# Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
# Shri Vaishnav Institute of Textile Technology
# Choice Based Credit System (CBCS) in Light of NEP-2020
# Generic Elective for UG Courses
# (2021-2025)

| COURSE CODE | CATEGORY | COURSE NAME | TEACHING & EVALUATION SCHEME | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | THEORY | | | PRACTICAL | | L | T | P | CREDITS |
| | | | END SEM University Exam | Two Term Exam | Teachers Assessment* | END SEM University Exam | Teachers Assessment* | | | | |
| GPTX201 | GE | MEDICAL TEXTILES | 60 | 20 | 20 | - | - | 3 | 0 | 0 | 3 |

**Legends**: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

**Course Educational Objectives (CEOs):**

1. To provide the introductory knowledge about textile materials and medical textiles.
2. To impart the knowledge of various properties of Medical Textiles as per different domains of health care.
3. To expose the knowledge of biocompatibility and related characterization methods of Medical textiles.

**Course Outcomes (COs):**

After completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes.
The students will be able to:

1. Familiarity of healthcare related problem.
2. Comprehend just requirements for a textile material to be used as medical textile.
3. Identify new scope and design of medical textile.

**Syllabus:**

**Unit-I Introduction to Biomaterials** **9 HRS**

Introduction to biomaterials and definition & properties, Classification – Metals, polymers, ceramics, composites properties and application as biomaterial. Characterization of materials - Mechanical Properties, surface properties, electrical properties and visco-elasticity, Metallic implant materials – Stainless steel, Co-based alloys, Ti and Ti-based alloys.

**Unit-II Introduction to Polymers and Fibres** **10 HRS**

Basic concept of polymer, their classification, methods of polymerization, molecular weight and its measurement, distribution and importance. General classification of fibres. Structure, properties, uses, advantages and disadvantages of most common natural and manmade fibres.

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**Unit-III Introduction to Biocompatibility** **8 HRS**

Biocompatibility–Definition. Factors affecting biocompatibility–Carcinogenicity, mutagenecity, cytogenicity, toxicity. Blood Compatibility–Factors affecting blood compatibility. Material response: Swelling and leaching, Corrosion and Dissolution, Reaction of Biological molecules with biomaterial surfaces. Testing of implants: Methods of test for biological performance-In vitro and In vivo implant test methods. Clinical testing of implant Materials, Design and selection of implant materials–Design Process.

**Unit-IV Health care domain specific Medical Textiles I: Suture, Wound Dressing** **7 HRS**

Medical textiles market. Classification of medical textiles. Sutures: Classification based on origin, physical configuration and absorbability, properties of sutures, Evaluation and standards. Wound dressings: Functional requirements, materials used, wound healing mechanism and factors affecting wound healing, Evaluation and standards.

**Unit-V Health Care Domain Specific Medical Textiles II: Healthcare & Hygiene Antimicrobial Finish Based Materials** **8 HRS**

Healthcare and Hygiene Products: Functional requirements, materials used, design procedure, Evaluation and standards. Antimicrobial finishing of medical textiles: Need for antimicrobial finishing, antimicrobial agents and their working mechanism, Antimicrobial test methods.

**Text Books:**


1. Manufactured Fibre Technology, Gupta, V.B., Kothari, V.K., Springer, 1997.
2. Textile Science: An Explanation of Fibre Properties, Gohl, E. P. G., Vilensky, L. D., CBS Publisher, 1984.
3. J B. Park, Roderic S. Lakes: Biomaterials: an Introduction, Plenum Press, New York, 1992.
4. 2. Jonathan Black, Biological Performance of materials, Marcel Decker, 1981.

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**References:**


1. Manmade Fibers – Moncrief, R.W., Halstead Press, New York, 1975.
2. Production of Synthetic Fibres – Vaidya, A. A., Prentice Hall of India, Private Limited, New Delhi, 1998.
3. Donald L. Wise...[et al.] eds. :Encyclopedic handbook of biomaterials and bioengineering (4 vols.), Marcel Dekker, New York,1995
4. 2. J. S Temenoff, A G Mikos: Biomaterials The intersection of biology and materials science, First Edition, Pearson Education
5. 3. Piskin and A S Hoffmann, Polymeric Biomaterials (Eds), Martinus Nijhoff Publishers, Dordrecht, 1986.