Department of Statistics
Jahangirnagar University

Syllabus for M. Phil/Ph.D in Statistics

Session: 2015-2016, 2016-2017, 2017-2018 and 2018-2019

The Master of Philosophy (M. Phil) program in Statistics foster at specializing and training in statistical methodology in its theoretical, practical/applied, and in scientific research aspects of modern age particularly with computer intensiveness. It meticulously helps to do such research which is very much of valued interests in order to develop knowledge in theory, methodology, application to enrich statistical methodology to help in policy planning and agenda implementation purposes.

This program shall extend over a period of two years. Each year denotes one academic year (July to June). In the first year, a student has to take two theoretical courses (a total of 2 units: 1 unit carries 100 marks) among the courses offered by the department as of his/her supervisor's approval. Pass marks in each of the courses is 50 per cent of the total marks allotted to each of the courses. Fail to do so will lead to discontinuation of the program. In the second year, a student has to write a dissertation which must be defended and be considered acceptable by the appropriate examination committee. For this purpose, three copies of the dissertation have to be submitted by a date that to be fixed by the department.

Year	Nature of Course	Unit	Marks	Credit
1	Theoretical	2	200	8
2	Dissertation			
	Viva-voce			
Total				

Course No.	Title	Marks	Credit
Stat-601/701	Statistical Inference	100	4
Stat-602/702	Research Methodology	100	4
Stat-603/703	Econometrics and Time Series Analysis	100	4
Stat-604/704	Demography	100	4
Stat-605/705	Multivariate Analysis & Categorical Data Analysis	100	4
Stat-606/706	Design of Experiments	100	4
Stat-607/707	Epidemiology and Bio-Statistics	100	4
Stat-608/708	Sample surveys	100	4
Stat-609/709	Environmental Statistics	100	4
Stat-610/710	Quality Control & Industrial Statistics	100	4

Details of the course material follows:

Stat-601/701 Statistical Inference

1 unit/4 credit (at least 50 - 60 class)   100 Marks

Probability Background: Probability and Measure, Family of Probability Measures, Integration, Stieltjes and Lebesgue Integrals, Borel Field (σ Field) in Extension of Probability Measure.

Estimation: Exponential Family Distributions, Convex Loss Function, Characterization of Sufficiency. Law of Equal Ignorance, Empirical Bayes Estimation Procedures, Minimax Principle, Principle of Invariance, Minimally and Admissibility in Exponential Families, Equivariance, Location Parameters, Principal of Equivariance, Location-Scale Families, Convergence in Probability and in Law, Large Sample Comparisons of Estimations, Trimmed Means, Methods of Estimation in Large Samples, Asymptotic Optimality, Asymptotic Efficiency, Asymptotic Efficiency of Bayes Estimators and Nonparametric Test Statistics.

Test of Hypothesis: UMP Test, Distribution with Monotone Likelihood Ratio, Comparison of Experiments, Generaliziaotn of the Neyman Pearson Lemma, Two-Sided Hypothesis, Randomized Test, S.P.R.T.

Unbiasedness: Invariance, Maximal Invariants, Most Powerful Invariant Test, Unbiasness and Invariance, Rank Tests.

Minimax Principle: Tests with Guaranteed Power, Maximum Test and Invariance, Hunt-Stein Theorem.

Method of Restricted Maximum Likelihood Method of Generalized Least Squares, MINQUE Method, Estimation of Prior Distribution, Application of Empirical Bayes Method, Testing Hypothesis in Byesian Approach.

Multiple Hypothesis Testing, Monotone Procedure of Testing, Optimal and Asymptotically Optimal Test Procedures, Test for Contingency Table, Log Linear and Other Models, U-Statistics, Asymptotic Relative Efficiency of Non-Parametric Tests.

Order Statistics in Statistical Inference: Types of Order Statistics, Order-Statistics and Sufficiency, Maximum-Likelihood Estimation, Linear Estimation of Location and Scale Parameter, Treatment of Outliers, the Problem of Outliers and Slippage Tests of Outliers, the Effect of Outlier Rejection on the Estimation of Parameters, Testing for Outliers from a Regression Model and in Patterned Data, Power of the Analysis of Variance Tests, Combination of

Estimate, Combination of Tests, Test of Linear Hypothesis in Univariate and Multivariate Analysis when the Ratios of the Population Variance are Unknown, Application of the Method of Mixtures to Quadratc forms, Hodges-Lehmann Estimators.

Text:

1. Gorge, C. and Berger, R. L. (2003): *Statistical Inference,* 2nd edition, Thompson-Duxbury, USA.

References
1. Lehman, E. L. and Cassela, G. (1998): *Theory of Point Estimation*, Springer Verlag, New York.
2. Lehman, E. L. (1997): *Testing Statistical Hypothesis*, 2nd edition, Springer Verlag, New York.
3. Rao, C. R. (1984): *Linear Statistical Inference and Its Application*, Wily Eastern, New Delhi.
4. Cox, D. R. and Hinkly, (1979): Theoretical Statisitcs, CRC Press.
5. Balakrishnan, N. and Cohen, A .C. (2014): *Order Statistics and Inference Estimation Methods*, Academic Boston,
6. Gibbons, J. D. and Chakraborti, S. (2011): *Non-Parametric Statistical Inference*, 5th Edition, McGraw-Hill,

Stat-602/702 Research Methodology

1 unit/4 credit (at least 50 - 60 class)   100 Marks

Research Design: Principal Components of Research Design, Objectives of the Study, Formulation of Hypothesis, Principal Findings of the Study; Source of Data, Comparative Analysis, Merits and Demerits of Different Sources of Data.

Sampling and Sample Size Determination, Design Effect, Type of Sampling Design Used for Bangladesh National Survey, Pilot Survey and the Purpose of Pilot Survey.

Sources of Errors in Surveys Sampling Errors and Non Sampling Errors, Rapid Methodology, Rapid Methodology Survey, its Scope Uses and Limitation; Lot Quality Sample Survey Method.

Different Parts of the Questionnaire, Guidelines to be followed for Preparing Questionnaires, Per-Coded Questionnaire. Difference between Closed Questionnaire and Open-Ended Questionnaire.

Formulating Hypothesis and Types of Hypotheses, Distinction between Research Hypothesis and Statistical Hypotheses.

Qualitative Data and its Importance, Different Methods of Qualitative Surveys Such as Focus Group and its, Importance in Health and Family Planning; Rapid Assessment Procedures, Qualitative Methodologies for Planning and Evaluation of Health Related Programs; Assessment Procedures for Nutrition and Primary Health Care, Anthropological Approaches to Improving Program Effectiveness Evaluation of Family Planning Program, Operations Research Hand its Scope and Limitations of Operation Research, Nonparametric Method in Analysis.

Test of Significance in Multivariate Analysis: Discriminate Function, Mahalanobis D^2, Canonical Correlation.

Applied Regression Analysis: Logistic Regression Analysis, Cluster Analysis, Dummy Variables, Dependent and Independent Variables, Choice of Reference Category, Multicolinearity and Interpretation of the Regression Coefficients Writing a Report, what are Important Issues to be addressed while Writing Report.

Developing Research Proposal; what are the Important Components to be addressed in a Research Study; Knowledge Of Compute, Analysis Through SPSS, And Presentation By Multimedia.

Text:
1. Molhotra, N. K. (2006): Marketing Research, 4th Edition, Pearson education, Singapore.

References
1. Zikmund W. G., B. J. Carr, J. C. and Griffin, M. (2015): Business Research Method 9th edition, Harcourt College Publishers.
2. Babbie, E. (2013): The practice of Social Research 13th edition, Wads Worth, Cengage Learning
3. Copper, D. R. (1995): Business Research Method, 5th edition, Irwin/McGraw-Hill Company, New York.
4. Churchill, G. A. and Nielse, A. C., (1995): marketing Research Methodological Foundation, 6th edition, Harcourt Bruce College Publishers, New York.

Stat-603/703 Econometrics and Time Series Analysis

1 unit/4 credit (at least 50 - 60 class)   100 Marks

Methodology of Econometrics Research: Specification of the Model, Equation of the Model, Evaluation of the Parameter Estimates, Evaluation of the Forecasting Power of the Model, Desirable Properties of an Econometric Model, AIC, BIC and Other Criteria of Model Selection.

Application of Multivariate Analysis to Economic Data, Discriminatory Analysis, Principal Components, Canonical Correlation, Weighted Regression and Some Related Issues; Lack of Fit, Pure Error, Partial F-Test, Sequential F-Test Backward Elimination Procedure, Forward Selection Procedure, Stage-Wise Regression Procedure and Associated Tests, Models of Economic Growth: Requirement of Steady Growth, the Harrod Model, the Neo-Classical Model, Some Applications to Development Economics, DOMR's Growth Model, Suitability of the Models for Underdeveloped Countries, Mahalanobis Model.

Limited and Qualitative Variables in Econometrics, Models under Rations Expectation Hypothesis, Models of Optimizing Agents, Forecasting with a Single Equation Model, Forecasting with Multiple Equations Model.

Choice of Econometric Technique, Monte Carlo Studies, Ranking of Econometric Techniques According to the Properties of the Estimates of Structural and Reduced form Parameters.

ARCH models, Co-integration, Unit roots Analysis of Panel data.

Text:
1. Johnston, J., and Dinardo (1997): Econometric Methods, 4th edition, McGraw-Hill.
2. Montogomery, D. C. Jennings, C. L. and Karlahci (2005): Introduction to time series analysis and forecasting, John Wily Press, New York.

References
1. Jutge, G. G., Hill, R. C., Griffins, W. E., Lut Kepohl, H. and Lee, T. C. (1988): Introduction to the Theory and Practical of Econometrics 2nd edition, John Wiley and sons, New York.
2. Greene, W. H. (2003): Econometric Analysis, 5th edition, Person.
3. Gujarati, D. (2003): Basic Econometrics, 4th edition, McGraw-Hill, New York.
4. Harris, R. and Robort, S. (2003): Applied time series modeling and forecasting, Replika Press, Indian.

Stat-604/704 Demography

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1 unit/4 credit (at least 50 - 60 class)   100 Marks

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Population Research Program in Bangladesh, Population Policies and Population Control in Bangladesh, Health Policy in Bangladesh; Aging and aging Policy in Bangladesh, Use Effectiveness an Extended Use Effectiveness an Extended Use Effectiveness of Contraception, Measuring the Births Averted by Sterilization, Measuring the Impact of Family Planning Program on Fertility, Demographic Transition Theory; Momentum Effect, Tempo Effect, Population Stabilization In Bangladesh; Concept of Ideal and Desired Family Size, Measurement of Ideal and Desired Family Size, Family Formation in Bangladesh, Relation Between Family Size And Socio-Economic Conditions, Sex Preference Child and its Effect on Contraception; Effect of Infant and Under Five Mortality on the Desired Fertility, Urbanization and Internal Immigration; Effect of Rapid Urbanization on the Health of Urban Poor Model Life Tables and its Application in Developing Countries.

Parity Progression Ratios, Population Projections, Coales' Three Parameters Model and Trussell Method of Estimating the Mean Age at Marriage, Mortality Estimation by Intercensal Ratio, Brass Growth Balance Model for Measuring the Completeness of Death Statistics, Evaluation of Birth and Death Registration for a Stable Population of Known Growth Rate, Estimating the Completeness of Death Registration from Inercensal Cohort Survival, Techniques for Correcting Age Distribution for Heaping on Multiples of Five and Graduation of Age Distribution by Sprague's Multiplier, Graduation, of Age Distribution by Brass Logit System and Method of Local Fitting Methods; Estimating Adult Mortality from Orphanhood, Widowhood and Eldest Surviving Children, Application of Relational Gompertz Model in Estimation of Fertility.

Advocacy and its Importance; Gender Inequality and its Importance on Population Change; Domestic Violence and its Implications on the Health of Women; Adolescents Fertility and Implications on the Health of Adolescents; Nutrition and Factors Affecting it; Health Seeking Behavior of Women in Reproductive Ages and its Implications on Maternal and Child Health; Infant and Child Mortality Levels and Factors Affecting it; Maternal Mortality and Factors Affecting it.

Multiple Decrement Life Table and Estimation of Discontinuation of Family Planning Methods and its Implications on the Program.

Unmet Need for Contraception and its Implications in the Achievement of Demographic Goals.

Text:
1. Brass, W. (1968): *The demographic of Tropical Africa,* Princeton University Press,
2. Brass, W. (1975): *Methods of Estimating Fertility and Mortality from Defective and Limited Data*, University of North Carolina at Chapel Hill,

References
1. Keyfitz, N. (1968): Introduction to Mathematics of Demography, Population Reading Man, Addition Wesley, New York.
2. Pressat, R. (2008): The Dictionary of Demography, Blackwell, UK.
3. Pressat, R. (1974): A Work book in Demography, Methuen, London.
4. Population Council, *Journal of Studies in Family Planning.*

Stat-605/705 Multivariate Analysis and Categorical Data Analysis

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1 unit/4 credit (at least 50 - 60 class)   100 Marks

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Theory of Distance and Its Application to Classification Problems: Objectives of Multivariate Analysis, Concept of Distance in Multivariate Analysis, Different Measures of Distance, Some Properties of Distance Function, Multivariate Normal Distribution, Assessing Assumptions of Multivarite Normality by Box-Cox Transformation, Detecting and Cleaning Outliers, Transformation of Multivariate Normal Observations to Near Multivariate Normal, Inference about Mean Vector, Hotteling T^2, Confidence Region, Conferring Methods of Multiple Comparison.

Analyzing Association among Variables: Measuring and Interpreting Association Especially between two Variables, Graphical Investigation of Many Associations, Correction of Correlation for Effects of Extraneous Variables, Measuring Association between two Sets of Variables, Testing Hypotheses about Sets of Associations, Test that all Population Correlations are Zero (Mutual Independence of all Variables), Test that all Population Canonical Correlations are Zero, Test that Some Population Canonical Correlations are Zero.

Two and Three-Way Contingency Tables: Log-Linear Models, Interpretation of Log-Linear Parameters, Choice of Model, Detection of Model Deviations, Log-Linear Hypotheses, Estimation, Testing Hypotheses.

Multi-Dimensional Contingency Tables: Log-Linear Models, Classification and Interpretation of Log-Linear Models, Choice of Model, Diagnostics, Model Search Strategies.

Analysis of Covariance Structure: Covariance Structure, Hypotheses about Covariance Structure, Model of Covariance Structure Analysis, Scope of Covariance Structural Analysis, Illustration of Likelihood Ratio Test, Illustration of Likelihood Ratio Test Procedures, Tests of Covariance Structure Based on Union-Intersection Principle, Illustration of Structural Analysis Based on Union-Intersection Principle, Sphericity Test, Advantages of Covariance Structure Analysis, Assumptions of Covariance Structure in Statistical Analysis, Estimation of Variance Components, Confirmatory Factor Aspect of Multivariate Analysis, Power of Statistical Tests when Covariance Structure is Known, Tests for Broad Class of Covariance Structures, Bayesian Inference in Multivariate Regression, Multivariate Analysis of Covariance, Checking and Violation of Assumptions, Two-Way Multivariate Analysis of Variance (MANOVA), Profile Analysis, Repeated Measures with Growth Curves.

Linear Discriminant Function: Introduction, General Ideas, Linear Programming and Perception Criterion, Error Correction and Perception Criterion, Fisher's Criterion, Least Squares Approach, Choosing an Estimation Method, Specializations and Generalizations.

Cluster Analysis: Distance Measures, Hierarchical Methods, Agglomerative Methods, Divisive Methods, Optimization Criteria, Optimization Algorithms, Method of Mixtures, Wishart's Mode Method, Clumping Techniques.

Factor Analysis and Latent Structure Analysis: Factor Analysis Models, Estimation, Tests for Appropriate Number of Factors, Interpretation of Factor Analysis, Rotation Problem of Factor Analysis, Factor Analysis and Principal Components, Latent Structure Analysis.

Multivariate Multiple Linear Regression Model: Test for Regression Parameters, Prediction from Multivariate Multiple Regression, Prediction of Survival Variables, Comparing Two Forms, Mean Correlated form of Regression Model, Multiple Regression Model with Time Dependent Errors.

Text:
1. Johnson, R. A. and Wichern, D. W. (2002): Applied Multivariate Statistical Analysis, 5th edition, Peasrson Education, Asia.
2. Agresti, A. (2002): Categorical Data Analysis, 2nd edition, John Wely, New York.

References
1. Rao, C. R. (1962): *Advanced Statistical Methods in Biometric Research*, John Wiley,
2. Rao, C. R. (1984): *Linear Statistical Inference and Its Application*, 2nd edition, Wiley
3. Zhang F. K. and Ting, Y. (1990): *Generalized Multivariate Analysis*, Springer-Verlag.
4. Mardia, K. V., Kent, J. T. and Bibby, J. M. (1997): Multivariate Analysis, Academic Press, London.

Stat-606/706 Design of Experiments

1 unit/4 credit (at least 50 - 60 class)   **100 Marks**

Review of Basic Designs, Row or Column Missing in R. B. and L. S. Designs, Basic Designs with Heterogeneous Error Variances, Analysis of Basic Designs when Usual Assumptions are Violated, Non-Orthogonal Designs, Incomplete Block Design, BIB Design with Recovery of Inter-Block Information, PBIB Design, Orthogonal Latin Squares with Construction of Latin Square Design, Weighing Design, Response Surface Design, Rotatable Design, Designs for Two-Way Elimination Of Heterogeneity, Row and Column Designs, Cross-Over Designs, Switch Over Design, Generally Balanced Design, Groups of Experiments, Repeated Measurement Designs, Stability Analysis, Factorial Experiments, Asymmetrical Factorial Experiments, Resolution Plans, Split-Split-Plot Designs, Split-Block Designs, Covariance Analysis with More than One Concomitant Variables, Bio-Assays, Nested Classification, Variance Component Analysis, Different Methods for the Estimation of Variance Components, Construction of Different Designs, Optimality of Designs.

Text
1. Montogomery, D. C. (2012): *Design and Analysis of Experiments*, 8th edition, John Wiley, New York.

References
1. Cochran, W. G. and Cox, G. M. (2000): *Experimental Designs*, 2nd edition, John Wiley, New Delhi.
2. Das, M. N. and Giri, N. C. (1997): *Design and Analysis of Experiments*, 2nd edition, New Age International (P) Ltd., India.
3. Federer, W. T. (1967): *Experimental Design: Theory and Application*, Oxford and IBH, New Delhi.
4. Graybill, F. A. (1961): *An Introduction to Linear Statistical Models*, Vol. I, McGraw-Hill, New York.
5. John, P. W. (1971): *Statistical Design and Analysis of Experiments,* Wiley, New York.

Stat-607/707 Epidemiology and Bio-Statistics

                    1 unit/4 credit (at least 50 - 60 class)   100 Marks

Survivor Function, Hazard Function, Censoring and Truncation, Ddifferent Types of Censoring, Survival Ddistributions, Exponential, Weibull, Extreme Value, Log-Normal And Gamma.

Inference Procedures for Exponential, Weibull and Extreme Value Regression Models, Inference Procedures, Residuals Analysis and Other Model Checks, Non-Parametric Estimation of Survivor Functions, Rank Test for Comparing Distributions.

Conditional Likelihood, Marginal Likelihood and Partial Likelihood, Proportional Hazards Regression Models, Inference Procedures, Clinical Trials, Aspects of Clinical Trials, Retrospective and Prospective Studies, Bioassays, Direct and Indirect Bioassays, Parallel Line Assays, Slope Ratio Assays.

Analysis of Three and Four-Dimensional Contingency Tables, Log Linear Models.

Text:
1. Lawless, J. E. (2003): *Statistical Models and Methods for Life Time Data*, 2nd edition, John Wiley and Sons.
2. Kenneth, J., Rathman, Timothy, L. and S. G. Land (2012): Modern Epidemiology, 3rd edition, lippin catt.

References
1. Fiendberg, S. F. (1980): The Analysis of Cross Classified Categorical Data, The MIT Press.
2. Kalbflesisch, J. D. and Prentice, R. L. (1980): *The Statistical Analysis of Failure Time Data*, John Wiley and Sons,
3. McCullough, P. and Nelder, J. A. (1983): *Generalized Linear Models*, Chapman and Hall.

Stat-608/708 Sample Survey

                    1 unit/4 credit (at least 50 - 60 class)   100 Marks

Sampling With Varying Probability of Selection, Hurwitz Thompson Estimator, Rao, Hartley Interpenetration Samples, Model Based and Model Assisted Method of Estimation, Model Based Ratio and Regression Method of Estimation and Cochran Method of Sampling, Multivariate Ratio and Regression Methods of Estimation in Various Situation, the Class of Ratio and Regression Estimators, Predictive Method of Estimation, Sampling on Successive Occasions, Multivariate Sampling, Multiphase Ratio and Regression Method of Estimation, Multistage Sampling, Two Stage Predictive Estimators, Optimum Allocation in Multivariate Surveys, Bias and Mean Square Error Reduction Methods, the Jackknife Method, the Bootstrap Method, Repetitive Sampling, Simulations in Sample Survey, Sensitive Analysis, Randomized Response Techniques, Rank Set Sampling, Different Type of Rank Set Sampling Adaptive Sampling.

Text:
1. Cochran, W. G. (1977): *Sampling Techniques*, 2nd edition, John Wiley.

References:
1. Thompson, S. K. (2002): Sampling, John Wiley, New York.
2. Sukhatme, P. V. and Sukhatme, B. V. (1984): Sampling Theory of Surveys with Applications, Indian Scociety of Agricultural Statistics, New York.
3. Raj, D. and Chandhok, P (1998): Sample Survey Theory Narosa publishing House, New Delhi.
4. Murthy, M. N. (1977): Sampling theory and Methods, Statistics Publishing Society, Calcutta.

Stat-609/709   Environmental Statistics

                    1 unit/4 credit (at least 50 - 60 class)   100 Marks

Environmental Monitoring and Sampling: Concept in Modeling Environmental System, Encounter Sampling and Modeling in Ecological and Environmental Studies, Comparing Sampling Designs for Monitoring Ecological Status and Trends.

Measuring Levels and Consequences of Pollution and Contamination: Point Process Modeling in Environmental Epidemiology, Estimation of Quantities in Airborne Pollution: Stochastic Model for Times Exposures to Air Pollution from a Point Source.

Climatological and Meteorological Issues: Long-Range Dependence and Global Warming: Environmental Factors Affecting Reservoir Safety, Rainfall Depth-Duration-Frequency Curves.

Water Resources: Water Resources And Statistics: Past, Present and Future: On the Estimation of Parameters of Rare Events in Environmental Time Series, Extreme Sea Levels.

Dynamics of Fish Populations: Ambiguous Inferences from Fisheries Data, Recapture Data on Tagged Fish.

Forestry: Statistical Analysis of Climatological and Ecological Factors in Forestry: Deforestation and its Consequences on the Environment.

Text:
1. Barnett, V. (2004): Environmental Statistics: Methods and Applications, John Wiley and Sons, New York.

References
1. Bryan, F. J. (2000): Statistics for Environmental Science and Management, 1st edition, Chapman and Hall/CRC, Press.
2. Millard, S. P. and Neerchal, N. K. (2000): Environmental Statistics Using S-PLUS, Chapman and Hall/CRC press
3. Harris, M. J. (2002): Environment and Natural Resource Economics: A Contemporary Approach, Houghton Mifflin Company.
4. Rober, H. (1990): Spatial Data Analysis in the Social and Environmentla Sciences, Cambridge University Press, Cambridge.

Stat-610/710 Quality Control and Applied Statistics

1 unit/4 credit (at least 50 - 60 class)   100 Marks

Basic Principles of Quality Control: Meaning of Quality, Quality Improvement, Statistical Methods for Quality Control and Improvement.

Methods and Philosophy of SPC: Causes of Variation, Statistical Basis of the Control Chart: Basic Principles, Choice of Control Limits, Analysis of Patterns on Control Charts etc., Implementation and Application of SPC.

Control Charts for Variables: Control Charts: $\overline{x}, R$ and S, The Effect of Non Normality on $\overline{x}, R$ Charts, OC Function, the Average Run Length for the $\overline{x}$ Chart, the Shewhart Control Chart for Individual Measurements, Applications of These Charts.

Control Charts for Attributes: Development of Different Control Charts: for Fraction Nonconforming, for Nonconformities, the OC Function and the ASN Curve for These Charts.

Choice between Attribute and Variable Control Charts, Guidelines for Implementing Control Charts.

Process and Measurement System Capability Analysis: Process Capability Analysis Using Six-Pack, Using Histogram, a Probability Plot, Process Capability Ratios, Using Control Charts, Design of Experiments etc.

Tolerance Limits: Parametric and Nonparametric Limits.

Other Statistical Process Monitoring & Control Techniques:

The Exponentially Weighted Moving Average Control Chart, the Moving average Control Charts.

Acceptance Sampling:

Types, Lot Formation, Guidelines of Using Acceptance Sampling.

Single Sampling Plan: Designing of the Plan, the OC Curve, Rectifying Inspection etc.

Double, Multiple and Sequential Sampling Plan: Design of the Plans, the Oc Curve, the ASN Curve etc.

The Dodge-Romig Sampling Plans: The AOQL Plans, LTPD Plans, Estimation of Process Average etc.

Other Acceptance Sampling Plans: Acceptance Sampling by Variables, Sequential Sampling by Variables, Chain Sampling etc.

Statistical Quality Control And Six-Sigma: 6σ Process Control and its Applications; 6σ Quality Assurance, Quality Management System; Quality Management Tools Used in 6σ, Six Steps to 6σ Control, Methods of 6σ Process: DMAIC (Duh-May-Ick), DMADV (Duh-Mad-Vec); Some Common Tools, Techniques and Unit of Measurements to Achieve 6σ: Cause and Effect Diagram also Known as a Fishbone Diagram, Cp/Cpk (Process Capability), DFSS-Design for Six Sigma, DMAIC - Define, Measure, Analyze, Improve, Control, Control Charts, DPMO - Defects Per Million Opportunities, DOE - Design of Experiments, PDCA – Plan do Check act, R & R Repeatability and Reproducibility, Tolerance Design, SPC - Statistical Process Control etc.

Text
1. Montgomery, D. C. (2008): *Introduction to Statistical Quality Control*, 6th edition, John Wiley and Sons, New York.

References
1. Banks, J. (1989): *Principles of Quality Control*, John Wiley and Sons, New York.
2. Burr, J. (2004): *Elementary Statistical Quality Control*, CRC Press.
3. Duncan, A. J. (1970): *Quality Control and Industrial Statistics*, 3rd edition, Richard D. Irwin, Homewood, Illinoy.
4. Gupta, S. C. and Kapoor, V. K. (2014), *Fundamentals of Applied Statistics,* Sultan Chand & Sons, New Delhi.
5. Grant, E. L. (1996): *Statistical Quality Control*, 7th edition, McGraw-Hill, New York.