



Tshwane University
of Technology
We empower people

TSHWANE UNIVERSITY OF TECHNOLOGY
FACULTY OF SCIENCE

DEPARTMENT OF MATHEMATICS AND STATISTICS

BTECH: QUALITY (BTQUA02)

INFORMATION BROCHURE

Compiler: JP Jordaan

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SECTION A:

ORGANISATIONAL

1. INTRODUCTION/ HISTORY

The BTech: Quality was originally established by one of TUTs predecessors – Technikon Pretoria, in the late 1980s as a National Higher Diploma: Quality Assurance. In the early 1990s a second National Higher Diploma was established – the NH Dip:TQM (Total Quality Management) which was aligned with a Post graduate diploma – TQM offered by the University of Northumbria in England. These two courses (NH Dip:QA and NHDip: TQM) were merged in the late 1990s as a Bachelors degree in Technology - BTech: Quality.

During the entire 25-year history of these programmes, the programme managers ensured that the educational programmes remain at the cutting edge of developments in the quality field.

During the 1990s and until present, TUT has taken the lead with these qualifications and has assisted five other Technikons/ Universities of Technology to implement and present the BTech: Quality – viz. :

- Durban University of Technology
- Nelson Mandela University (Port Elizabeth)
- University of Johannesburg
- Cape Peninsula University of Technology (Cape Town)
- University of South Africa (Distance education)

Since the year 2000, a greater focus of the BTech: Quality at TUT has been to adopt as many as relevant ISO management system standards as possible.

These Standards being a source of international best practice; viz.:

QMS301T	SANS ISO 9000:2005 - Quality management systems: Fundamentals and vocabulary SANS ISO 9001:2008 - QMS: Requirements ISO 10005:2005 – QMS: Guidelines for Quality Plans ISO 10013:2001 – Guidelines on QMS documentation ISO 10015:1999 – QMS: Guidelines for training ISO 14001:2004 – Environmental management systems: requirements with guidance for use ISO 17025:2005 – General requirements for the competence of testing and calibration laboratories
SQT 301T	ISO 10017:2003 - Guidance on statistical techniques for ISO 9001:2000

QAQ 401T	ISO 19011:2002 - Guidelines on quality and/or environmental management systems auditing IAF (International Accreditation Forum) ISO 9000 Auditing Practises Group (APG) – Auditing Guidelines (19),
QPI 401T	ISO 10001/2/3 - Quality Management — Customer Satisfaction
CQI 301T	SANS ISO 9004:2000 - QMS: Guidelines for performance improvements. ISO 10014:2005 – QMS – Guidelines for realizing financial and economic benefits
PJT 400T	ISO 10006:2003 QMS – Guidelines for quality management in projects

2. LECTURER INFORMATION

Main Lecturer: Mr. Johan Jordaan
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3. PRESCRIBED TEXT BOOKS

See Subject Study Guides. Students may use alternative textbooks if they wish to. Additional notes may be handed out during lectures. The notes and articles form part of the official study material and students should also prepare this study material for test and examination purposes.

4. EVALUATION

4.1 Semester TESTS

Usually five forty minute tests are written during the semester. These tests are compulsory.

In some subjects, the written semester tests count 40% of the predicate mark ($8\% \times 5 = 40\%$). A minimum predicate of 40% is required for admission to the examination.

4.2 Assignments

During the semester assignments will be handed out to students to work out and submit for evaluation. In some subjects the average of the Assignments counts for 60% of the predicate.

In the last session of a Semester a presentation of the assignment work to the Class is required. The presentation will be in MS PowerPoint. The presentation portion of the assignments accounts for 10% of the predicate.

4.3 Examination

At the end of the semester a three-hour examination will be written. The final mark will be calculated from the average of the predicate mark and the examination mark. An average of 50% or more is required for successful completion of the subject.

5. SYLLABUS:

See subject study guides.

6. CREDITS

Credits for each contact subject is 0,125 (x 6 – 0,750)

Credit for the Project IV is 0,250

SECTION B

STUDY COMPONENT

1. How to master the field of study

Quality is a field of study in which comprehension forms a vital component of the body of work. **This means that memorising is not the core ability needed to master the content of the subject.** On the other hand this does not mean that there isn't any work that need not be memorised. It is vitally important that the student will know and understand the basic principles and basic terminology of the subject. It is recommended that the following guidelines are followed by the student when studying in this subject:

- a. Within 2-days of the lecture ensure that you read through the work in the study notes. Ensure that you master all new terminologies, techniques and definitions. Should you fail to do this you will find that the work piles up and that it becomes more difficult to see the continuity of the lectures.
- b. Continuously evaluate the information given to you in handouts in class and try to determine how this affects the answers to your case studies.
- c. Do not hesitate to make contact with your lecturer should you encounter any difficulties while studying the subject. It does not pay to wait too long as you will become despondent and it will become increasingly difficult to catch up the work.

Throughout the course there is a strong emphasis on case study work. Students are to ensure that they attend all lectures and are capable of performing the work discussed during the assessment of the case studies individually.

BTECH: QUALITY COURSE DETAILS

JOB OPPORTUNITIES:

Quality Practitioners and/or managers tasked with implementing and maintaining quality systems for the purpose of continuous improvement, meeting client requirements, and ensuring international competitiveness.

Human Resource managers/personnel tasked with changing organizational processes through TQM.

Business managers, technicians, engineers and leaders entrusted with quality related assignments.

JOB DESCRIPTION:

Quality Practitioners deal with a broad spectrum of quality activities, including the development, maintenance, and continuous improvement of quality systems. They will be required to implement and use ISO 9000, ISO 14000, SPC programs; Quality Function Deployment (QFD); Failure Mode & Effect Analysis (FMEAs); Fault Tree Analysis, Benchmarking; Organizational Self Assessment programs; and development to world class manufacturing; and much more.

POTENTIAL EMPLOYERS:

Traditionally Quality Practitioners were very active in the manufacturing sector. Over the past decade and with the opening of the international markets the premium for quality of products and services is at an all time high.

Therefore, there is demand in all sectors of the industry and commerce, be they in primary, secondary or tertiary industries; as well as in the government sectors.

FACULTY:

Faculty of Science
Department of Mathematics & Statistics
Arcadia campus, Pretoria

PROGRAM MANAGER:

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BACHELORS DEGREE IN TECHNOLOGY: QUALITY

Course code: BTQUO2

REMARKS

a. Admission requirement:

Any three year degree or National Diploma awarded by a South African University or Technikon or an equivalent three year qualification.
A Potential Assessment and personal interview with a departmental evaluation panel will decide compliance to requirements.
Prospective students must have demonstrated computer-skills including data bases, presentation packages, word processing and spread sheets.

b. Duration:

Two years, part time. Presented as a block course.
Consists of six contact subjects of 6 contact days/ subject over a five month (semester) periods; plus a 12 contact day, 240 hour project spread over one academic year.

c. Structure:

This course consists of six subjects in which lectures are attended, plus a research project (seventh subject). Before the project can be accepted for examination an article (approved by the supervisor) based on research carried out, must be submitted for consideration for publication in a journal. A draft of the article must be handed in with the Project IV. A successful colloquium is to take place before the degree can be awarded.

FIRST OR SECOND SEMESTER/ATTENDANCE

CODE

SUBJECT

PREREQUISITE SUBJECT

QMS301T Quality Management Systems III

SQT301T Statistical Quality Techniques III

QTS401T Quality Techniques IV

Statistical Quality Techniques III

QAQ401T	Quality Auditing Techniques IV	Quality Management Systems III
QPI401T	Quality Planning & Implementation IV	
CQI401T	Continual Quality Improvement IV	
PJT400T	Project IV: Quality (full year subject)	

CORE CONTENTS OF SUBJECTS

PROJECT IV: QUALITY (PJT400T)

Research methodology. Project Management Principles ISO 10006.
Project discussion sessions. Colloquiums.

QUALITY AUDITING TECHNIQUES IV (QAQ401T) 1 X 3-HOUR PAPER

Application of quality systems. Quality improvement. Quality management tools.
Practical application of ISO 9001:2008 and 9000: 2005. Quality auditing techniques.
Vendor quality. Configuration management. Communication Technology.

QUALITY MANAGEMENT SYSTEMS III (QMS301T) 1 X 3-HOUR PAPER

Development and current significance of quality systems. Quality systems standards.
Implementation of a quality system. Quality documentation. Internal audits. Case studies. The ISO 9000 Compendium. Environmental management systems (ISO 14001 and 17025). Implementation of a quality management, quality assurance and environmentally integrated system.
Functional roles in an organisation. Operations of functional departments.
Organisational structures. Business and a society, politics and the environment. A solid foundation is laid and an overview given of a variety of management functions as these occur in the organisation.

QUALITY PLANNING & IMPLEMENTATION IV (QPI401T) 1 X 3-HOUR PAPER

Product versus quality system versus organisational change planning. The Quality gurus (Juran, Deming, Crosby, Feigenbaum, Ishikawa, etc.). Quality frameworks and assessments; Malcolm Baldrige award; EFQM quality award; South African Excellence Model (SAEM). Gap analysis. Organisational change and change management: Closing the gap. Service quality. Senge, Garvin, etc

Change management. Management issues for effect management. Application of management theory and concepts. Management skill applications. Organisational culture. Organisational behaviour and analysis.

STATISTICAL QUALITY TECHNIQUES III (SQT301T) 1 X 3-HOUR PAPER

Fundamentals of practical statistics. Application of binomial, Poisson and normal exponential distributions. Experimental methods. Reliability. Relation to ISO 9004. Statistical analysis (basic statistical models). Enumerative studies. SPC - Software. Process capability, sampling, Hyper-geometric, Anova, Cusum, Huma, BS 6001/2, Sampling techniques. Operating Characteristics curve. Design of experiments. Statistical computer packages, ISO 10017.

QUALITY TECHNIQUES IV (QTS401T) 1 X 3-HOUR PAPER

Six Sigma Techniques methodology and practice, Basic SPC Techniques, Advanced SPC Techniques, SPC and Process Capability, SPC for Measurement, R&R Studies, FMEA's.

Continual Quality Improvement IV (CQI401T) 1 X 3-HOUR PAPER

Part 1: Introduction to TQM, ISO 9000 and TQM. Business philosophies and management programmes. Setting objectives. Pursuing objectives. Concepts related to quality improvement. Exercise. QFD (Quality Function Deployment): QPD (Quality Policy Deployment)

Part 2: Systems thinking and quality. Benchmarking, BPR and concurrent engineering.

Part 3: Quality information systems. Structuring data. Purpose of a quality information system. Quality-related costs and ISO 10014 . Computer support. General concepts. Applications.