Course Name	: TOTAL QUALITY MANAGEMENT & QUALITY TOOLS
Course Code	: TQMN 501
Credits	:3
L-T-P	: 300
Pre-Req.	: Nil

Course Objectives:

- To learn the basic concepts of quality and quality from organizational point of view.
- To learn the concept of total quality management from western and Japanese approach.
- To learn the internal politics, quality culture, education and training of the organization.
- To be aware of international/national Quality awards.

Lecture wise breakup

Number of Lectures

Evolution of Quality - Historical Perspective, Basic Concepts of Quality, Vision, Mission and Objectives of an Organization, Corporate Structure in an Organization and Role of	4
Quality	
Quality Planning, Quality By Design, Quality Costs and Cost of Failure, Waste Control,	4
How Quality Benefits Business	
Quality and Competitiveness in Business, Zero Defects and Continuous Improvement,	6
Role of Leadership and Commitment in Quality Deployment, Team Building, Motivation	
and Rewards, Total Employee Empowerment, Quality Functions - Measurement,	
Inspection, Testing, Calibration and Assurance	
Design Control and Conformity, Tolerance and Variability, PDCA Cycle, Juran Trilogy,	8
Crosby's 10 points and Deming's 14 Points Customers Requirements, Customer-Supplier	
and Chain Links, Establishing Customer Focus-Customer, Satisfaction, Measurement and	
Customer Retention	
Product Liability, Total Quality Concepts and CWQC, Difference in Western And	6
Japanese Approach of TQM, Basic Philosophy and Fundamental Models of TQM, Total	
Quality and Ethics	
Internal Politics and Total Quality Management, Quality Culture, Education and Training	3
Implementing Total Quality Management - An Integrated System Approach	3
Total Preventive Maintenance	3
Salf Assassment International/National Quality Awards: Malcolm Baldridge Award	5
Deming Prize, European Award, Rajeev Gandhi Award, CII Exim Award, Jamna Lal Bajaj Award, Golden Peacock Award	3

Course Outcome:

- Students should be able to Quality environment of the organization.
- Student should be able to know the TQM approach for manufacturing/service organization in length.
- Student should be able to know various Quality terms like Tolerance and Variability, PDCA cycle, Crosby's 10 points and Deming's 14 Points.
- Student should be able to know international/national Quality awards

Text Book:

- 1. Total Quality Management by N.V.R Naidu, G. Rajendra New Age international, First Edition, Jan 2006
- 2. Total Quality Management by R.S Naagarazan ,New Age international,3e, 2015

3. Quality Control & Application by B. L. Hanson & P. M. Ghare, Prentice Hall of India, 2004.

Reference Books

- 1. Total Quality Management by V.S Bagad Technical Publications, First Edition, Jan 2008
- 2. Total Quality Management by S. Rajaram Dreamtech Press, First Edition, Jan 2008

Course Name	: QUALITY MANAGEMENT SYSTEMS
Course Code	: TQMN 502
Credits	:3
L-T-P	:300
Pre-Req.	: Nil

Course Objectives:

- To learn about QMS standards ,
- To learn about management systems audits,
- To know about principles of "The Plan, Do, Check, Act (PDCA)cycle.

Lecture wise breakup

Number of Lectures

Introduction to Modern Quality Management System	2
Historical Development of Quality Standards	6
ISO 9001:2000 Quality Management System Standards, Documentation,	
Implementation of ISO 9000:2000, Quality Management Systems,	
Accreditation/Certification Quality Audit - Internal, Second Party, Third Party, and	8
Surveillance Audit, Failure, Non-Conformance Analysis and Corrective Action	
Environment Management System - ISO 14000, ISO 14001, QS-9000 Quality	8
Standards, Quality System for Automotive Supplier - TS 16949, Quality System for	
Telecom Industries - TL 9000	
Guidelines for Processed Material, Guidelines for Safety and Hazard (OHSAS), Quality	8
Assurance Requirement for Measurement Equipment - Meteorological Confirmation	
System - ISO 10012-1	
Guidelines for Control and Measurement Processes - ISO 10012-3	4
Quality Management - Guidelines for Training - ISO 10015, Hazard and Critical	
Control Points (HACCP)	
Good Manufacturing Practices (GMP).Good Laboratory Practices (GLP) in	6
Pharmaceutical Industries, Guidelines on Application in Food and Drink Industry	2

Course Outcome:

- Able to have Thorough Knowledge of Various ISO Standards for manufacturing/service Industry,
- Able to understand Quality System Of Telecom Industry And Environment Management Systems,
- Able to implement of Quality Systems In Various Fields As In Food And Drinks Industry.

Text Books:

- 1. Arora KC, ISO 9001 to OHAS 18001, Katson Ludhiana, 2013
- 2. Bagchi T P ISO 9001 and Auditing, 2006
- 3. Quality Control & Application by B. L. Hanson & P. M. Ghare, Prentice Hall of India, 1998

Reference Book:

- 1. Singhal and Singhal ISO 9001:2012(PH1 Learning System), 2e,2012
- 2. Juran's Quality Handbook by Joseph Juran , A. Blanton Godfrey, McGraw Hill, 1999

Course Name	: STATISTICAL PROCEDURES
Course Code	: TQMN 503
Credits	:3
L-T-P	:300
Pre-Req	: Nil

Course Objectives:

Students should understand:

- The fundamentals of probability theory and theorems.
- Probability distributions like normal, binomial, poisson etc; for help in quality control tools.
- Probability distributions like Exponential, Weibull, Raleigh, and Log-Normal for help in reliability engineering .
- Inference about population mean and variance.
- Understanding Different Data Distributions And Their Properties, Probability Theory, Probability Distributions, Sampling Distribution.

Lecture wise breakup

Number of Lectures

8

Data Representation and Frequency Distribution, Histogram, Box-Plots, Stem Leaf 4 Diagram

Measures of Central Tendency and Dispersion, Moments of a Frequency Distribution, 6 Skewness and Kurtosis

Concepts of Population Sample, Elements of Probability Theory

Laws of Probability and Bayes Theorem, Random Variables and Probability 4 Distributions

Mathematical Expectation, Discrete Probability Distributions - Bernoulli, Binomial, **8** Poisson, Geometric, and Hyper Geometric

Continuous Probability Distributions - Normal, Exponential, Weibull, Raleigh, and Log- 6 Normal

Sampling Distributions - Chi-Square, t and F – Distributions, Inter Relationships among **6** various Probability Distributions

Course Outcome:

By the end of the course students are expected to be able:

- To distinguish between random and non-randoxperiments.
- To find the mean and variance of the population through sample.
- To construct Control chart, OC curve through knowledge of probability distributions
- To apply standard discrete probability distribution to different situations of operations.

Text Books

1.Probability & Statistics for Engineers & Scientists, Ronald E. Walpole, Roanoke College, Raymond H. Myers, Sharon L. Myers, Keying Ye, Prentice Hall, 2010

2.Probability and statistics for Engineers, by I. R. Miller, J. E. Freund & R. Johnson, Prentice Hall of India, 2012

Reference Books:

1. Quality Control and Improvement, Amitava Mitra, A John Wiley & Sons, Inc., 2003

2. Quality Control & Application, B. L. Hanson & P. M. Ghare, Prentice Hall of India, 2009

Course Name	: STATISTICAL QUALITY CONTROL & ASSURANCE
Course Code	: TQMN 504
Credits	:3
L-T-P	: 300
Pre-Req	: Nil
-	Total No. of Lectures-42

Objectives of this course to let learn the students about:

- Statistical basis for control charts, Causes of variation,
- To construct Control chart for a manufacturing process/service activities,
- To evaluate the Process capability of machines.
- To design the single and double sampling plans for given producer and consumer risk.

Lecture wise breakup

Concepts of Reliability, Maintainability and Product Life Cycle, Statistical Basis for **6** Control Charts, Causes of Variation - Special Causes and Common Causes, Concepts of Statistical Process Control, Use of Control Charts for Statistical Process Control

Concepts of Testing of Hypothesis, Type I and Type II Errors, Analysis of Patterns in 6 Control Charts, Operating Characteristics (OC) Curves - Producer's Risk and Consumer's Risk, Operating Characteristics (OC) Curves for Attribute control Charts

Control Charts for Variables - X Bar-R Charts, X Bar-s Charts, Individual Item (MR) 8 Charts, Control Charts for Attributes - p-Charts, np-Charts, c-Charts, u-Charts, U Bar Charts

Process Capability Analysis - Specification Limits, control Limits, Natural Tolerance **8** Limits, Statistical Tolerance Limits, C_p , C_{pk} , CPU, CPL, C_{pm} Indices, Setting Tolerances for Assembly and Components

Statistical Tolerance Limits for Normal Distributions, Concepts of Sampling, Producer's **4** Risk and Consumer's Risk

Acceptance Sampling Plans for Attributes - Single, Double and Multiple Sampling Plans, **8** Chain, Sequential and Skip Lot Sampling Plans, Switching Rules, Acceptance Sampling Plan for Variable - Sampling Plans for Process Parameters and Sampling Plans for Acceptance of Lots

Evaluating Sampling Plans - AQL, AOQ, and AOQL, Taguchi's Loss Function

2

No. of Hours

Course Outcome:

- Students should be able to draw variable and attribute control charts for different types of manufacturing processes and service activities.
- Students should be able to evaluate process capability and its various indicis Cp, Cpk, Cpm for different machines.
- For a given Producer and consumer risk, Students should be able to design a single and double sampling plan.

Text Book:

- 1. Quality Control and Improvement ,Amitava mitra,A John Wiley & Sons, Inc., Publication,2001
- 2. Total Quality Management by Dale H. Besterfield, Carol Besterfield-Michna, Glen H. Besterfield and Mary Besterfield-Sacre, Pearson Education, 2005
- 3. Probability and statistics for Engineers, by I. R. Miller, J. E. Freund & R. Johnson, Prentice Hall of India, 2002

Reference Books:

- Juran's Quality Handbook by Joseph Juran , A. Blanton Godfrey, McGraw Hill, 1999
 Quality Control & Application by B. L. Hanson & P. M. Ghare, Prentice Hall of India, 2007

Course Name	: STATISTICAL APPLICATIONS RELIABILITY,
	MAINTAINABILITY and AVAILABILITY
Course Code	: TQMN 505
Credits	:3
L-T-P	:300
Pre-Req.	: Nil

Course Objectives:

The objectives of this course are:-

- To address systems maintainability through analytical engineering and management procedures, tools and techniques.
- To let know about the improvement of maintenance processes, safety, operational effectiveness and cost of ownership.
- To let know about MTBF, MTTR, Life Cycle costs and Support Requirements

Lecture wise breakup

No. of Lectures

6

Product Reliability, Failure Rate and Product Life, Relationship to Quality Control, **8** Reliability Measurement, Reliability Function, Reliability Prediction Methods, Reliability Engineering - Standardization, Redundancy, Physics of Failures, Reliability Testing, Burnin, FMEA, Fault Tree Analysis

Life Testing and Reliability - Types of Tests, Failure Terminated Tests, Time Terminated **8** Tests, Sequential Reliability Testing, Life Testing Plans using Exponential Distribution, Life Testing Plans using Handbook H-108, Sequential Life Testing Plans

System Reliability - Life Cycle Curves and Probability Distributions in Modeling 6 Reliability - Exponential, Weibull, Raleigh, Gamma, Normal, Log-Normal, Reliability Improvement

Value Engineering

Maintenance and Maintainability, Maintainability Engineering ,Design for Maintainability, 6 Maintainability Assurance

Qualitative and Quantitative Maintenance Requirements, Maintenance Engineering 6 Analysis, Equipment Survival and Equipment Replacement

Reliability Management, Availability - Operational and Inherent, MTBF and MTTR Trade 6 off, MTTR Prediction

Corrective Maintenance Analysis, Integrated Logistic Support, Life Cycle Costs, Support 6 Requirements

Course Outcome:

- Student should be able to work/support the maintainability or maintenance manager, service engineer, analyst, design engineer in the practice of maintainability and maintenance.
- Student should be able to integrate maintainability and maintenance to present the entire process with emphasis on the need to design and build products right the first time, so they can be successfully maintained.
- Student should be able to update methods and techniques, including life-cycle economic analysis and reliability-based maintenance.
- Student should be able to analyze the operation of maintenance production, resolve statistical reliability, maintainability, supportability and availability measurement and calculations.

Text Books:

- 1. An Introduction to Reliability and Maintainability Engineering by Charles E.Ebeling, Tata McGraw-Hill Publications, 2000.
- 2. An introduction to reliability engineering by L. Shrinath, 4th Edition ,2005.
- 3. TPM Development Programme : Nikajima, Productivity Press Cambridge, 1988
- 4. Maintenance Engineering Handbook : Higgins, McGraw Hill, 1988
- 5. Maintenance Planning & Control : Kelly, Butterworths, 1999
- 6. Probability and statistics for Engineers, by I. R. Miller, J. E. Freund & R. Johnson, Prentice Hall of India, 2001

Reference books:

- 1. The Reliability of Mechanical Systems, Edited by John Davidson, Published by Institution of Mechanical Engineers, London, 1994
- 2. Quality Control and Improvement, Amitava Mitra, A John Wiley & Sons, Inc., Publication 2004

Course Name	: QUALITY IMPROVEMENT TECHNIQUES: TOOLS AND
	METHODS
Course Code	: TQMN 506
Credits	:3
L-T-P	: 300
Pre-Req	: Nil

Course Objectives:

The purpose of this course is to promote the development of the student's skills in the fundamentals and use of quality and performance improvement models. Techniques using quality and performance improvement are also necessary for their participation in various quality and performance improvement projects.

Lecture wise breakup

Number of Lectures

Guidelines for Quality Improvement (ISO 9004-4), Classification of Tools: Based on What **8** It Will Achieve and According to Type, Basic (Old) Quality Tools and Practices: Tally Sheets, Check sheet, Check List, Bar Chart, Gantt Chart, Histogram, Pareto Analysis, Cause and Effect Diagram, Scatter Diagram, Flow Chart

Advanced(New) Quality Tools and Practices, Data Gathering: Brain Storming, **8** Questionnaire, Suggestion Scheme, Supplier Survey, Relation Diagram, Tree Diagram, Affinity Diagram, Matrix Diagram, Responsibility Matrix, Matrix Data Analysis Diagram, Process Decision Program Chart

Concepts of Off-line and On-line Quality, Planning and Preventative Tools: Quality **6** Function Deployment (QFD), Fault Tree Analysis, FMEA (Design), FMEA (Process), Progravaluation and Review Technique (PERT), Critical Path Analysis (CPA) and Critical Path Method (CPM) and Why-How Chart, Balanced Score Card

Japanese Tools and Practices: JIT, ANDON, KAIZEN, JIDOKA, KANBAN, HOSHIN **6** KANRI, POKA-YOKE, 5S

Quality Circles, Business Process Re-engineering (BPR), Bench-Marking, Zero Defect6Taguchi Loss Function, Orthogonal Arrays Overview of Six Sigma Quality Management8

Course Outcome:

- Student should be able to apply flow charting techniques on the job, use different types of charts (i.e. Pareto, etc.).
- Student should be able to assess quality improvement programs such as lean, corrective action, FMEA, 5S, and six sigma.
- Student should be able to select the appropriate sampling method for the situation,
- Student should be able to explain sampling concepts such as consumer risk.
- Student should be able to explain the difference between statistical and non-statistical sampling, identify variables and attribute data, interpret scatter diagrams, identify the purpose and use of control charts. identify in-control and capable processes, assess quality tool usage by others.

Text Book:

- 1. Quality Control and Improvement ,Amitava mitra,A John Wiley & Sons, Inc., Publication,3e,2008
- 2. Total Quality Management by Dale H. Besterfield, Carol Besterfield-Michna, Glen H. Besterfield and Mary Besterfield-Sacre, Pearson Education, 2003
- 3. Quality Control & Application by B. L. Hanson & P. M. Ghare, Prentice Hall of India, 2000

Reference Books :

1. Juran's Quality Handbook by Joseph Juran, A. Blanton Godfrey, McGraw Hill, 1999

Course Name	: LEAN & SIX SIGMA QUALITY MANAGEMENT
Course Code	: TQMN 507
Credits	:3
L-T-P	: 300
Pre-Req	: Nil
-	Total No. of Lectures-42

This course acquaints the students with the concepts on productivity, The tools and techniques of Total Quality Management and Six Sigma to improve Productivity in Manufacturing, Service and I.T Areas.

Lecture wise breakup

Number of Lectures

Overview of Six Sigma Methodology, Cultural Imperatives to Six Sigma, Six Sigma: The 6 Power of Culture

Strategies for Effectively Implementing Six Sigma in an Organization, Understanding of **8** Deployment Strategies – Business Goals/ Dashboards/ Balance, Business Score Card Or Customer Goals including Linkages With Financial Goals, Linkage of Six Sigma Methodology with Other Initiatives like Lean Concepts etc., Roles and Responsibilities In Six Sigma Implementation, Six Sigma Project Selection-Linkage to Strategy

Over View of Six Sigma Project Execution (DMAIC Or DFSS/ DMADV) (Define- 6 Measure-Analyze- Improve & Control), Design For Six Sigma, Define Measure Analyze Design and Validate)

Project Review, Guidelines and Selection of Belts for the Projects, Process of Closing the 6 Project, Work Through a Sample Six Sigma Project

Lean Means Speed, Lean Six Sigma: Creating Breakthrough, Creating Competitive 4 Advantage with Lean Six Sigma

Infrastructure and Deployment Planning, Establishing the Vision Company-Wide, Selecting 6 the Right People and the Right Projects, Predicting and Improving Team Performance

Implementation: The DMAIC Improvement Process, Implementation: The DMAIC Tools,6Institutionalizing Lean Six Sigma, Total Supply Chain Acceleration, Lean Six SigmaLogistics, Design For Lean Six Sigma

Course Outcome:

Students of this course will develop a broad

- understanding of Lean/Six Sigma principles and practices,
- Build capability to implement Lean/Six Sigma initiatives in manufacturing operations, and learn to operate with awareness of Lean/Six Sigma at the enterprise level.
- Understand how to apply Six Sigma and Lean tools to achieve higher quality and greater speed in Health Care Processes.
- Understand the Six Sigma DMAIC processes and tools at a fundamental level.
- Understand basic Lean and Design for Six Sigma tools and concepts.

Text Books:

1. An Introduction to Six Sigma and Process Improvement by James Evans, William Lindsay, Cengage Learning, 2010

2. Simplified Six Sigma Methodology, Tools and Implementation N. Gopalakrishnan, 2012 **Reference Books:**

- 1. The Certified 6 Sigma Green belt Handbook Roderick A Munro, Mathew J Maio, Mohamed B. Nawaz, Govindrajan Ramu, 2005
- 2. The Six Sigma Way Peter Pande, Robert Neuman, Roland Cavanagh, McGraw Hills ,2006

Course Name	: DESIGN OF EXPERIMENTS AND RESEARCH METHODOLOGY
Course Code	: TQMN508
Credits	:3
L-T-P	: 3-0-0
Pre-Reg	: Nil
-	Total No. of Lectures-42

To provide the student with an overview of the advanced mathematics, numerical analysis and optimization techniques to enhance their knowledge towards the knowledge of parameters design and optimization of process parameters.

Lecture wise breakup

Number of Lectures

Introduction And Basic Principles:	10
Classification of experimental designs, Design and analysis of one factor experiments -	
Completely randomized and randomized complete block designs, Analysis of variance	
Estimation Of Parameters:	10
Residual analysis and model checking, Sample size problem. Design with two blocking	
variables, Latin squares, Analysis of data from a Latin square.	
Experiment With Two Factors:	8
Introduction, Main effects and interactions, Two-factor analysis of variance, Graphic	
analysis, Choice of sample size.	
Design Of Experiment:	6
Design of Experiments with the help of orthogonal arrays, Taguchi's Robust parameter	
design, Analysis, Noise factors, Tolerance on control factors.	
Research Methodology:	8
Nature and objective of research, Research topic, Literature review, Formulation of	
problem, Research design, Sampling techniques, Data collection, Statistical and sensitive	
analysis of data, Interpretation of result and report writing	

Course Outcome:

The students should integrate their role, numerical analysis and optimization techniques to enhance their knowledge towards the knowledge of parameters design and optimization of process parameters

Text Book:

1. Probability and Statistics for Engineers and scientists, Walpole, Myers, Ye, 7th ed, 2002, Pearson Education.

Reference Books :

- 1. Taguchi Statistics in Research, Bernand Ostle and Richard N.Mensing 3e, 1975, Oxford & IBH Pub Co.
- 2. Probability and Statistics in Engineering, Hines, Montgomery, Goldsman and Borror, 4th ed, 2003, John Wiley & Sons.
- 3. Experimental design, Theory & application, Federer, 1955, Oxford & IBH pub Co.

: MEASUREMENT SYSTEM & ANALYSIS **Course Name Course Code** : TQMN509 Credits :3 : 3-0-0 Pre-Req. : Nil

Total No. of Lectures-42

Course Objectives:

L-T-P

Experimental Measurement Systems is the core of Quality implementation. Along with Measurement Systems Analysis (MSA) these are the core components of the Six Sigma approach. Many problems encountered with Statistical Process Control (SPC) and Design of Experiments (DOE) are caused by problems with measurement systems

Lecture wise breakup

Introduction And Estimation Of Experimental Uncertainties:

Uncertainty analysis to specify the uncertainty for each instrument - method of equal effects. Instrument role in final uncertainty, Bias and the Tolerance, Confidence Limits and the Bias Linearity Gage R&R Studies, The Range Method, Range Exercise, Calculating the Repeatability & the Reproducibility, Percentage Error, Stability, Measurement Regions, Attribute Gage Study Short Method Long Method, Comparing Operators, Gage R & R Exercise.

Considerations For The Selection Of Instruments:

Cost of new instruments and sensors for acceptable uncertainty and sensitivity with lack of sensitivity to other independent variables. Accuracy and precision are limited by the hysteresis transducer instrument

Test Matrix And Sequence Replications And Repetition:

Order of test sequence over range of variable, trends in data, correlation of data with time of day! Replicate or repeat in a different random order. Discussion of case studies .

Course Outcome:

The students should integrate their role of a Quality technocrat with MSA Responsibilities and analysis using Gage R&R Studies SPC & DOE. By Applying the tools relational expertise generated .

Text Books:

1. Holman, J. P. 2000. Experimental Methods for Engineers. McGraw-Hill Book Co., NY.

Reference books

- 2. Measurement Systems Analysis, Manual, Third Edition, March 2002.
- 3. Doebelin, E. O.Engineering Experimentation: Planning, Execution, and Reporting, McGraw-Hill Book Co., NY. 1995
- 4. Wheeler, A. J. and Ganji, A. R. Guidelines for Planning and Documenting Experiments 1996.

5.Englewood Cliffs, N J. Introduction to Engineering Experimentation, Prentice Hall, 1999.

10

16

Number of Lectures

16

Course Name	: INFORMATION SECURITY SYSTEMS & MANAGEMENT
Course Code	: TQMN510
Credits	:3
L-T-P	: 300
Pre-Req.	: Nil

The advent of computers is now prevailing in all the phases' of life and for information security too. This has drastically changed the traditional way of computing process of information and its development. In fact, a internet with information technology is now integrated with the development process with security. The purpose here will be to expose the students about the same with security

Lecture wise breakup

Number of Lectures

Total No. of Lectures-42

Introduction And Information Security Requirements:	7
Intellectual property, types of information and knowledge as power. Internet Security.	
Attacks (Interruption, Interception, Modification and Fabrication), Security Services	
(Confidentiality, Authentication, Integrity, Non-repudiation, access Control and	
Availability) and Mechanisms, modeling Internetwork security, Internet Standards and	
RFCs, Buffer overflow & format string vulnerabilities, TCP session hijacking, ARP	
attacks, route table modification, UDP hijacking, and man-in-the-middle attacks.	
Conventional Encryption Principles:	7
Conventional encryption algorithms, cipher block modes of operation, location of	
encryption devices, key distribution Approaches of Message Authentication, Secure Hash	
Functions and HMAC.	
Public Key Cryptography Principles:	7
public key cryptography algorithms, digital signatures, digital Certificates, Certificate	
Authority and key management Kerberos, X.509 Directory Authentication Service	
Email Privacy:	4
Pretty Good Privacy (PGP) and S/MIME.	
Ip Security Overview,:	3
IP Security Architecture, Authentication Header, Encapsulating Security Payload,	
Combining Security Associations and Key Management.	
Web Security Requirements	6
Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic	
Transaction (SET). Firewall Design principles, Trusted Systems, Intrusion Detection	
Systems	
Basic Concepts Of Snmp	4
SNMPv1 Commy facility and SNMPv3, Intruders, Viruses and related threats	
Information Security Standardization:	4
ISO 27000:2005. Information Security Management Systems	

Course Outcome:

The purpose here will be to expose the students about the information with security

Text Books:

- 1. Network Security Essentials (Applications and Standards) by William Stallings Pearson Education India, 4e, 2011.
- 2. Hack Proofing your network by Ryan Russell, Dan Kaminsky, Rain Forest Puppy, Joe Grand, David Ahmad, Hal Flynn Ido Dubrawsky, Steve W.Manzuik and Ryan Permeh, wiley Dreamtech 2nd Edition Nov 2000,

Reference Books

- 1. Fundamentals of Network Security by Eric Maiwald (Dreamtech press) 2004.
- 2. Network Security Private Communication in a Public World by Charlie Kaufman, Radia Perlman and Mike Speciner, Pearson/PHI 2nd Edition May 2002.
- 3. Principles of Information Security, Whitman, Thomson Cengage Learning, 4e,2011
- 4. Cryptography and network Security, Third edition, Stallings, PHI/Pearson, 5e, 2011
- 5. Network Security: The complete reference, Robert Bragg, Mark Rhodes, TMH, 2004.
- 6. Introduction to Cryptography, Author Buchmann, Springer, 2001

Course Name	: PERFORMANCE MANAGEMENT & SYSTEMS
Course Code	: TQMN511
Credits	:3
L-T-P	:300
Pre-Req.	: Nil

Course Objectives:

The Metrics and KPI's (Key Performance indicators) are vital for performance management of any organization, system, operation, process, people etc. The metrics are designed and chased for Quality realization of relevant objectives.

Lecture wise breakup Number of Lectures Introduction: 6 Performance Management(PM), Efficiency and effectiveness of processes, Organizations, Business Objectives, Human Resources, Metric, Key Performance indicators, Monitoring & Measurement; Step-by-step PM Process Checklist, Reporting, Dashboards The Kpi Family Dimension: 6 Internal Business Benchmarks, External Industry Benchmarks, Productivity and Efficiency Measurements, Quality Measurements, Profitability Effectiveness, Timeliness and Effective Resource Utilization, Innovation and Technology. The Human Factor: 6 Metrics for an Engaged Workforce, Employee Engagement and Productivity, Performance enhancement. Synergizing people, Role, Benefits Strategic Plan Key Result Areas Results, Measures or KPIs, Real-World Improvements Using KPIs, Distributing Knowledge Management Responsibilities, Getting Cooperation and Buy-In to KPI Objectives Human Competence: 4 Engineering Worthy Performance, Performance Appraisals Catalytic Coaching: The modern thoughts in Performance Review Abolishing, 360 Degree Feedback Knowledge Management & Development Measurements: 6 Performance Indicators (KPI's) and Common Metrics, Balanced Scorecard Systems. Case Studies Strategic Performance Management Systems: 4 Emerging Issues viz. Governance, Empowerment and the Strategic Audit, Performance measurement and control, The scope of performance measurement, Performance analysis in not-for-profit Organizations and the public sector, Make-or-buy and other decisions Performance Assessment By Awards: 10 Deming Application Prize, Rajiv Gandhi National Quality award, Malcolm Baldrige

National Quality Award. Tata Excellence model Case Studies

Course Outcome:

After the course the student to monitor and engineer the performance for desired product realization.

Text Books:

- 1. Keeping Score: Using Right METRICS TO DRIVE World Class Performance: Brown PH1 Learning 1996.
- 2. Performance Management : Strategies, Interventions, Drivers Isbn:Kandula, Srinivas, PHI Learning, Delhi 2000

Reference Books:

- 1. Strategic Human Resource Development: Srinivas Kandula PHI learning Jan 2001.
- 2. Performance Modeling Of Automated Manufacturing Systems Narahari, Y., Viswanadham, N, 2001
- Performance Management : Concepts, Skills And Exercises Cardy, Robert L., Leonard, Brain Phi Learning, Delhi 2nd Edition. 2001

Course Name	: SOFTWARE PRODUCT QUALITY PLANNING AND
	ASSURANCE
Course Code	: TQMN512
Credits	:3
L-T-P	: 300
Pre-Req.	: Nil
-	Total No. of Lectures-42

Course Objectives: Software professionals and managers will gain a thorough knowledge of testing approaches that can be integrated into the software life cycle.

Lecture wise breakup

Number of Lectures

Introduction to SQA Framework and Standards:	6
SQA Framework: What is Quality? Software Quality Assurance, Components of Software	
Quality Assurance – Software Quality Assurance Plan: Steps to develop and implement a	
Software Quality Assurance Plan – Quality Standards: ISO 9000 and Companion ISO	
Standards, CMM, CMMI, PCMM, Malcom Balridge, 3 Sigma, 6 Sigma	
Software Quality Assurance Metrics And Measurement:	6
Software Quality Metrics: Product Quality metrics, In-Process Quality Metrics, Metrics for	
Software Maintenance, Examples of Metric Programs – Software Quality metrics	
methodology: Establish quality requirements, Identify Software quality metrics, implement	
the software quality metrics, analyze software metrics results, validate the software quality	
metrics – Software quality indicators – Fundamentals in Measurement theory	
Software Testing Strategy And Environment:	6
Establishing testing policy, structured approach to testing, test factors, Economics of	
System Development Life Cycle (SDLC) Testing	
Software Testing Methodology:	6
Defects hard to find, verification and validation, functional and structural testing,	
workbench concept, eight considerations in developing testing methodologies and testing	
tactics checklist.	
Software Testing Techniques:	6
Black-Box, Boundary value, Bottom-up, Branch coverage, Cause-Effect graphing, CRUD,	
Database, Exception, Gray-Box, Histograms, Inspections, JADs, Pareto Analysis,	
Prototyping, Random Testing, Risk-based Testing, Regression Testing, Structured	
Walkthroughs, Thread Testing, Performance Testing, White-Box Testing.	
Software Testing Tools:	4
Taxonomy of Testing tools, Methodology to evaluate automated testing tools, Load	
Runner, Win runner and Rational Testing Tools, Java Testing Tools, JMetra, J and Cactus.	
Testing Process:	6
Eleven Step Testing Process: Assess Project Management Development Estimate and	
Status, Develop Test Plan, Requirements Phase Testing, Design Phase Testing, Program	
Phase Testing, Execute Test and Record Results, Acceptance Test, Report test results,	
testing software installation, Test software changes, Evaluate Test Effectiveness.	
Testing Specialized Systems And Applications:	2
Testing Client/Server – Web applications, Testing off the Shelf Components, Testing	
Security, Testing a Data Warehouse.	

Course Outcome:

Students learn how to build testing methods into their work process to design for functional and maintainable products. Additionally, this course will prepare students for the ASTQB Certified Tester Foundation Level Exam.

Text Books:

- 1. Effective Methods for Software Testing, 2nd Edition by Willia. Perry , Second Edition, published by Wiley,2001.
- 2. Software Quality, by Mordechai Ben-Menachem/Garry S. Marliss, by Thomson Learning publication, 2003

Reference Books:

- 1. Testing and Quality Assurance for Component-based Software, by Gao, Tsao and Wu, Artech House Publishers, 2003
- 2. Software Testing Techniques, by Bories Beizer, Second Edition, Dreamtech Press, 1996.
- 3. Managing the Testing Process, by Rex Black, Wiley 3rd Edition,2000
- 4. Handbook of Software Quality Assurance, by G. Gordon Schulmeyer, James I.McManus, Second Edition, International Thomson Computer Press, 2004
- 5. Software Testing and continuous Quality Improvement, by William E.Lewis, Gunasekaran Veerapillai, Second Edition, Auerbach Publications, 2006.

Course Name	: TQM Lab-1 (Deming – PDCA).
Course Code	: TQMN 520
Credits	: 2
L-T-P	: 0-0-3
Pre-Req.	: Nil

To understand Deming Principle and the functioning of core tools. Analyze behavior of processes and to speculate error situations.

- Exp. No. 1 Red Bead experint: Speculate the probability of distribution of beads w.r.t quantity of input, Quality of input, and analyze w.r.t application of 7 QC tools. Plot distribution graphs with qualitative statistics to substantiate data generated by red bead experintation.
- Exp. No. 2 Funnel Experint: To plan and study the effect of
 - (a) Contingent adjustnt of funnel at the an of last five experints. Repeating to understand an of ans. Plot all scenarios.
 - (b) Continuous error correction, and study the role of compensation and under/over compensation.
 - (c) Study the effect of PDCA.
 - (d) Understand and plot consistency.
- Exp. No. 3 Case study and presentation on PDCA Cycle with industry experience.

Course Outcome:

Hands on experience on six sigma process and its tools, CTQ, DFSS, Geotrical dinsioning and tolerance. Hands on experience on Deming Principles, PDCA cycle, and 7QC tools

Course Na	: TQM Lab – II(Six sigma)
Course Code	: TQMN 530
Credits	: 2
L-T-P	:003
Pre-Req.	: Nil

To understand six sigma Principle and the functioning of core tools. Analyse behaviour of processes and to speculate error situations, and able to work on software's like Minitab etc.

PART A

- Exp. No. 1 On a microter / vernier caliper study the process, equipnt and operator errors, bias, Linearity etc, and in Varying situations discuss Geotrical dimensioning and tolerance.
- Exp. No.2 Plot Customer dissatisfaction in a hospital scenario and study the root cause of prioritized problem. Or similar customer dissatisfaction problems in other area of student's interest.
- Exp. No. 3 Design an alternative system for above using DFSS approach.
- Exp. No. 4 Understand time deployment in various sub processes in a typical process, and find the opportunities analyzing value stream mapping, and applying cellular manufacturing.
- Exp. No. 5 Application of system analysis through customer interviews in the scenario as in experiment 2, using QFD templates, and report CTQ's
- Exp. No. 6 Selecting 5 processes in different domains, analyze how defects are defined, what kinds of defects are predominant; the root causes of defects, and analyze the strategies of reduction of DPU's sigma levels etc.

PART B

Computer Applications Using MS Excel / MINITAB

Syllabus as per Manuals of the concerned Software, 28 Exercises based on courses studied .

Course Outcome:

Hands on experience on six sigma process and its tools, CTQ, DFSS, Geometrical dimensioning and tolerance.

Course Name	: PROJECT/INDUSTRY BASED PROJECT - I
Course Code	: TQMN 560
Credits	: 2
L-T-P	:003
Pre-Req.	: Nil

A comprehensive report in any area from Manufacturing / Service, Industry/ construction/ Health care / Software Engineering etc as approved by the department.

Course Outcome:

As per specialization, each will be assessed by faculty members in an open presentation towards the end of the semester.

Course Name	: PROJECT/ INDUSTRY BASED PROJECT - II
Course Code	: TQMN 570
Credits	:2
L-T-P	:003
Pre-Req.	: TQMN 560

The students shall be working on a project in the area of his/her thesis work.

Course Outcome:

The project would be presented before the faculty members in an open presentation towards the end of the semester.