Annexure 5.5

Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore - 43
Department of Textiles and Clothing
Ph.D Textiles and Clothing

Candidate Name	**: Vidhya.N**
Name of the Supervisor	**: Dr.R.Sunitha**
Registration No	**: 21PHTCP001**

Paper- III: Specialization Paper
21PHTC03C Nonconventional Fibres for Sustainability
(Applicable for Ph.D part time scholar admitted in August, 2021)

Hrs of instruction/week – 7
No. of credits: 5

Objectives:

- To understand the importance of Nonconventional fibres
- To study the sustainability of fibres for various application
- To acquire knowledge about fabrication methods in Technical textiles
- To enhance the knowledge on comprehensive application in the field of Technical textiles.

Unit I **Natural Fibers** – Plant Fibers & Animal Fibers. Plant Fibers – Seed Fiber, Leaf Fiber, Bast Fiber, Fruit Fiber, Stalk Fiber. Production process of Plant Fibers – Cotton, Jute, Linin, Hemp. Production process of Animal Fibers – Wool, Silk. Bast fibers – Ramie, Kenaf. Production Process of Fruit Fibers – Pineapple, Banana, Coconut. **20 Hrs**

Unit II **Non Woven** – Introduction – definition, Classification, Scope & Application of Non-woven. Fibers used for Non-Woven – Web Preparation – opening, Cleaning machine, Production of parallel Laid Web, Cross laid web & Random laid Web. Bonding methods – Mechanical, Thermal, Chemical / Adhesive, Melt Blown & Spun lace technique. Finishing of bonded fabrics. **20 Hrs**

Unit III **Textile Composite:** Composite structures-Definition, Properties, types of composite material and its Application. Raw materials needed for preparing Composites-matrix and reinforcing agent. Classification of Textile Composites. Techniques for producing Nonwoven and Nonwoven Composites. **20 Hrs**

Unit IV **Technical Textiles:** Definition, Growth, Types and Development of Technical Textiles. Classification of Technical textiles and its Application. Indian and Global Technical Textile market. Importance of Sustainability in Technical Textiles. **20 Hrs**

Unit V **Evaluation of Natural Fibres, Nonwovens and Composite Structures: Testing of** Physical Test & Mechanical Test – Tensile Test, Microscope test, Longitudinal & Cross Sectional View & Chemical Test. Non Technical Test – Feeling Test & Burn Test. Visual inspection, Physical Properties- Thickness, GSM, Air Permeability; Mechanical properties test- Tensile test, compression test, Fatigue test, Fracture toughness test, Flexural rigidity, Insulation property- Acoustic tests, Thermal Behaviour and biodegradability. **25 Hrs**

Total Hours: 105

Course Outcomes:

- Understand the scope of Technical textiles and upcoming technologies
- Implement knowledge about sustainable raw materials and its applications
- Experiment the techniques of fabrication methods in technical textiles.
- Evaluate the sustainability in the field of Technical textiles.
- Investigate the potentiality of recycling in sustainable technical textiles.

References:

Text Book:

1. ***Caroline Baillie, Randika Jayasinghe, (2017)*** Green Composites: Waste and Nature based Materials for a Sustainable Future, *Second Edition*, Woodhead Publishing, ISBN-9780081007839.
2. ***T. Karthik, Prabha Karan C., R. Rathinamoorthy, (2017)*** Nonwovens: Process, Structure, Properties and Applications, Woodhead Publishing India PVT. Limited, 2017, ISBN-9385059645
3. ***Subramanian Senthilkannan Muthu,*** *(2018)* Green Composite: Processing, Characterisation and Applications for Textiles, Springer Publisher, Singapore. ISBN- 9789811319723.
4. ***Sheraz Ahmad, Abher Rasheed, Ali Afzal, Faheem Ahmad, (2017)*** Advanced Textile Testing Techniques, Published July 26, 2017 by CRC Press, ISBN 9781138746336.
5. ***Horrocks, A.R., and Anand, S.C, (2016)*** Hand book of Technical Textiles, second edition, The Textiles Institute, Wood Head Publishing Ltd, England

Journal:

1. Technical Textiles International, Elsevier Publication
2. The Journal of Industrial Textiles, Sage publication
3. Sustainable Materials and Technologies, Elsevier publication
4. Journal of Composites Science, online, open access journal, MDPI (Multidisciplinary Digital Publishing Institute), Switzerland
5. The Journal of Composite Materials, Sage publications

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Candidate Name : Hadiya Zaineb
Name of the Supervisor : Dr.G.Bagyalakshmi
Registration No : 21PHTCP002

Paper III – Specialization Paper

21PHTC03D Traditional Folk Arts of Southern India

(Applicable for Ph.D part time scholar admitted in August, 2021)

Hrs of instruction/week – 7
No. of credits: 5

Objectives:

- To study about various folk arts of Southern India
- To acquire knowledge about the materials and techniques used in folk arts.
- To explore the uniqueness of folk arts to create products.

Unit I	**Study on Traditional Folk Arts of southern India** - History, importance, techniques and materials used. Characteristic features of folk arts. Scope and field of Folklore. Concepts of Folklore, lifestyle of the artisans, contribution of folk art in today's world.	**25 Hrs**
Unit II	**Traditional folk of different southern states**- Tamil Nadu, Kerala, Karnataka, Andhra Pradesh- Their symbolism, history, materials used, motifs, colours, techniques. Growth and Prospects, constraints faced by artisans. Role of folk art in the Indian fashion arena.	**20 Hrs**
Unit III	**Folk art and textile design development** - Introduction, interventions in design development, revival, stylization and adaptation of folk art for textile design development, transformation of folk art to contemporary textile art. New dimensions of textile designing with folk art.	**20 Hrs**
Unit IV	**Folk art and textile products** - Introduction, adaptation of folk art design on accessories and apparels, inspiration from folk arts for value addition on textile and fashion products. Materials and processes- Leather, canvas, fabric. Material sourcing, production methods involved, storing. Handling of these materials. Design development and production.	**20 Hrs**
Unit V	**Folk art and new prospects** -Research and development using folk art techniques in making modern fashion/ home accessories. Promotional activities and assistance rendered to artisans, artist education and training programmes, documentation, digitalisation and marketing, strategies for future and sustainability of folk arts	**20 Hrs**

Total Hours: 105

Course outcome:

- Explain different traditional folk arts of various region
- Analyze contemporary, folk and regional styles in art forms.
- Apply design intervention techniques to uplift folk arts
- Substitute appropriate technologies for artisans
- Design and develop contemporary textile and fashion products

References:

Text Books

1. *Aditi Rajan/MP Ranjan (2014), Craft of Indian, Handmade in India, CohandsMapin Publication ISBN-978-8188204-49-6,.*
2. Jasleen Dhamija (1994),Indian Folk Arts and Crafts, National Book Trust, India.
3. Peter Claus, Sarah Diamond, Margaret Mills (2003),South Asian Folklore, Routledge,Great Britain.
4. Charu Smita Gupta (2008),Indian Folk and Tribal Paintings. Lustre Press, Delhi.
5. John Peacock (2000)Fashion Accessories The Complete 20th Century Sourcebook, Thames and Hudson, UK.

Journals

1. International Journal of Crafts and Folk Arts
2. *Journal of Traditional Art and Folk Culture*
3. ShodhKosh: Journal of Visual and Performing Arts
4. Journal of Textile Design Research and Practice
5. Journal of Art and Design.

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Department of Textiles and Clothing
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Candidate Name : S.Mounica
Name of Supervisor : Dr. R. Prabha
Registration No : 21PHTCP003

Paper III Specialization paper
21PHTC03E Textile Recycling for Technical Textile Applications
(Applicable for Ph.D part-time scholar admitted in August, 2021)

Hours of instruction /week – 7
No. of credits: 5

Objectives:

- To acquire knowledge on recycling textiles for technical applications
- To study and understand various resources for recycling and fabrication methods for preparing technical textiles.
- To enhance the knowledge on detailed application of Technical textiles for various purposes and assessment of end products

Unit I **Introduction to Technical Textiles** **20Hrs**

Introduction, definition and scope, Growth and development- future of technical textiles, Global Technical Textiles Market, Indian Technical Textiles Market, classifications – Mobil tech, Indu tech, Med tech, Home tech, Cloth tech, Agro tech, Build tech, Sports tech, Pack tech, Geo tech, Pro tech and various applications.

Unit II **Non Conventional Fibers** **20Hrs**

Introduction, Definition and Scope of Non-Conventional fibers. Importance of Non-Conventional fibre. Its advantage and disadvantage. Types – Banana, Flax, Jute, Kenaf, Sugarcane, Pina, Ramine, Bamboo, Soy, Quinoa, Nettle, Mulberry, Hop, okra, Agave, Cotton grass, Barley, Reygrass, Sabai grass. Properties and uses of non conventional fibers.

Unit III **Reclaimed Textile Fibers** **20Hrs**

Introduction, Sources, Reclaimed fibres to make technical textiles - Pre-treatment, Ring and Rotor Spinning of Recycled Fibres - Classification the raw material, Types of Recycling in the Textile and Apparel Industry, Mechanical Recycling, Chemical Recycling, Textile and Apparel Recycling Programs in the Industry

Unit IV **Processing and Fabrication** **20Hrs**

Non Conventional Fibers - Extraction of Non-conventional fibre. Importance of extraction. Methods of extraction , Reclaimed Textile Fibers - Preparatory Process - Re-granulation, Composite recycling, Recycling methods for composites, Recycling of garments, Uses in technical textile

Fabrication - Woven – Introduction and Definition. Types of Woven, Weaving process, Properties and Uses of Woven fabrics. Knitted – Introduction and Definition. Types of Knits, Knitting process, Properties and Uses of Knitted fabrics. Non-woven – Introduction and Definition. Types of Non-woven, Preparation of non woven, Properties and uses of Non-woven fabrics.

Unit V **Evaluation of Technical Textiles** **25Hrs**

Woven – Introduction and Definition.
Types of Woven, Weaving process, Properties and Uses of Woven fabrics. Knitted – Introduction and Definition. Types of Knits, Knitting process, Properties and Uses of Knitted fabrics. Non-woven – Introduction and Definition. Types of Non-woven, Preparation of non woven, Properties and uses of Non-woven fabrics.

Total Hours: 105

Course outcomes:

- Understands the importance of recycling textiles
- Implement knowledge about sustainable raw materials and its applications
- Experiment the techniques of fabrication methods in technical textiles.
- Evaluate the sustainability in the field of Technical textiles.
- Investigate the potentiality of recycling in sustainable technical textiles.

References:

Text Book:

1. ***Horrocks, A.R., and Anand, S.C, (2016)*** Hand book of Technical Textiles, second edition, The Textiles Institute, Wood Head Publishing Ltd, England
2. ***Stephen Eichhorn, Hearle, J.W.S. Jaffe, M. Kikutani, T.,*** (2009), Handbook of Textile Fibre Structure, Woodhead Publishing in Textiles, New Delhi.
3. ***T. Karthik,*** Prabha Karan C., ***R. Rathinamoorthy, (2017)*** Nonwovens: Process, Structure, Properties and Applications, Woodhead Publishing India PVT. Limited, 2017, ISBN-9385059645
4. ***Subramanian Senthilkannan Muthu, (2018)*** Green Composite: Processing, Characterisation and Applications for Textiles, Springer Publisher, Singapore. ISBN- 9789811319723.
5. ***Sheraz Ahmad, Abher Rasheed, Ali Afzal, Faheem Ahmad, (2017)*** Advanced Textile Testing Techniques, Published July 26, 2017 by CRC Press, ISBN 9781138746336.

Journal:

1. Technical Textiles International, Elsevier Publication
2. The Journal of Industrial Textiles, Sage publication
3. Sustainable Materials and Technologies, Elsevier publication
4. The Journal of Composite Materials, Sage publications
5. Journal of Composites Science, online, open access journal, MDPI (Multidisciplinary Digital Publishing Institute), Switzerland.

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Department of Textiles and Clothing

Ph.D Textiles and Clothing

Candidate Name : Suparna M G

Name of the Supervisor : Dr.K.Kalaiarasi

Registration No : 21PHTCP004

Paper- III: Specialization Paper

21PHTC03F - ADVANCED TEXTILE FINISHES

(Applicable for Ph.D Part-Time Scholar Admitted in August, 2021)

Hrs. of instruction/week – 7

No. of credits: 5

Objectives:

- To gain knowledge on fabric formation
- To learn about textile finishes
- To gain knowledge about antimicrobial and fragrance finishes

Unit I **Textile finishes**-Introduction, Objectives , Classification. Basic finishes- Singeing, Desizing, Scouring, Bleaching, Mercerisation, Degumming, Weighting, Carbonising, Crabbing, Decating, Fulling, Optical brightening, Heat setting, Tentering, Calendering, Sizing, Softening. **20Hrs**

Unit II **Functional finishes**-Functional Finishes – Crease resistant finish, Flame retardant finish, Water repellent finish, Anti-static finish, Stain and Soil repellent finish, Insects and mite resistance finish, Ultra violet protection, Abrasion resistant, Antistatic finish, Soil release finish. **20Hrs**

Unit III **Anti- microbial Finish** – Introduction, Objectives, Types - Leaching and Non-leaching. Antimicrobial Finishing Methods- Pad-dry-cure, Microencapsulation, Cross-linking, Modification of fiber surface, Nanotechnology. Evaluation of Antimicrobial finished fabric- Agar diffusion method, disc diffusion method, genetic method for assessing anti-microbial resistance. Benefits of Antimicrobial finished textiles. **20Hrs**

Unit IV **Fragrance finishes** – Introduction, Necessity, Technology for Fragrance finishing, Micro encapsulation-mechanism of release, Applications of Fragrance finish in textiles, Evaluation of Fragrance finished fabrics, Benefits of Fragrance finish in Textiles and Recent Development in Fragrance finishes **25Hrs**

Unit V **Evaluation of Finished Fabric** –Fabric Dimensions - Length, Width, Thickness, Weight, Air Permeability, Stiffness, Drape, Crease Resistance, Abrasion Resistance, Pilling, Shrinkage, Bow and Skew. Tensile Properties of Fabrics -Tensile Strength, Bursting Strength, Tear Strength. Absorbency tests. Colour Fastness of Fabrics - Colour Fastness to Laundering, Rubbing, Light and Perspiration. **20Hrs**

Total Hours: 105

Course Outcomes:

- Understand the importance of textile finishes
- Acquire knowledge in the types of finishing
- Understand the antimicrobial finishing techniques
- Develop fragrance finished textile materials
- Prepare and evaluate the finished fabrics.

References

Text Books

1. Deepali Rastogi, Sheetal Chopra (2017). Textile science, Orient blackswan Private Limited.
2. Shenai and Saraf(1995). Technology of Textile Finishing, Sevak publications.
3. Prayag (1996). Technology of finishing, Shree J. Printers, Pune.
4. Nalankalli G.S.Jeyapragasham (1997) Textile Finishing, , First Edition, SSM Institute of Textile Technology.
5. Vinayagamurthi P ,S .Kavitha, D.Gopalakrishnan (2018). Textiles finishing –Basic concepts and application, Astral Publications International Pvt.Ltd, New Delhi

Journals

1. Indian Journal of Fibre and Textile Research, NISCAIR publications New Delhi.
2. Journal of Modern Textile Science and Engineering, Gavin Publishers, Lisle.
3. Colourage, ORES, published India. (Pvt) Ltd., Mumbai.
4. Fibers and Polymers, Springer.
5. Journal of Textile Institute, Taylor and Francis, Australia.

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Department of Textiles and Clothing

Ph. D Textiles and Clothing

Candidate Name : Nivedha.K

Name of the Supervisor : Dr.K.Kalaiarasi

Registration No : 21PHTCF003

Paper- III: Specialization Paper

21PHTC03G Special Finishes on Textiles

(Applicable for Ph. D full time Scholar Admitted in January, 2022)

Hrs of instruction/week – 7

No. of credits: 5

Objectives

- To gain knowledge on fabric formation
- To learn about the textile finishes
- To gain knowledge on performance assessment of finished fabrics

Unit I	**Fiber to fabric** –Fibre- Introduction, Classification- Non conventional fibers – Importance, Extraction. Fabric formation- Weaving, Knitting, Non-Woven and their properties. Fabric Preparatory Processes: Objectives, Importance, Cellulosic - Singeing, Desizing, Scouring, Bleaching, Mercerization. Protein- Degumming, Scouring, Carbonizing. Man-Made- Scouring, Bleaching, Heat Setting.	**20Hrs**
Unit II	**Textile Finishes**- Introduction, Objectives, Types, Classification-Aesthetic finishes- Special Calendaring, Raised surface, Flocking, Acid finish, Plisse effect, Shearing, Beetling. Functional finishes- Flame retardant finish, Antimicrobial finish, Insect and mite resistant, Ultraviolet protection, Crease resistance, Abrasion resistant, Water repellent, Stain and soil repellent finish, Antistatic finish, Soil release finish.	**20Hrs**
Unit III	**Anti- microbial Finish** – Introduction, Objectives, Types - Leaching and Non-leaching. Antimicrobial Finishing Methods- Pad-dry-cure, Microencapsulation, Cross-linking, Modification of fiber surface, Nanotechnology. Evaluation of Antimicrobial finished fabric- Agar diffusion method, disc diffusion method, genetic method for assessing anti-microbial resistance. Benefits of Antimicrobial finished textiles.	**25Hrs**
Unit IV	**Surface modification of textile fabrics**-Plasma treatment-Introduction, types, Ionization radiations- Introduction, High-energy electrons, X-rays, Gamma-rays, Infrared and UV. Enzymatic surface modification of textiles and Ozone treatment.	**20Hrs**
Unit V	**Evaluation of Finished Fabric** –Fabric Dimensions - Length, Width, Thickness, Weight, Air Permeability, Stiffness, Drape, Crease Resistance, Abrasion Resistance, Pilling, Shrinkage, Bow and Skew. Tensile Properties of Fabrics -Tensile Strength, Bursting Strength, Tear Strength. Absorbency tests. Colour Fastness of Fabrics - Colour Fastness to Laundering, Rubbing, Light and Perspiration.	**25Hrs**

Total Hours: 105

Course Outcomes:

- Acquire knowledge in fabric formation and preparatory processes
- Understand the different textile finishes
- Develop Antimicrobial finish on textiles
- Outline the fabric surface modification techniques
- Evaluate the fabric properties

References

Text Books

1. Mittal K.L, Thomas Bahners(2017), Textile finishing- recent development and future trends, Scrivener Publishing, India
2. Amutha K (2016). A Practical Guide to Textile Testing, Woodhead Publishing India, New Delhi.
3. Iynnsteelemoore, averyc.goodwin (2019). Antimicrobial Susceptibility Testing Protocols,Woodhead Publishing India, New Delhi.
4. Wei Q (2009). Surface modification of Textiles" 1st edition, Woodhead Publishing, India
5. Schindler, W.D. and Hauser, P.J (2004). Chemical Finishing of Textiles, The Textile Institute, Woodhead Publishing Ltd. England,

Journals

1. Indian Journal of Fibre and Textile Research, NISCAIR publications New Delhi.
2. Journal of Modern Textile Science and Engineering, Gavin Publishers, Lisle.
3. Colourage, ORES, published India. (Pvt) Ltd., Mumbai.
4. Fibers and Polymers, Springer.
5. Journal of Textile Institute, Taylor and Francis, Australia.

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Candidate Name : Suvetha.S
Name of Supervisor : Dr. R. Prabha
Registration No : 21PHTCF004

Paper III Specialization paper
21PHTC03H Eco-friendly Natural dyes
(Applicable for Ph.D full-time scholar admitted in January, 2022)

Hrs of instruction/week -7
No. of credits: 5

Objectives:

- To study and understand various eco- friendly natural dyes.
- To gain knowledge about the availability of various natural dye sources extraction techniques.
- To explore knowledge on functional properties of natural dyes.

Unit I	**Overview of natural dyes –** Origin of Natural dyes, Definition, Classification, Advantage and disadvantage of natural dyes. Applications of natural dyes on textiles – UV protective textiles, Antimicrobial finished textiles, Fragrance finished textiles.	**20Hrs**
Unit II	**Extraction of natural dye –** Importance of extraction, Conventional extraction methods- fermentation, aqueous, alkaline, acidic and alcoholic extraction methods. Non-Conventional extraction methods- soxhlet, microwave assisted and Sonicator methods .Optimization of natural dye extraction –concentration, time, temperature, PH, M: L ratio.	**20Hrs**
Unit III	**Characterization** -Characterization of natural dyes-UV absorption, Thermal characterization by DSC (Differential Scanning Calorimetry) and TGA (Thermo gravimetric Analyser).Separation techniques for natural pigments - Adsorption Chromatography and Scanning Electron Microscopy to identify natural dyes in textiles.	**20Hrs**
Unit IV	**Dyeing Process** -Desizing, Scouring, Mercerization, Bleaching, Mordanting and Dyeing. Mordants and Mordanting: Natural and Chemical mordants – selection and limitations, Optimization of natural mordants concentrations, mordanting techniques - Pre, post, simu and Meta mordanting. Dyeing - Conventional and Non-conventional methods of natural dye -Dip and dry, dyeing in high temperatures, Advanced Dyeing - Padding mangle, Ultrasonic and Nano spray drying.	**20Hrs**
Unit V	**Evaluation of dyed fabric** -Colour Measurement - Evaluation of percent colour reflectance and Colour strength (K/S). Colour fastness properties - sunlight, crocking, pressing, washing and perspiration. Wet ability and absorbency property of dyed fabrics. Physical, mechanical and comfort properties of dyed fabrics.	**25Hrs**

Total Hours: 105

Course Outcome:

- Understand the availability of natural dye and the need for eco-friendly textiles
- Gain knowledge on extraction methods and characterization in natural dyes
- Prepare sustainable textiles with natural colourant
- Understand the various dyeing process
- Develop and evaluate eco- friendly functional textiles

References:

Textbook:

1. Gulrajani M.L., Gupta, D., "Natural Dyes and Their Application to Textiles", Department of Textile Technology, IIT, New Delhi, 1992.
2. Dr. Padma S Vankar , 2nd revised edition (2016) , "Handbook on Natural Dyes for Industrial Applications".
3. Padma Vankar , (2017), Natural Dyes for Textiles, Woodhead publishing, Cambridge, England.
4. Jamshed A. Khan (2016), Eco-Friendly Textile Dyeing and Finishing, Scitus Academics Llc.

Journals:

1. Ado A., Yahaya H., Kwalli A. A., Abdulkadir R. S., Dyeing of Textiles with Eco-Friendly Natural Dyes: A Review. International Journal of Environmental Monitoring and Protection. Vol. 1, No. 5, 2014, pp. 76-81.
2. "Eco-Friendly Dyes And Dyeing" Asim Kumar Roy choudhury AdvMatTechEnv: 2018: 2(1):pp-145-176, ISSN: 2559 – 2637.
3. N.S. Elshemy , (2011),"Unconventional Natural Dyeing Using Microwave Heating with Cochineal as Natural Dyes", Research Journal of Textile and Apparel, Vol. 15 Issue 4 pp. 26 – 36
4. Colourage, ORES, published India. (Pvt) Ltd., Mumbai.