



NATIONAL UNIVERSITY OF ENGINEERING
COLLEGE OF INDUSTRIAL AND SYSTEMS ENGINEERING
SYSTEMS ENGINEERING PROGRAM

SYLLABUS - ST254 SOFTWARE QUALITY MANAGEMENT

I. GENERAL INFORMATION

CODE	: ST254
SEMESTER	:
CREDITS	: 3
HOURS PER WEEK	: 4 (Theory – Practice)
PREREQUISITES	: ST204 Software Engineering Workshop I
CONDITION	: Elective
INSTRUCTOR	: Percy Calizaya
INSTRUCTOR E-MAIL	: pcalizaya@uni.edu.pe

II. COURSE DESCRIPTION

This course trains students in the application of quality software concepts, methods and techniques. The learning units are: Introduction to quality (Concepts of quality. Quality management models. Tools for solving problems). Software process models (The CMMI model – Capacity Maturity Model Integrated, The ITIL model – Information Technology Infrastructure Library). Software quality assurance (Quality management in IT projects – SQA – Software Quality Assurance, Process and product quality metrics). Quality international standards: ISO 9001, Ecology – ISO 14001, Security – ISO 17799, projects – ISO 10006, and Software engineering – PSP and TSP for people. ISO/IEC 9126 and 12119 for the product, ISO/IEC 90003 for the process, CMMI and ISO/IEC 15504 for maturity and capability, IDEAL and SPI for continuous improvement, and TMMI. National quality standards: Software process lifecycle – NTP-ISO / IEC 15504, and quality – NTP-ISO / IEC 9126.

III. COURSE OUTCOMES

1. Acquire a detailed vision of quality concepts, tools and methods in the software development lifecycle.
2. Develop skill to carry out the software quality assurance in the lifecycle.
3. Participate, analyze and lead a software project team, and use roles and procedures according to the best national and international practices with regard to software quality.
4. Assess the quality of the project software results and design the project sustainability process.

IV. LEARNING UNITS

1. SOFTWARE QUALITY FUNDAMENTALS / 4 HOURS

Introduction to quality / Software quality / Quality and quality engineering / Standards and models of assessment and software processes improvement / Introduction to total quality / Quality management / basic tools / Creativity tools / Statistics tools / Design tools / Measurement tools / Maturity levels.

2. SOFTWARE PROCESSES MODEL / 10 HOURS

Factors determining software quality (Mc Cali) / Current situation of the software industry / Standards and assessment models, and software processes improvement (External and internal) / ISO / IEC 15504 (SPICE):

Components, Dimensions, Attributes assessment and certification / Model CMMI: Approach, What is and what is not CMMI? How to use CMMI?/ key concepts: capability, performance, maturity and institutionalization. Analysis of costs and model CMMI implementation advantages / Structure and representation of CMMI model / Process area, goals and CMMI specific practices / Verification and quality / test process / TPI / TMMI vs. TPI / TMMI levels / Processes improvement models / TI priorities / What is what is not ITIL? / ITIL: Characteristics, objectives, fundamentals, progressive improvement. Key areas. Relationship with other methodologies / Important aspects. Components of an organization. Perspectives / ITIL implementation.

3. SOFTWARE ASSURANCE QUALITY / 10 HOURS

Introduction to information quality / Quality approximation / Conceptual models measurement / Logical models measurement / data quality / Quality project management methodology / Project control office / Quality management activities / Software project management measurement / Software project estimate / Risk analysis / Software development delivery / Development plan and estimate methods / Mc Call attributes application / Quality perspectives.

4. SOFTWARE STANDARDS AND REGULATIONS / 4 HOURS

NTP – ISO / IEC 12207 Quality model / Software lifecycle processes / Main processes / Support processes / Organizational process / Implementation strategies / Software quality plans / NTP –ISO/IEC 15504 Quality model – Software continuous assessment and improvement / Practical cases.

V. LABORATORIES AND PRACTICAL EXPERIENCES:

Lab 1: Apply main elements of ISO 9000 and ISO/IEC 15504 standard system to study cases.

Lab 2: CMMI – Check the maturity degree of an organization process area.

Lab 3: Elaboration and presentation of the plan SQA.

VI. METHODOLOGY

The course is carried out in theory and lab sessions. In theory sessions, the instructor introduces concepts, tools, good practices, methods and standards. In lab sessions, software quality assurance software is used. In theory sessions, students must hand in and expose group works, reading controls and tools research. In lab sessions, they must work out exercises and practical cases works. In all sessions, students' active participation is encouraged.

VII. EVALUATION FORMULA

The average grade PF is calculated as follows:

$$PF = 0.30 EP + 0.3 EF + 0.05 IL + 0.35 LB$$

EP: Mid-Term Exam

EF: Final Exam

LB: Labs average

IL: Research and readings

VIII. BIBLIOGRAPHY

1. **PIATTINI, MIGUEL & al.**
Information systems quality (Spanish)
Alfaomega, Mexico, 2007
2. **PRESSMAN, ROGER**
Software engineering: A practical approach (Spanish)
Mcgraw-Hill, Madrid, 2007
3. **SOMMERVILLE, IAN**
Software engineering (Spanish)
Addison Wesley, 8th Edition, 2005