of statistical inference.

4. Capability Ratios, Six Sigma Metrics, and KPIs

5.Analysis of the measurement system (R&R)

5. TOPIC 4: Analyze stage.

1.AMFE (2019 latest version updates)

2. Design of experiments

6. TOPIC 5: Improve stage.

7. TOPIC 6: Control stage.

1. Statistical process control (SPC)

2.Standardization

3.Close

8. TOPIC 7: CHALLENGE. Development of a case with the objective of improving an industrial process through the application of sigma's

LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources

Subject notes
Presentations by external Lecturers
Moodle Platform
Labs

Bibliography

DEHNAD, K.(1988). Quality Control, Robust Design, and the Taguchi Method. Wadsworth & Brooks / Cole Advanced Books & Software, Pacific Grove (California), ISBN 978-1-4684-1472-1

KACKAR, R.N.(1985) Off-Line Quality Control, Parameter Design, and the Taguchi Method. Journal of Quality Technology. 17:4, 176-188

PANDE, P.; NEUMAN, R.P; CAVANAGH, R.R (2002) Las claves del seig sigma. La implantación con éxito de una cultura que revoluciona

el mundo empresarial. Ed. McGraw Hill, Madrid. ISBN 84-481-3753-1.

PRAT, ALBERT; TORT-MARTORELL, XAVIER; GRIMA, PERE; POZUETA, LOURDES.(1997) Métodos estadísticos. Control y Mejora de la calidad. Ed. UPC, Barcelona. ISBN 84-8301-786-5.

ASTM standard, Standar Guide for Measurement System Analysis (MSA) E2782 – 17 (2022)

Measurement System Analysis. Reference Manual. Ford Motor Company (2010); Forth Edition.

Thomas Pyzdek and Paul Keller, The Six Sigma Handbook, McGraw-Hill Professional; 4th edition, 2014.

Gutiérrez Pulido, H., & Salazar, V. (2004). Control estadístico de calidad y seis sigma/Humberto Gutiérrez pulido, coautor Román de la Vara Salazar.

Automotive Industry Action Group, (2019). Failure Mode and Effects Analysis, Handbook, 1st edition. AIAIG, Southfield, MI 2019.