A) COURSE

Course Id:	Course
5965	QUALITY CONTROL

Class Hours per Week	Lab hours per week	Complementary practices	Credits	Total hour course
3	0	NA	6	48

B) GENERAL COURSE INFORMATION:

	EE (IEA)	ME (IM)	MME (IMA)	EME (IME)	MTE (IMT)
Level:	VIII	VII	VIII	VII	VII
Course Type (Required/Elective)	MANDATORY	MANDATORY	MANDATORY	MANDATORY	MANDATORY
Prerequisite Course:	270	PRODUCTION SYSTEMS	PROBABILITY AND STATISTICAL INFERENCE	PRINCIPLES OF MANAGEMENT	PRINCIPLES OF MANAGEMENT, PROBABILITY AND STATISTICAL INFERENCE
CACEI Classification:	CI	CI	CI	CI	CI

C) COURSE OBJECTIVE

At the end of the course, the student will be capable of:
Student will be able to design a quality control system to the total quality management system. He will apply methodologies based on acceptance sampling, statistical inference applied to processes in any organization. He will be capable to design protocols oriented to quality and production improvement areas.

D) TOPICS (CONTENTS AND METHODOLOGY)

UNIT 1. QUALITY, PRODUCTVITY AND COMPETITIVENESS	Hours: 6
Specific Objective:	Students will be able to analyze and understand the need for organizations to carry out its activities better , faster , and as financially relevant . He should also recognize some tools for people to be more effective and ensure success within their organization. The students recognize the concepts of quality, productivity, efficiency, effectiveness, internal / external customer; as well as elements related to innovation and competitiveness. The Students must understand and recognize the main ideas proposed by the most important quality leaders. They must understand and use the different philosophies and related tools, as the context. They learn and are able to implement a culture oriented to continuous improvement that benefits the company to those around him and above all , to themselves

1.1. History of Quaity
1.2 . Philosophies of the leaders who have contributed to quality control
1.3 . Concepts related to quality, quality costs, selection of critical to quality characteristics

Readings and other resources	Recommended books Frank Gryna, *Análisis y Planeación de la Calidad Método Juran*, Mc Graw Hill, ISBN: 9789701061428, 2007 Grant, E.L. (2004): 'Control Estadístico de Calidad'. Editorial CECSA, Segunda Edición.México Montgomery, Douglas. C. (1991): "Control Estadístico de la Calidad". Ed. Iberoamericana. México. 3ª Edición. Reading of scientfic articles and technical notes an reports related to cases and quality control problems. The review some links at internet. i.e. http://www.seissigma.com.mx http://www.minitab.com/es-mx/ http://www.itl.nist.gov/div898/handbook/ http://www.wolframalpha.com/
Teaching Methodologies	• Professor exposes topics in conventional manner in the classroom • At least once a week he works using collaborative working groups to solve practical exercises using Excel or statistical software and generate technical reports to be delivered to the teacher .. • Students are supervised by Professor during elaboration of the Final Project • Reading of articles and reporting where the view shown student. These are articles about the use of Statistical Quality Control successful cases
Learning Activities	Research work, exercises done in class, tasks performed by students, academic reports with results of special projects, have the objective of extend and know in deep the topics studied in the course.

UNIT 2. ACCEPTANCE SAMPLING AND ACCEPTANCE CRITERIA	Hours: 8
Specific Objective:	The student must learn sampling techniques to generate samples of a population of elements in order to know the behavior of critical to quality characteristic. students shall understand , and acknowledge that sampling is important because the sampling results let it to analyze situations in a company or some field of society
2.1. Introduction to Acceptance Sampling	
2.2. Sampling techniques in quality control	

Readings and other resources	Recommended books Frank Gryna, *Análisis y Planeación de la Calidad Método Juran*, Mc Graw Hill, ISBN: 9789701061428, 2007 Grant, E.L. (2004): 'Control Estadístico de Calidad'. Editorial CECSA, Segunda Edición. México Montgomery, Douglas. C. (1991): "Control Estadístico de la Calidad". Ed. Iberoamericana. México. 3ª Edición. Reading of scientfic articles and technical notes an reports related to cases and quality control problems. The review some links at internet. i.e. http://www.seissigma.com.mx http://www.minitab.com/es-mx/ http://www.itl.nist.gov/div898/handbook/ http://www.wolframalpha.com/
Teaching Methodologies	• Professor exposes topics in a conventional manner in the classroom • At least once a week he works using collaborative working groups to solve practical exercises using Excel or statistical software and generate technical reports to be delivered to the teacher .. • Students are supervised by Professor during elaboration of the Final Project • Reading of articles and reporting where the view shown student. These are articles about the use of Statistical Quality Control successful cases
Learning Activities	Research work, exercises done in class, tasks performed by students, academic reports with results of special projects, have the objective of extend and know in deep the topics studied in the course.

UNIT 3. STATISTICAL QUALITY CONTROL	Hours: 20
Specific Objective:	The student will understand, learn and implement their knowledge, based on methodologies consider: obtaining information related to the problems, statistical sampling schemes and statistical tools. He should consider customer requirements and conditions of the processes using valid, reliable and representative samples. Based on the above he will be able to analyze information and make decisions

3.1 Review of concepts relatedto probablity and statistics.
3.2 Designing and implementing Control Charts (variables and atributes)
3.3 Construction and interpretation of Indexes capability of process: C_{pi}, C_{ps}, C_p, C_{pk}, C_r, Z_i, Z_s, C_{pm}

Readings and other resources	Recommended books Frank Gryna, *Análisis y Planeación de la Calidad Método Juran*, Mc Graw Hill, ISBN: 9789701061428, 2007 Grant, E.L. (2004): 'Control Estadístico de Calidad'. Editorial CECSA, Segunda Edición.México Montgomery, Douglas. C. (1991): "Control Estadístico de la Calidad". Ed. Iberoamericana. México. 3ª Edición. Reading of scientfic articles and technical notes an reports related to cases and quality control problems. The review some links at internet. i.e. http://www.seissigma.com.mx http://www.minitab.com/es-mx/ http://www.itl.nist.gov/div898/handbook/ http://www.wolframalpha.com/
Teaching Methodologies	• Working conventionally with exposure teacher. • At least once a week teamwork in practical exercises or use of software. • Preparation of the Final Project • Readings Articles of Statistical Quality Control .Activities of learning Research work
Learning Activities	Research work , exercises done in class, tasks performed by students , academic reports with results of special projects , are intended to broaden and deepen the topics reviewed in the course. Professor advance deliver the rubrics to assess essays, reports and final project. These headings must be approved by the Academy of Quality

UNIT 4. ANALYSIS OF MEASUREMENT VARIAOTION SYSTEM	Hours: 14
Specific Objective:	The student will know, understand and apply the main elements of descriptive statistics and inference, in order to apply it in quality analysis and process variability for making decisions. He will learn to know the natural variability of the process for a critical to quality characteristic. He will know to what extent this characteristic quality meets the specifications or customer requirements. In addition, you will learn and apply statistical tools to monitor and control processes in an appropriate manner .

4.1. Introduction to Analysis of Variance
4.2 Introduction to Design of Experiments
4.3. Study Repeatability and Reproducibility (R & R).
4.4 ISO 17025 Measurement Systems Analysis (MSA)

Readings and other resources	Recommended books Frank Gryna, *Análisis y Planeación de la Calidad Método Juran*, Mc Graw Hill, ISBN: 9789701061428, 2007 Grant, E.L. (2004): 'Control Estadístico de Calidad'. Editorial CECSA, Segunda Edición.México Montgomery, Douglas. C. (1991): "Control Estadístico de la Calidad". Ed. Iberoamericana. México. 3ª Edición. Reading of scientfic articles and technical notes an reports related to cases and quality control problems. The review some links at internet. i.e. http://www.seissigma.com.mx http://www.minitab.com/es-mx/ http://www.itl.nist.gov/div898/handbook/ http://www.wolframalpha.com/
Teaching Methodologies	• Working conventionally with exposure teacher. • At least once a week teamwork in practical exercises or use of software. • Preparation of the Final Project • Readings Articles of Statistical Quality Control .Activities of learning Research work
Learning Activities	Research work , exercises done in class, tasks performed by students , academic reports with results of special projects , are intended to broaden and deepen the topics reviewed in the course. Professor advance deliver the rubrics to assess essays, reports and final project. These headings must be approved by the Academy of Quality

E) TEACHING AND LEARNING METHODOLOGIES

F) EVALUATION CRITERIA:

Evaluation:	Schedule	Suggested Form of Evaluation and weighing	Topics
1st Partial Examination	Session 16	Partial Examination 60% , Homeworks 20%, Weekly examiations and reports 20%	Unidad 1 y 2
2d Partial examination	Sesión 32	Partial Examination 60% , Homeworks 20%, Weekly examiations and reports 20%	Unidad 3
3d. Partial examination	Sesión 48	Partial Examination 60% , Homeworks 20%, Weekly examiations and reports 20%	Unidad 4
Final Examination		Final Examination 20%, Final Project 20%, Average of partial examinations 60%	

Other activities			
Extraordinary examination	Week 17	100% Test	100% Course Program
examination certificate of proficiency	Dates are programmed for Administration in charge	100% Test	100% Course Program
Regularization Examination	Dates are programmed for Administration in charge	100% test	100% Course program

G) BIBLIOGRAPHY AND ELECTRONIC RESOURCES

Basic Texts:

1. Frank Gryna, *Análisis y Planeación de la Calidad Método Juran*, Mc Graw Hill, ISBN: 9789701061428, 2007
2. Deming, Walter E.: Calidad, productividad y competitividad, Madrid. Díaz de Santos, 1989.
3. Humberto Gutiérrez Pulido, *Calidad y Productividad*, Mc Graw Hill , ISBN: 9786071511485, Edición: 04, 2014
4. James R. Evans y William M. Lindsay. Administración y Control de la Calidad, 7ma Edición. Editorial CENAGE Learning.
5. Grant, E.L. (2004): 'Control Estadístico de Calidad'. Editorial CECSA, Segunda Edición.México
6. Montgomery, Douglas. C. (1991): "Control Estadístico de la Calidad". Ed. Iberoamericana. México 3ª Edición.
7. Humberto Gutiérrez Pulido, Román De La Vara Salazar, *Control Estadístico de la calidad y Seis Sigma*, Mc Graw Hill, ISBN: 9786071509291, 2013.
8. Dale H. Besterfield, *Control de Calidad*, Pearson , ISBN: 9786074421217, 2009
9. Gary K. Griffith, The Quality Technician's Handbook, Sixth Edition ISBN: 978-0-13262-128-1
10. Paul Keller, Statistical Process Control Demystified , ISBN: 978-0-07174-249-8
11. Rowland Hayler and Michael Nichols , What is Six Sigma Process Management?, ISBN: 978-0-07145-341-7
12. Marjorie L. Icenogle, Ph.D. and Steven M. Zimmerman, Ph.D., Statistical Quality Control Using Excel, SecondEdition, ISBN: 978-0-87389-566-8.

Complementary Books

1. Summers, *Administración de la Calidad*, Pearson, ISBN: 9789702608134, 2006
2. Jose Luis Palacios Blanco , *Administración para la calidad*, Trillas , ISBN 13 / Cód Barra:9786071708854, 2011
3. Burr, I. W. (1976). Statistical Quality Control Methods, Marcel Dekker Inc., New York NY.
4. Grant, E. L. and R. S. Leavenworth (1988). Statistical Quality Control, 6th ed., McGraw-Hill Book Company,
New York NY.
5. W. Hastay, and W. A. Wallis, Selected Techniques of Statistical Analysis for Scientific and Industrial Research and Production and Management Engineering, McGraw-Hill Book Company, New York NY.
6. Montgomery, D. C. (1985). Introduction to Statistical Quality Control, John Wiley & Sons, New York NY.
7. Small, B. B. et. al. (1958). Statistical Quality Control Handbook, AT&T, ISBN Select Code 700-444.
8. Wheeler, D. J. and D. S. Chambers (1992). Understanding Statistical Process Control, 2nd ed., SPC Press,
Knoxville, TN.-

Software: Excel, Mega Stat, Super CEP, Quality Windows, Minitab.