

**SU/BOS/Sci & Tech/470**

**Date : 26/06/2023**

**To,**

**1) The Director,**  
Departments of Technology,  
Shivaji University, Kolhapur

**2) The Principal/ Director,**  
All affiliated Engineering Colleges/ Institute,  
Shivaji University, Kolhapur.

**Subject:** Regarding revised syllabus of **Ph. D. Coursework** under the Faculty of Science and Technology.

**Sir/Madam,**

With reference to the subject mentioned above, I am directed to inform you that the university authorities have accepted and granted approval to the syllabus of **Ph. D. Coursework** under the Faculty of Science and Technology.

1.	Civil Engineering & Technology
2.	Mechanical Engineering & Technology
3.	Electrical Engineering & Technology
4.	Electronics Engineering & Technology
5.	Electronics and Telecommunication Engineering & Technology
6.	Textile Engineering & Technology
7.	Computer Science Engineering & Technology
8.	Environmental Engineering & Technology
9.	Pharmacy

This syllabus will be implemented from the academic year 2023-24 i.e. from June 2023 onwards.

You are therefore, requested to bring this to the notice of all students and teachers concerned.

Thanking you,

**Yours faithfully,**

  
**Dr. S. M. Kubal**  
**Dy. Registrar**

**Copy to:**

1	The Dean, Faculty of Science & Technology	7	Computer Centre (IT)
2	The Chairman, Respective Board of Studies	8	Affiliation Section (T.1)
3	Director, Examination and Evaluation	9	Affiliation Section (T.2)
4	Eligibility Section	10	P.G.Admission Section
5	O.E. – 4	11	P.G Seminar Section
6	Appointment Section	12	Meeting Section

# **SHIVAJI UNIVERSITY, KOLHAPUR**

## **Doctor of Philosophy [Ph. D.]**

### **Ph.D. Coursework**

## **TEXTILE ENGINEERING**

### **Course Structure**

**(To be implemented from Academic Year 2022-23 Onwards)**

## Course Structure

### TEXTILE ENGINEERING

#### **Total number of papers:**

S. No.	Subject	Marks
1	Research Methodology, Quantitative Techniques and Computer Application.	100
2	Advances in Textile Engineering	100
3	Elective Subjects (Based on Specialization). The student has to select one elective from the followings. 1. Surface Treatment of Textiles or 2. Fibre Reinforced Composite or 3. Theory of Clothing Comfort or 4. Mechanics of Textile Machines	100
	<b>Total</b>	<b>300</b>

**For each Paper there will be 60 hours of work load (Lectures -40 hours, Discussion/Seminars - 10 hours and Library work -10 hours).**

#### **Scheme of Examination:**

##### **Paper I:– Research Methodology, Quantitative Techniques and Computer Application.**

This is a common subject for the Faculty of Engineering and its scheme of examination is also common.

##### **Paper II & III:-**

Paper No	Paper Title	Theory Marks	Internal Marks	Total Marks
Paper II	Advances in Textile Engineering	80	20	100
Paper III	Elective Subjects (Based on Specialization).	80	20	100
			Total	300

For Paper II the internal evaluation will include 2 Seminars of 10 Marks each

For Paper III the internal evaluation will be as follows:

- a) Seminars (Submission and Presentation)- 10 marks
- b) Review of Literature: Submission and Presentation- 10 marks

**Syllabus:**

**PAPER-II**  
**ADVANCES IN TEXTILE ENGINEERING**

**TEXTILE FIBRES:**

Natural fibres – cellulosic fibres, protein fibres, regenerated cellulosic and protein fibres, and their physical and chemical properties. Synthetic fibres: apparel grade and industrial grade fibres and their physical and chemical properties.

**THEORY OF TEXTILE STRUCTURES:**

Fibre structure-morphology of fibres, mechanical properties of fibres-creep, stress relaxation, dynamic test, Boltzmann superposition principle, elastic recovery, Thermal properties of fibres-specific heat capacity, thermal conductivity, mechanics of heat setting, decomposition and degradation, Frictional properties of fibres-factors affecting friction, mechanism of friction.

Yarn structure-Migration - geometrical approach and tension variation as mechanism of migration, Extension behavior of continuous filament yarn - theoretical approach, actual behavior, breakage of staple yarn – modified approach.

Fabric structure - Peirce paper on fabric geometry, bending, buckling, compression behavior of fabric, Structure of knitted fabric, transfer properties of fabric-Moisture, air, water, heat transmission, hand of fabric-KAWABATA, FAST systems.

**YARN AND FABRIC MANUFACTURING**

Development trends in yarn and fabric manufacturing technologies, Non woven – web formation details, orientation of fibres and its effect, web forming machines, doubling, bonding methods bonding material, properties of nonwovens and quality assessment, applications

**CHEMICAL PROCESSING OF TEXTILES**

Recent advancements in Dyes and Chemicals; Eco –friendly Processing of Textiles; Modern Processing of Textiles, Conservation of utilities in Textile Processing, Recent Advancements in Chemical Processing Machinery, Applications of Bio-Technology, Plasma Technology and Nanotechnology in Textiles.

**REFERENCE BOOKS: -**

1. Handbook of textile fibres, Vol I and II, - Gorden and Cook
2. HandBook of fibre chemistry – Menachem Lewin
3. Manufactured fibre technology – V B Gupta and V K Kothari
4. Physical properties of textile fibres-Morton W.E. And Hearle J.W.S.
5. Textile Fibres yarns and fabrics-Kaswell E.R.
6. Textile yarns –Martindale and Goswami.
7. The Textile Institute Publication - Manual of Textile Technology – Short Staple Spinning Series by W. Klein.
8. Yarn Production Theoretical Aspects - P. Grosberg & C.Iype.
9. Handbook of Weaving – Sabit Adnur
10. Modern Preparation and Weaving Machinery – A Ormerod
11. Handbook of Textile processing machinery by R.S. Bhagwat
12. Garment Technology for fashion designers by Gerry Cooklin
13. Introduction to clothing Manufacturing by Gerry Cooklin