B.E. 401 - ENGINEERING MATHEMATICS III

Unit I

Functions of complex variables : Analytic functions, Harmonic Conjugate, Cauchy-Riemann Equations, Line Integral, Cauchy's Theorem, Cauchy's Integral Formula, Singular Points, Poles & Residues, Residue Theorem , Application of Residues theorem for evaluation of real integrals

Unit II

Errors & Approximations, Solution of Algebraic & Trancedental Equations (Regula Falsi , Newton-Raphson, Iterative, Secant Method), Solution of simultaneous linear equatins by Gauss Elimination, Gauss Jordan, Crout's methods , Jacobi's and Gauss-Siedel Iterative methods

Unit III

Difference Operators, Interpolation (Newton Forward & Backward Formulae, Central Interpolation Formulae, Lagrange's and divided difference formulae), Numerical Differentiation and Numerical Integration.

Unit IV

 Solution of Ordinary Differential Equations(Taylor's Series, Picard's Method, Modified Euler's Method, Runge-Kutta Method, Milne's Predictor & Corrector method),   Correlation and Regression, Curve Fitting (Method of Least Square).

Unit V

Concept of Probability : Probability Mass function, Probability density function. Discrete Distribution: Binomial, Poisson's, Continuous Distribution: Normal Distribution, Exponential Distribution ,Gamma Distribution ,Beta Distribution ,Testing of Hypothesis |:Students t-test, Fisher's z-test, Chi-Square Method

Reference:

(i)   Numerical Methods using Matlab by J.H.Mathews and K.D.Fink, P.H.I.
(ii)   Numerical Methods for Scientific and Engg. Computation by MKJain, Iyengar and RK Jain, New Age International Publication
(iii)   Mathematical Methods by KV Suryanarayan Rao, SCITECH Publuication
(iv)   Numerical Methods using Matlab by Yang,Wiley India
(v)   Pobability and Statistics by Ravichandran ,Wiley India
(vi)   Mathematical Statistics by George R., Springer

TX- 402 – Statistics and Quality Control

Unit I Collection and presentation of data, Measures of central tendency, Measures of variation, Skewness, Moments and kurtosis, Probability Theory, priori and posteriori probabilities, conditional probabilities Bay's theorem (Simple Problems).

Unit II Probability distribution: discrete distribution, binomial and poison distributions .Continuous Normal Distribution, Exponential Distribution, central value theorem, Normal Probability curve, calculation of mean and variance From Normal Curve, Practical usefulness of normal Distribution, sampling distribution, Bivariate Distribution, Correlation and Regression, Analysis of Variance, significance of error R_2 (one way classification only).

Unit III Elementary theory of testing of hypothesis, Statistical Hypothesis, Null Hypothesis, Errors of first and second kind, Critical Region, level of Significance. Chi-square test of goodness of fit Test of significance based on T, F and Z distribution.

Unit IV General idea of sampling method, random sample, sampling size, sample size for different distribution, differences between average and variances

Unit V : Statistical quality control chart, control limits, X, R, P, Pn chart etc., analysis by defects, number of defects (C chart), introduction to TQM and ISO 9000

References:
1. Gupta, Kapoor: Fundamental of Mathematical Statistics
2. Booth J.E.: Textile Testing.
3. SITRA : Application of statistics in textile.
4. Grover B. & Hanby D. S.: Textile testing and Quality Control.
5. Grant Eugene; Statistical Quality control; TMH

TX- 403 – Textile Chemistry –I

Unit I Sequence of chemical processing of textiles, natural and added impurities in textiles, introduction to various preparatory processes e.g. singeing, scouring and bleaching for different natural and synthetic materials and blends.

Unit II
Mercerising of cotton, Optical whitening agents and their use, heat setting of synthetic fibre fabrics,

Unit III
Classification of different classes of dyes according to their chemical constitution and application, Brief introduction to dyeing of natural and synthetic fibre fabric with various dye classes
e.g. Direct, Basic, Acid, Sulphur, Vat, Solubilised vat, Azoic, Reactive and Disperse.

Unit IV Different machines involved in the dyeing processes Dyeing of blends. Colour measurement, Fastness, properties of dyed textiles.

References:
1. Shennai; Scoring And Bleaching -.
2. Shennai; Dyeing;
3. Tiotman; Textile Scoring & Bleaching;
4. John Shore; Cellulosic Dyeingp;

List of Experiments (Pl. expand it):
1. Chemical identification of textile fibres.
2. Scouring of cotton, Bleaching of cotton with hypochlorite, sodium chlorite and Hydrogen peroxide.
3. Application of direct, Vat, sulpher, reactive and napthol dyes on cotton and necessary after treatments.
4. Dyeing of compound shades and shade matching.
5. Scouring of cotton hank and fabric.
6. Bleaching of cotton hank and fabric.
7. Mercerisation of cotton fabric.
8. Dyeing of cotton by reactive dyes.
9. Dyeing of cotton by sulphur dyes.
10. Dyeing of cotton by vat dyes.
11. Dyeing of cotton by azo dyes.

TX- 404 – Yarn Manufacturing –II

Unit 1 Draw frame Object of drawing, constructional details of draw frame, concept of perfect drawing, different drafting systems, monitoring and auto leveling of irregularities.

Unit 2 Draw frame blending, recent developments, performance assessment, idea of setting, speed and other technical parameters. Calculations related to draft, production etc. Defects and remedies, supervisory check points.

Unit 3 Combing Lap preparation, Lap former, setting, speed and recent developments, production calculations, Methods of Lap preparations and its importance.

Unit 4 Object of combing, construction and principle of working, function of different motions, combing cycles, different types of combers, different setting points and speeds. Calculation related to production, noil %, draft etc. Recent developments, assessment of comber performance, control of waste, Defects and remedies, supervisory check points.

Unit 5 Speed frame Object of speed frame, construction and principle of working, details of speed frames. Drafting, twisting winding and building mechanism, Speed and setting points, latest developments, Different types of flyers and suspended type of speed frame Calculation related to speed, draft, production, performance assessment, defects and remedies, supervisory check points.

References:
1. --;Manual of Cotton Spinning Vol. 3–Text. Institute.
2. Klein; The Textile Institute – Short Staple Spinning Series.
3. Taggart; Cotton Spinning Calculations.
4. Venkatasubramani; Spun Yarn Tech. Vol. 3.
5. Khare AR; Elements of Carding & Drawing.
6. Khare AR; Elements of Combing.
7. Cotton Combing – Gilbert Merrill
8. Cotton Drawing and Roving – Gilbert Merrill
9. Drawing, Combing and Roving – Z.S. Szaloki
10. Electronics Controls for Textile Machines – Hiren Joshi, Gouri Joshi, NCUTE Pub.2002
11. Cotton Spinning – Taggart

List of Experiments (Pl. expand it):
An elaborate study of Drawframe, Comber and Speed frame, constructional details, setting and gauging, controls and change places, Calculations of speeds, drafts, production
1. To study the general features of a draw frame, Draw the drafting arrangement of the draw frame.
2. Draw the gearing diagram of draw frame and calculate break draft, main draft, total draft, draft constants, creel draft.
3. Study the machine, material and man safety devices in draw frame.
4. To study the general features of a speed frame. Draw the drafting arrangement of the speed frame.
5. Draw the gearing diagram of speed frame and calculate break draft, main draft, total draft, draft constants, creel draft.
6. To study the building mechanism of a speed frame.
7. To study the twisting mechanism and to calculate the twist constants and spindle speed based on the gearing diagram.
8. Study the machine, material and man safety devices in speed frame.

TX- 405 – Fibre Science –II

Unit 1 New Fibres Glass, Carbon, Aramid, Spandex, Spectra, Nano fibres and Teflon etc. Basic concept of bi-component, hollow and tri-lobal fibres, High speed extrusion, Tow conversion process.

Unit 2 Texturing - Importance, basic principle, heat setting, false twisting, process variables, development of false twist texturising machine. Textured yarns like stuffer box, crimping, edge crimping, knit-de-knit, gear crimping etc. properties of such yarn. Principle of air bulking and properties of air-jet textured yarn. Chemical texturising, production of POY, MOY, FDY and DTY yarn

Unit 3 Optical properties - refraction, absorption, dichroism, reflection and luster. Birefringence and orientation, specific index of birefringence and its measurement.

Unit 4 Electrical properties – dielectric properties, electrical resistance of fibres and its measurement, static electricity, measurement and explanation of static phenomena. Frictional properties - nature of friction and application to fibres, static and dynamic friction of yarn on ceramics, metals

Unit 5 Thermal properties thermal parameters, structural changes in fibres on heating, concept of heat setting and its usefulness, factors affecting the heat setting behavior of textile materials, first and second order transition.

References:
1. Vaidya; Production of Synthetic Fibres.
2. Shennai VA; Technology of Textile Processing – Vol.I, Textile Fibres.
3. Gupta, Kothari; Progress in TST Vol.II Textile Fibres Developments & Innovations
4. Murthy HVS; Introduction to Textile Fibre
5. Moncrieff Man Made Fibres.
6. Akira Nakamura; Fibre Science & Technology (Translated from Japanese).
7. Mishra SP; A Text Book of Fiber Science & Technology.
8. Tatsuya Hongu, Glyn O. Philips; New Fibers 2nd Edition.

List of Experiments (Pl. expand it):
1. Identification of fibres by microscopic and other different physical and chemical methods.
2. Chemical identification of textile fibres.
3. Quantitative Analysis of Different blends.

TX- 406 – Cad in Textile

Unit I Introduction Overview of woven structure, weave notation and repeat, overview to design system, review of simple and complex design weave, introduction of computer aided design softwares, applications, features, types, requirements of hardware, installation process, attachments.

Unit II Dobby Basic fundamental dobby mechanism and fabric, make design on graph paper with drafting system, significance of starting parameters, significance of menu commands, tool bars, grid settings, make particular design on system, save to design library, library management, application of different yarn e colors on same design, calculation and simulation.

Unit III Jacquard Basics, fundamental Jacquard mechanism & fabrics. Draw a figured pattern on graph paper, significance of file menu, edit menu, view menu, tools menu, color menu, utility tools, filters, weave tools management, apply graph paper design on it. Overview of electronic CAD jacquard with punch card.

Unit IV Printex Introduction of textile printing, use and application. Significance of file menu, edit menu, draw a figured design on paper, view menu, tool menu, introduction of curves, color tools, fileter, introduction of enhanced tools. Preparation of various designs by simulating on CAD, reproduction of designs from samples in all 3 types of designs.

Suggested List of Experiments:
1. Weaving structure
2. Installation of CAD software
3. Various menu commands
4. To prepare design on dobby CAD software with proper parameters and color effects. Take a printout.
5. To manage dobby design library with twill honey comb, huck back design.
6. To draw figured pattern on graph paper and apply to Jacquard CAD software with proper parameters and color effects. Take a printout.
7. To manage jacquard design library with same figure to different weave.
8. To draw figured pattern on graph paper and apply to printex CAD software with proper parameters and color effects. Take a printout.
9. To manage printex design library with different yarn and color specification.
10. Introduction of electronic jacquard punching system

References:
1. Gokarneshnan, N. : Fabric Structure & Design
2. CAD Manuals
3. Rao; CAD-Cam Principles and applications; TMH