



UNIVERSITY
OF MANITOBA

**University of Manitoba
Faculty of Agricultural & Food Sciences
Department of Biosystems Engineering
Fall 2022**

Course Details

Course Title & Number:	BIOE 7370 Engineering Properties of Fibres for Industrial Uses
Number of Credit Hours:	3
Lecture time:	MWF – 11:30 am – 12:20 pm (EITC: E2-360)

Instructor: Dr. Mashiur Rahman

Room # 583 Duff Roblin

Tel: 474-8509

Fax: 474-7512

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Appointment: Send an email and I would reply within 48 hours. We will meet in-person, however, if it is needed, we would also meet using online platforms. When you email me, in the subject headline, please mention the course # and your name.

[*Note 1: Please check university's email communication policy*].

[*Note 2: The Department of Biosystems Engineering has devised a plan so that there is minimal impact on the delivery and content of the course, should the instructor fall sick and is unable to continue lectures in-person. Please be assured that the alternative plan outlining any deviation from the normal mode of instruction will be communicated to you as quickly as possible if/when the need arises.*

Course Description:

This course will discuss engineering properties of fibre and develop scientific thinking skills related to engineering properties of textile products. Students will learn how to engineer and evaluate a fibre for engineering applications (biomedical, geotechnical, agricultural, and athletic).

Reading Materials

- El-Mogahzy, Y.E. (2009). Engineering Textiles: integrating the design and manufacture of textile product, Woodhouse Publishing, Cambridge, England.
- Adanur, S. (1995). Wellington Sears Handbook of Industrial Textiles, Technomic Publishing Co. Inc. Lancaster, USA.
- Alagirusamy, R., Das, A. (2010). Technical textile yarns: industrial and medical applications,

Boca Raton, CRC Press, 2010.

- Tao, X (edited), (2005). Wearable electronics and photonics, Boca Raton, CRC Press, 2005.
- Maraveas, C. (2020). The Sustainability of Plastic Nets in Agriculture, Sustainability, 12, 3625; doi:10.3390/su12093625.

Major topics and lecture schedule:

The following is a proposed course schedule with approximate dates, though these are subject to change at the discretion of the instructor and/or as the learning needs of students evolve. Any such changes are subject to Section 2.8 of the ROASS Procedure.

Date	Topics	Assignment
September 07, Wednesday	Course outline, Intro to fibre; Fibre classification	
September 09 Friday	<ul style="list-style-type: none"> • Engineered textile products • Exposure conditions determination and performance characteristics of fibre • Fibre selection for a specific application 	Assignment 1
September 12, Monday	<u>Engineering Properties of Fibre:</u> <ul style="list-style-type: none"> • HT Fibre: tenacity • HT Fibre: elongation and stress-strain curve • Internal structures and their relationships with fibre properties 	
September 14, Wednesday	<u>Engineering Properties of Fibre:</u> <ul style="list-style-type: none"> • HT Fibre: tenacity • HT Fibre: elongation and stress-strain curve • Internal structures and their relationships with fibre properties 	
September 16, Friday	<u>Engineering Properties of Fibre:</u> <ul style="list-style-type: none"> • HT Fibre: tenacity • HT Fibre: elongation and stress-strain curve • Internal structures and their relationships with fibre properties 	
September 19, Monday	Fibre to Filament Fibre (yarn) Engineering process; Melt, Wet and other man-made fibre spinning processes	Assignment 2
September 21, Wednesday	Filament fibre engineering process; spinning speed, heat setting and draw ratio	
September 23, Friday	Filament fibre engineering process; spinning speed, heat setting and draw ratio	

September 26, Monday	Filament fibre engineering process; spinning speed, heat setting and draw ratio	
September 28, Wednesday	Engineering fibres – glass fibres	
September 30, Friday	National Truth and Reconciliation Day – No classes	
October 03, Monday	Engineering fibres – aramid fibres	
October 05, Wednesday	Engineering fibres - HMWP	
October 07, Friday	Engineering fibres – nano	
October 10, Monday	Thanksgiving Day	
October 12, Wednesday	Engineering fibres – biomass and waste biomass	
October 14, Friday	Staple Fibre to Yarn Engineering – general principles, ring and other spinning processes; Different types of yarns	
October 17, Monday	Staple Fibre to Yarn Engineering – general principles, ring and other spinning processes; Different types of yarns	
October 19, Wednesday	Staple Fibre to Yarn to Fabric Engineering	
October 21, Friday	Staple Fibre to Yarn to Fabric Engineering	
October 24, Monday	Staple Fibre to Yarn to Fabric Engineering	
October 26, Wednesday	Engineered fibres by surface modifications	Assignment 3
October 28, Friday	Engineered fibres by surface modifications	
October 31, Monday	Engineered fibres by surface modifications	
November 02, Wednesday	Engineered fibres by surface modifications	
November 04, Friday	Engineered fibres by surface modifications	
November 07 –10	Midterm break – No classes	
November 11, Friday	Remembrance Day - No classes	
November 14, Monday	Engineered fibres by surface modifications	Assignment 3
November 16,	Engineered fibres by surface modifications	

Wednesday		
November 18, Friday	Fibre identification, testing and analysis	Assignment 4
November 21, Monday	Fibre identification, testing and analysis	
November 23, Wednesday	Fibre identification, testing and analysis	
November 25, Friday	Fibre identification, testing and analysis	
November 28, Monday	Fibre identification, testing and analysis	
November 30, Wednesday	Fibre identification, testing and analysis	
December 03, Friday	Fibre identification, testing and analysis	
December 06/08/10 Monday/Wed/Fri	Presentation	
December 12	Last day of class	

Course Evaluation Methods

Assignment 1: Selection of Fibre for an Engineering Product - 10% - Due October 10, 2022;
 Assignment 2: Process of Making Engineered Fibre (HT Fibre) 25% - Due on November 14th, 2022

Assignment 3: Engineered fibre/yarn/fabric by Surface Modifications – 20%, Due on December 05, 2022

Assignment 4: Identification and Testing of Engineered Fibre – 15%, Due on December 20, 2022
 Presentation – 5%

Final Exam (Take-home) – 25% (Register Office will announce the date)

Total: 100%

Note: Each assignment is due by 11:59 pm. Assignments submitted after the due date will be docked 10% mark per school day. You should upload the assignment file in the UMLearn.

Grading Scheme:

Letter Grade Percentage out of 100

A+	92-100
A	85-91.9
B+	78-84.9
B	72-77.9
C+	66-71.9
C	60-65.9
D	50-59.9
F	Less than 50

UNIVERSITY SUPPORT OFFICES & POLICIES

A list of academic supports available to Students, such as the Academic Learning Centre, Libraries, and other supports as may be appropriate:

Writing and Learning Support

The Academic Learning Centre (ALC) offers services that may be helpful to you throughout your academic program. Through the ALC, you can meet with a learning specialist to discuss concerns such as time management, learning strategies, and test-taking strategies. The ALC also offers peer supported study groups called Supplemental Instruction (SI) for certain courses that students have typically found difficult. In these study groups, students have opportunities to ask questions, compare notes, discuss content, solve practice problems, and develop new study strategies in a group-learning format.

You can also meet one-to-one with a writing tutor who can give you feedback at any stage of the writing process, whether you are just beginning to work on a written assignment or already have a draft. If you are interested in meeting with a writing tutor, reserve your appointment two to three days in advance of the time you would like to meet. Also, plan to meet with a writing tutor a few days before your paper is due so that you have time to work with the tutor's feedback.

These Academic Learning Centre services are free for U of M students. For more information, please visit the Academic Learning Centre website at:

<http://umanitoba.ca/student/academiclearning/>

You can also contact the Academic Learning Centre by calling 204-480-1481, or by visiting 205 Tier Building during 'normal time'.

University of Manitoba Libraries (UML)

As the primary contact for all research needs, your liaison librarian can play a vital role when completing academic papers and assignments. Liaisons can answer questions about managing citations, or locating appropriate resources, and will address any other concerns you may have, regarding the research process. Liaisons can be contacted by email or phone, and are also available to meet with you in-person. A complete list of liaison librarians can be found by subject: <http://bit.ly/WcEbA1> or name: <http://bit.ly/1tJ0bB4>. In addition, general library assistance is provided in person at 19 University Libraries, located on both the Fort Garry and Bannatyne campuses, as well as in many Winnipeg hospitals. For a listing of all libraries, please consult the following: <http://bit.ly/1sXe6RA>. When working remotely, students can also receive help online, via the Ask-a-Librarian chat found on the Libraries' homepage: www.umanitoba.ca/libraries.

Mental health support and referral information:

For 24/7 mental health support, contact the Mobile Crisis Service at 204-940-1781.

Student Counselling Centre

Contact SCC if you are concerned about any aspect of your mental health, including anxiety, stress, or depression, or for help with relationships or other life concerns. SCC offers crisis services as well as individual, couple, and group counselling. *Student*

Counselling Centre: <http://umanitoba.ca/student/counselling/index.html>

474 University Centre or S207 Medical Services

(204) 474-8592

Student Support Case Management

Contact the Student Support Case Management team if you are concerned about yourself or another student and don't know where to turn. SSCM helps connect students with on and off campus resources, provides safety planning, and offers other supports, including consultation, educational workshops, and referral to the STATIS threat assessment team.

Student Support Intake Assistant <http://umanitoba.ca/student/case-manager/index.html>

520 University Centre

(204) 474-7423

University Health Service

Contact UHS for any medical concerns, including mental health problems. UHS offers a full range of medical services to students, including psychiatric consultation.

University Health Service <http://umanitoba.ca/student/health/>

104 University Centre, Fort Garry Campus

(204) 474-8411 (Business hours or after hours/urgent calls)

Health and Wellness

Contact our Health and Wellness Educator if you are interested in information on a broad range of health topics, including physical and mental health concerns, alcohol and substance use harms, and sexual assault.

Health and Wellness Educator <http://umanitoba.ca/student/health-wellness/welcome.html>

Katie.Kutryk@umanitoba.ca

469 University Centre

(204) 295-9032

Live Well @ UofM

For comprehensive information about the full range of health and wellness resources available on campus, visit the Live Well @ UofM site:

<http://umanitoba.ca/student/livewell/index.html>

Copyright Information:

All students are required to respect copyright as per Canada's *Copyright Act*. Staff and students play a key role in the University's copyright compliance as we balance user rights for educational purposes with the rights of content creators from around the world. The Copyright Office provides copyright resources and support for all members of the University of Manitoba community. Visit <http://umanitoba.ca/copyright> for more information.

University and Unit policies, procedures, and supplemental information available on-line:

Your rights and responsibilities

As a student of the University of Manitoba, you have rights and responsibilities. It is important for you to know what you can expect from the University as a student and to understand what the University expects from you. Become familiar with the policies and procedures of the University and the regulations that are specific to your faculty, college or

school.

The [Academic Calendar](http://umanitoba.ca/student/records/academiccalendar.html) <http://umanitoba.ca/student/records/academiccalendar.html> is one important source of information. View the sections *University Policies and Procedures* and *General Academic Regulations*.

While all of the information contained in these two sections is important, the following information is highlighted.

- If you have questions about your grades, talk to your instructor. There is a process for term work and final **grade appeals**. Note that you have the right to access your final examination scripts. See the Registrar's Office website for more information including appeal deadline dates and the appeal form <http://umanitoba.ca/registrar/>
- You are expected to view the General Academic Regulation section within the Academic Calendar and specifically read the **Academic Integrity** regulation. Consult the course syllabus or ask your instructor for additional information about demonstrating academic integrity in your academic work. Visit the Academic Integrity Site for tools and support <http://umanitoba.ca/academicintegrity/> View the **Student Academic Misconduct** procedure for more information.
- The University is committed to a respectful work and learning environment. You have the right to be treated with respect and you are expected to conduct yourself in an appropriate respectful manner. Policies governing behavior include the:

Respectful Work and Learning Environment

http://umanitoba.ca/admin/governance/governing_documents/community/230.html

Student Discipline

http://umanitoba.ca/admin/governance/governing_documents/students/student_discipline.html and,

Violent or Threatening Behaviour

http://umanitoba.ca/admin/governance/governing_documents/community/669.html

- If you experience **Sexual Assault** or know a member of the University community

who has, it is important to know there is a policy that provides information about the supports available to those who disclose and outlines a process for reporting.

The **Sexual Assault** policy may be found at:

http://umanitoba.ca/admin/governance/governing_documents/community/230.html

More information and resources can be found by reviewing the Sexual Assault site

<http://umanitoba.ca/student/sexual-assault/>

- For information about rights and responsibilities regarding **Intellectual Property** view the policy
http://umanitoba.ca/admin/governance/media/Intellectual_Property_Policy_-_2013_10_01.pdf

For information on regulations that are specific to your academic program, read the section in the Academic Calendar and on the respective faculty/college/school web site

<http://umanitoba.ca/faculties/>

Contact an **Academic Advisor** within our faculty/college or school for questions about your academic program and regulations <http://umanitoba.ca/academic-advisors/>

Student Advocacy

Contact Student Advocacy if you want to know more about your rights and responsibilities as a student, have questions about policies and procedures, and/or want support in dealing with academic or discipline concerns.

<http://umanitoba.ca/student/advocacy/>

520 University Centre

204 474 7423

student_advocacy@umanitoba.ca

