The Science of Texture and Rheology in Product Design Training Course

Professional Development Training Course Outline

Category	Food processing and Technology	**Duration**	10 Days
Base Fee	$3,000 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

The Science of Texture and Rheology in Product Design Training Course provides an in-depth understanding of how texture, viscosity, and flow behavior influence product performance, sensory experience, and consumer acceptance. Participants explore the scientific principles behind rheological measurements, structural mechanics, and material behavior across various industries such as food, cosmetics, pharmaceuticals, and polymers.

This comprehensive program focuses on how to apply texture and rheology science in designing innovative, high-quality, and stable products. Through advanced analytical techniques, case studies, and real-world applications, learners gain essential knowledge in product formulation, texture optimization, and process design, ensuring products meet both functional and consumer-driven demands.

Programme Curriculum

The Science of Texture and Rheology in Product Design Training Course

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applications, learners gain essential knowledge in product formulation, texture optimization, and process design, ensuring products meet both functional and consumer-driven demands.

Course Objectives

1. Understand the fundamentals of rheology and its application in product design.
2. Analyze the role of texture in consumer perception and product quality.
3. Measure viscosity, elasticity, and flow behavior using rheological tools.
4. Explore viscoelastic properties and their relation to product structure.
5. Apply rheology principles to optimize formulation and process design.
6. Evaluate textural attributes using instrumental and sensory methods.
7. Understand yield stress, shear thinning, and thixotropy behavior.
8. Utilize rheological data for predictive modeling and performance analysis.
9. Integrate rheology in quality control and product standardization.
10. Develop skills to troubleshoot texture and flow inconsistencies.
11. Explore current trends in rheology-driven product innovation.
12. Implement sustainable and cost-effective texture solutions.
13. Strengthen product development through cross-disciplinary applications.

Organizational Benefits

- Improved product consistency and performance.
- Enhanced innovation in product design and formulation.
- Better understanding of consumer-driven texture requirements.
- Reduced production waste through optimized rheological control.
- Strengthened quality assurance and standardization.
- Improved equipment calibration and process efficiency.
- Enhanced competitiveness through advanced R&D integration.
- Increased technical expertise across departments.
- Streamlined troubleshooting of product texture issues.
- Higher market success through improved sensory experience.

Target Audience

1. Food scientists and technologists
2. Cosmetic formulation specialists
3. Pharmaceutical product developers
4. Material and polymer engineers
5. Quality assurance professionals
6. R&D scientists and technologists
7. Product innovation managers
8. Research students and laboratory analysts

Course Duration: 10 days

Course Modules

Module 1: Introduction to Texture and Rheology

- Fundamentals of texture and rheology
- Importance in product design and innovation

- Flow properties and textural attributes
- Differences between Newtonian and non-Newtonian behavior
- Industrial relevance of rheology in manufacturing
- Case Study: Understanding viscosity changes in dairy-based systems

Module 2: Rheological Properties and Measurement Techniques

- Viscosity, elasticity, and yield stress principles
- Tools: rheometers, viscometers, and texture analyzers
- Shear rate and shear stress relationships
- Instrument calibration and data reliability
- Standard testing procedures across industries
- Case Study: Comparing rheological profiles in cosmetic emulsions

Module 3: Texture Profile Analysis (TPA)

- Instrumental texture measurement parameters
- Hardness, cohesiveness, springiness evaluation
- Correlation with sensory perception
- Factors affecting texture reproducibility
- Data interpretation and statistical analysis
- Case Study: Evaluating gel strength in confectionery products

Module 4: Viscoelasticity and Product Structure

- Understanding elastic and viscous responses
- Time-dependent deformation behavior
- Importance of viscoelastic testing in product development
- Frequency sweep and stress relaxation methods
- Microstructure-rheology relationship
- Case Study: Viscoelastic behavior in polymer gels

Module 5: Flow Behavior and Material Classification

- Newtonian, pseudoplastic, and Bingham plastics
- Flow curves and rheograms interpretation
- Thixotropic and rheopectic materials
- Importance in process design and transport systems
- Flow modeling and simulation tools
- Case Study: Flow behavior analysis in sauces and creams

Module 6: Rheology in Food Product Design

- Role of rheology in food texture and shelf life
- Emulsion and suspension stability
- Gelation mechanisms and thickening systems
- Rheological optimization in frozen desserts and beverages
- Sensory-textural relationships in food design
- Case Study: Texture improvement in plant-based meat alternatives

Module 7: Rheology in Cosmetic and Personal Care Formulations

- Viscosity and spreadability in creams and lotions
- Sensory perception and consumer appeal
- Emulsion stabilization and texture control
- Thixotropy and product dispensing characteristics
- Shelf-life prediction and stability testing
- Case Study: Rheological design of a moisturizing cream

Module 8: Rheology in Pharmaceutical Systems

- Flow properties of suspensions and gels
- Controlled release through viscoelastic modification
- Rheological behavior and bioavailability correlation
- Temperature and pH effects on product stability
- Role of rheology in drug formulation design
- Case Study: Optimization of topical gel consistency

Module 9: Rheology in Polymer and Industrial Applications

- Flow and deformation of molten polymers
- Thermal and shear degradation studies
- Rheological modeling for extrusion and molding
- Impact of additives on polymer flow
- Quality control through rheological fingerprinting
- Case Study: Melt rheology in thermoplastic manufacturing

Module 10: Sensory and Consumer Perception of Texture

- Linking instrumental data to sensory experience
- Sensory panels and descriptive analysis
- Consumer preference testing for texture optimization
- Statistical correlation of sensory and rheological data
- Designing for target texture profiles
- Case Study: Texture profiling in bakery products

Module 11: Formulation and Product Optimization

- Adjusting ingredients to achieve desired rheology
- Formulation stability and phase behavior
- Balancing cost and functionality
- Texture enhancement using natural hydrocolloids
- Pilot-scale formulation trials and validation
- Case Study: Optimizing texture in low-fat emulsions

Module 12: Data Interpretation and Modeling

- Rheological curve fitting and modeling techniques
- Predictive modeling for texture consistency
- Statistical software in rheological analysis
- Trend interpretation and error minimization
- Application in process design and quality assurance
- Case Study: Predictive modeling of viscosity behavior

Module 13: Advanced Analytical Techniques

- Oscillatory rheology and creep testing
- Microstructural imaging and rheo-optical methods
- Thermal analysis and dynamic mechanical testing
- Coupled analytical systems (DSC, DMA, FTIR)
- Data integration for advanced product insight
- Case Study: Correlating microstructure to flow properties

Module 14: Sustainability and Innovation in Rheology

- Green formulation strategies
- Bio-based rheological agents
- Process optimization for energy efficiency
- Recyclable and eco-friendly materials
- Future trends in rheological innovation
- Case Study: Sustainable thickener replacement in skincare

Module 15: Industrial Applications and Case Integration

- Multi-industry application of rheology
- Quality management through rheological control
- Scaling up from lab to production
- Cross-functional collaboration in R&D
- Industrial problem-solving workshops
- Case Study: Resolving flow instability in paint manufacturing

Training Methodology

- Interactive lectures and visual demonstrations
- Practical laboratory and texture testing sessions
- Case study analysis and problem-solving exercises
- Group discussions and peer learning workshops
- Real-life industrial applications and field visits
- Assessment through practical assignments and projects

Top of Form

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org or call *+254769199797*

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
23 Nov 2026	04 Dec 2026	Online	$2,000
23 Nov 2026	04 Dec 2026	Physical	$3,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$9,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$12,000

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