

Course Title	Statistical Analysis and Quality Control				
Course Code	ECE613				
Course Type	Compulsory				
Level	Master (2 nd cycle)				
Year / Semester	1 st Year / 1 st Semester				
Teacher's Name	TBA				
ECTS	6	Lectures / week	3 Hours	Laboratories / week	None
Course Purpose and Objectives	<p>This course is designed to help students develop a better appreciation of the vital role of total quality management in modern firms and learn its basic concepts and tools. The practical aspects of adopting and implementing quality standards are considered through the analysis of case studies in Telecommucniation industry. It provides students with practical knowledge of environmental assessment tools and the process of adoption of environmental standards through analysis of cases and other assignments. Students will acquire the necessary skills to enable them to work with probabilities, model engineering data using some of the more common probability distributions and evaluate confidence intervals for parameters. They also apply regression and correlation methods to straight line data, design one and two-stage acceptance sampling plans and be aware of ways of describing and evaluating failure time data through examples motivated by telecommunication engineering related applications using real data from well known standards, recommendations and models. The class will follow a seminar and discussion/workshop format.</p>				
Learning Outcomes	<p>Upon successful completion of this course students should be able to:</p> <ul style="list-style-type: none"> • Use various resources to carry out a literature search. • Structure and format the project to agreed conventions. • Design, execute, interpret and report results from empirical research projects • Develop transferable skills including collaborative work, peer-review and reflection (self-assessment). • Identify statistical problems of multivariate dimension, with special emphasis in telecommunication engineering. 				

	<ul style="list-style-type: none"> • Describe multivariate datasets • Recognise and describe multivariable statistical models • Apply statistical models for regression analysis, and ANOVA models, applied to real data of telecommunication engineering • Ability to model time series data, estimate their parameters and apply it to real problems of signal processing and telecommunications • Design, execute, interpret and report results from simulations / experiments using MATLAB. • Manage a project and explain the relevant techniques and tools needed in order to complete it successfully on time and within budgeted resources. 		
Prerequisites	None	Co-requisites	None
Course Content	<p>The nature of research: Definitions and types of research; research process; topic selection and scope; feasibility and value.</p> <p>The literature search: Sources of information; differentiating between types of sources; primary, secondary and tertiary sources; using the library and digital databases to conduct efficient literature reviews; searching the Internet; role of the supervisor.</p> <p>Quality Management: Evolution of Quality and Early Theories of Quality Management, The Cost of Quality –The Voice of the Customer / Market, Managing Quality Improvement - Teams and Projects, Managing Supplier Quality in the Supply Chain, Quality Management Systems, Quality Management - Measures of Organizational Success, Designing Quality Services.</p> <p>Project management: Methods, techniques and tools for research design, and data collection.</p> <p>Analysis and synthesis: Statistical Analysis: Review of basic concepts, point estimation, statistical inference. Sample statistics and their distribution, estimation and estimators. Methods of moments and of maximum likelihood. Confidence intervals and hypothesis testing. Distribution and density functions, distribution fitting, central limit theorem, graphical methods, goodness of fit chi-</p>		

	<p>square test, transformations. Comparison of populations, comparison of two means from independent /paired samples. Comparison of two variables from normal populations. The multiple regression model, simple and multiple regression. Inference in the regression model. Time series analysis. Applications in telecommunication engineering.</p> <p>Presentation of research findings: Project structure; conventions on citation and quotations; style of writing a report.</p> <p>Quality Policies, Standards and Recommendations in Telecommunications: Quality policies, quality organization and quality planning, acceptance sampling, reliability, failure rates, standards and certification. ITU Models ITU Models / Recommendations R-REC: F (Fixed Services), M (Mobile), P (Radiowave Propagation), SF (Frequency Sharing), SM (Spectrum Management) and T-REC: K , O. Also recommendations from OFCOM, FCC and ETSI.</p> <p>Course Project The student will write a technical report on a related subject provided by the instructor. The subject can be interference analysis, link budget, design requirements analysis and specification as well as the implementation of simulation model to generate useful data for further processing.</p>
Teaching Methodology	Face to face
Bibliography	<p>W. Mendenhall W and T. Sincich, Statistics for Engineering and the Sciences, Latest Edition, Prentice Hall</p> <p>E. G. Schilling and D. V. Neubauer, Acceptance Sampling in Quality Control, Latest Edition</p> <p>C. Chatfield, Statistics for Technology, Latest Edition, Chapman & Hall</p> <p>R. E. Walpole, R. H. Myers, S. L. Myer and K. E. Ye, Probability and Statistics for Engineers and Scientists, Latest Edition, Pearson</p> <p>R. Johnson, Miller & Freunds Probability and Statistics for Engineers, Latest Edition, Pearson</p>

	<p>J. L. Devore, Probability and Statistics for Engineering and the Sciences, Latest Edition, Thomson</p> <p>R. D. De Veaux, P. F. Velleman and D. E. Bock, Stats: Data and Models, Latest Edition, Pearson</p> <p>TL9000:2016 REQUIREMENTS HANDBOOK.</p> <p>Goetsch D.L and Davis S.B (2010) Quality Management for organizational Excellence – Introduction to Total Quality, International Edition, Pearson Education.</p> <p>J. Zobel., WRITING FOR COMPUTER SCIENCE, Springer.</p> <p>W. Navidi, Statistics for Engineers and Scientists, McGraw-Hill Science/Engineering/Math; Latest Edition.</p> <p>Statistical Methods for Engineers, by Geoffrey Vining and Scott M. Kowalski, Thomson, Brooks/Cole, Latest Edition.</p> <p>J.G. Paradis, M., Zimmerman, THE MIT GUIDE TO SCIENCE AND ENGINEERING COMMUNICATION, The MIT Press.</p> <p>D. Madsen, SUCCESSFUL DISSERTATIONS AND THESES., A GUIDE TO GRADUATE STUDENT RESEARCH FROM PROPOSAL TO COMPLETION, Jossey Bass.</p> <p>T. Cornford, S. Smithson, PROJECT RESEARCH IN INFORMATION SYSTEMS., A STUDENT'S GUIDE, Macmillan</p> <p>ITU Models / Recommendations www.itu.int/pub/R-REC - F (FIXED SERVICES), M (MOBILE), P (RADIOWAVE PROPAGATION), SF (FREQUENCY SHARING), SM (SPECTRUM MANAGEMENT) and www.itu.int/pub/T-REC K , O</p>				
Assessment	<p>Examinations</p> <p>Project/Assignments</p>	<table border="1"> <tr> <td>40%</td> </tr> <tr> <td>60%</td> </tr> <tr> <td>100%</td> </tr> </table>	40%	60%	100%
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Language	English				