National Institute of Fashion Technology

Syllabus for the Examination for Selection of Candidates for the post of Assistant Professor (PG level Fashion Technology Programme under Department of Higher Education)

Unit I <u>Fashion Industry/ Fashion Business</u>

Overview of Fashion Theories, Fashion Vocabulary, Classification of fashion wear into Avant Garde, Haute Couture, Pret-e-porter, Ready to wear, Classics, Fads, Knock off and Style. Understanding of Fashion Value and Supply Chain, Markets for Fashion. Concepts of Slow and Fast Fashion, Structure of Textile and Clothing Industry. Garment detailing and types of sleeves, necklines, skirts, trousers and other silhouettes.

Unit II <u>Textile Processes: Development of Fibres to Fabrics, Finishing, Dyeing and Printing</u>

Classifications of textile fibers based on its source as natural and man-made. Classification and examples of plant, animal and mineral based natural fibres. Classification with examples of regenerated, synthetics and inorganic animal based fibres. Knowledge of processes involved in fabric development such as spinning, weaving, knitting, nonwoven, dyeing, printing, finishing. Brief introduction to other high-performance fibres- polypropylene, polyethylene, nomex, Kevlar, glass and carbon dyeing and printing technology, fabric and garment finishes, technical textiles and functional finishes.

Unit III <u>Pattern Making and Garment Construction Techniques</u>

Knowledge of body measurement, size charts and pattern drafting: basic bodice, sleeve, skirt and trouser block. Dart manipulation for developing garment variations. Garment Construction of basic bodice, sleeve, skirts and trousers. Knowledge of different types of stitches and seams made with SNLS and other specialized machinery (SNLS– UBT, DNLS, Overlock, Flat lock, Multi needle chain stitch etc).

Unit IV Apparel Production Management

Basic terminologies related to the sewing floor: Capacity, Production, Productivity, Performance, Utilization, Efficiency, ON-Std. time, OFF-Std. time, Throughput time, Cycle time, Pitch time, WIP, SAM, SMV etc, Work Study, Method Study, Work Measurement, Operation breakdown, Order Analysis, Line balancing.

Concepts related to Apparel Quality: fabric and garment defects, methods of garment inspection, points of measurement, quality management techniques, control charts, advanced quality tools, six sigma, safety standards and specifications. Quality in a cutting, sewing and finishing room.

Understanding Apparel Merchandising and Costing: Export Merchandising, Tech packs, Buying House Merchandising, Garment costing, Bill of Material. Concepts of lean manufacturing

Understanding Sustainable production: three pillars of sustainability, economical and environmental impact of apparel manufacturing. Methods of waste reduction and energy conservation. Understanding terminologies such as product lifecycle assessment, carbon footprint, green label, certifications and standards, sustainability index.

Unit V Apparel production Technology

Knowledge of automation in sewing, cutting and finishing room operations:

a) Automation in cutting room processes using CAD/CAM solutions for fabric spreading, marker making and cutting operations. Understanding and usage of 2D Apparel Computer Aided Design (CAD) solutions Lectra/ Optitex/ TuksCAD/CLO etc. for making precise patterns, ensuring fabric optimization in apparel manufacturing industry. Experience of working with one such tool.

b) Knowledge and application of 3D Apparel CAD solutions for simulation of garments on virtual body forms which has a potential to reduce time for sample approval automating the garment fit and sizing process. Working knowledge of one such virtual prototyping tools such as CLO/ Lectra etc.

c) Concepts of Mechatronic Systems for low-cost automation solutions in apparel manufacturing having mechanical, electronics, computing, sensor, actuator components. Brief understanding of mechanical components for movements having degree of freedom (link mechanisms model and basic gripper mechanism), basic electronic circuits and coding environment details using arduino UNO, Raspberry Pi. Hydraulic and pneumatic circuits with different types of valve & controllers. Sensors and its classification.

d) Switchless Manufacturing for joining of pliable soft material for developing well fitted and contoured garment & for undertaking sampling room procedures. Ultrasonic and Dielectric welding techniques for joining soft materials including.

e) Concepts related to plant layout, material handling in apparel production setup. Developing floor plan of factory as per size and measurement using AUTOCAD highlighting all departments.

Unit VI <u>Industry 4.0 Technologies</u>

Integration of new technologies such as Internet of Things (IoT), cloud computing and analytics, and AI etc with manufacturing to develop, improve and distribute products.

a) **Application of Artificial Intelligence (AI)**

Understanding of the terms: Machine Learning (ML), Deep Learning (DL), Neural Network (NN). Role of AI in the apparel industry to enhance various aspects of the business processes from design to production to inventory management to supply chain and customer experience.

Application of AI in trend forecasting (predict upcoming fashion trends), for design and product development, virtual try-on and sizing and supply chain optimization. AI-powered recommendation systems helping retailers suggest personalized product recommendations to customers based on their preferences, purchase history, and browsing behavior (collaborative and cluster filtering of data). AI-powered automation and quality control system based on image and videos analysis of products to identify defects.

b) **Internet of Things (IoT)**

Concept of IoT and its role in Smart Factory & Smart Manufacturing. Understanding basic architecture of IoT, building blocks involving sensing, actuation and communication devices. Understanding of various use cases of IoT in Apparel Sector such as for developing smart textiles and wearables, supply chain management (real- time visibility into the location and condition of products by embedding sensors in garments and packaging material, building on embedded circuit), Inventory optimization, personalized customer experiences (IoT devices such as smart mirrors and interactive kiosks for enhancing customer shopping experience).

c) **Descriptive analysis of historical data**

Descriptive analysis of critical manufacturing / sales business data to develop meaningful dashboards and reports using a spreadsheet tools such as MS Excel.

d) **Developing Predictive Models**

Developing machine learning predictive models using Python and R Programming for business analytics & Intelligence. Concepts of developing regression and classification predictive models. Developing other predictive models for forecasting and planning using time series data (used for demand planning, production scheduling, and accurate resource allocation, improve operational efficiency) or for quality control and defect detection or sentiment analysis to analyze customer reviews on the social media posts.

e) **Augmented Reality (AR) and Virtual Reality (VR)**

Understanding of role of AR and VR technology in Fashion Industry. Understanding of various use cases such as Virtual Try-On, enhanced product visualization, allowing product customization and personalization, Visualization of digital prototypes for improved design and production processes. Understanding of AR experiences through mobile applications as part of Branding and Marketing exercises.

f) **Smart Manufacturing**

Manufacturing geared with Industrial IoT systems and interconnected assets for agileand more efficient production.

g) **Cloud Computing**

Concept of Cloud Computing for using infrastructure and applications via the internet. Types of cloud computing services: SaaS, IaaS, PaaS. Concept of private clouds, public clouds, hybrid clouds, and multiclouds.

Unit VII <u>Research Methodology and Techniques</u>

Types of research, data collection methods, data analysis and Interpretation, Sampling design, Attitude measurement and scaling, ANOVA, Hypothesis Testing, Research Ethics, Research report writing. Statistics for quantitative research.

Unit VIII <u>Retail Technology Management</u>

Introduction to Retailing-Global and Indian perspective. Understanding terms related to retail space such as customer behavior, market segmentation, retail strategy, retail mix, assortment planning, retail pricing, retail space planning, inventory management, supply chain management, warehousing, PoS, VM etc. Concepts related to retail technologies for seamless retail: E-commerce m-commerce, social media (f-commerce), Blockchain and Bitcoin, QR codes (Quick Response Codes), Near Field Communication (NFC), Interaction digital advertising, CRM Customer Relationship Management, virtual / digital assistants, chatbots (AI), visual search features.

Note:-

If any aspirant has any observation with regard to syllabus, he/she may write mail on: dr.jkpsc@gmail.com