Syllabus for B.Tech(Apparel Production Management) up to Fourth Year

Revised Syllabus of B.Tech in APM for the students who were admitted in Academic Session 2010-2011)

Second Year – Third Semester

A.Theory							
Sl.No	**Paper Code**	**Subjects**	**Contact Hours / Week**				**Cr.Points**
			L	**T**	**P**	**Total**	
	HU-301	Values & Ethics in Profession	2	0	0	2	2
	PH-301	Physics-2	3	1	0	4	4
	CH-301	Basic Environmental Engineering & Elementary Biology	3	0	0	3	3
	TT-301	Instrumentation & Control	3	0	0	3	3
	APM-301	Basics of Mechanical Processing of Textiles.	3	1	0	4	4
	APM-302	Apparel Production-I	3	1	0	4	4
		Total Theory	17	3	0	20	20
B.Practical							
Sl.No	**Paper Code**	**Subjects**	**Contact Hours / Week**				**Cr.Points**
			L	**T**	**P**	**Total**	
	PH-391	Physics-2 Lab	0	0	3	3	2
	TT 391	Instrumentation & Control Lab	0	0	3	3	2
	APM-391	Textile & Garment Testing Lab	0	0	3	3	2
	APM-392	Apparel Production Lab-I	0	0	3	3	2
		Total Practical	0	0	12	12	8
		Total Semester	17	3	12	32	28

Second Year – Fourth Semester

A.Theory							
Sl.No	**Paper Code**	**Subjects**	**Contact Hours / Week**				**Cr.Points**
			L	**T**	**P**	**Total**	
	M(CS)-401	Numerical Methods	2	0	0	2	2
	M-402	Mathematics-3	3	1	0	4	4
	TT-401	Theory of Machines	3	0	0	3	3
	APM-401	Basics of Chemical Processing of Textiles	3	1	0	4	4
	APM-402	Apparel Production-II	3	1	0	4	4
		Total Theory	14	3	0	17	17
B.Practical							
Sl.No	**Paper Code**	**Subjects**	**Contact Hours / Week**				**Cr.Points**
			L	**T**	**P**	**Total**	
	HU-481	Technical Report Writing & Language Lab Practice	0	0	3	3	2
	M(CS)-491	Numerical Methods Lab	0	0	2	2	1
	TT-491	Theory of Machines Lab	0	0	3	3	2
	APM-491	Chemical Processing Lab-I	0	0	3	3	2
	APM-492	Apparel Production Lab-II	0	0	3	3	2
		Total Practical	0	0	14	14	9
		Total Semester	14	3	14	31	26

Syllabus for B.Tech(Apparel Production Management) up to Fourth Year

Revised Syllabus of B.Tech in APM for the students who were admitted in Academic Session 2010-2011)

Third Year – 5th Semester

A. Theory							
Sl.No	**Paper Code**	**Subjects**	**Contact Hours / Week**				**Cr.Points**
			L	**T**	**P**	**Total**	
	HU-511	Principles and Practice of Management	2	0	0	2	2
	APM-501	Quality Assurance in Apparel Industry	3	1	0	4	4
	APM-502	Technology of Apparel Machineries & Maintenance	3	1	0	4	4
	APM-503	Technology of Garment and Fabric Finishing & Care	3	0	0	3	3
	TT-504A/ TT-504B	Free Elective-I (Statsitical Quality Control / Total Quality Management /)	3	0	0	3	3
		Total Theory	14	2	0	16	16
B. Practical							
Sl.No	**Paper Code**	**Subjects**	**Contact Hours / Week**				**Cr.Points**
			L	**T**	**P**	**Total**	
	APM-591	Apparel Quality Assurance Lab	0	0	3	3	2
	APM-592	Apparel Machineries & Maintenance Lab	0	0	3	3	2
	APM-593	Chemical Processing Lab-II	0	0	3	3	2
	TT-594A/ TT-594B	Free Elective-I Lab (Statsitical Quality Control / Total Quality Management)	0	0	3	3	2
		Total Practical	0	0	12	12	8
		Total Semester	14	2	12	28	24

Syllabus for B.Tech(Apparel Production Management) up to Fourth Year

Revised Syllabus of B.Tech in APM for the students who were admitted in Academic Session 2010-2011)

6th Sem , B.Tech (APM)

Sl No	Paper Code	Name of the Paper	Contact Hours / week				Cr. Point
			L	T	P	TOTAL	
THEORY							
1	HU 611	Production & Operation Management	2	0	0	2	2
2	APM 601	Application of IT & CAD/CAM in Apparel Industry	3	1	0	4	4
3	APM 602	Production Planning & Control in Apparel Industry	3	1	0	4	3
4	APM 603	Apparel Marketing & Merchandising	3	0	0	3	3
5	Apparel Elective-I: APM 604 A/B	Knitting & Knitwear Technology / Home Textiles	3	0	0	3	3
6	Free Elective-II: APM 605 A/B/C	Basics of ERP / Database Management System / Basics of E-commerce	3	0	0	3	3
PRACTICAL							
7	APM 691	Lab on IT & CAD in Apparel	0	0	3	3	2
8	APM 692	Lab on Production Planning & Control in Apparel Industry	0	0	3	3	2
9	Apparel Elective Lab-I: APM 693 A/B	Lab on Knitting & Knitwear Technology / Lab on Testing of Home Textiles.	0	0	3	3	2
10	Free Elective Lab-II: APM 694 A/B/C	ERP Lab/ DBMS Lab / E-Commerce Lab	0	0	3	3	2

Syllabus for B.Tech(Apparel Production Management) up to Fourth Year

Revised Syllabus of B.Tech in APM for the students who were admitted in Academic Session 2010-2011)

Fourth Year – Seventh Semester

Sl No	Paper Code	Name of the Paper	Contact Hours / week				Cr. Point
			L	T	P	TOTAL	
THEORY							
1	APM 701	Physical & Chemical Testing of Garments	3	1	0	4	**3**
2	APM 702	Clothing and comfort Science	3	0	0	3	3
3	Apparel Elective-II: APM703 A/B	Elements of Fashion Designing / Apparel Accessories and Surface Ornamentation	3	0	0	3	3
4	Apparel Elective-III: APM 704 A/B	Protective Clothing / Smart Garments	3	0	0	3	3
5	Free Elective-III : APM 705 A / B /**C /D**	International Business & Documentation / Principles of Marketing & Market Research / **Introduction to Soft Computing/ Image Processing**	3	0	0	3	3
Total Theory			15	1	0	16	**15**
PRACTICAL							
6	HU-791	Group Discussion	0	0	3	3	2
7	APM-791	Lab on Physical & Chemical Testing of Garments.	0	0	3	3	2
8	Apparel Elective Lab-III : APM 792 A/B	Fashion Designing Lab / Garment Surface Ornamentation Lab	0	0	3	3	2
9	Free Elective Lab-III : APM 793 A/B/**C/D**	Assignments on International Business & Documentation / Assignments on Market Survey & Analysis / **Introduction to Soft Computing Lab / Image Processing Lab**	0	0	3	3	2
10	APM 794	Industrial Training of 30 days (Viva Voice on training Report)				2	**2**
11	**APM 795**	**Project Part-I**					**2**
Total Practical			0	0	12	14	**12**
Total Semester			15	1	12	30	**27**

Syllabus for B.Tech(Apparel Production Management) up to Fourth Year

Revised Syllabus of B.Tech in APM for the students who were admitted in Academic Session 2010-2011)

Fourth Year – Eighth Semester

Sl No	Paper Code	Name of the Paper	Contact Hours / week				Cr. Point
			L	T	P	TOTAL	
THEORY							
1	**HU801A HU801B**	A. Organisational Behaviour B. Project Management	2	0	0	2	2
2	Apparel Elective-IV: APM 801 A/B	Application of Industrial Engineering in Apparel Industry / Apparel Plant Management	3	0	0	3	3
3	Free Elective-IV : APM 802 A/B/C /D **/E /F**	Entrepreneurship Development / Retail Management & Visual Merchandising / Robotics & Control Engineering / Supply Chain Management / **Mechatronics / / Introduction to Biotechnology**	3	0	0	3	3
Total Theory			8	0	0	8	8
PRACTICAL							
4	APM 891 (Design Lab)	Apparel Product line designing & Portfolio Presentation	0	0	6	6	**4**
5	APM 892	Project	0	0	12	12	6
6	APM 893	**Grand viva**	0	0	**0**	**0**	**3**
Total Practical			0	0	20	20	**13**
Total Semester			8	0	20	28	**21**

Syllabus for B.Tech(Apparel Production Management) up to Fourth Year

Revised Syllabus of B.Tech in APM for the students who were admitted in Academic Session 2010-2011)

VALUES & ETHICS IN PROFESSION			
HU-301			
L	**T**	**P**	**Credits**
3	**0**	**0**	**3**

Serial No.	Chapters/Units	Description	Lectures in hour
1)	**Introduction**	Science, Technology and Engineering as knowledge and as Social and Professional Activities	3
2)	**Effects of Technological Growth:**	Rapid Technological growth and depletion of resources, Reports of the Club of Rome. Limits of growth: sustainable development	**2**
		Energy Crisis: Renewable Energy Resources.	**2**
		Environmental degradation and pollution, Eco-friendly Technologies, Environmental Regulations. Environmental Ethics	**2**
		Appropriate Technology Movement of Schumacher; later developments.	**2**
		Technology and developing notions. Problems of Technology transfer, Technology assessment impact analysis.	**2**
		Human Operator in Engineering projects and industries. Problems of man, machine, interaction, Impact of assembly line and automation. Human centered Technology.	**2**
3)	**Ethics of Profession**	Engineering profession: Ethical issues in Engineering practice, Conflicts between business demands and professional ideals. Social and ethical responsibilities of Technologists. Codes of professional ethics. Whistle blowing and beyond, Case studies.	**5**
4)	**Profession and Human Values**	Values Crisis in contemporary society	**2**
		Nature of values: Value Spectrum of a good life	**2**
		Psychological values: Integrated personality; mental health	**2**
		Societal values: The modern search for a good society, justice, democracy, secularism, rule of law, values in Indian Constitution.	**3**
		Aesthetic values: Perception and enjoyment of beauty, simplicity, clarity.	**2**
		Moral and ethical values: Nature of moral judgements; canons of ethics; ethics of virtue; ethics of duty; ethics of responsibility.	**4**
		Total Lectures=	**35**

Text Books and Articles:

1. Stephen H Unger, Controlling Technology: Ethics and the Responsible Engineers, John Wiley & Sons, New York 1994 (2nd Ed)
2. Deborah Johnson, Ethical Issues in Engineering, Prentice Hall, Englewood Cliffs, New Jersey 1991.
3. A N Tripathi, Human values in the Engineering Profession, Monograph published by IIM, Calcutta 1996.

PHYSICS-2			
PH- 301			
L	**T**	**P**	**Credits**
3	**1**	**0**	**4**

Serial No.	Chapters/Units	Description	Lectures in hour
1)	**Module 1:** Vector Calculus:	1.1 Physical significances of grad, div, curl. Line integral, surface integral, volume integral - physical examples in the context of electricity and magnetism and statements of Stokes theorem and Gauss theorem [No Proof]. Expression of grad, div, curl and Laplacian in Spherical and Cylindrical co-ordinates	**2**
2)	**Module 2 :** Electricity	2.1 Coulumbs law in vector form. Electrostatic field and its curl. Gauss's law in integral form and conversion to differential form . Electrostatic potential and field, Poisson's Eqn. Laplace's eqn (Application to Cartesian,Spherically and Cylindrically symmetric systems – effective 1D problems) Electric current, drift velocity, current density, continuity equation, steady current.	**5**
		2.2 Dielectrics-concept of polarization, the relation $D=\varepsilon 0E+P$, Polarizability. Electronic polarization and polarization in monoatomic and polyatomic gases.	**3**
3)	**Module 3:** Magnetostatics & Time Varying Field:	3. Lorentz force, force on a small current element placed in a magnetic field. Biot-Savart law and its applications, divergence of magnetic field, vector potential, Ampere's law in integral form and conversion to differential form. Faraday's law of electro-magnetic induction in integral form and conversion to differential form	**3**
4)	**Module 4:** Electromagnetic Theory:	4.1 Concept of displacement current Maxwell's field equations, Maxwell's wave equation and its solution for free space. E.M. wave in a charge free conducting media, Skin depth, physical significance of Skin Depth, E.M. energy flow, & Poynting Vector.	**6**

5)	**Module 5:** Quantum Mechanics:	5.1 Generalised coordinates, Lagrange's Equation of motion and Lagrangian, generalised force potential, momenta and energy. Hamilton's Equation of motion and Hamiltonian. Properties of Hamilton and Hamilton's equation of motion. *Course should be discussed along with physical problems of 1-D motion*	**4**
		5.2 Concept of probability and probability density, operators, commutator. Formulation of quantum mechanics and Basic postulates, Operator correspondence, Time dependent Schrodinger's equation, formulation of time independent Schrodinger's equation by method of separation of variables, Physical interpretation of wave function ψ (normalization and probability interpretation), Expectation values, Application of Schrodinger equation – Particle in an infinite square well potential (1-D and 3-D potential well), Discussion on degenerate levels.	**9**
6)	**Module 6:** Statistical Mechanics:	6.1 Concept of energy levels and energy states. Microstates, macrostates and thermodynamic probability, equilibrium macrostate. MB, FD, BE statistics (No deduction necessary), fermions, bosons (definitions in terms of spin, examples), physical significance and application, classical limits of quantum statistics Fermi distribution at zero & non-zero temperature, Calculation of Fermi level in metals, also total energy at absolute zero of temperature and total number of particles, Bose-Einstein statistics – Planck's law of blackbody radiation	**7**
		Total Lectures=	**39**

Text Books and Articles:
1. Perspectives of Modern Physics: A. Baiser
2. Modern Physics and Quantum Mechanics E.E. Anderson
2.Refresher course in B.Sc. Physics (Vol. III): C.L. Arora
3.Fundamentlas of Physics (Vol. III): Haliday, Resnick & Krane
4.Engineering Physics: R.K. Kar
5.Classical Mechanics: a) A.K. Roychaudhuri
b) R.G. Takwal & P.S. Puranic
6. Quantum Mechanics: a) Eisberg & Resnic ;b) A.K. Ghatak & S. Lokanathan;c) S.N. Ghoshal
7.Statistical Mechanics and Thermal Physics: a) Sears and Salinger;b) Avijit Lahiri;c) Evelyn Guha
8.Solid Sate Physics: a) A.J. Dekker;b) C. Kittel;c) Aschroft & Mermin;d) S.O. Pillai

BASIC ENVIRONMENTAL ENGINEERING AND ELEMENTARY BIOLOGY

CH-301

L	**T**	**P**	**Credits**
3	**0**	**0**	**3**

Serial No.	Chapters/Units	Description	**Lectures in hour**
1)	**General**	Basic ideas of environment, basic concepts, man, society & environment, their interrelationship.	**1**
		Mathematics of population growth and associated problems, Importance of population study in environmental engineering, definition of resource, types of resource, renewable, non-renewable, potentially renewable, effect of excessive use vis-a-vis population growth, Sustainable Development.	**2**
		Materials balance: Steady state conservation system, steady state system with non conservative pollutants, step function.	**1**
		Environmental degradation: Natural environmental Hazards like Flood, earthquake, Landslide-causes, effects and control/management; Anthropogenic degradation like Acid rain-cause, effects and control. Nature and scope of Environmental Science and Engineering.	**2**
2)	**Ecology**	Elements of ecology: System, open system, closed system, definition of ecology, species, population, community, definition of ecosystem- components types and function.	**1**
		Structure and function of the following ecosystem: Forest ecosystem, Grassland ecosystem, Desert ecosystem,Aquatic ecosystems, Mangrove ecosystem (special reference to Sundar ban); Food chain [definition and one example of each food chain], Food web.	**2**
		Biogeochemical Cycle- definition, significance, flow chart of different cycles with only elementary reaction [Oxygen, carbon, Nitrogen, Phosphate, Sulphur].	**1**
		Biodiversity- types, importance, Endemic species, Biodiversity Hot-spot, Threats to biodiversity, Conservation of biodiversity.	**2**
3)	**Air pollution and control**	Atmospheric Composition: Troposphere, Stratosphere, Mesosphere, Thermosphere, Tropopause and Mesopause.	**1**
		Energy balance: Conductive and Convective heat transfer, radiation heat transfer, simple global temperature model [Earth as a black body, earth as albedo], Problems	**1**
		Green house effects: Definition, impact of greenhouse gases on the global climate and consequently on sea water level, agriculture and marine food.Global warming and its consequence, Control of Global warming. Earth's heat budget.	**1**

		Lapse rate: Ambient lapse rate Adiabatic lapse rate, atmospheric stability, temperature inversion (radiation inversion).	**2**
		Atmospheric dispersion: Maximum mixing depth, ventilation coefficient, effective stack height, smokestack plumes and Gaussian plume model.	**2**
		Definition of pollutants and contaminants, Primary and secondary pollutants: emission standard, criteria pollutant. Sources and effect of different air pollutants- Suspended particulate matter, oxides of carbon, oxides of nitrogen, oxides of sulphur, particulate, PAN.	**2**
		Smog, Photochemical smog and London smog. Depletion Ozone layer: CFC, destruction of ozone layer by CFC, impact of other green house gases, effect of ozone modification.	**1**
		Standards and control measures: Industrial, commercial and residential air quality standard, control measure (ESP. cyclone separator, bag house, catalytic converter, scrubber (ventury), Statement with brief reference).	**1**
4)	**Water Pollution and Control**	Hydrosphere, Hydrological cycle and Natural water. Pollutants of water, their origin and effects: Oxygen demanding wastes, pathogens, nutrients, Salts, thermal application, heavy metals, pesticides, volatile organic compounds.	**2**
		River/Lake/ground water pollution: River: DO, 5 day BOD test, Seeded BOD test, BOD reaction rate constants, Effect of oxygen demanding wastes on river[deoxygenation, reaeration], COD, Oil, Greases, pH.	**2**
		Lake: Eutrophication [Definition, source and effect].	**1**
		Ground water: Aquifers, hydraulic gradient, ground water flow (Definition only)	**1**
		Standard and control: Waste water standard [BOD, COD, Oil, Grease], Water Treatment system [coagulation and flocculation, sedimentation and filtration, disinfection, hardness and alkalinity, softening] Waste water treatment system, primary and secondary treatments [Trickling filters, rotating biological contractor, Activated sludge, sludge treatment, oxidation ponds] tertiary treatment definition.	**2**
		Water pollution due to the toxic elements and their biochemical effects: Lead, Mercury, Cadmium, and Arsenic	**1**
5)	**Land Pollution**	Lithosphere; Internal structure of earth, rock and soil	**1**
		Solid Waste: Municipal, industrial, commercial, agricultural, domestic, pathological and hazardous solid wastes; Recovery and disposal method- Open dumping, Land filling, incineration, composting, recycling. Solid waste management and control (hazardous and biomedical waste).	**2**
6)	**Noise Pollution**	Definition of noise, effect of noise pollution, noise classification [Transport noise, occupational noise, neighbourhood noise]	**1**
		Definition of noise frequency, noise pressure, noise intensity, noise threshold limit value, equivalent noise level, *L*10 (18hr Index) , *n Ld* . Noise pollution control.	**1**
7)	**Environmental Management**	Environmental impact assessment, Environmental Audit, Environmental laws and protection act of India, Different international environmental treaty/ agreement/ protocol.	**2**
		Total Lectures=	**39**

Text Books and Articles:

1. Masters, G. M., "Introduction to Environmental Engineering and Science", Prentice-Hall of India Pvt. Ltd., 1991.
2. De, A. K., "Environmental Chemistry", New Age International.

INSTRUMENTATION & CONTROL			
TT-301			
L	**T**	**P**	**Credits**
3	**0**	**0**	**3**

Serial No.	Chapters/Units	Description	**Lectures in hour**
8)	Basic concepts of measurements	Introduction, idea of a generalized measurement system, basic characteristics of measuring devices - accuracy, precision error, hysteresis, resolution, threshold , repeatability , reliability , span , dynamic accuracy, calibration; Transducer and Sensors: classification, basic requirements;	4
9)	Displacement measurement	Idea of servo potentiometers , differential inductors and transformers , capacitive , shaft encoders, hall effect devices , proximity devices and digital transducers .	**3**
10)	Velocity measurement	D.C.Tachogenerators, A.C. drag-cup tachogenerators, digital velocity transducers.	**2**
11)	Temperature measurement	Introduction, concept of transmitters, liquid in glass thermometers, liquid filled systems, Resistance type temperature sensors, thermistors, thermocouples, solid state sensors, quartz	**3**

		thermometers, temperature measurement by radiation method, optical pyrometers.	
12)	Force and torque	Introduction, strain gauges and load cells, concept of different configurations, digital force transducers, concept of electronic weighing systems, concept of torque measurement	**4**
13)	Pressure measurement	Introduction, diaphragms, capsule, Bourdon tube, potentiometric devices, strain gauges devices, LVDT & capacitive devices, solid state devices (piezo-junction & piezo-resistance).	**3**
14)	Special measurements	Idea of transducers for measurement of .pH, humidity, density and thickness	**3**
15)	Measurement accessories	Brief concept of instrumentation amplifiers, signal generation and processing, data acquisition and conversion, input-output devices and displays.	**4**
16)	General test equipment	Brief review of general-purpose electronic test equipment - CRO, digital multimeters, counters, signal generators, regulated power supplies.	**4**
17)	Control systems and engineering	Introduction, open and closed loop systems, idea of mathematical modelling of simple physical systems, concept of transfer functions, types of control action - ON-OFF, proportional, derivative, integral and PID, concept of time response analysis with respect to instrumentation systems - zero order systems, first order systems and its step, ramp frequency response, second order systems and its step, ramp response.	**10**
		Total Lectures=	**40**

Text Books and Articles:

1. Instrumentation & Control by Rangan, Mani & Sharma,
2. Transducers & Instrumentation by D.V.S. Murty, PHI Learning Pvt. Ltd.
3. Control Systems Engineering by Nagrath and Gopal, New Age International
4.Doeblin E. O., Measuremennt Systems : Application and Design, 4th edition McGraw Hill , NewYork, 1992.
5. Patranabis D, Principle of Industrial Instrumentation, 2nd edition Tata McGraw Hill , NewDelhi,1997.
6. Ogata K., 2002, Modern Control Engineering 4th Ed., Prentice Hall .
7.Kuo B.C., Golnaraghi F., 2003, Automatic Control Systems, 8th Ed., Wiley .

BASICS OF MECHANICAL PROCESSING OF TEXTILES

APM-301

L	**T**	**P**	**Credits**
3	**1**	**0**	**4**

Serial No.	Chapters/Units	Description	Lectures in hour
1)	Introduction to Textile Fibres	Introduction of textile fibers: Classification of textile fibers-Physical and chemical properties of fibers and their uses-cotton, jute, wool,silk,viscose,nylon,polyester,acrylic,polypropylene, introduction of microfibers. Texturisation, definition and types, properties of textured yarn-its uses. Comparison of fiber properties in context of suitability for different types of Garments in different climatic condition.	**4**
2)	Introduction to Yarn Manufacturing Systems	Yarn manufacturing Process: Ginning-objectives, Objectives and process sequence – Blowroom, carding, Drawing, combing, simplex, ringframe. Objectives and basic principles of Rotor spinning, airjet spinning, friction spinning, compact spinning. Comparison of yarn properties produced in the above processes. Ply yarn and single yarn characteristics	**5**
3)	Sewing Thread	Sewing thread manufacture: fibres used and essential quality particulars of sewing thread, process sequence and Manufacturing details of sewing thread.	**2**
4)	Introduction and principles of Weaving Mechanisms.	Introduction to weaving process: woven fabric formation: weaving preparatory-objectives, process sequence.Looms-brief study of primary motions and secondary motions. Passage of material in loom .Basic introduction and objective of dobby, jacquard, shuttleless looms airjet looms, water jet looms, and rapier looms.	**8**
5)	Structure of Different Woven Fabrics.	Woven structures: Definition of design,-draft-Peg Plan- construction of Plain weave- its derivatives-Twill weave,-drill-Gabardine-Pointed twill-satin and sateen weaves-Honey comb-Huckaback, Construction particulars for cambric, voile, poplin, denim and chambray- Uses of these structured fabrics.	**6**
6)	Yarn Testing Methods.	Testing of yarn: yarn –yarn numbering systems-method of count determination –Physical balance-Beesely balance-Single yarn strength tester-Lea tester-CSP-Corrected CSP-yarn crimp-shirley crimp tester-yarn appearance tester-ASTM grades, Evenness, Hairiness, USter Evenness Tester, Uster Hairiness tester.	**5**
7)	Fabric Testing Methods	Fabrics: Strength testing-tensile strength-tearing strength-Bursting strength-Abrasion testing-pill testing thickness. Air permeability testing . Shirley Thickness tester-drape-drape meter- Low stress mechanical properties by KES and FAST Testing of shade variation –Testing color fastness washing fastness-Light-rubbing-Importance of these on Garments. Computerized fabric inspection system-Tailorability of woven and knitted fabrics	**5**

8)	Garment Testing	Garment testing: Seam slippage and Seam strength testing, Shrinkage testing, Button strength testing, Zipper testing.	**2**
9)	Introduction To Knitting Process	Introduction to knitting process: knitting, definition, classification, comparison of basic properties of woven and knitted fabrics. Basic principles and introduction of Warp and Weft Knitting Machine.	**3**
		Total Lectures=	**40**

Text Books:

1.Booth .J.E Principle of textile testing,Butter worths,London,1983
2.Grosicki Z.J. Watsons Advanced Textile Design and colour'' Newness Butterworths,London,1975
3.Spencer 'Knitting technology',Pergamon Bros,Oxford,1982
4.Ajgaonkar D.B.'Principle of knitting'Universal publishing corpn,1998
5.Ormerod A and Sondhelm W.S ''Weaving Technology and operations ''the textile institute 1995
6.Ajgaonkar .D.B., 'Principles of knitting' Universal Publishing corporation,1998
7.Corbmann.B.P Textiles : fibre to fabric' Mcgraw Hill Inc. Singapore 1986
8.Spencer D.J. 'knitting technology'Pergamon Press,Oxford 1982
9.Jacob Solinger ,'Apparel manufacturing Analysis' textile Book publisher, New York, 1988
10. .Sreenivasamoorthy .H.V 'Introduction to textile fibres'ATA ,1987

APPAREL PRODUCTION – I

APM-302

L	T	P	Credits
3	**1**	**0**	**4**

Serial No.	Chapters/Units	Description	Lectures in hour
1)	Theory of Human Figures.	Anatomy: proportion and disproportion of human figure. Figure types and variations- normal figures measurements And its importance-Standard body measurements for children, ladies and gents. Sequence of taking body measurements for various age groups and sex. Recording of measurements, standardization of body measurements.	**4**
2)	Introduction to Pattern Drafting	Drafting: Consideration while cutting paper patterns-preparation of paper patterns, importance of paper patterns- types-Principles for pattern drafting-Advantages.Layout-open layout- Lengthwise layout Crosswise layout-Double layout-combination layout-principles of layout-laying of different patterns on different types of fabric. Drafting basic pattern for bodice, sleeve, collar, yoke , and skirt..	**10**
3)	Style Reading	Style reading:Preparation of dressform and draping fabric for various garments-Advantages of draping style reading of basic bodice, different types of collars, sleeves, cuffs pockets and plackets.	**5**
4)	Concept of Garment fit and Pattern Alterations.	Flat pattern techniques: Fitting and pattern alteration : fitting-definition-principles of a good fit. Causes for poor fit ,checking the fit of a garment, solving fitting problems in various garments-basic principles, fitting techniques Pattern Alterations: Importance of altering patterns .principles of pattern alterations, common pattern ,alterations In a blouse. Alteration of pattern for irregular figures.	**10**
5)	Stitches	Stitches: Definition, Classification –constructive stitches-temporary and permanent stitches standards for good stitches.	**3**
6)	Seams	Seams: definition, types of seams and seam finishes. their suitability and application in various garments. hem finish	**3**
7)	Fullness	Fullness: definition, methods of introducing fullness in garments-gathers, pleats, flares, flounces, smocking tucks & darts, methods of controlling fullness.	**5**
		Total Lectures=	**40**

Text Books:

1.Mary Mathews 'Practical clothing construction' Thomson & Co. Madras,1974 Cock V.
2.'Dress making simplified' Blackwell science,1987

PHYSICS LAB-2

PH-391

L	T	P	C

0	0	3	2

Contacts: (3P)
Credit: (2)

Group 1: Experiments on Electricity and Mangentism
1. Determination of dielectric constant of a given dielectric material.
2. Determination of resistance of ballistic galvanometer by half deflection method and study of variation of logarithmic decrement with series resistance.
3. Determination of the thermo-electric power at a certain temperature of the given thermocouple.
4. Determination of specific charge (e/m) of electron by J.J. Thomson's method.
Group 2: Quantum Physics
5. Determination of Planck's constant using photocell.
6. Determination of Lande'g factor using Electron spin resonance spetrometer.
7. Determination of Stefan's radiation constant
8. Verification of Bohr's atomic orbital theory through Frank-Hertz experiment.
9. Determination of Rydberg constant by studying Hydrogen/ Helium spectrum
Group 3: Modern Physics
10. Determination of Hall co-efficient of semiconductors.
11. Determination of band gap of semiconductors.
12. To study current-voltage characteristics, load response, areal characteristics and spectral response of photo voltaic solar cells.
a) A candidate is required to perform 3 experiments taking one from each group. Initiative should be taken so that most of the Experiments are covered in a college in the distribution mentioned above. Emphasis should be given on the estimation of error in the data taken.
b) In addition a student should perform one more experiments where he/she will have to transducer the output of any of the above experiments or the experiment mentioned in c] into electrical voltage and collect the data in a computer using phoenix or similar interface.
c) Innovative experiment: One more experiment designed by the student or the concerned teacher or both.
Note:
i. Failure to perform each experiment mentioned in b] and c] should be compensated by *two* experiments mentioned in the above list.
ii. At the end of the semester report should sent to the board of studies regarding experiments, actually performed by the college, mentioned in b] and c]
iii. Experiment in b] and c] can be coupled and parts of a single experiment.

INSTRUMENTATION & CONTROL LAB.
TT-391

L	T	P	C
0	0	3	2

Contacts: (3P)
Credit: (2)
The following list is in no way exhaustive. Additional laboratory work or experiments can be planned to consolidate the theoretical work and to emphasize the activities for doing rather than the knowing.

1) Study of Displacement measurement
2) Study of Velocity measurement
3) Study of Temperature measurement
4) Study of Force and torque
5) Study of Pressure measurement
6) Study of Relative Humidity, PH measurements
7) Study of Inductive and Optical Proximity sensors
8) Study of General test equipment: CRO, digital multimeters, counters, signal generators, Stroboscope, Photo Diodes ,regulated power supplies.

Study of Control systems and engineering

9) Familiarization with MATLAB control system tool box & Simulink tool box
10) Determination of Step response for first order and second order system with unity feedback on CRO and calculation of control system specification: Time constant, percentage peak overshoot, settling time from the response.
11) Determination of Step response and Impulse response for type-0, type-1 and type-2 system with unity feedback using MATLAB/PSPICE.
12) Determination of Root locus, BODE plot, Nyquist plot for 2nd order system & determination of different control system specification from the plot using MATLAB.
13) Determination of PI, PD and PID controller action for first order simulated processes.

14) Study of practical position control system and determination of control system specification for different system parameters.

TEXTILE & GARMENT TESTING LAB PRACTICAL
APM-391

L	T	P	C
0	0	3	2

Contacts : (3P)
Credits : (2)

The following list is in no way exhaustive. Additional laboratory work or experiments can be planned to consolidate the theoretical work and to emphasize the activities for doing rather than the knowing.

List of Experiments:
Yarn testing: Count determination of yarn , Single yarn/ply yarn twist testing , Single yarn/lea strength
Fabric Testing: Fabric tesile/tearing strength; bursting strength, fabric abrasion resistance, drape, stiffness, crease recovery, pilling test, Air permeability; Fabric analysis: woven fabric analysis-weave –draft-peg plan Warp particulars-materials warp-ends per inch-count, direction & amount of twist; weft particulars-material weft, picks per inch, count, direction & amount of twist, crimp%, cover factor; total cover factor knitted fabric analysis- structure, Wales/inch-coarse/inch-loop length, coarse/inch loop length, coarse length, stich density-tightness factor;
Garment testing: Seam slippage and Seam strength testing, Shrinkage testing, Button strength testing, and Zipper testing. , Garment-checking procedure , Interlinings-Peel bond strength .

APPAREL PRODUCTION LAB – I
APM-392

L	T	P	C
0	0	3	2

Contacts : (3P)
Credits : (2)

The following list is in no way exhaustive. Additional laboratory work or experiments can be planned to consolidate the theoretical work and to emphasize the activities for doing rather than the knowing.

List of Experiments:
1.Prepare basic patterns and do variations
2.Grade the basic patters
3.Construct,finish and press the same using the drafted patterns
A.Bodice
B.Cuffs
C.Sleeves.
D.Yokes
E.Pockets
F.Collars
G.Plackets
H.Skirts

SEMESTER-IV

NUMERICAL METHODS

Syllabus for B.Tech(Apparel Production Management) up to Fourth Year

Revised Syllabus of B.Tech in APM for the students who were admitted in Academic Session 2010-2011)

M (CS)-401			
L	**T**	**P**	**Credits**
2	**0**	**0**	**2**

Serial No.	Chapters/Units	Description	Lectures in hour
1)	Approximation in numerical computation:	Truncation and rounding errors, Fixed and floating-point arithmetic, Propagation of errors.	4
2)	Interpolation:	Newton forward & backward interpolation, Lagrange's and Newton's divided difference Interpolation.	**5**
3)	Numerical integration:	Trapezoidal rule, Simpson's 1/3 rule, Weddle's rule.	**3**
4)	Numerical solution of a system of linear equations:	Gauss elimination method, Matrix inversion, LU Factorization method, Gauss-Jacobi and Gauss-Seidel iterative methods.	**6**
5)	Numerical solution of Algebraic equation:	Bisection method, Secant method, Regula-Falsi method, Newton-Raphson method.	**4**
6)	Numerical solution of ordinary differential equation:	Taylor's series method, Euler's method, Runge-Kutta methods, Predictor-Corrector methods and Finite Difference method.	**6**
		Total Lectures=	**28**

Text Books:

1. C.Xavier: C Language and Numerical Methods.
2. Dutta & Jana: Introductory Numerical Analysis.
3. J.B.Scarborough: Numerical Mathematical Analysis.
4. Jain, Iyengar , & Jain: Numerical Methods (Problems and Solution).

References:

1. Balagurusamy: Numerical Methods, Scitech.
2. Baburam: Numerical Methods, Pearson Education.
3. N. Dutta: Computer Programming & Numerical Analysis, Universities Press.
4. Soumen Guha & Rajesh Srivastava: Numerical Methods, OUP.
5. Srimanta Pal: Numerical Methods, OUP.

MATHEMATICS-3			
M-402			
L	**T**	**P**	**Credits**
3	**1**	**0**	**4**

Note 1: The whole syllabus has been divided into five modules.

Note 2: Structure of the question paper

There will be three groups in the question paper. In Group A, there will be one set of multiple choice type questions spreading the entire syllabus from which 10 questions (each carrying one mark) are to be answered. From Group B, three questions (each carrying 5 marks) are to be answered out of a set of questions covering all the three modules. Three questions (each carrying 15 marks) are to be answered from Group C. Each question of Group C will have two or three parts covering not more than two modules. Sufficient questions should to be set covering the whole syllabus for alternatives.

Serial No.	Chapters/Units	Description	Lectures in hour
1)	Module I Fourier Series:	Introduction, Periodic functions, Even and odd functions, Special waveforms, Eulers formulae for Fouriers coefficients, Dirichlet's conditions and sum of the Fourier series, Half range Fourier series, Parseval's identity (Statement only). ***Fourier Transform:*** Fourier Transform and its properties, Inverse Fourier Transform (Statement only), Fourier Transform of derivatives (Statement only), Convolution theorem (Statement only). Related problems.	**8**
2)	Module II Calculus of Complex variable:	Functions, Limit and Continuity, Analytic functions, Cauchy-Riemann equations (Statement only) and related problems, Analytic continuation, Complex integration and Cauchy's theorem (Statement only), Cauchy's integral formula (Statement only), Taylors and Laurent series, Zeros of an analytic function, Poles, Essential singularities, Residue theorem (Statement only) and its application to evaluation of definite integrals (Elementary cases only), Introduction to Conformal Mapping.	**12**
3)	Module III Probability:	Axiomatic definition of probability, Conditional probability, Independent events, Related problems, Bayes theorem (Statement only) & its application. One dimensional random variable, Probability distributions-discrete and continuous, Expectation, Binomial, Poisson, Uniform, Exponential and Normal distribution, Problems on	**12**

		Binomial, Poisson and Normal distribution only.	
4)	Module IV Partial Differential Equations:	Solution of one dimensional wave equation, One dimensional heat-conduction equation, Laplace equation in two dimension by the methods of 1: Separation of variables 2: Integral Transforms (Laplace and Fourier Transforms)	**6**
5)	Module V Series solution of Ordinary Differential equation:	Introduction, validity of series solution of an ordinary differential equation, general method to solve equation of the type: Poy// + P1y/+P2y = 0, related problems, Bessel's equation, properties of Bessel's function, Recurrenceformula for Bessel's function of first kind, Legendre's equation, Legendre function; Recurrence formula for Legendre function (Pn(x)); Orthogonality relation.	**10**
		Total Lectures=	**48**

Text Books:

1. Brown J.W and Churchill R.V: Complex Variables and Applications, McGraw-Hill.
2. Das N.G.: Statistical Methods, TMH.
3. Grewal B S: Higher Engineering Mathematics, Khanna Publishers.
4. James G.: Advanced Modern Engineering Mathematics, Pearson Education.
5. Lipschutz S., and Lipson M.L.: Probability (Schaum's Outline Series), TMH.

References:

1. Bhamra K. S.: Partial Differential Equations: An introductory treatment with applications, PHI
2. Dutta Debashis: Textbook of Engineering Mathematics, New Age International Publishers.
3. Kreyzig E.: Advanced Engineering Mathematics, John Wiley and Sons.
4. Potter M.C, Goldberg J.L and Aboufadel E.F.: Advanced Engineering Mathematics, OUP.
5. Ramana B.V.: Higher Engineering Mathematics, TMH.

THEORY OF MACHINES

TT-401

L	T	P	Credits
3	**0**	**0**	**3**

Serial No.	Chapters/Units	Description	Lectures in hour
1)	Basic concepts	Kinematics and Kinetics ;Introduction to mechanisms; Difference between Machine , Mechanism and Structure; Classification of Pairs of Elements; Links, Frames and Kinematic Chains; Pairs, Higher Pairs, Lower Pairs and Linkages Types of joints in a chain; Four & six-bar linkage: motions of links, Grashof's criterion of movability; Degrees of freedom for plane Mechanisms, Gruebler's criterion for plane mechanism; Introduction to Kinematic inversions.	**6**
2)	Velocity and Acceleration in Mechanisms	Velocity analysis in Mechanisms: Relative velocity method – slider crank mechanism, four bar mechanism, Crank and slotted lever mechanism; Instantaneous centre method –Kennedy's theorem; Acceleration analysis: Acceleration Images, Klein's construction, analytical expression of velocity & acceleration.	**5**
3)	Mechanisms with Lower Pairs	Study of lower pair Mechanisms- Pantograph, Parallel linkage mechanisms, Straight line mechanism, Hooks joint.	**3**
4)	Belt, Rope and Chain Drives	Belt Drives, Rope Drives and Chain Drives: -description and analysis.	**4**
5)	Cams	Introduction, Cam Mechanisms, Classification of Cam Mechanisms; Follower Arrangement- In-line, Offset ;Cam Shape -Plate cam or disk cam, Grooved cam or closed cam , Cylindrical cam or barrel cam ,End cam ;Constraints on the Follower; Cam Nomenclature- Trace point, Pitch curve, Working curve, Pitch circle, Prime circle (reference circle, Base circle, Stroke or throw, Follower displacement, Pressure angle ;Motion events- Constant Velocity Motion, Constant Acceleration Motion, Harmonic Motion , cycloidal motion ; Cam Design- Parameters, Cam profile design principle, Design equations , manual drawing examples of some textile cams.	**5**
6)	Gears	Gear terminology, Laws of gearing, types of gears – Spur, Bevel, Helical, Worm; tooth profile, interference; Gear trains – simple, compound, epicyclic gear train; Speed-torque analysis of gear trains.	**5**

7)	Friction & other Mechanisms	1.Introduction., 2.Efficiency of Inclined Plane.,3. Screw Friction.,4. Screw Jack.,5. Friction of a V-thread. ,6. Friction in different types of bearing - Friction Circle. ,7. Brakes and Clutches.1. Ratchet Mechanisms, Intermittent Gearing, 2. The Geneva Wheel, 3. The Universal Joint,4. Flywheel.	**6**
8)	Balancing of Masses	Introduction to Balancing of Rotating Masses and Balancing of Reciprocating Masses.	
9)	Vibrations	a) Longitudinal and Transverse Vibrations: Introduction.,Terms Used in Vibratory Motion., Types of Vibratory Motion., Types of Free Vibrations., Natural Frequency of Free Longitudinal Vibrations. , Natural Frequency of Free Transverse Vibrations. , b)Introduction to Torsional Vibrations	**4**
		Total Lectures=	**40**

Text Books:

1. Theory of Machines – R.S.Khurmi &.J.K.Gupta, S. Chand Publisher, Delhi
2. Theory of Machines – S S Rattan, Tata McGraw Hill
3. Theory of Mechanisms & Machines – A.Ghosh & A.K.Mallik, AEWP
4. Design of Machinery – R.L.Norton, Tata McGraw Hill
5. Mechanism & Machine Theory – Rao, R.V. Dukkipati, Wiley
6. An introduction to textile mechanisms. Author, P. Grosberg. Publisher, Benn, 1968
7. Theory of Machines and Mechanisms, by Shigley, J. E. and Uicker, J. J., Jr., McGraw-Hill, New York, 1980.

BASICS OF CHEMICAL PROCESSING OF TEXTILES

APM-401

L	T	P	Credits
3	**1**	0	**4**

Serial No.	Chapters/Units	Description	Lectures in hour
1)	Introduction to Preparatory Wet Processes of Textile Materials.	Preparatory process in wet processing: sequence of process used in textile wet processing (brief definition)-Singeing-type of singeing, desizing- type of desizing, Enzyme desizing method –scouring of cotton and wool - method of kier boiling, degumming- bleaching- bleaching of all fibres with hypocholorites, peroxide and chlorite. Continuous scouring and peroxide bleaching mercerizing- method of mercerizing for yarn and fabric.	**12**
2)	Basic Principles of Dyeing .	Classification of dyes, brief principle of application on various fibres, Dyeing methods of cellulosic fibre with direct, reactive, sulphur and vat dyes, dyeing of protein fibres with acid dyes, dyeing of synthetic fibres with acid ,cationic and disperse dyes.	**8**
3)	Principles of different Dyeing Techniques for Textile Materials	Comparison between Fibre dyeing , Yarn dyeing , fabric dyeing and Garment Dyeing. Introduction to Dyeing machines - hank dyeing, jigger dyeing, winch dyeing, denim dyeing and soft flow dyeing machines, pad-steam and pad-thermosol methods. Modern Garment Dyeing Machines. Concept of space dyeing.	**8**
4)	Principles of different Printing Techniques for Textile Materials.	Printing of textiles: Difference between dyeing and printing- methods and styles of printing- printing of cellulosic fibres with pigment and reactive dyes, Silk and nylon with acid dyes, polyester with disperse dyes. Methods of printing -screen printing-roller printing-rotary screen printing- -flock printing- -transfer printing- batik, tie and dye – steaming and curing. Concept of Ikat Printing.	**12**
		Total Lectures=	**40**

Text Books:

1. Shenai V.A ‘Technology of textile processing’ Vol III,V,VII,&VIII Shevak.Publications 1981
2. Datya K.V.,Vaidya AA ‘Chemical processing of synthetic fibres and blends’’John Wiley&Sons,Newyork,1984
3. Peter R.H.’textile chemistry’ Vol I & Vol II extile institute,Manchester 1970
4. Roy Choudhury A./K. “Textile Preparation and Dyeing” Science Publishers USA and Oxford & IBH, India.
5. Roy Choudhury A./K. “Modern Concept of Colour and Appearance” Science Publishers USA and Oxford & IBH, India.
6. Peter R.H.’textile chemistry’ Vol I & Vol II extile institute,Manchester 1970
7. Miles L.W.C ‘Textile Printing’ dyers Pub co. UK 1981
8. Jacob Solinger ,’ Apparel manufacturing Analysis’ textile Book publisher, New york,1988
9. W D Schindler and P J Hauser, 2004. Chemical Finishing of Textiles (Cambridge, England: Woodhead)
10. M Lewin and S B Sello, Ed. Functional Finishes, Handbook of Fibre Science and Technology: Volume II, Part A and B (New York, USA: Marcel Dekker)
11. J.T. Marsh, An introduction to textile finishing, B.I. Publications, India, 1979.
12. A.J. Hall, Textile finishing, Heywoods, London, 1966.

APPAREL PRODUCTION - II

APM-402

Syllabus for B.Tech(Apparel Production Management) up to Fourth Year

Revised Syllabus of B.Tech in APM for the students who were admitted in Academic Session 2010-2011)

L	T	P	Credits
3	1	0	4

Serial No.	Chapters/Units	Description	Lectures in hour
1)	Dart Manipulation and Pattern Balancing.	Pattern making by manipulation of dart - elementary and advanced dart manipulation. Manipulation as seen through existing suppression points (bust points), away from suppression points, as gathers or darts. Methods: Slash and spread method, pivot method, difference between permanent pattern (draft) working patterns and production patterns. Importance of drill hole marks in the darts; seam allowances and its importance. Importance of notches: balance marks and grain lines. Basic principles and methodologies used to draft standard size block patterns for men, women and kids wear -viz., shirts, pants, skirts, blouses, jackets, dresses etc.,	**12**
2)	Sleeve Construction.	Sleeves: Making and constructing sleeves , set-in sleeves, sleeves with bodice style and sleeveless styles. Construction of sleeve block - crown height and its relationship with the fit of garment. Introduction to Silhouettes of the sleeves.	**5**
3)	Neck Finishings.	Neck Finishes: definition of finishes, facing, binding, fitted facing, bias-true bias-joining bias strip	**2**
4)	Skirt and Trousers	Skirts: its types, adding fullness and controlling fullness, finishing skirts Trouser: Components and Patterns Blocks of Trousers. Different types.	**7**
5)	Grading	Principles and technology of grading. Standard size block patterns - grading techniques for half-size and full-size patterns. Pattern Grading:Master grades-basic back grading-basic front grading-basic sleeve grading-basic collar grading-basic facing grading Grading of one piece collar and lapel-grading of set in sleeves-principles of grading full raglan sleeve principles Magyar sleeves and Kimono sleeves. Multitrack grading: track grading-simplified two dimensional system-trouser grading-Jacket. grading-shirt sizing and grading-Men's waistcoat-grading and size charts.	**10**
6)	Introduction to Marker Planning and Lay Lot Planning	Definition of Marker , Marker Efficiency , Principles of Making Marker , Concept of Cut Planning and Spread Planning / Lay Lot Planning.	**4**
		Total Lectures=	**40**

Text Books:

1.Struin Pamela ,"Pattern drafting for Dress Making"Augustan Delhi 1995
2.Martin M. Shoben and Janet P.ward,"Pattern cutting and Make for outerwear"Butter worth heinmann Ltd,Oxford 1987
3.Alorich Winifred "Metric pattern Cutting",Blackwell science ,London,1995
4.Mary Mathews ,'Practical clothing construction' Thomson &co.,madras,1974.
5.Cock V,.'Dress Making Simplified' Black science, 1987
6.Patric taylor J., Marti shoben M, 'grading for the fashion Industry' Stanley Thomas(publishers)Ltd.1990
7.Cartis Irving E.,'Fundamentals principles of pattern making for misses and women's garments'New york,FIT,1987
8.Handrod Jack .,'Profesional pattern grading for women's,men's and children's apparel', redendo bench plycon press,1980
9.Erwin M.D. and Kinchen,' Clothing for moderns' McMillan company New york 1970
10.Dangaji and desh panda .,'Basic process and clothing construction orient' longnians,1970
11.Lang R.M., and Webster J., 'stitches and seams',The textile institute 1998

TECHNICAL REPORT WRITING & LANGUAGE LAB PRACTICE

L	T	P	C
0	0	3	2

Code: HU-481
Credit-2

Guidelines for Course Execution:

Objectives of this Course: This course has been designed:

1. To inculcate a sense of confidence in the students.
2. To help them become good communicators both socially and professionally.
3. To assist them to enhance their power of Technical Communication.

Detailed Course Outlines:

A. Technical Report Writing : 2L+6P

1. Report Types (Organizational / Commercial / Business / Project)
2. Report Format & Organization of Writing Materials

3. Report Writing (Practice Sessions & Workshops)

B. Language Laboratory Practice

1. Introductory Lecture to help the students get a clear idea of Technical Communication & the need of Language Laboratory
Practice Sessions 2L
2. Conversation Practice Sessions: (To be done as real life interactions) 2L+4P

a) Training the students by using Language Lab Device/Recommended Texts/cassettes /cd's to get their Listening Skill & Speaking Skill honed
b) Introducing Role Play & honing over all Communicative Competence
3. Group Discussion Sessions: 2L+6P
a) Teaching Strategies of Group Discussion
b) Introducing Different Models & Topics of Group Discussion
c) Exploring Live /Recorded GD Sessions for mending students' attitude/approach & for taking remedial measure
Interview Sessions; 2L+6P
a) Training students to face Job Interviews confidently and successfully
b) Arranging Mock Interviews and Practice Sessions for integrating Listening Skill with Speaking Skill in a formal situation for effective communication
4. Presentation: 2L+6P
a) Teaching Presentation as a skill
b) Strategies and Standard Practices of Individual /Group Presentation
c) Media & Means of Presentation: OHP/POWER POINT/ Other Audio-Visual Aids
5. Competitive Examination: 2L+2P
a) Making the students aware of Provincial /National/International Competitive Examinations
b) Strategies/Tactics for success in Competitive Examinations
c) SWOT Analysis and its Application in fixing Target

Books – Recommended:

Nira Konar: English Language Laboratory: A Comprehensive Manual
PHI Learning, 2011
D. Sudharani: Advanced Manual for Communication Laboratories &
Technical Report Writing
Pearson Education (W.B. edition), 2011
References:
Adrian Duff et. al. (ed.): Cambridge Skills for Fluency
A) Speaking (Levels 1-4 Audio Cassettes/Handbooks)
B) Listening (Levels 1-4 Audio Cassettes/Handbooks)
Cambridge University Press 1998
Mark Hancock: English Pronunciation in Use
A. 4 Audio Cassettes/CD'S OUP 2004

NUMERICAL METHODS LAB
M(CS) 491

L	T	P	C
0	0	2	1

Contacts : (2P)
Credits : (1)

1. Assignments on Newton forward & backward, Lagrange's interpolation.
2. Assignments on numerical integration using Trapezoidal rule, Simpson's 1/3 rule, Weddle's rule.
3. Assignments on numerical solution of a system of linear equations using Gauss elimination, Matrix inversion, Gauss-Jacobi, and Gauss-Seidel iterations.
4. Assignments on numerical solution of Algebraic Equation by Bisection, Secant, Regular-falsi and Newton Raphson methods.
5. Assignments on ordinary differential equation: Taylor series, Euler's, Runga-Kutta and Finite difference methods.
6. Introduction to Software Packages: Matlab / Scilab / Labview / Mathematica.

Theory of Machines Lab

TT-491

L	T	P	C
0	0	3	2

Contacts : 3P
Credits : 2

1. Study of Inclined Plane/ sliding friction
2. Study of Pressure Distribution in a Journal Bearing
3. Study of various links and mechanisms.
4. Study and draw various inversions of 4- bar chain and single slider crank chain
5. Draw velocity and diagram of crank mechanism using graphical methods including Klein's construction.
6. Study of governors
7. Study of gyroscopic couple
8. Study of Balancing of rotating masses
9. Study of vibration characteristics of free and forced spring mass system with and without damping.
10. Study of Cam profile analysis (graphical method)
11. Study of gear- train value of compound gear trains and Epicyclical gear trains. Measurement of gear characteristics of Helical, Bevel, Worm gear
12. Study of chain and belt drives. Study of Braking system in a Textile machines
13. Study of characteristics of Needle, Ball, Rroller bearing used in the textile machines
14. Study of special mechanisms (Universal joint , Flywheel Brakes and Clutches ,Geneva wheel etc.)

CHEMICAL PROCESSING LAB – I
APM 491

L	T	P	C
0	0	3	2

Contacts : (3P)
Credits : (2)

The following list is in no way exhaustive. Additional laboratory work or experiments can be planned to consolidate the theoretical work and to emphasize the activities for doing rather than the knowing.

List of Experiments:

1.Desizing and scouring of cotton yarn/cloth
2.Bleaching of cotton yarn/cloth using hydrogen peroxide
3. Degumming of silk
4.Scouring and bleaching of jute
5. Colour measurement by spectrophotometer.
6. Dyeing of cotton yarn/fabric using direct dye
7. Dyeing of cotton yarn/fabric using cold brand and hot brand reactive dyes
8. Dyeing of cotton yarn/fabric using Vat and sulphur dye

APPAREL PRODUCTION LAB – II
APM 492

L	T	P	C
0	0	3	2

Contacts : (3P)
Credits : (2)

The following list is in no way exhaustive. Additional laboratory work or experiments can be planned to consolidate the theoretical work and to emphasize the activities for doing rather than the knowing.

List of Experiments:

Draft The Paper Pattern And Do Grading For The Following:
1. Romper, A-line frock
2. Brief and vest

3.Sari petticoat sari blouse
4.Salwar-Kameez
5.Middy top and skirt,
6. Shirt

Using the drafted paper patterns construct, finish and press the following

1. Romper, A-line frock
2.Brief and vest
3. Sari petticoat sari blouse
4. Salwar-Kameez
5. Middy top and skirt,
6. Shirt

SEMESTER-V

Principles & Practices of Management			
HU-511			
L	**T**	**P**	**Credits**
2	**0**	**0**	**2**

Serial No.	Chapters/Units	Description	**Lectures in hour**
1)	**Module I: Management**	Definition, nature, importance, evolution of management thoughts – pre & post scientific era, contributions made by Taylor, Fayol, Gilbreth, Elton Mayo, McGregor, Maslow –covering Time & Motion Study, Hawthrone Experiments; Is management a science or art? Functions of manager, ethics in managing and social responsibility of managers.	**4**
2)	**Module II: Planning & Control**	Why Management process starts with planning, steps in planning, planning premises, types of planning, barriers to effective planning, operational plan, strategic planning, Mckinsey's 7's Approach, SWOT analysis, Controlling- concept, Planning- control relationship, process of control, human response to control, dimensions of control, MBO.	**4**
3)	**Module III: Decision Making & Organizing**	Nature, process of decision making, decision making under Certainty and Uncertainty, decision-tree, group-aided decision, brain-storming. Organizing – concept, nature and process of organizing, authority and responsibility, delegation and empowerment, centralization and decentralization, concept of departmentation.	**4**
4)	**Module IV: Staffing & Motivation**	Concept, Manpower planning, Job design, recruitment & selection, training and development, performance appraisal, motivation, motivators and satisfaction, motivating towards organizing objectives, morale building.	**3**
5)	**Module V: Leadership & Communication**	Defining leadership and its role, should managers lead, leadership style, leadership development, Leadership behavior. Communication- Process, Bridging gap-using tools of communication, electronic media in Communication.	**3**
6)	**Module VI: Financial Management**	Financial functions of management, Financial Planning, Management of Working Capital, Sources of Finance.	**3**
7)	**Module VII: Marketing Management**	Functions of Marketing, Product Planning & Development, Marketing Organization, Sales Organization, Sales Promotion, Consumer Behaviour, Marketing Research and Information.	**3**
		Total Lectures=	**24**

Suggested Readings: Text & References:

1. Robbins & Caulter – Management (Prentice Hall of India, 8th Edition)
2. John R.Schermerhorn– Introduction to Management (WILEY-INDIA EDITION,10th Edition)
3. Koontz – Principles of Management (Tata McGrew Hill, 1st Edition 2008)
4. New Era of Management, 10th Edition by Richard L. Daft published by Cengage Learning
5. Stoner, Freeman, Gilbert. Jr. – Management (Prentice Hall of India, 6th Edition)
6. Koontz, weihrich – Essentials of Management (TMH, 5th Edition)
7. D.Chandra Bose– Principles of Management and Administration (PHI)
8.Kiran Nerkar, Vilas Chopde & Kogent Learning Inc– Principles and Practices of Management (Dreamtech Press)
9. Parag Diwan – Management Principles and Practices (Excel Books, New Delhi)
10. Management of Principles and Practices by Joseph M Putty
11. Principles of Management" - 10 e/d by Richard. L.Daft; Cengage Learning
12.Management Principles and Practices by Joseph M Putti
Publisher- Macmillan

Syllabus for B.Tech(Apparel Production Management) up to Fourth Year

Revised Syllabus of B.Tech in APM for the students who were admitted in Academic Session 2010-2011)

Quality Assurance in Apparel Industry			
APM-501			
L	**T**	**P**	**Credits**
3	**1**	**0**	**4**

Serial No.	Chapters/Units	Description	Lectures in hour
1)	**Basics of Quality Assurance**	Quality systems in textile and clothing organization: the quality assurance and quality control processes , planning and documentation – quality manual , quality plan , work procedures and work instructions , implementation and monitoring quality systems. Concept of AQL .	9
2)	**Quality Management**	Quality management concepts - quality control and inspections - S.Q.C. - acceptance sampling - T.Q.M. - I.S.O. Laboratory testing for quality and performance.	**7**
3)	**Fabric Inspection**	Design satisfaction tests. Fabric specification - cloth defects - four point system - shrinkage potential.	**7**
4)	**Garment Inspection**	Garment specification - manufacturing specification - name of operation and associated details in respect of sewing, dyeing and washing of garments. garments testing-seam strength ,seam slippage ,garment checking procedure, interlining-peel bond strength Style features - trims specification - stitch specification - size scale – garment dimensions and tolerances.	**11**
5)	**Classes of Garment & Trim defects.**	Quality of trims and accessories. Defects in garments and their remedies - A, B and C zones in a garment with respect to defects.	**6**
		Total Lectures=	**35**

Reference Books:

1. Mehta V., " Managing quality in the apparel industry ", New Age International, Chennai, 1998.
2. Sigmon, D.M., Grady P.L., and Winchester S.C., " Computer Integrated Manufacturing and Total Quality Management ", Textile Progress, The Textile Institute, Manchester, 1998.
3. Laing, R.M. and Webster J., " Stitches and Seams ", The Textile Institute, Manchester, 1998.
4. Glock R.E. and Kunz G.I., " Apparel Manufacturing: Sewn Product Analysis ", Prentice Hall, 1995.
5. Mehta P.V. " An Introduction to Quality Control for the Apparel Industry ", Marcel Dekker, 1992.
6.Cooklin G., " Garment Technology for Fashion Designers ", Blackwell Science

Technology of Apparel Machineries & Maintenance			
APM-502			
L	**T**	**P**	**Credits**
3	**1**	**0**	**4**

Serial No.	Chapters/Units	Description	Lectures in hour
1)	**Introduction to Apparel Machineries**	Introduction to spreading machines and cutting machines - types and functions History of sewing machines and development. Sewing machinery - classification according to bed types, stitch types (hook or looper), material wise (extra light to heavy weight). Technology of Sewing Mechanism for Lockstitch & Chainstitch.	8
2)	**Technology of Sewing Machine**	Major parts of sewing machinery and functions. stand height, pedal, presser foot, height of needle bar, needle to hook relationship, height of feed dog, normal and reverse feed stitch length, feed timing, presser foot pressure, needle and bobbin thread tension, bobbin winding assembly, belt tension. Sewing machine safety regulations.	**10**
3)	**Maintenance and adjustment of Sewing Machine**	Sewing needle and sewing thread, thread consumption, thread routing. Adjustment on SNLS UBT: Needle stop position, wiper, thread timing sequence, timing of thread trimmer cam, positioning the moving knife, installation, sharpening, replacing moving knives, adjusting the floating amount of the auxiliary tension disk.	**10**
4)	**Maintenance and adjustment of Overlock machine**	Parts, functions and adjustments of Over lock: Needle height, feed dog height, differential feed ratio, tilt of the feed dog, position of the upper and lower knives, sharpening of knife and loopers, trouble shooting in over lock.	**6**
5)	**Features of ancillary garment machines.**	Collar turning machines, folding machinery, fusing and pressing machinery.	**4**

6)	**Introduction to Computerized Garment machines**	Computer controlled cutting, sewing, folding machinery.	**2**
		Total Lectures=	**40**

Reference Books:

11. Jacob Solinger., " Apparel Manufacturing Handbook ", VanNostrand Reinhold Company (1980).
2. Peyton B .Hudson., " Guide to Apparel Manufacturing ", MEDIApparel Inc (1989) ISBN: 0 - 945116-08-X.
3. Carr.H, Latham. B., " The Technology of Clothing Manufacture ", Blackwell Scientific Publications (1988).4. Glock R.E. and Kunz G.I., " Apparel Manufacturing: Sewn Product Analysis ", Prentice Hall, 1995.
5. Mehta P.V. " An Introduction to Quality Control for the Apparel Industry ", Marcel Dekker, 1992.
6.Cooklin G., " Garment Technology for Fashion Designers ", Blackwell Science

Technology of Garment and Fabric Finishing & Care

APM-503

L	T	P	Credits
3	**0**	**0**	**3**

Serial No.	Chapters/Units	Description	Lectures in hour
1)	**Introduction to Garment Dyeing**	Garment dyeing: dye selection, garment-dyeing machinery.Problems in conventional processing, awareness of banned dyes and chemicals- German ban, Eco-labels, natural dyes - history and backgrounds and applications.	9
2)	**Eco friendly Chemical Processing**	Eco friendly processing- desizing scouring, bleaching and dyeing. Alternative dyes and chemicals-structure- identification methods including chromatographic techniques .	**6**
3)	**Garment finishing**	Garment finishing: Chemicals and enzymes, crinkle effect, softening, acid wash, stone wash, enzyme wash-denim finishing, chemical and sand blasting. Washing: Stone washing, acid washing, enzyme washing, bio polishing, emerisation, bleaching, laser fading and ozone fading. Stain removal, selection of spotting chemicals, factors for spotting, dry cleanings, care labels, laundering equipment and procedures	**12**
4)	**Garment Pressing & Packaging**	Pressing: reasons for pressing, pressing and fabric characteristics, pressing equipments, conditions and types of pressing Packaging and folding: criteria for packaging, packaging and folding, specifications and standards for packaging, materials and equipments used for packaging, considerations for packaging and folding	**8**
		Total Lectures=	**35**

Reference Books:

References:

1. Harrison.P (Editor), " Garment Dyeing: Ready to wear fashion from the dye house", The Textile Institute, U.K (1988) ISBN: 1870812131.
2. Noemia D, souza ., " Fabric Care" , New Age International (P) Ltd Publisher, Chennai ,1998, ISBN: 81-224-1143-6.
3. Hall , A.J., " Textile Finishing ", Elsevier Publishing Co. Ltd., 1986.
4. Marsh, J.T., " An Introduction to Textile Finishing ", Chapman and Hall Ltd., London, 1979.
5. Shenai, V.A., " Technology of Textile Finishing " , Sevak Publications, Bombay, 1995.
6.Whittall N.S,"laundering and dry cleaning"v0l 8 textile progress 1996
7.Goldman R.f. and lyleD.S "Performance of testiles"john wiley and sons,new york
8.Garment wet processing technical manual AATCC/SDC 1994
9. Roy Choudhury A./K. "Textile Preparation and Dyeing" Science Publishers USA and Oxford & IBH, India
10. Finishers and environment –Solutions, Textile institute, Manchester 1993
11. Are Textiles finishing polluting the environment ? Textile institute Manchester 1990
12. Reife A and Freeman H..S, Environmental chemistry of dyes and pigments Wiley 1996.

Free Elective-I
Statistical Quality Control

Syllabus for B.Tech(Apparel Production Management) up to Fourth Year

Revised Syllabus of B.Tech in APM for the students who were admitted in Academic Session 2010-2011)

TT-504A			
L	**T**	**P**	**Credits**
3	**1**	**0**	**4**

Serial No.	Chapters/Units	Description	Lectures in hour
1)	**Quality Management**:	Definition of quality and its importance, different approaches to quality, Description of Deming's fourteen points and Ishikawa's seven tools of quality, utility of statistical method for quality control and improvement, concept of Total Quality Management (TQM), ISO 9000 Standards, Quality Function Deployment (QFD) and Quality Costs.	**6**
2)	**Basic Approaches to Statistical Quality Control**:	Population and sample, descriptive and inductive statistics, discrete and continuous variables, subjective tests, collection and classification of data, frequency distributions, measures of central tendency, measures of dispersion, random variables and probability distribution, differences and applications of normal, binomial, Poisson's and other form of distribution.	**6**
3)	**Statistical Analysis for Continuous Function**:	Population and sampling distribution of mean, statistical estimation theory, points estimates, concept of single tail and double tail test, Student's t distribution, confidence limit, statistical decision theory, tests of hypotheses and significances, type I and type II errors, difference between two sample means. Test for single variance, Chi-square test, the F distribution, test for the difference between two variances, confidence limits for variance and ratio of two variances, choice of sample size.	**8**
4)	**Statistical Analysis for Discrete Function:**	Application of binomial and Poisson's distribution, normal approximation, test for a single proportion and difference between two proportions, application ication of χ 2 distribution, contingency table.	**5**
5)	**Subjective Tests**:	Rank correlation, tied rank, coefficient of concordance.	**3**
6)	**Acceptance Sampling**:	Basic idea about acceptance sampling, OC curve, producer's risk and customer's risk.	**3**
7)	**Control Charts**:	Advantages using quality control charts, random and assignable causes, action and warning limits, $\bar{X}$, R, p , n p and c chart, Process Capability Ratio (CP and CPK), concept of 6 sigma process control, brief idea about CUSUM and EWMA chart.	**4**
8)	**ANOVA and Regression**:	Some basic concept of Analysis of Variance, method of least squares, linear regression methodology, correlation and standard error.	**5**
		Total Lectures=	**40**

Text Books:

1. Montogomery D C, "Introduction to Statistical Quality Control", Fourth Ed., John Wiley & Sons (Asia) Pte. Ltd., Singapore, 2004.
2. Mehta P V, "Quality Management: An Overview", in '*Testing and Quality Management'*, Vol. 1, Ed. V K Kothari, IAFL Publication, New Delhi, 1999.
3. Spiegel M R and Stephens L J, "Schaum's Outlines Statistics", Third Ed., Tata McGraw Hill, New Delhi, 2000.
4. Leaf G A V, "Practical Statistics for the Textile Industry", Part-I and II, The Textile Institute, U.K, 1984.
5. Walpole R. E. and Myers R.H., "Probability and Statistics for Engineers and Scientists", McMillan Publishing Company, New York, 1985.

Free Elective-I
Total Quality Management

TT-504B			
L	**T**	**P**	**Credits**
3	**1**	**0**	**4**

Serial No.	Chapters/Units	Description	Lectures in hour
1)	Introduction	Definition of Quality, Small q & Big Q, Quality characteristics- weaves, Dimensions, determinants, Quality Planning, Quality & profitability - idea, Analysis Techniques for Quality Costs, Basic concepts of Total Quality Management, Historical Review, Principles of TQM, Leadership – Concepts, Role of Senior Management, Quality Council, Quality Statements, Strategic Planning, Deming Philosophy, Barriers to TQM Implementation.	**6**
2)	Quality & Management Philosophies	Customer satisfaction – Customer Perception of Quality, Customer Complaints, Service Quality, Customer Retention, Employee Involvement – Motivation, Empowerment, Teams, Recognition and Reward, Performance Appraisal, Benefits, Continuous Process Improvement: Deming Philosophy- Chain reaction, 14 points for management, triangle theory of variance, deadly diseases & sins, Demings wheel. Juran Philosophy- 10 steps for quality improvement, quality trilogy, universal breakthrough sequence. Crosby Philosophy- Crosby's 6 C's, Absolutes of quality, Crosby's 14 points for quality, Crosby triangle. Comparison of 3 major quality philosophies ,Supplier Partnership – Partnering, sourcing, Supplier Selection, Supplier Rating, Relationship Development, Performance Measures – Basic Concepts, Strategy, Performance Measure.	**8**
3)	Managing Quality	Traditional Vs Modern quality management, the quality planning, road map, the quality cycle. Cost of	**6**

		quality- Methods to reduce cost of quality, Sampling plans, O.C. curve.	
4)	Quality Control	Objectives of quality control, seven tools of quality, Strategy & policy. Company wise quality control. Quality Assurance- Definition, concepts & objectives. Economic models for quality assurance. Statistical methodology in quality assurance. Process capability ratio,Concept of six sigma, New seven Management tools.	**7**
5)	TQM Tools	Benchmarking – Reasons to Benchmark, Benchmarking Process, Quality Function Deployment (QFD) – House of Quality, QFD Process, Benefits, Taguchi Quality Loss Function, Total Productive Maintenance (TPM) – Concept, Improvement Needs, FMEA – Stages of FMEA.	**7**
6)	Quality Systems	Need for ISO 9000 and Other Quality Systems, ISO 9000:2000 Quality System – Elements, Implementation of Quality System, Documentation, Quality Auditing, TS 16949, ISO 14000 – Concept, Requirements and Benefits.	**6**
		Total Lectures=	**40**

Text Books:

1. Dale H.Besterfiled, et al., "Total Quality Management", Pearson Education, Inc. 2003. (Indian reprint 2004). ISBN 81-297-0260-6.
2. James R.Evans & William M.Lidsay, "The Management and Control of Quality", (5th Edition), South-Western (Thomson Learning), 2002 (ISBN 0-324-06680-5).
3. Feigenbaum.A.V. "Total Quality Management", McGraw-Hill, 1991.
4. Oakland.J.S. "Total Quality Management", Butterworth Hcinemann Ltd., Oxford, 1989.
5. Narayana V. and Sreenivasan, N.S. "Quality Management – Concepts and Tasks", New Age International 1996.
6. Zeiri. "Total Quality Management for Engineers", Wood Head Publishers, 1991.

APPAREL QUALITY ASSURANCE LAB

APM 591

L	T	P	C
0	0	3	2

Contacts: 3P
Credits: 2

The following list is in no way exhaustive. Additional laboratory work or experiments can be planned to consolidate the theoretical work and to emphasize the activities for doing rather than the knowing.

List of Experiments:

1. Fabric inspection according to 4 point system
2. Fabric inspection according to 10 point system.
3. Analysis of fabric defects of the gives sample.
4. Garment inspection for visible defects . Identification of stitching defects.
5. Inspection of the following garments against spec sheet : Men's shirt , Men's Trouser , Women's Salwar , Women's top.
6. Statistical Analysis.

APPAREL MACHINERY AND EQUIPMENT LAB

APM 592

L	T	P	C
0	0	3	2

Contacts: 3P
Credits: 2

The following list is in no way exhaustive. Additional laboratory work or experiments can be planned to consolidate the theoretical work and to emphasize the activities for doing rather than the knowing.

List of Experiments:

1. Study Of The Hook Shuttle Assembly In Lock Stitch machine
2.Study of needle bar section in lock stitch machine.
3.Study Of The Mechanisms Of Over Lock And Give The Threading Procedures For Three Thread Machines
4. Study Of The Mechanisms Of Over Lock And Give The Threading Procedures For Three Thread

Machines
5. Study Of The Hook Shuttle Assembly In Flat lock Machine
6. Study of the needle bar sections in flat lock machines
7. Study Of The Cutting And Sharpening Mechanisms In Straight Knife Cutting Machines
8. Study Of The Stitch Mechanisms, Gears And Button Fixing Machine And Set The Same Various Stitch Levels and Length In A Button Fixing Machine.

CHEMICAL PROCESSING LAB – II
APM 593

L	T	P	C
0	0	3	2

Contacts: 3P
Credits: 2
The following list is in no way exhaustive. Additional laboratory work or experiments can be planned to consolidate the theoretical work and to emphasize the activities for doing rather than the knowing.
List of Experiments:
1.. Dyeing of silk fabric using acid and basic dyes
2.. Dyeing of wool using Reactive dyes
3. Dyeing of Cotton and silk fabrics using natural dyes
4. . Printing of cotton fabric by Table Screen Method
7. Wax printing (Batik) and tie & dye printing.
8. Finishing of cotton by a few temporary and durable methods.
9.. Few special finishes like Enzyme finish, Acid finish, bio polishing on Denim garment.

STATISTICAL QUALITY CONTROL LAB
TT-594A

L	T	P	C
0	0	3	2

Contacts: 3P
Credits: 2
The following list is in no way exhaustive. Additional laboratory work or experiments can be planned to consolidate the theoretical work and to emphasize the activities for doing rather than the knowing.
List of Experiments (All experiments to be conducted):-
1. Preparation of frequency distribution and histogram ,calculation of average ,median,mode,variance,standard deviation ,minimum ,maximum,range,lower quartile,upper quartile interquartile range

2. Statistical inference testing for mean with variance known ,variance unknown,inference on the variance ,Study of OC curves,Type I and II error,producers risk,consumers risk
3. Rank correlation,coefficient concordance;preparation of control chart for xbar,R,process capability,study of correlation coefficient and regression equation

4. Study of simple 2 factorial design,Development of regression model,practical interpretation ,response surface plot,study of moving average control charts;

5. Use of Excel and Statistical software.

TOTAL QUALITY MANAGEMENT LAB
TT-594B

L	T	P	C
0	0	3	2

Contacts: 3P
Credits: 2
The following list is in no way exhaustive. Additional laboratory work or experiments can be planned to consolidate the theoretical work and to emphasize the activities for doing rather than the knowing.

List of Experiments (All experiments to be conducted):-

1. Experimental planning,analysis,design of experiments

2. Study of Pareto analysis
3. Preparation of scatterplot
4. Preparation control charts,flow chart for industrial process taking textile or garment industry
5. Cause effect chart,Fishbone,Ishikawa Diagram for cause-effects, development of check sheets,check sheet,check list

Detailed syllabus content of 6th Sem B.Tech in Apparel Production Management

Theory

Production & Operations Management			
HU-611			
L	**T**	**P**	**Credits**
2	**0**	**0**	**2**
Serial No.	Chapters/Units	Description	**Lecture hours**
1)	**Introduction :**	System concept of production; Product life cycle; Types and characteristics of production system; Productivity; Process and product focused organization structures; Management decisions – strategic, tactical and operational.	**3**
2)	**Forecasting :**	Patterns of a time series – trend , cyclical, seasonal and irregular; Forecasting techniques : moving average, simple exponential smoothing, linear regression; Forecasting a time series with trend and seasonal component.	**4**
3)	**Materials Management and Inventory Control :**	Components of materials management; Inventory control : EOQ model, Economic lot size model, Inventory model with planned shortages, Quantity discounts for EOQ model; ABC analysis; Just-in-time inventory management.	**4**
4)	**Materials Requirement Planning :**	MRP concept – bill of materials (BOM), master production schedule; MRP calculations.	**3**
5)	**Machine Scheduling :**	Concept of Single machine scheduling – shortest processing time (SPT) rule to minimize mean flow time, Earliest due date (EDD) rule to minimize maximum lateness, Total tardiness minimizing model; Minimizing makespan with identical parallel machines; Johnson's rule for 2 and 3 machines scheduling.	**3**
6)	**Project Scheduling :**	Activity analysis; Network construction; critical path method (CPM); Crashing of project network.	**3**
7)	**Quality Assurance :**	Meaning of Quality; Quality assurance system; choice of process and quality; Inspection and control of quality; Maintenance function & quality; Process control charts : x-chart and	**4**

		R-chart, p-chart and c-chart; Acceptance sampling : Operating characteristic (O.C) curve, Single sampling plan, Double sampling plan, Acceptance sampling by variables; concept of Six Sigma.	
Total Lectures=			**24**

Suggested Readings: Text & References:

1. Modern Production/Operations Management, 8th ed.by Buffa and Sarin, John Wiley & Sons.
2. Production and Operations Management by R. Panneerselvam, PHI.
3. Operations Management by Russell & Taylor, 4th ed.' PHI.
4. Production and Operations Management by Adam and Ebert, PHI.

Application of IT & CAD/CAM in Apparel Industry			
APM- 601			
L	**T**	**P**	**Credits**
3	**1**	**0**	**4**

Sr. No.	Chapters/ Units	Description	**Lecture hours**
1.	**Introduction to Computer Systems**	Introduction to computer – Computer Systems: computer Software-operating-Programming Languages-general Software Features and trends. Data base management system : Data processing-Database Management system fundamentals-database design concepts	**3**
2.	**Computerised Pattern making & Marker Planning**	Concepts of CAD/CAM in Garment Manufacturing. pattern making CAD :Computerized production pattern making and grading - Hardware, software and system programming to produce a sample production pattern. Computerized marker planning. Application of Digitizer and Plotter .	**8**
3.	**Computerised Production Planning and process control**	Computer aided production planning in Garment Manufacturing : Application of Computer for purchase, inventory control and sales, Computerized quality control and production control. Introduction to finite scheduling concept and fast react software. Creating product and order planning, concept of CIM, CAPP etc. updating.Elimination of late deliveries - General set up, Application of DBMS in Apparel Merchandising process. control mechanisms - critical path and time tables.	**10**
4.	**CAM in Garment Manufacturing**	Computer controlled machinery for garment manufacturing—Computerised Sewing Machines, Computerized Cutting Knife , Computerized Embroidery machines. 3D body scanning technology . Use of microcomputers for production control in garment industry	**5**
5.	**Application of IT in Apparel Manufacturing**	Management Information System in garments Industry: EDI in garment technology Concept of Enterprise Resource Planning (ERP). , MRP and MRP-II and RFID. Multimedia & Virtual Reality: Introduction to multimedia-multimedia tools-introduction to Virtual reality and simulation – application in clothing industry.. Application of IT	**8**

		:Electronic commerce- introduction to Online analytical Processing (OLAP)-geographic information system(GIS)	
6.	**Concept of Algotithms and simple problem solving.**	Illustration of Algorithms and simple problem solving like cost calculation , Line balancing ,SAM calculation etc through computer programming , Algorithm for computerized Cut Planning and lay lot planning. , Order processing and sorting , Incentive and Labor cost calculation etc . Algorithm for 3D Product visualization of Garments	6
Total Lectures=			**40**

References:

1.Alexis leon and Mathews leon"Fundamentals of Information Technology" Leon press,1999
2.Dennis P Curtin "Information Technology",Tata McGraw hill Pvt Ltd 1999
3.James A Senn"Information Technology in Business",Prentice Hall of India Pvt Ltd 1998.
Windows office XP/MSOFFICE/MSACCESS/
4. Stephen Gray " CAD / CAM in clothing and Textiles ", Gower Publishing Limited, 1998,
ISBN 0-566-07673X.
5. Compilation of papers presented at the Annual world conference Sep 26 -29, 1984 Hongkong,
" Computers in the world of textiles ", The textile Institute ISBN: 0-0900739-69X.
6. W.Aldrich, " CAD in clothing and Textiles ", Blackwell Science 2nd edition, 1992, ISBN: 0-63 -3893 - 4
7. Jacob Solinger, " Apparel Manufacturing Handbooks ", Van no strand and Reinhold Company,
1980,ISBN:0-442-21904-0.

Production Planning & Control in Apparel Industry			
APM-602			
L	**T**	**P**	**Credits**
3	**1**	**0**	**4**

Serial No.	Chapters/Units	Description	**Lectures in hour**
1)	Production system	Apparel production parameters. Product data management: Understanding and interpretation of specification sheet. Operation sequence development: Garment breakdown with machine and attachment details, development of production grid for garment construction, development of production flowchart. Bundle tickets: Guidelines for bundle ticket design, functions of bundle tickets, bundle ticket control.	**10**

		Different manufacturing systems: Make through and Assembly line manufacturing - advantages and disadvantages.	
2)	Fundamentals of Productivity	Concept of Productivity, Concept of Standard Allowed Minutes, Allowance, Performance rating etc. Productivity calculation techniques, Calculation of Production efficiencies. Different levels of productivity calculation. Numerical exercises.	**6**
3)	Production planning & control tools.	Production Planning & Control – objectives and techniques, Production planning tools, PERT , CPM , Gantt chart etc Production control charts i.e Operation Process Chart , Flow Process chart , Travel chart , Multiple Activity Chart etc	**7**
4)	Productivity analysis and improvement techniques	Analysis of the factors responsible for the loss in productivity in Apparel Industry. Graphical analysis. Numerical exercises. Concept of High , medium and low productivity . Analysis of influence of different factors (types of garment , export destination , wastage % , Work measurement techniques , incentive scheme etc) on Productivity . Different methods of improving Productivity in Garment Industry. Evaluation of productivity improvement techniques.	**6**
5)	Apparel Work Study	Time and motion study: General approach for making a time and motion study, sewing work study, Principles of work cycle timing methods, objectives of time study, statistical approaches – statistical calculation of time study- operator efficiency distributions. Work Sampling. Concept of Method study.	**7**
6)	Plant Layout	Plant Layout Definition - Types of production layout, methods of plant layout. Criteria for evaluation of a plant layout, Impact of different plant layouts on costing. Government regulations for plant layout.	**4**

References

1..Sultan Chand& sons"Management Accounting"New Delhi,2nd edition 1998

2. A.J. Chuter., " Introduction to Clothing Production Management ", Blackwell Scientific Publications

3. David J. Tyler., " Materials Management in Clothing Production ", Blackwell Scientific Publications

Professional Books.

4. Jacob Solinger., " Apparel Manufacturing Handbook ", VanNostrand Reinhold Company (1980).

5. Bethel , Tann , Atwater and Rung., " Production Control ", McGraw Hill Book Co., New York, (1948).

6. Biegel , John. E., " Production Control ", A Quantitative Approach " Prentice Hall Inc.,

(1971) 2nd edition.

7. Apple. J. M., " Plant Layout and Materials Handling ", The Ronald Press Co., New York (1950).

8. Immer , John. R., " Layout Planning Techniques ", McGraw Hill, New York, (1950).

9. Barnes, Ralph M., " Motion and Time Study ", John Wiley and Sons., New York., (1958) 4 th edition

Apparel Marketing & Merchandising

Syllabus for B.Tech(Apparel Production Management) up to Fourth Year

Revised Syllabus of B.Tech in APM for the students who were admitted in Academic Session 2010-2011)

APM-603			
L	**T**	**P**	**Credits**
3	**0**	**0**	**3**

Serial No.	Units	Description	**Lecture hours**
1)	Basics of Apparel Marketing	Introduction to Marketing, Marketing mix, Functional organization of an apparel firm. Responsibilities of a marketing division – marketing objectives and Strategies - Marketing research – Consumer survey, Market segmentation. Different levels of Fashion Marketing and Fashion marketing environments. Brand concept and Brand building	8
2)	Introduction to Retail marketing	Types of markets: Retails and wholesale strategies for merchandise distribution. Types of Retail. Concept of Visual Merchandising.	2
3)	Apparel Costing & pricing .	Elements of cost, Direct material, Direct labour , factory overhead; cost of goods manufactured statements, Apparel Marketing cost Analysis: Marketing cost accounting, marketing cost standards, variance analysis for marketing cost, price variance; Determining Pricing of apparel products: Price elasticity of demand and supply, sample costing-marginal revenue and marginal cost, cost plus pricing methods; Full cost pricing, conversion cost pricing differential cost pricing ,variable cost pricing, direct cost pricing derivation of cost of apparel products-woven/knits; The budgeting process: Budgeting principles for the apparel industry. Principles of cost control in Apparel Industry.	8
4)	Elements of Merchandising	Merchandising: Definition of merchandising - functions of merchandising division - Role and responsibilities of a merchandiser – Market Forecasting – product development - line planning line presentation. Factors to be considered for product mix and product development . Evaluation of a Product line. Concept of Product Life Cycle	6
5)	Sourcing	Sourcing: Need for sourcing - sourcing materials - manufacturing resources planning - principles of MRP, Overseas sourcing - sourcing strategies.	4
6)	Spec sheet & consumption Analysis.	Understanding of Spec sheet , Interpretation of a Spec sheet , Techniques and standard formats for spec sheet creation , Theory and exercises/assignments on consumption calculation for fabric , thread , buttons etc.	4
		Total	30

References

1. Richord D.Irwin Icn,"Principles of cost Accounting:Managerial Applications"Revised by Gayle Rayburn 1983
2.Sultan Chand& sons"Management Accounting"New Delhi,2nd edition 1998
3. D. Sinha., - " Export Planning and Promotion ", - IIMS, Calcutta (1989).
4. Tuhin K. Nandi., - " Import - Export Finance ", - IIMS, Calcutta (1989).
5. Elaine Stone, Jean A. Samples., - " Fashion Merchandising ", McGraw Hill Book Company (1985) ISBN: 0 - 07 - 061742 - 2.
6. S. Shivaramu., - " Export Marketing - A practical guide to Exporters ", Wheeler Publishing (1996) ISBN: 81-7544-166-6.
7. J.A. Jarnow, M.Guerreiro, B.Judelle., - " Inside the Fashion Business " , Macmillan Publishing Company (1987)

Apparel Electives-I

Knitting & Knitwear Technology			
APM-604 A			
L	**T**	**P**	**Credits**
3	**0**	**0**	**3**

Syllabus for B.Tech(Apparel Production Management) up to Fourth Year

Revised Syllabus of B.Tech in APM for the students who were admitted in Academic Session 2010-2011)

Serial No.	Chapters/Units	Description	**Lecture hours**
1)	**Fundamentals of Knitting Technology**	Circular knitting: circular knitting production of various weft knitted structures needle control in circular knitting machines. Factors affecting the formation of loop. effect of loop length and shape on fabric properties. Faults in knitted fabrics, causes and remedies. Production calculation. Flat knitting: basic principles; elements of flat knitting machines. Different types of flat knitting machines manual, mechanical and computer controlled knitting machines. Production of various fabric designs with flat knitting machines. Warp knitting: warp knitting fundamentals. Machine classification. Preparation of yarn for warp knitting .	12
2)	**Basic Knit Structures**	Introduction : comparison between knitted and woven fabrics. warp knitting and weft knitting. Knitting needles. Fundamentals of formation of knit, tuck and float stitches. basic knitted structures and their production i.e.,plain, rib, interlock and purl. Knitted Structures: Notation for representing the structures-stitches-knit, tuck, float- stitch density. Single Jersy: Derivatives and ornamentations-Properties.Rib structures: properties, Derivative cardigan,full cardigan-Purl Structure-properties-Derivatives-Eight lock.Double knit structures:Single pique-double pique-Milano rib, Swiss Pique,French pique-Pontedi roma-Ottaman rib-barrelet –Blister fabrics. Quality of yarn required for knitting. yarn preparation for knitting.	**11**
3)	**Fundamentals of the Knitted Garments Manufacturing Technology.**	Types of yarns used for winter garments: quality specification, quality requirements of fabrics for winter garments. Type of circular sweater strip machines, production techniques for sweaters. Fully fashioned sweaters description ,knitting of slipovers-cardigans, control defects in full fashioned knitting-production of full fashioned sleeves on v-bed flat machines. Cut and sew sweaters: cutting techniques, cutting machines-operating difficulties and Remedies, sewing of sweater –strips- types of stitches and seams used in sweaters, common sewing defects and its remedies. Pressing of sweaters-open buck, steam press, body form stem press	**12**
Total Lectures=			**35**

Text Book :

1. D.B Ajgaonkar ., " Knitting Technology", Universal Publication Corporation, Mumbai, 1998. ISBN:81-85027-34-X

2.Charles Richman ,'Guide to manufacturing of sweater,knit shirts and swim wear' national knitted outwear Association ,Newyork,1978

References :

1. Chandrasekhar Iyer, Bernd Mammal and Wolfgang Schach., "Circular Kintting ", Meisenbach GmbH, Bamberg, 1995,ISBN:3-87525-066-4.
2. D.J.Spencer., " Knitting technology", Textile Institute, Manchester, 1989, ISBN:1855733137.
3. Samuel Raz.,. " Flat Knitting ; The new generation ", MeisenbachGmbH, Bamberg, ISBN:3-87525-054-

0.

4. Samuel Raz., " Warp Knitting Production ", Melliand TextilberichteGmbH, Rohrbacher, 1987. ISBN:3-87529-022-4

5. A study on quality of knit wears that are being made by knitting industry'-SITRA publication 1990

Home Textiles			
APM-604B			
L	**T**	**P**	**Credits**
3	**0**	**0**	**3**
Serial No.	Chapters/Units	Description	**Lecture hours**
1)	Introduction to Textile Furnishing	Introduction To Textile Furnishings; Definition - Different types of furnishings materials Woven and nonwoven - factors affecting selection of home furnishings	**4**
2)	Manufacturing principles of Home decorative	Introduction to the manufacturing process of Floor Coverings: Hard floor coverings, resilient floor coverings, soft floor coverings, rugs, cushion and pads - Use and care. Wall Coverings: Types- Manufacturing methods and blends used Introduction to the manufacturing process of Home Decoration: Draperies - Choice of fabrics - Calculating the amount of material needed – Different types of doors and windows - Their applications - Curtains - Types of curtains. Method of finishing draperies Tucks or pleats. Uses of drapery rods, hooks, tape rings and pins.	**12**
3)	Manufacturing principles of upholstereries and covers.	Introduction to the manufacturing process of Living Room Furnishings: Sofa covers - Wall hangers - Cushion - Cushion covers - Upholsteries Bolster and bolster covers. Types of fibres used. Introduction to the manufacturing process of Bed Linens: Definitions - Different types of bed linen - Sheets - Blankets - Blanket covers - Comforts -Comfort covers - Bed spreads - Mattress and mattress covers - Pads - PiIlows and pillow covers – Types of fibres used. Introduction to the manufacturing process of Kitchen Linens: Definitions - Types of kitchen linens - Dish cloth - Hand towels - Fridge cover – Fridge handle cover - Mixie cover - Grinder cover - Their use and care. Table Linen: Definitions, types - Table linens - Table mats - Table cloth - Hand towels - Selection – Types of fibres to used	**12**
4)	Testing of Home Furnishings	Different functional parameters of Home furnishings, required tests. Test procedures and standards.	**5**
5)	New Trends in Home Furnishing	New trends in Home furnishing	**2**
Total Lectures=			**42**
REFERENCE l.Alexander,N.G., "Designing Interior Environment", Mas Court Brace Covanorich,Inc.,New York, 4th			

edition 1996.
2.Donserkery,K.G. "Interior decoration in India", D.B. Taraporeval sons and co. Pvt.Lts., 3rd edition 1996.
JOURNALS:
l. Clothesline.
-2.The Indian Textile Journal.
3. Colourage.

Free Elective-II

Paper Code: APM 605 A : Basics of ERP

Module 1: Overview of ERP **(Lectures : 9)**

The evolution of ERP systems: A historical perspective - Evolution through Payroll system, Inventory Control system, Materials Requirement Planning (MRP I) system, Manufacturing Resource Planning (MRP II) system, Their advantages and disadvantages. Definition and Concept of ERP, Business reasons for rise and popularity of ERP system - Benefits of an ERP system

2. Business processes supported by ERP systems
Various business functions in an Organization – Purchasing, Materials Management, Manufacturing, Sales & distribution, Plant Maintenance, Quality Management, Finance & Accounting including Costing, Human Resources etc.

ERP market place – SAP, Oracle, PeopleSoft, JD Edwards, Baan, Microsoft's suit of products etc. Business modules in these ERP packages – a brief comparative description of business function modules and sub modules. Overview of key end-to-end business processes supported in two major ERP systems (preferably SAP and Oracle) – Order to Cash, Procure to Pay, Plan to Produce and Despatch.

Module 2 : Information Technology and ERP systems **(Lectures : 9)**

1. The evolution of Information Technology (IT): A historical perspective
Evolution of computer generations (hardware and software) – Operating systems, File systems to Database Management systems, Communication Networks. Enabling of ERP systems by IT evolution.

2 . Related technology concepts
ERP and Supply Chain Management (SCM), and Customer Relationship Management (CRM), ERP and Business Intelligence (some of the popular tools like Cognos, Business Objects should be mentioned), ERP and Data warehousing (Data Mart, Data Mining and On-line Analytical Processing - OLAP), ERP and E-business.

Module 3 : Implementation of ERP system **(Lectures : 11)**

Types of services required in implementation – Consulting, Configuration, Customization and Support

1. ERP implementation approach

Single vendor versus Best-of Breed ERP implementation, Big Bang versus Phased (by module/ site) implementation, Using ERP of Application Service Provider (ASP).

2. ERP implementation life cycle

Planning different aspects (Economic viability, Senior Management commitment, Resource requirements, Change management etc.), Understanding requirements and Process preparation – Gap analysis and Business Process Engineering, User Acceptance criteria, Design, Configuration, Customization (difference between Configuration and Customization, advantages and disadvantages), Extensions, Data migration, End-user training, User Acceptance, Going live, Roll-out. Differences between ERP implementation life cycle and Custom Software development phases. Drawbacks of ERP system.

3. Organizing implementation

Interaction with Vendors, Consultants, and Users. Contracts with Vendors, Consultants, and Employees. Project Management and Monitoring. ERP Project Organization – Formation of Steering Committee and different User Groups. Top Management Commitment and Steering Committee meetings. Change Management, Risks and Challenges in ERP implementation.

4. Post-implementation Support, Review, Maintenance and Security of ERP systems

A typical Support Cycle (Planning, Stabilization, Ongoing and Upgrade phases). Post-implementation Review of ERP systems – measures of review (Efficiency, Effectiveness, and Competitive Advantage), and approaches for review (User attitude survey, Cost/benefit analysis, Compliance audit, Budget performance review, Service level monitoring, Technical review, Product review, Integration review etc.). System maintenance and ERP system maintenance. Software upgrade (patch, release, version). Security and Access control of ERP systems.

Module 4 : Emerging Trends and Future of ERP systems **(Lectures : 7)**

Emerging Technologies and ERP

Service-oriented Architecture (SOA): Enterprise SOA layers – Business processes, Business services, Components and Integration services, Advantages and Drawbacks of SOA, When to use SOA, Difference between multi-layered Client-server architecture and SOA, basic awareness of Net Weaver from SAP, Web sphere from Oracle and .Net from Microsoft.

Enterprise Application Integration (EAI): Basic understanding of the concept, Types of EAI (levels) – User Interface, Method (logic), Application Interface, Data. EAI architecture – Typical framework (Business Processes, Components &Services, Messaging service, and Transport service. Mention of some of the leading EAI vendors – IBM, Microsoft, Oracle, SAP, TIBCO.

Radio Frequency Identification (RFID) and ERP: awareness of RFID technology, Benefits of RFID integrated with ERPs.

M-Commerce: basic concept and applications, difference with E-Commerce, benefits of integration with ERPs.

Books Recommended:

1. Enterprise Resource Planning – A Managerial Perspective by D P Goyal, Tata McGraw Hill Education, 2011

2. Enterprise Resource Planning by Ashim Raj Singla, Cengage Learning, 2008

References:

1. Enterprise Resource Planning, 2nd Edition by Alexis Leon, Tata McGraw Hill Education, 2008

Total Class Hours = 36

Paper Code : APM-605 B : Database Management System

Introduction **[4 Lectures]**

Concept & Overview of DBMS, Data Models, Database Languages, Database Administrator, Database Users, Three Schema architecture of DBMS.

Entity-Relationship Model **[5 Lectures]**

Basic concepts, Design Issues, Mapping Constraints, Keys, Entity-Relationship Diagram, Weak Entity Sets, Extended E-R features.

Relational Model **[3 Lectures]**

Structure of relational Databases, Relational Algebra, Relational Calculus,

SQL and Integrity Constraints **[6 Lectures]**

Concept of DDL, DML, DCL. Basic Structure, Set operations, Aggregate Functions, Null Values, Domain Constraints, Referential Integrity Constraints, assertions, views, Nested Subqueries

Relational Database Design **[7 Lectures]**

Functional Dependency, Different anamolies in designing a Database., Normalization using funtional dependencies, Decomposition, Boyce-Codd Normal Form, 3NF, Nomalization using multi-valued depedencies, 4NF, 5NF

Internals of RDBMS **[7 Lectures]**

Physical data structures, Query optimization : join algorithm, statistics and cost bas optimization. Transaction rocessing, Concurrency control and Recovery Management : transaction model properties, state serializability, lock base protocols, two phase locking.

File Organization & Index Structures **[6 Lectures]**

File & Record Concept, Placing file records on Disk, Fixed and Variable sized Records, Types of Single-Level Index (primary, secondary, clustering), Multilevel Indexes, Dynamic Multilevel Indexes using B tree and B+ tree .

Total Class Hours = 38

Text Books:

1. Henry F. Korth and Silberschatz Abraham, "Database System Concepts", Mc.Graw Hill.
2. Elmasri Ramez and Novathe Shamkant, "Fundamentals of Database Systems", Benjamin Cummings Publishing. Company.
3. Ramakrishnan: Database Management System , McGraw-Hill
4. Gray Jim and Reuter Address, "Transaction Processing : Concepts and Techniques", Moragan Kauffman Publishers.
5. Jain: Advanced Database Management System CyberTech
6. Date C. J., "Introduction to Database Management", Vol. I, II, III, Addison Wesley.
7. Ullman JD., "Principles of Database Systems", Galgottia Publication.

Reference:

1. James Martin, "Principles of Database Management Systems", 1985, Prentice Hall of India, New Delhi
2. "Fundamentals of Database Systems", Ramez Elmasri, Shamkant B.Navathe, Addison Wesley Publishing Edition
3. "Database Management Systems", Arun K.Majumdar, Pritimay Bhattacharya, Tata McGraw Hill

Paper Code: APM 605 C: Basics of E-Commerce

Introduction to E-Commerce [5 Lectures]:

Definition, Scope of E-Commerce, Hardware requirements, E-Commerce and Trade Cycle, Electronic Markets, Electronic Data Interchange and Internet Commerce.

Business to Business E-Commerce [7 Lectures]:

Electronic Markets, Electronic Data Interchange (EDI): Technology, Standards (UN/EDIFACT), Communications, Implementations, Agreements, Security, EDI and Business, Inter-Organizational Ecommerce.

Legal issues [5 Lectures]:

Risks: Paper Document vs. Electronic document, Authentication of Electronic document, Laws, Legal issues for Internet Commerce: Trademarks and Domain names, Copyright, Jurisdiction issues, Service provider liability, Enforceable online contract.

Security Issues [6 Lectures]:

Security Solutions: Symmetric and Asymmetric Cryptosystems, RSA, DES, and Digital Signature, Protocols for secure messaging, Secure Electronic Transaction (SET) Protocol, Electronic cash over internet, Internet Security.

Business to Consumer E-Commerce [8 Lectures]:

Consumer trade transaction, Internet, Page on the Web, Elements of E Commerce with VB, ASP, SQL.

E-business [7 Lectures]:

Internet bookshops, Software supplies and support, Electronic Newspapers, Internet Banking, Virtual Auctions, Online Share Dealing, Gambling on the net, E-Diversity, Case studies through internet.

Total Class Hours = 38

Books:

1. E-Commerce-Strategy, Technologies & Applications by David Whitley, TMH
2. E-Commerce- The cutting edge of business by Kamlesh K. Bajaj, TMH
3. E-Commerce through ASP by W Clarke- BPB
4. Beginning E-Commerce with VB, ASP, SQL Server 7.0 & MTS by Mathew Reynolds, Wrox Publishers
5. Global Electronic Commerce- Theory and Case Studies by J. Christopher Westland and Theodore H. K Clark, University Press

APM 691: Lab on IT & CAD in Apparel Industry

Contact hours / week				Credit points
L	T	P	Total	
0	0	3	3	2

List of experiments:

1. Understanding of tools of Apparel CAD.

Design a pattern, grading and marker planning using CAD for the following garments

1.Men's shirt

2.Pants.

5.Skirt and Top

6.Marker planning for plain,stripe,,plaids,checks,design fabric of different widths .

7. Marker efficiency calculations

8. Problem solving through Cut planning Software.

9. Assignment on ERP software in Apparel Industry.

10. Problem solving through Computer Programming Language.

11. Job on Digitiser.

APM 692: Lab on Production Planning & Control in Apparel Industry

1. Job assignment on Preparation of Lay lot Planning for cutting with

The help of Cut Planning software or manually.

2. Job assignment on preparation of Production Planning in Sewing through tools like Gantt Chart , PERT chart etc : Case study.
3. Individual assignment for Line Balancing.

4. Individual assignment on Study of Productivity and stoppage analysis.

Apparel Elective Lab-I :

APM 693 A: Lab on Knitting & Knitwear Technology

1. Production calculation of circular weft knitting machine .
2. Study of yarn path and yarn tension on circular weft knitting m/c.
3. Study of different components of circular weft knitting m/c.
4. Study of cam profile and cam setting in designing of weft knitted fabrics.
5. Analysis of knitted fabrics.
6. Pattern making , Cutting and Stitching of Men's knitted T-shirt .
7. Pattern making , Cutting and Stitching of Kid's knitted Garment .
8. Pattern making , Cutting and Stitching of Women's knitted T-shirt .

APM 693 B: Lab on Testing of Home Textiles

1. Testing of Light Fastness for various types of Home furnishing items. i.e curtains etc
2. Testing of Rubbing Fastness for various types of Home furnishing Items i.e upholsteries etc
3. Testing of Flame resistance for various types of Home furnishing items.
4. Testing of Tensile behavior.
5. Testing of Drape for curtain fabrics and table covers etc.

Free Elective Lab-II:

APM 694 A: ERP Lab

APM 694 B: **Database Management System Lab**

Structured Query Language

1. **Creating Database**

- Creating a Database
- Creating a Table
- Specifying Relational Data Types
- Specifying Constraints
- Creating Indexes

2. **Table and Record Handling**

- INSERT statement
- Using SELECT and INSERT together
- DELETE, UPDATE, TRUNCATE statements

- DROP, ALTER statements

3. **Retrieving Data from a Database**

1. The SELECT statement

2. Using the WHERE clause

3. Using Logical Operators in the WHERE clause

4. Using IN, BETWEEN, LIKE , ORDER BY, GROUP BY and HAVING

Clause

5. Using Aggregate Functions

6. Combining Tables Using JOINS

7. Subqueries

4. Database Management

- Creating Views
- Creating Column Aliases
- Creating Database Users
- Using GRANT and REVOKE

APM 694 C : E-commerce Lab

7Th Sem (THEORY)

Physical & Chemical Testing of Garments			
APM 701			
L	**T**	**P**	**Credits**
3	**0**	**0**	**3**

Serial No.	Chapters/Units	Description	**Lectures in hour**
1)	**Unit-1**	Introduction to Garment Testing, Objectives and significance of Garment Testing. International Standards available for Garment Testing. Introduction to REACH Audits and REACH screening. Sampling Techniques , AQL standards of Sampling. Oeko tex 100 Standards	**8**
2)	**Unit-2**	Principles, necessity and methods of various Physical Testing of Garment - Weight of Garment, Garment Thickness, Seam Strength, Pilling resistance, Button strength Testing , Zipper strength Testing , Formability and Sewability Testing of Apparel Fabrics. Air Permeability and Tearing Strength of Apparel Fabrics. Washing Shrinkage , Flammability Property	**13**
3)	**Unit-3**	Principles , necessity and methods of various Chemical Testing of Garment - Testing the presence of Prohibited Azo dyes, Nickel in metal parts , Pentachlorophenol, PCP , Allergenic disperse dyes , Color Fastness properties – fastness to light , fastness to rubbing , fastness to washing , fastness to Ironing , fastness to dry cleaning , fastness to chlorine water , fastness to perspiration, saliva fastness. Testing of blend composition in garment.	**13**
Total Lectures=			**34**

References:

Clothing Science and comfort			
APM 702			
L	**T**	**P**	**Credits**
3	**0**	**0**	**3**

Serial No.	Chapters/Units	Description	**Lectures in hour**
1)	**Fabric appearance**	Fabric appearance, Grading of appearance, Elements of Fabric appearance, Different knitted fabric GSM standards, selection of fibre, yarn structure, yarn structure and fabric construction; their effect on fabric appearance. Study of properties such as durability, pilling, fastness and luster.	**10**

2)	**Comfort**	The effect of fiber properties, yarn structure and fabric construction on the fabric properties such as drapability, air permeability, moisture absorption, bending rigidity, sheerness , selection of fibres and yarn structure and its effect on comfort properties effect of fabric construction	**9**
3)	**Fabric protection**	Easy care--- the fibre properties and chemical treatments that decide the fabric properties such as crease recovery, shrinkability, pilling formation.	**6**
4)	**Fabric engineering**	for given end use, designing of fabric from selection fibre, type of yarn manufacture, fabric design to finishing treatments.	**5**
Total Lectures=			**30**

References:

1. Y.Li and D.X-Q Dai ,Biomechanical Engineering of Textile and Clothing,WoodHead Publishing Ltd.England.
2. Y.Li,A.S.W Wong Clothing Biosensory Engineering WoodHead Publishing Ltd.England.
3.K.Slater,Comfort Properties of Textiles,Textile Progress,JTI,1977

Apparel Elective-II

Elements of Fashion Design			
APM 703 A			
L	**T**	**P**	**Credits**
3	**0**	**0**	**3**

Serial No.	Chapters/Units	Description	**Lectures in hour**
1)	**Fashion : Elements and terminologies**	Fashion : Terminology, Cycle influence, Elements of fashion history of fashion Fashion designers American, European & others, Fashion centers of world Basic Design : Types of Design-Mod board-Formation of mood board . fashion life cycle : classic & fad item . Theories of Fashion adaptation. .	7
2)	**Elements of Design**	Elements of Design: Introduction to element of design- line & direction –shape& form – size colour- texture introducing element of design on apparels Principles of design of costumes:Introduction to principles of design – balance-proportion-Rhythm-Harmony- Introducing principle design on apparels..	**8**
3)	**Basics of Color & Figure designing**	Colour aspects of costumes : colour theory-primary-secondary-tertiary colour- Intermediate colour-colour scheme- colour dimension-Warm& cool colour-colour harmony Illusion:illusion created by elements, principles &colour on apparel. Figure/ Design Analysis : stout figure,slim figure,slender,narrow shoulder,broad shoulders,round shoulders,large bust,flat bust,large hips,large abdomen,short waist,long waist,sway back,large neck,short neck,large face,small face,square or broad face,round face,narrow pointed face,retrousse nose,prominent nose,prominent forehead,sharp angular features and large features.	**8**
4)	Consunmer oriented Fashion.	Chracteristics of a well dressed person- selection of fabrics, textiles, pattern & colour,Asthetic requirement for dress Elements of apparels :women's dress –style, fashion & fad- suitability to the individual factors in personality – Men's dress- factors to consider, fabrics, coats, trousers, shirts, collars & pockets.	**6**
5)	**Fashion trends and Fashion forecasting.**	Planning wardrobes for different age groups:Helth and comfort in dress, economy in dress. Fashion shows & Window display –importance survey on modern dress, study of current fashion trends, fashion forecasting-colour, fabrics, current fashion silhouettes, texture, designs seasons	**6**
		Total Lectures=	**35**

Reference :

1.Ander son B. and Anderson C"costume design",Harcourt Brace 2nd Ed.,1999
2.Laver J., costume and Fashion" Thames & Hudson 1995

Apparel Accessories & Surface Ornamentation			
APM-703 B			
L	**T**	**P**	**Credits**
3	**0**	**0**	**3**

Syllabus for B.Tech(Apparel Production Management) up to Fourth Year

Revised Syllabus of B.Tech in APM for the students who were admitted in Academic Session 2010-2011)

Serial No.	Chapters/Units	Description	**Lectures in hour**
1)	Introduction to Apparel Accessories	Introduction to Apparel Accessories . Different Categories & features. .	2
2)	**Trimmings & Fasteners**	Trimmings and decorations; Definition, need, types Fasteners: types, suitability to garments-methods of stitching.	**5**
3)	**Surface decorations**	Surface decorations : Bias tubing- method of making-application on suitable garments, fringes, tassels, pompon, sequence, beads, mirror work Applique-varities-method of application Inter lining: types and methods of attachments .	**10**
4)	Embroidery designing .	Embroidery:Basic principles of hand embroidery,machine embroidery-running, cording, satin, long and short ,granite, eyelet, cutwork, monogram shoes, hosiery, hand bags and hats: definition, types& material used.	**12**
5)	**Miscellaneous Accessories**	Jwellery: types – fine& costume jewellary. Other Accessories: gloves- millinery- belts- handkerchief-sunglass-umbrella. Body wears.	**6**
		Total Lectures=	**35**

Apparel Elective-III

Smart Garment			
APM 704 A			
L	**T**	**P**	**Credits**
3	**0**	**0**	**3**

Serial No.	Chapters/Units	Description	**Lectures in hour**
1		Introduction To Smart Textiles: Smart properties - structural, aesthetic, functional and their advantages.	**3**
2		Smart Textile Materials: Smart Viscose fiber, Nano fibers, Photo adaptive fibers, Chameleon fibers, Conductive fibers - properties of above fibers and their applications in textiles and apparels. Surface structured silk and wool - special effects. Encapsulation technique in production of intelligent fibers. Shape memory polymers - Thermo sensitivity, other chemical properties.	**7**
3		Interactive Textiles: Comfort - psychological, sensorial, thermo physiological. Environment sensor -changing color, temperature and humidity sensors creating energy and heat. Body sensor – moisture management, heat and moisture transfer properties, heat and pressure receptors, air permeability.	**7**
4		Speciality Finishes: Softening - handle variation, elastic soft handle. Resin fmishing - crease free effects. Emerising and raising - special effects and designs.	**4**
5		Comfort Wear: Thermo wear to give warmth, multilayer sweater with thermal insulation. Smart Viscose, trousers/ shirts - cotton look and feel; viscose intimate apparels for silken feel and comfort; viscose lycra knits for fashion and comfort. Active Wear Sports Wear: Breathe thermo wear, anti sweat apparel, sports underwear, anti drag swim wear, athletes wear with pressure receptors, temperature controlled garment, liquid insulated garment, hitech cooling vest, energy expenditure wear, futuristic jogging suit. Medical Wear: Antimicrobial resistant wear, anti cellulites panty hose, undergarment for catheters, life shirts, ceramic coated health care apparels .	**14**

		Protective Wear: Security wear, protection from UV radiation, chemical, nuclear effects - bullet proof fabrics, military applications - during war and for medical treatment. Wearable Electronics: Introduction - model of a design - business executive applications- medicine safety -their applications - entertainment and recreational applications - musical jackets - electronic table cloth.	
		Total Lectures=	**35**

REFERENCES: REFERENCES:

1.Sanjay Gupta, "Smart Textiles" - Their Production and Marketing Strategies. Printers Bhumica, NewDelhi, 2000
2. VigoT.L., "Intelligent Fibers", Journal of textile Institute 1999,90 Part 3 Textile Institute
3. High Performance Textiles, 1999, International Newsletter
4. Advances in Textile Technology, 2000
5. "Intelligent Textiles for Garments". The Indian Textile Journal May 1999/2000

Protective Clothing			
APM 704 B			
L	**T**	**P**	**Credits**
3	**0**	**0**	**3**

Serial No.	Chapters/Units	Description	**Lectures in hour**
	Selection of fibres for protective clothing.	Selection of fibres -suitability and properties of high performance fibres for various protective clothing. Chemical composition and physical structure, characteristics and working of various fibres according to different end uses like thermal protection, ballistic protection, anti microbial protection, protection against cold etc.	
	Yarn & Fabric properties and finishes for Protective clothing .	Yarn & fabric (knitted, woven & non-woven) parameters-their method of production- . effect of structure on their performance- use of composite materials in yarn and fabric formation used for protective end uses. Chemical finishes for protective garments: Use of coated fabrics - different type of finishes like fire retardant finishes, for different textile materials, water repellent finishes, anti microbial finishes. Chemical finishes against radiation and chemicals - Method of application of those finishes Protective finishes for health	
		Garment Construction: Method of construction of garments according to various protective end uses like protection against cold, ballistic protection, Use of different fabric types (knitted, woven, and nonwoven), coated/ laminated in different places. Use of interlining & composites. 3D structures. Hi-tech textiles -wearable electronics. Protective garments for industrial and apparel end uses.	
		Evaluation of protective fabrics. Desirable properties of protective textiles- method of testing for thermal protective performance, abrasion & wear resistance, Evaluation of resistance to mildew, ageing, sunlight, chemical, electrostatic and electrical resistivity, impact properties. ASTM standards for protective garments.	

REFERENCES

1. P.W.Harrison"The Design of Textiles for Industrial Application " the Textile institute,Manchester 1998.
2.Bajaj P. and Sengupta A.K "Protective Clothing"The Textile Institute 1992.
3.Jhonson J.S. and Mansdork S.Z, "Performance of Protective Clothing",ASTM 1996
4.Corbman B.P.,"Textiles :Fibre To Fabric",McGrawhill Book Company,1985

Free Elective-III

Image Processing Technology			
TT-705A			
L	**T**	**P**	**Credits**
3	**0**	**0**	**3**

Serial No.	Chapters/Units	Description	**Lectures in hour**
1)	Introduction and fundamentals of Image Transform	Elements of digital image processing , Image model , Sampling and quantization , Relationships between pixels , Basic geometric transformations-Introduction to Fourier Transform and DFT – roperties of 2D Fourier Transform – FFT – Separable Image Transforms -	**7**

		Walsh – Hadamard – Discrete Cosine Transform, Haar, Slant – Karhunen – Loeve transforms.	
2	IMAGE ENHANCEMENT TECHNIQUES.	Enhancement by point processing , Spatial Domain methods: Basic grey level transformation – Histogram equalization – Image subtraction – Image averaging, Spatial filtering- Smoothing, sharpening filters – Laplacian filters – Frequency domain filters : Homomorphic filtering. , Enhancement in the frequency domain , Color Image Processing	8
3	Image restoration	Model of Image Degradation/restoration process – Noise models – Inverse filtering -Least mean square filtering – Constrained least mean square filtering – Blind image restoration – Pseudo inverse – Singular value decomposition.	**5**
4	Image compression	Lossless compression: Variable length coding – LZW coding – Bit plane coding- predictive coding-DPCM. Lossy Compression: Transform coding – Wavelet coding – Basics of Image compression standards: JPEG, MPEG,Basics of Vector quantization.	**5**
5	Image Segmentation and Representation	Edge detection – Thresholding - Region Based segmentation – Boundary representation: chair codes-Polygonal approximation – Boundary segments – boundary descriptors: Simple descriptors-Fourier descriptors - Regional descriptors –Simple descriptors- Texture	**5**
6	Morphological Image Processing	Dilation and Erosion , Opening and Closing , Some basic Morphological algorithms , Extensions to gray level images	**5**
		Total Lectures=	**35**

TEXT BOOKS

1. Rafael C Gonzalez, Richard E Woods 2nd Edition, Digital Image Processing - Pearson Education 2003.

REFERENCES

1. William K Pratt, Digital Image Processing John Willey (2001)
2. Image Processing Analysis and Machine Vision – Millman Sonka, Vaclav hlavac, Roger Boyle, Broos/colic, Thompson Learniy (1999).
3. A.K. Jain, PHI, New Delhi (1995)-Fundamentals of Digital Image Processing.
4. Chanda Dutta Magundar – Digital Image Processing and Applications, Prentice Hall of India, 2000

Introduction to Soft computing

TT-705B

L	**T**	**P**	**Credits**
3	**0**	**0**	**3**

Serial No.	Chapters/Units	Description	**Lectures in hour**
1)	Introduction	Basics of Soft computing and artificial intelligence , basic differences with the traditional computing process . Necessity of soft computing. , Knowledge Representation–Reasoning, Issues and Acquisition: Prepositional and Predicate Calculus Rule Based knowledge Representation. Symbolic Reasoning Under Uncertainity Basic knowledge Representation. Fundamentals of Heuristic model: Techniques for Heuristic search Heuristic Classification.	**6**
2)	Introduction to Fuzzy Logic.	Basic concepts of fuzzy logic, Fuzzy sets and Crisp sets, Fuzzy set theory and operations, Properties of fuzzy sets, Membership functions, interference in fuzzy logic, , Fuzzy implications and Fuzzy algorithms, Fuzzyfications & Defuzzifications, fuzzy if-then rules and rule base , Fuzzy Controller, Application of Fuzzy logic in Textile Research.	7
3)	Fundamentals of Neural Network	Neuron, Nerve structure and synapse, Artificial Neuron and its model, activation functions, Neural network architecture: single layer and multilayer feed forward networks, recurrent networks. Various learning techniques; perception and convergence rule, Auto-associative and hetro-associative memory.	**8**
4)	Neural Network (Back Propagation network)	Architecture: preceptor model, solution, single layer artificial neural network, multilayer perception model; back propagation learning methods, effect of learning rule co-efficient ;back propagation algorithm, factors affecting back propagation training, applications.	**6**
5)	Applications of Artificial Neural network	Introduction, applications in prediction, pattern recognition, image processing, classification, fault diagnosis, machine control etc	**4**

6)	NEURO FUZZY MODELING	Adaptive Neuro-Fuzzy Inference Systems – Architecture – Hybrid Learning Algorithm– Learning Methods that Cross-fertilize ANFIS and RBFN – Coactive Neuro Fuzzy Modeling – Framework Neuron Functions for Adaptive Networks – Neurofuzzy Spectrum.	**5**
7)	Genetic algorithm	Basic concepts, working principle, procedures of GA, flow chart of GA, Genetic representations, (encoding) Initialization and selection, Genetic operators, Mutation, Generational Cycle, applications.	**4**
		Total Lectures=	**40**

Text Books:

1. Introduction to Fuzzy Logic using MATLAB by S. N. Sivanandam, S. Sumathi and S. N. Deepa ,Springer
2. Fuzzy Logic: Intelligence, Control, and Information by John Yen and Reza Langari
3. Timothy J. Ross, "Fuzzy Logic with Engineering Applications, Third Edition" ,Wiley | 2010

1. S. Rajsekaran & G.A. Vijayalakshmi Pai, "Neural Networks,Fuzzy Logic and Genetic Algorithm:Synthesis and Applications" Prentice Hall of India.
2. N.P.Padhy,"Artificial Intelligence and Intelligent Systems" Oxford University Press.

Reference Books:

3. Siman Haykin,"Neural Netowrks"Prentice Hall of India
4. Timothy J. Ross, "Fuzzy Logic with Engineering Applications" Wiley India.
5. Kumar Satish, "Neural Networks" Tata Mc Graw Hill

Principles of Marketing & Market Research			
APM-705 C			
L	**T**	**P**	**Credits**
3	**0**	**0**	**3**

Serial No.	Chapters/Units	Description	**Lectures in hour**
1)	Introduction to Marketing	.Basics of Marketing. Elements of Marketing. Marketing Mix, Market Segmentation and Consumer segmentation, Market Atmosphere. Buying cycle. Principles of Marketing Strategy building.	3
2)	**Introduction to Market Research.**	Role of marketing research in marketing · Definition · Scope · · Limitations · · Difference between Marketing Research and Market Research · Introduction to Market Research · Types of Research – Basic & Applied, Nature, Scope, Objectives, Importance and . Types of Data Limitations of Market Research. · Prominent Research agencies in India	**6**
3)	**Research process**	Introduction · Steps in Research Process · Common Research Methods -Probable sources of research errors.	**2**
4)	Research designs	· Types of Research Design · Exploratory Research · Conclusive Research	**2**
5)	**Sources and collection of Secondary Data.**	· Types of data · Secondary data · Advantages & Limitations of secondary data · Internal Sources · External Sources	**3**
6)	Sources and collection of Primary Data.	Primary Data · Advantages & Limitations of primary data · Methods of Collecting Primary Data · Survey method of Primary Data Collection · Questionnaire Design · Observation Method · Consumer Panel Method · Experimental Research Method · Others	**6**

7)	Sampling Design	Some basic Terms · Advantages of Sampling · Disadvantages of Sampling · The sampling process · Sampling methods · Characteristics of Good Sampling Design · sampling and non sampling errors · Sample size calculation (Numerical expected) · Practical considerations in determining sample size.	**5**
8)	Data analysis	Data Processing · Data Analysis · Univariate analysis · Bivariate analysis · Multivariate analysis · Simple and cross tabulation· Simple and multiple regression · Factor analysis.	**5**
9)	Hypothesis testing	Introduction · What is Hypothesis · Types of tests and test selection · One sample test · Two-Independent Sample tests · Two-related sample tests · Chi-square test · Tests for large and small samples (Numerical expected)	**3**
		Total Lectures=	**35**

REFERENCES

References:

1. Donald.S. Tull., Del I. Hawkins, "Marketing Research - Measurement methods", Prentice Hall of India, 1997.
2 S.A.Chuawala, K.C.Sethia, "Foundations of Advertising - Theory and Practice", Himalaya Publishing House, 1997. .
3 Ronald .M. Weiers, "Marketing Research", Prentice Hall Inc., 1984
4 Paul. E.Green, Donalds Tull and Geral Album, "Research for Marketing Decisions", Prince Hall Inc., 1999
5. Harper.W.Boyd, Jr. Ralph West Stanley F Stasch, "Marketing Research", Richard D Irwin Inc., 1994

INTERNATIONAL BUSINESS & DOCUMENTATION (APM705 D)

Export marketing of Apparel, global scene,Prospects For India Apparel in Overseas market, globalization GATT & WTO
Multi fibre Agreement and Bilateral Textile agreements signed by India with importing quota countries.NAFTA,AGOA:
Govt of India 's export entitlement policy on garment exports.
AEPC's role in the administration of export entitlement policy.
Export promotional activities of AEPC
Facilities available for garment exporters.cash compensatory support.
Duty draw back.,Export finanace through banks.Export credit guarantee corporation
Export-Import Bank,Market Development Assistance;1005 export oriented scheme of the Govt. of India:Free Trade Zones;How to start a garment Exporting company:Export contracts;Documents connected with experts; exchange control regulation relating to exports

References

1.Darlie O. Koshly, "Effective export Marketing of Apparel",Global Business Press 1996
2.Hearle J.W.S.,Hines T., and Suh M (Eds) "Global marketing Of Textiles:Journal Of Textile Institute special issue" The textile institute 1997
3.Dickerson K. G. "Textiles and Apparel in the global economy" Prentice Hall,3rd Ed 1998.

Paper Code:- APM-791

Paper name :- Lab on Physical & Chemical Testing of Garments.

1. **Formability and sewability testing of fabric , Pilling resistance testing , Air permeability testing of fabric , Flammability Testing, seam slippage testing**
2. **Button and Zipper strength testing**
3. **Blend composition determination of given Garment.**
4. **Different Colorfastness property testing.**

Apparel Elective Lab-II

APM 792 A : Fashion Designing Lab

1. Working with 3-D shapes

2.Introduction to drawing
3.drawing figures to scale
4. Preparation of story board , Mood board etc for at least 2 themes.
5.DesigningDes ladies blouse and skirts and giving suitable colours
6.Designing men's shirt and part and giving suitable colours
7.Designing children's wear of individual choice and justify the color combination
8.Designing ladies and me's summer wear.
9.Designing ladies and men's winter wear
10.Designing ladies and men's casual wear
11. Understanding the tools and working of Fashion CAD software.

APM 792 B: Apparel Surface Ornamentation Lab

At least 3 designs each to be prepared and made on fabric for Thread embroidery , beads work , mirror work etc

Free Elective Lab-III

APM 793A : Image Processing Lab

List of Practicals
1. Write Matlab Program for generation and Manipulation of signal.
2. Write Matlab Program for convolution and correlation.
3. Write C/C++ Program for Discrete Fourier Transform.
4. Write Matlab Program for Histogram Processing
5. Write Matlab Program for Image smoothing.
6.Write Matlab Program for Image sharpening.
7. Write Matlab Program for Edge detection.
8. Write Matlab Program for Trimmed Average Filter.

APM 793B: SOFT COMPUTING LAB

ARTIFICIAL NEURAL NETWORK

1: WRITE A PROGRAMME / PREPARE AN ANN MODEL TO IMPLEMENT AND FUNCTION USING ADALINE WITH BIPOLAR INPUTS AND OUTPUTS.
2: WAP TO IMPLEMENT AND FUNCTION USING MADALINE WITH BIPOLAR INPUTS AND OUTPUTS.
3: WRITE A MATLAB PROGRAM TO IMPLEMENT DISCRETE HOPFIELD NETWORK AND TEST FOR INPUT PATTERN.
4: WRITE A MATLAB PROGRAM / PREPARE AN ANN MODEL TO IMPLEMENT BACK
PROPAGATION NETWORK FOR A GIVEN INPUT PATTERN.

FUZZY LOGIC

P1: WRITE A MATLAB PROGRAM / PREPARE A FUZZY MODEL TO IMPLEMENT FUZZY SET OPERATION AND PROPERTIES.
P2: WRITE A PROGRAM TO IMPLEMENT COMPOSITION OF FUZZY AND CRISP RELATIONS.
P3:WRITE A PROGRAMME / FUZZY MODEL TO PERFORM MAX-MIN COMPOSITION OF TWO MATRICES OBTAINED FROM CARTESIAN PRODUCT.
P4: PREPARE A FUZZY RULE BASE FOR THE RELATIONSHIP TAKING AT LEAST 3 INPUT PARAMETERS.

Genetic Algorithm

P1: WRITE A MATLAB PROGRAM FOR MAXIMIZING F(X)=X2 USING GA, WHERE X IS RANGES FROM 0 t0 31 (perform 5 iterations.)

APM 793 C: Assignments on Market Survey & Analysis

Assignments to be given, Students are supposed to prepare research plan, questionnaire etc and conduct a market survey & Analysis under the guidance of the subject teacher.

APM 8 TH SEMESTER

THEORY

Organisational Behaviour
HU801A
Contracts: 2L
Credits- 2

1. Organizational Behaviour: Definition, Importance, Historical Background, Fundamental Concepts of OB, Challenges and Opportunities for OB. **[2]**
2. Personality and Attitudes: Meaning of personality, Personality Determinants and Traits, Development of Personality, Types of Attitudes, Job Satisfaction. **[2]**

3. Perception: Definition, Nature and Importance, Factors influencing Perception, Perceptual Selectivity, Link between Perception and Decision Making. **[2]**
4. Motivation: Definition, Theories of Motivation - Maslow's Hierarchy of Needs Theory, McGregor's Theory X & Y, Herzberg's Motivation-Hygiene Theory, Alderfer's ERG Theory, McClelland's Theory of Needs, Vroom's Expectancy Theory. **[4]**
5. Group Behaviour: Characteristics of Group, Types of Groups, Stages of Group Development, Group Decision Making. **[2]**
6. Communication: Communication Process, Direction of Communication, Barriers to Effective Communication. **[2]**
7. Leadership: Definition, Importance, Theories of Leadership Styles. **[2]**
8. Organizational Politics: Definition, Factors contributing to Political Behaviour. **[2]**
9. Conflict Management: Traditional vis-a-vis Modern View of Conflict, Functional and Dysfunctional Conflict, Conflict Process, Negotiation – Bargaining Strategies, Negotiation Process. **[2]**
10. Organizational Design: Various Organizational Structures and their Effects on Human Behaviour, Concepts of Organizational Climate and Organizational Culture. **[4]**

References:

1. Robbins, S. P. & Judge, T.A.: Organizational Behavior, Pearson Education, 15th Edn.
2. Luthans, Fred: Organizational Behavior, McGraw Hill, 12th Edn.
3. Shukla, Madhukar: Understanding Organizations – Organizational Theory & Practice in India, PHI
4. Fincham, R. & Rhodes, P.: Principles of Organizational Behaviour, OUP, 4th Edn.
5. Hersey, P., Blanchard, K.H., Johnson, D.E.- Management of Organizational Behavior Leading Human Resources, PHI, 10th Edn.

Or

Project Management
HU801B
Contracts: 2L
Credits- 2

1. Project Management Concepts: Concept and Characteristics of a Project, Importance of Project Management.**[1]**
2. Project Planning: Project Evaluation, Financial Sources, Feasibility Studies. **[4]**
3. Project Scheduling: Importance of Project Scheduling, Work Breakdown Structure and Organization Breakdown Structure, Scheduling Techniques – Gantt Chart and LOB, Network Analysis – CPM/PERT. **[6]**
4. Time Cost Trade-off Analysis – Optimum Project Duration. **[2]**
5. Resource Allocation and Leveling. **[2]**
6. Project Life Cycle. **[2]**
7. Project Cost – Capital & Operating Costs, Project Life Cycle Costing, Project Cost Reduction Methods. **[2]**
8. Project Quality Management: Concept of Project Quality, TQM in Projects, Project Audit. **[1]**
9. Software Project Charateristics and Mangement **[2]**
10. IT in Projects: Overview of types of Softwares for Projects, Major Features of Project Management Softwares like MS Project, Criterion for Software Selection. **[2]**

References

1. Gopalkrishnan P. and Rama Mmoorthy: Text Book of Project Management, Macmillan
2. Nicholas John M.: Project Management for Business and Technology – Principles and Practice, Prentice Hall India, 2nd Edn.
3. Levy Ferdinand K., Wiest Jerome D.: A Management Guide to PERT/CPM with GERT/PDM/DCPM and other networks, Prentice Hall India, 2nd Edn.
4. Mantel Jr., Meredith J. R., Shafer S. M., Sutton M. M., Gopalan M. R.: Project Management: Core Text Book, Wiley India, 1st Indian Edn.
5. Maylor H.: Project Management, Pearson, 3rd Edn.

6. Nagarajan K.: Project Management, New Age International Publishers, 5th Edn.
7. Kelkar. S.A, Sotware Project Management: A concise Study, 2nd Ed., PHI

Apparel Elective-IV

Application of Industrial Engineering in Apparel Industry			
APM-801 A			
L	**T**	**P**	**Credits**
3	**0**	**0**	**3**

Serial No.	Chapters/Units	Description	**Lectures in hour**
1	**Introduction to Industrial Engineering.**	Introduction & significances of IE	2
2	**Apparel Product Design and Development.**	· Principles of good product design, tolerance design; quality and cost considerations; product life cycle; standardization, simplification, diversification, value engineering and analysis.	**6**
3	**Work System Design**	Taylor's scientific management, Gilbreths's contributions; productivity – concepts and measurements; method study, Proceess Flow diagrams micro-motion study in Sewing department , work measurement – stop watch time study, work sampling, standard data, PMTS; ergonomics; job evaluation, merit rating in Swing and Finishing department .	**10**
4	**Layout analysis**	Facility location factors and evaluation of alternate locations; types of Apparel plant layout and their evaluation; computer aided layout design techniques; assembly line balancing; materials handling systems.	**5**
5	**Production Planning and Inventory Control:**	Basics of production planning; master production scheduling; MRP and MRP-II; order control and flow control; routing, scheduling and priority dispatching; push and pull production systems, concept of JIT manufacturing system in Apparel Industry , application of Kanban etc; introduction to supply chain management; Inventory – functions, costs, classifications, deterministic and probabilistic inventory models, quantity discount; perpetual and periodic inventory control systems.	**10**
6	**Management Information System:**	Value of information; information storage and retrieval system – database and data structures; knowledge based systems. Application in Apparel Merchandising	**2**
		Total Lectures=	**35**

REFERENCES:

1. Khanna.a.P., "Industrial Engineering and Management", Danpat Roi & Sons, 1987.
2. Jacob Solinger, "Apparel Manufacturing Handbook, Analysis, Principles and Practice" Van Nostrand Reinhold Company, 1992.

Apparel Plant Management			
APM-801 B			
L	**T**	**P**	**Credits**
3	**0**	**0**	**3**

Serial No.	Chapters/Units	Description	**Lectures in hour**
1	Principles of Management.	Principles of management: Planning, organizing, staffing, coordination, direction and controlling organizational structure in Apparel Industry , management by objective in Apparel Industry, management by crisis management , Delphi technique.	5
2	**Personal Management in Apparel Plant**	Personal management: nature, scope, objective , role and profile of a good personnel manager in an Apparel factory, planning and procurement of manpower-manpower planning recruitment and selection –job description and specification of different job profiles of Apparel Industry. Tools selection –application, tests and interview techniques. Employee communication: Channels, media, forms and barriers of communication. Employee motivation in theory and practice in Apparel factory.	**8**

		Job change: transfer and promotion –layoff and retrenchment, dismissal and discharge-job enlargement and job enrichment	
3	**Labor Management.**	Growth of trade unions in India and its problems , Handling of grievances: causes and detection –open door policy-model grievance procedures-responsibility and behaviour in handling grievances .management of discipline-changing concept of discipline . Labour welfare and labour legislation: Concept of labour welfare-voluntary and stautory benefits and services. Factories Act 1948 shops and establishment act , labour contract(regulation and abolition) act 1970. Workers participation in management –govt. scheme-how to make it a success	**8**
4	**Wage and salary administration**	Wage and salary administration :Concept of wage and salary –time and piece wages –money and real wages, minimum, fair and living wages-methods of payment and fixation of wages-collective bargaining and wage boards, statutory methods of fixing wages –payment of wages act.1936,Minimum wages act 1984, Equal remuneration Act 1976 and Payment of bonus Act 1965.	**6**
5	**Production and Inventory Management**	. Materials or Product in Management: a) Materials procurement : Introduction, Yarns, Fabrics, Trims purchasing or procurement, stores and material control, b) Material Handling : Introduction, functions and principles of material handling, types of material handling equipment in Apparel factory , selection of equipment. c) Material sales and marketing management : Introduction , sales management, sales organisation, functions of sales department of Apparel Industry	**8**
		Total Lectures=	**35**

References:
1.Harold Koontz and Heinz weitrich "Essentials of management"Mc Graw hill publishing company 1990.
2.Arun monappa,Mirza Saiyadin S.,"Personal Management" Mc Graw hill publishing company 1991
3Hicks&Gullet "Management" Mc Graw hill publishing company 1990.
4.John M Nance Vich,"Human Resource management" Irvin/Mcgraw Hill 1998
5.Leap L and Crino M. D. "Personal/Human resource management " Macmillan Publishing 1989.
6.Lon Roberts,"Process re-engineering" Mc Graw hill publishing company 1989.
7.Lon Roberts "Process Re-engineering", Mc Graw hill publishing company 1995
8.Koontz & O'Donnel "principles of management" Mc Graw hill NewYork,1995.

FREE ELECTIVE-IV
APM 802A : ENTREPRENEURSHIP DEVELOPMENT

1. Creativity and innovation and their Commercialization (Lecture: 1 hour)

What is creativity? What is innovation? Example of creativity that leads to innovation. The commercialization of creative and innovative ideas. Trends in technology development.

2. Entrepreneurship: An Overview (Lecture: 3 hour)

Definition of an entrepreneur Entrepreneurship Management And Ownership, Contrast entrepreneurship with management,Entrepreneur: Their Characteristics, Role of an entrepreneur in Industrial development,. Starting A New Business, Business Planning/ Strategic Planning And Strategic Management, Site Selection And Layout

3. Establishing New Venture (Lecture:8 hour)

Opportunities for Entrepreneurship, Meaning and Definition of SSI, Ancillary industry, Importance of SSI, Government policies for SSI. Basic criteria for final selection of a business opportunity, Amount of investment, Nature of technology. Input requirement for setting up SSI , Institutional support to SSI at State & National level. Products Identification in various fields, Causes of industrial disputes , Machinery for settlement of disputes, Idea of risk management.

4. The Business Plan Development (Lecture: 4 hours)

What is a Business Plan? The Need for a Business Plan, Define the structure of a business plan, Discuss the critical elements of an effective business plan, Preparing a Business Plan: a) Forecasting Developments and Charting an Action Plan b) Identifying the Product/Service c) Evaluating the Business Venture d) Market Research and Feasibility Study; Differentiate the feasibility study and the business plan, Identify requirements for venture feasibility.

5. Enterprise Management: (Lecture: 5 hour)

Identify mechanisms of and requirements for growth of a venture, Describe effective organizational structures, Discuss the operational challenges for entrepreneurships, Review alternative operations strategies for adapting an organization to changes in the marketplace, Differentiate entrepreneurial and traditional corporate career paths, Organizational structure relevant to small organization, Procedures involved in the management of man, machine, material and methods of production and operation.

6. Financing Business (Lecture: 4 hours)

Type of capital, importance of financial management in context to small scale industry, Sources of Debt Financing, Sources of Equity Financing ,Financial Controls

7. Marketing Products (Lecture: 2 hours)

Creating the Marketing Plan, Pricing for Profit, Creative Advertising and Promotion.

8. Indian Entrepreneurship and Case Studies (Lecture: 4 hours)
Overview and analysis of successful entrepreneurs (such as Jamshedji Tata,G.D. Birla, Aditya Birla, Dirubhai Ambani, Azim Premji etc.) ,Discussion of Indian business environment

Text Book and Articles:

1.Peggy A. Lambing (1999), Entrepreneurship, 2/e. Prentice Hall., 2.David Carson, Stanley Cromie & Pauric McGowan (1996), Marketing and Entrepreneurship in SME's: An Innovative Approach, 1/e. Prentice Hall. 3.Donald E. Vaughn (1997), Financial Planning for the Entrepreneur, 1/e. Prentice Hall.4.William L. Megginson, Mary Jane Byrd & Leon C. Megginson (1999), Small Business Management: An Entrepreneur's Guidebook, 3/e. McGraw Hill. 5.Cengiz Haksever et al (1999), Service Management and Operations, 2/e. Prentice Hall. 6.Sally Jones (1999), Principles of Taxation for Business and Investment Planning, 3/e. McGraw Hill. 7.Barjoyai Bardai (1996), Indian Tax Policy. Pelanduk Publication. 8.V. Anantaraman, Indian Industrial Relations:: Law & Practice. UPM Press, 1997, Serdang. 9.Success (Magazine) 10.Fortune 500 (Magazine) 11.Business Today(Magazine) 12.Businessworld (Magazine) 13.Merrill Lynch, “How to Read a Financial Report” 14.Stancill, “How Much Money Does Your New Venture Need?” HBR May-June 1986 15.Siegel, “Financial Plan,” Business Plan Guide Chp 13 16.Sahlman, “How to write a great business plan,” Harvard Business Review 17.Rich & Gumpert, “How to write a winning business Plan,” The Entrepreneurial Venture Chp 10 18.WebCafe: Ernst & Young, "Guide to Producing a Business Plan" 19.Merrill Lynch, “How to Read a Financial Report” 20.Stancill, “How Much Money Does Your New Venture Need?” HBR May-June 1986 21.Siegel, “Financial Plan,” Business Plan Guide Chp 13 22.“Alternative Sources of Financing,“ HBS (9-384-187) 23.Internet: Background on Wharton Entrepreneurial Programs: (www.wep.wharton.upenn.edu) 24.WebCafe: Ernst & Young, "Guide to Producing a Business Plan" 25.WebCafe: Steve Jurvetson and Tim Draper, “Viral Marketing”

Retail Management & Visual Merchandising			
APM 802 B			
L	**T**	**P**	**Credits**
3	**0**	**0**	**3**

Serial No.	Chapters/Units	Description	**Lectures in hour**
1)	Introduction Retailing	1. Retailing, Role, Relevance of & Trends. 2. Classification of Retail	4
2)	Operations: .	· Definition of Retail Management · Elements of Retail Management. 1. Retail location strategy 2. Product Mix and Merchandise management 3. Stores Management	**12**

		4. Pricing 5. Advertising & sales promotion 6. Concept of Branding & Brand Management 7. Introduction to Consumer Analysis & Consumer Segmentation.	
3)	**Legal & compliances:**	1. License 2. Legal Process 3. IR – Law 4. Shops & establishments 5. IPR (International patents & Trademarks)	**3**
4)	**Introduction to Visual Merchandising**	· Definition of VM , Significance of VM , Types of VM	**2**
5)	**Elements of VM**	· Different Elements of VM, Types of Store Planning & store Layout. Significances of Colour, Texture, Interiors, Fixtures, Props & Mannequins. Significance of Window Display & types of Window Display.	**12**
6)	Visual Merchandising Planning	Sequential steps of Visual Merchandising Planning	**2**
		Total Lectures=	**35**

APM 802 C : Robotics and Control Engineering

1) Introduction: Historical development of robots, Types of robots and their basic feature
2) Robot arm kinematics - direct kinematics problem , inverse kinematics problem,\Classification of manipulators
3) Jacobians - Velocities and static forces
4) Robot arm dynamics - Newton -Euler formulation. Lagrangian formulation
5) Manipulator trajectory generation - general concept , joint inter polated trajectories , Cartesian path trajectory
6) Control of robot manipulators - Control of robot arm , Computation of torque and steady state error for positional control of joints ,stability performance criteria and compensation technique ,Controller of multi joints robot , Resolved motion control, Sensing- Range sensor, Proximity sensor, Touch sensor Force and torque sensor
7) Robot vision - Image acquisition ,Illumination techniques, Image geometry ,Camera models ,Stereoscopy, Preprocessing of image data in spatial domain and frequency domain - Smoothing ,Enhancement ;Edge detection ,Thresholding ,Image analysis -Segmentation ,Description ,Recognition and Interpretation for 2D and 3D objects
8) Robot programming languages -An introduction
9) Robot intelligence and task planning - All techniques, Recent advancement in robotics.

Reference Subjects:
1. Applied Mechanics (TT306).
Text Books and Articles:1.Robotics- control, sensing, vision & intelligence by K.S. Fu, R.C. Gonzalez and C.S. G. Lee. 2. Robotics Motion- planning and Control by MIT Press, 3. Robotics by N.R. Deb

SUPPLY CHAIN MANAGEMENT
APM 802 D

Syllabus for B.Tech(Apparel Production Management) up to Fourth Year

Revised Syllabus of B.Tech in APM for the students who were admitted in Academic Session 2010-2011)

L	T	P	Credits
3	0	0	3

Serial No.	Chapters/Units	Description	Lectures in hour
1)	Introduction to Supply Chain Management	Supply chain – objectives – importance – decision phases – process view , competitive and supply chain strategies – achieving strategic fit, supply chain drivers – obstacles – framework –Elements of supply chain.	**5**
2)	Designing the supply chain network.	Designing the supply chain network Designing the distribution network – role of distribution – factors influencing distribution – design options – e-business and its impact – distribution networks in practice – network design in the supply chain – role of network – factors affecting the network design decisions – modelling for supply chain.	8
3)	Designing and Planning of Transportation and logistics Networks.	Role of transportation - modes and their performance - transportation infrastructure and policies - Just-in-time & Quick Response Logistics The Japanese Philosophy- Quick Response Logistics- Vendor Managed inventory- Logistics Information Systems logistics.	**6**
4)	Sourcing and Pricing.	Sourcing – In-house or Outsource – 3rd and 4th PLs – supplier scoring and assessment, selection – design collaboration – procurement process – sourcing planning and analysis. Pricing and revenue management for multiple customers, perishable products, seasonal demand, bulk and spot contracts.	**9**
5)	Information Technology in the supply chain	IT Framework – customer relationship management – internal supply chain management – supplier relationship management –transaction management– future of IT	**5**
6)	Coordination in a Supply Chain	Coordination in a Supply Chain Lack of supply chain coordination and the Bullwhip effect – obstacle to coordination – managerial levers – building partnerships and trust – continuous replenishment and vendor-managed inventories – collaborative planning, forecasting and replenishment. Measuring effectiveness of supply management, logistics engineering. Operations Research Models for operational and strategic issues in supply chain management.	**7**
		Total Lectures=	**40**

REFERENCES:

I. Sunil Chopra, Peter Meindal, "Supply Chain Management (Strategy, Planning and Operation). Prentice Hall,2001

2. Benjamin S. Blanchard," Logistics Engineering and Management". Inc Upper saddle river, New Jersey, 2003.

3.Donald J.Bowersox, Davis J.Closs "Logistical Management - The Integrated Supply Chain Process", Prentice Hall, 2002

4.Martin Christopher, "Chap.7 of Logistics & Supply chain Management - Strategies for Reducing cost & Improving Service", 2nd Edition, 2003.

5.Douglas M. Lambert, James R.Stotk, Lisa, M.Ellram, "Fundamentals of Logistics Management"., Prentice Hall, 2002.

APM 891 (Design Lab) : **Apparel Product line designing & Portfolio Presentation**

1. Working on at least 2 themes
2. Planning for creating two lines of Products , making Mood board , Color board , fabric Board , client board (with the help of available software packages)
3. Garment Designing (on software or manual) for each line of collection, at least 4 garments per line.) , Spec creation.
4. Presentation with the design plan portfolio.

Syllabus for B.Tech(Apparel Production Management) up to Fourth Year

Revised Syllabus of B.Tech in APM for the students who were admitted in Academic Session 2010-2011)