MEMORANDUM OF AGREEMENT FOR “3+X” PROGRAM

BETWEEN

NORTH CAROLINA STATE UNIVERSITY
RALEIGH, NC, U. S. A.

AND

SOOCHEW UNIVERSITY
SUZHOU, CHINA

This Agreement is to formalize the academic exchange between the Wilson College of Textiles at North Carolina State University (hereafter referred to as NC State) and Soochow University (hereafter referred to as SU) for a 3+X Master’s program. The two institutions subscribe to the statement of principles and procedures given below and to the terms of agreement regarding the responsibilities of each institution. This agreement is based on a spirit of cooperation, reciprocity, and of mutual benefit to both parties.

Both Universities wish to enter into an arrangement as set forth below:

1. Undergraduate students who complete three (3) years’ course studies at SU and one semester of studies at NC State that result in a bachelor’s degree from SU may be considered for enrollment in an NC State Master’s degree program (hereafter referred to as the Program).

2. The Program may be completed in one additional year plus one summer session. Some degrees may require a total of 3 or more semesters due to some graduate courses not being offered in summer sessions, any necessary pre-requisite courses, or optional elective courses the student may take.

3. Admission to the Master’s program is contingent upon the student meeting the relevant entry requirements as established by NC State and the degree program to which they are applying.

Both Universities have agreed to the terms and conditions stated below.
ENTRY AGREEMENT FOR 3+X PROGRAM

(1) SU will select qualified rising senior students at the end of their first semester in their third year of education to attend NC State for their fourth year of study. SU students need to have:
   a) completed the third year of the bachelor’s program at Soochow University and achieved an overall GPA (Grade Point Average) of more than 3.0 on a 4.0 scale;
   b) obtained minimum requirement for TOEFL or IELTS scores needed for admission into a graduate program at NC State as listed online;
   c) obtained an official written recommendation statement from SU confirming the student has successfully passed the SU evaluation.

(2) This 3+X Master’s program will focus on the existing degree programs offered by NC State’s Wilson College of Textiles (see the list below for current Master’s programs). The specific Master’s programs offered in one year may depend on the interests of SU students and specific course availability at NC State.
   Participating Master’s Programs in the Wilson College of Textiles at NC State:
   • Master of Science in Textiles
   • Master of Textiles
   • Master of Science in Textile Chemistry
   • Master of Science in Textile Engineering

(3) The number of admitted students will be negotiated annually. The program plans to admit up to 10 students per year in the first phase (1-2 years) of this program, with students coming to NC State in Fall 2019. Depending on the total number of applicants from SU, this number may increase.

(4) NC State will evaluate those selected SU students using NC State’s admission standards for their qualifications. NC State faculty may conduct an on-site interview to ensure student quality. The selected students who meet both NC State and the Program’s entry qualifications will begin studies at NC State as “GTI Certificate students” in the Global Training Initiative (GTI) program.

(5) As NC State’s policy will not allow admitting students into graduate programs prior to completion of their bachelor’s degrees, these admitted students will first apply to and matriculate via the GTI Certificate Program for the first (fall) semester (and may come during an optional “early start” program in July). As GTI Certificate students they will be expected to register full-time (minimum 12 credit hours) and to take the required courses that are designed for the specific Program as well as the required GTI 401 Colloquium. Credit and non-credit English courses are also available during this first semester and students will have the opportunity to take the TOEFL or other standardized tests after arrival, but prior to October 15. The GTI has a separate on-line application process, which must be completed before a student visa certificate can be issued. See https://projects.ncsu.edu/ GTI/ for more information.
(6) After they have successfully completed the course work needed to complete their bachelor's degree (minimum 12 credit hours) as GTI Certificate students at NC State, SU will grant each of these students a statement that the student has completed bachelor's degree requirements in their respective discipline. Students will be required to provide an official letter from SU indicating the bachelor's degree requirements are satisfied prior to being approved for the Program. They must also provide a final transcript once the bachelor's degree has been conferred.

(7) NC State will officially review SU students for admission to the program upon completion of the GTI semester and certification of bachelor's degree.

(8) The graduate programs in the Wilson College of Textiles has specific degree requirements, as outlined in the appendix. It is required that at least 18 credit hours be taken after the student is admitted into the program at NC State.

(9) SU students will pay out-of-state tuition, fees and living expenses during their studies at NC State. Current NC State tuition and fee rates are available for reference online at https://studentservices.ncsu.edu/your-money/ tuition-and-fees/. To complete the Program in one (1) year, it is anticipated that students may also need to register for a minimum of six (6) credits during the Summer Session(s). NC State may provide guidance and logistical help with student housing and other relevant arrangements. The amount of living expenses may vary depending on the type of housing and living preferences.

(10) Upon successful completion of all program requirements, students will be granted one of the following degrees by NC State:
  - Master of Science in Textiles
  - Master of Textiles
  - Master of Science in Textile Chemistry
  - Master of Science in Textile Engineering

(11) Graduates who want to enter a Ph.D. program at NC State will be required to apply following the normal application procedures and admission requirements set by NC State.

GENERAL AGREEMENT

1) This Agreement represents the entire understanding between the parties and supersedes all other arrangements. This Agreement may only be changed with the written consent of both parties.

2) If either party shall temporarily fail to enforce any provision of this Agreement such temporary forbearance shall not constitute a waiver.

3) The two parties shall be in regular communication to resolve any problems or issues relating to this agreement.
4) Neither party may assign, transfer or sub-contract its commitments under this Agreement.

5) Either party may terminate this Agreement if the other shall be in material breach and following written notice of such breach shall not have remedied the breach within a period of 30 days. If the Agreement is discontinued, a teach-out plan will be required for those students remaining in the Program.

6) The relationship of NC State and SU under this Agreement shall be that of independent contractors, and a party shall not be deemed, nor hold itself out as being a partner or agent of the other party. In addition, neither NC State nor SU shall be liable for the acts of the other, and they shall not be liable for the acts of participating students in the Program.

7) Subject to the governing law of each Institutions' jurisdiction regarding public records, the Institutions agree not to use or disclose to anyone information belonging to the other party which is disclosed in connection with this Agreement which is of confidential nature and agree not to make any announcements of any nature in respect of this Agreement without the consent of the other party hereto.

8) Either party may terminate this Agreement for any reason upon nine (9) months’ prior written notice to the other. If the Agreement is discontinued, a teach-out plan will be required for those students remaining in the Program.

9) This Agreement shall remain subject to laws and regulations of both countries.

10) This Agreement is for a period of five years, unless otherwise specified. Prior to the end of the fifth year the agreement must be reviewed and re-approved if requesting an extension. Upon the scheduled review date, responses to review criteria will be required to be completed and provided to the university review committee. If the Agreement will be discontinued, a teach-out plan will be required for those students remaining in the Program.
SIGNATURES

Executive Vice Chancellor and Provost
North Carolina State University

Signature: ____________________________
Dr. Warwick Arden

Date: 12/10/19

Vice President
Soochow University

Signature: ____________________________
Professor Xiaohong Zhang

Date: _______________________________

Dean, Graduate School
North Carolina State University

Signature: ____________________________
Dr. Peter Harries

Date: 11/29/18

Dean, Wilson College of Textiles
North Carolina State University

Signature: ____________________________
Dr. David Hinks

Date: 11/8/18
Appendix I
Degree Requirements for Master of Science in Textiles (MS)

Master of Science – Textiles
The Master of Science in Textiles (MS) prepares students for industry positions. Students interested in continuing with a Ph.D. in Textile Technology and Management (TTM) or Fiber and Polymer Science (FPS) are also encouraged to pursue the MS degree. The MS degree requires a minimum of 36 hours including a thesis and typically takes 2 years to complete.

MS DEGREE REQUIREMENTS:
1. Students should form a thesis committee and have an approved Plan of Work (POW) by the end of the second semester (for full time students).
2. Thesis committee composition:
   o A minimum of three NC State Graduate Faculty members;
   o The committee chair must be a graduate faculty member in TATM; and
   o If the student has a minor, one committee member needs to represent the minor.
3. Students must successfully pass the thesis defense to graduate.
4. A minimum of 36 credit hours are required to earn the degree.
5. A maximum of 12 credit hours of relevant courses taken as non-degree studies (NDS) may be included in the program with the approval of the student’s thesis committee.
6. Two (2) credit hours of TTM 601 (graduate seminar) are required for the degree. No more than 2 hours of TTM 601 count toward the degree.
7. A total of 6-10 credit hours of 600 level courses (TT/TTM 630, 693, 695) in the major for research and independent study can count toward the degree.
8. A maximum of nine (9) credit hours of supporting coursework from outside the Department are allowed to count towards the degree. This may be increased to a maximum of 12 hours for students taking 6-credit hour classes in the College of Design.
9. All course work toward the degree must be at the 500 level or above. However, up to 3 credit hours of advanced undergraduate 400 level coursework from outside of the department may be allowed on the plan of work.
10. Each specialization requires a minimum of 15 credit hours of TT/TTM course work at the 500 or 700 levels.
11. If a minor is selected, a minimum of nine (9) hours must be taken in the minor area and nine (9) hours are counted toward the degree requirement.
12. The degree must be completed within six (6) years of the date of the first course completed that is on the Plan of Work. Students must be continuously enrolled once they begin their graduate program. Students may request a leave of absence from the program for one semester at a time; two (2) semesters maximum.
13. Graduate students must maintain a minimum 3.0 GPA to remain in the program and have a minimum 3.0 GPA at the time of graduation.

Students must meet all the rules outlined in the Graduate School Administrative Handbook.

Specific course requirements for specializations are as follows (not all courses are offered every semester and/or may be cancelled):
RECOMMENDED FOCUS IN TEXTILE DESIGN & FASHION DESIGN
• TT 551- Advanced Woven Fabric Design & Structures
• TT 570- Textile Digital Design and Technology
• TTM 510- Apparel Technology Management
• TTM 515- Apparel Production
• TTM 517- Advanced Computer-Aided-Design for Fashion
• TT/TTM 591- Special Studies
• TT/TTM 630- Independent Study
• TT/TTM 632- Special Studies in Tex. Prod. Development
• TT/TTM 676- Special Projects

RECOMMENDED FOCUS IN BRANDING & RETAIL
• TTM 561- Strategic Technology Management in the Tex. Complex
• TTM 573- Management of Textile Product Development
• TTM 582- Global Text. Brand Management and Marketing
• TTM 583- Strategic Planning for Textile Firms
• TTM 585- Market Research In Textiles
• TTM 588- Global Perspectives in Textile Supply Chain Management
• TT/TTM 591- Special Studies
• TT/TTM 630- Independent Study
• TT/TTM 676- Special Projects

RECOMMENDED FOCUS IN TEXTILE TECHNOLOGY
• TT 504- Introduction to Nonwovens Processes and Products
• TT 520- Yarn Processing Dynamics
• TT 530- Textile Quality and Process Control
• TT 541- Theory and Practice Of Knitted Fabric Production and Control
• TT 550- Production Mechanics and Properties of Woven Fabrics
• TT/TTM 591- Special Studies
• TT/TTM 630- Independent Study
• TT/TTM 676- Special Projects

RECOMMENDED FOCUS IN TEXTILE MANAGEMENT
• TTM 530- Textile Quality and Process Control
• TTM 533- Lean Six Sigma Quality
• TTM 535- Research Methods and Management
• TTM 561- Strategic Technology Management in the Tex. Complex
• TTM 581- Global Textile and Apparel Business Dynamics
• TTM 583- Strategic Planning for Textile Firms
• TTM 591- Special Studies
• TTM 630- Independent Study

OTHER SPECIALIZATIONS
• Multiple Specializations
• Use the optional 9 hours outside the department
• Use TT/TTM 591, TT/TTM 630, & TT/TTM 676 (12 hours) to structure a focus
Appendix II
Degree Requirements for Master of Textiles (MT)

Master of Textiles (MT): On-Campus

The Master of Textiles (MT) is a non-thesis degree that can be completed in only two semesters (1 year) of full-time on campus study or up to a maximum of six (6) years through distance education. The program is also available entirely via distance education and may be completed on a part time basis. The degree requires a minimum of 30 credit hours.

MT DEGREE REQUIREMENTS:
1. Students must work with an adviser throughout the program. A Graduate Committee is not required.
2. Students must submit a Plan of Work (POW) by the end of their first semester.
3. A minimum of 30 credit hours is required to complete the degree.
4. A maximum of six (6) credit hours independent study courses, TT/TTM 630/632, are allowed to count towards the degree.
5. A maximum of 12 credit hours of relevant courses taken as non-degree studies (NDS) may be included in the program with the approval of the student's adviser.
6. TTM 601 (Graduate Seminar) is not required for the degree. Students are allowed to take TTM 601, but no more than 2 credit hours of TTM 601 count toward the degree.
7. No minor can be declared.
8. Nine (9) credit hours of supporting coursework from outside the Department are allowed on the Plan of Work. This may be increased to 12 hours for students taking 6-credit hour classes in the College of Design.
9. All course work must be at the 500 level or above. However, up to 3 credit hours of advanced undergraduate 400 level coursework from outside of the department may be allowed on the Plan of Work.
10. The degree must be completed within six (6) years of the date of the first course included in the Plan of Work. Students must be continuously enrolled once they begin their graduate program. Students may request a leave of absence from the program for one semester at a time; two (2) semesters maximum.
11. Graduate students must maintain a minimum 3.0 GPA to remain in the program and must have a 3.0 GPA or higher at the time of graduation.

Students must meet all the rules outlined in the Graduate School Administrative Handbook.
RECOMMENDED FOCUS IN TEXTILE DESIGN & FASHION DESIGN

- TT 551- Advanced Woven Fabric Design & Structures
- TT 570- Textile Digital Design and Technology
- TTM 510- Apparel Technology Management
- TTM 515- Apparel Production
- TTM 517- Advanced Computer-Aided-Design for Fashion
- TT/TTM 591- Special Studies
- TT/TTM 630- Independent Study
- TT/TTM 632- Special Studies in Tex. Prod. Development
- TT/TTM 676- Special Projects

RECOMMENDED FOCUS IN BRANDING & RETAIL

- TTM 561- Strategic Technology Management in the Tex. Complex
- TTM 573- Management of Textile Product Development
- TTM 582- Global Text. Brand Management and Marketing
- TTM 583- Strategic Planning for Textile Firms
- TTM 585- Market Research In Textiles
- TTM 588 – Global Perspectives in Textile Supply Chain Management
- TT/TTM 591- Special Studies
- TT/TTM 630- Independent Study
- TT/TTM 676- Special Projects

RECOMMENDED FOCUS IN TEXTILE TECHNOLOGY

- TT 504- Introduction to Nonwovens Processes and Products
- TT 520- Yarn Processing Dynamics
- TT 530- Textile Quality and Process Control
- TT 541- Theory and Practice Of Knitted Fabric Production and Control
- TT 550- Production Mechanics and Properties of Woven Fabrics
- TT/TTM 591- Special Studies
- TT/TTM 630- Independent Study
- TT/TTM 676- Special Projects

RECOMMENDED FOCUS IN TEXTILE MANAGEMENT

- TTM 530- Textile Quality and Process Control
- TTM 533- Lean Six Sigma Quality
- TTM 535 – Research Methods and Management
- TTM 561- Strategic Technology Management in the Tex. Complex
- TTM 581 – Global Textile and Apparel Business Dynamics
- TTM 583- Strategic Planning for Textile Firms
- TTM 591- Special Studies
- TTM 630- Independent Study

OTHER SPECIALIZATIONS

- Multiple Specializations
- Use the optional 9 hours outside the department
- Use TT/TTM 591, TT/TTM 630, & TT/TTM 676 (12 hours) to structure a focus
Appendix III
Degree Requirements for Master of Science in Textile Chemistry (MS TC)

Master of Science in Textile Chemistry (MS TC)
The Master of Science (M.S.) in Textile Chemistry (TC) emphasizes the fundamental principles of polymer science, dyeing and finishing technology, color science, dye chemistry, analytical science, and fiber formation. Our program is highly relevant to many of the chemical, fiber, retail, and textile industries, as well as environmental, medical and forensic science. Some of the active research projects in textile chemistry include study of biomedical applications of polymers, surface treatment and finishing, color perception and imaging, energy harvesting and storage, polymer and fiber science, integration of biotechnology into polymers and fibers, molecular modeling of dyes and fibers, advanced analytical characterization techniques, and environmental sustainability and pollution prevention.

Graduates of Textile Chemistry are recruited by a broad range of employers across the globe, including fiber and textile companies, chemical and polymer industries, research and development laboratories, and even state and federal agencies involved with forensic science. Some graduates have also gone onto doctoral programs, particularly in fiber and polymer science (FPS) and textile technology management (ITM).

TC PROGRAM REQUIREMENTS

*Note that we are in the process of changing this degree to what is proposed below, so it is tentative pending approval.*

The Textile Chemistry M.S. degree program has both a thesis and a non-thesis track, as well as an online Distance Education (DE) option, which entail the following:

<table>
<thead>
<tr>
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<th>THESS TRACK</th>
<th>NON-THESIS AND DE TRACKS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Minimum Number of Credits:</strong></td>
<td>32+ credit hours</td>
<td>32 credit hours¹</td>
</tr>
<tr>
<td>Graduate Seminar</td>
<td>2 semesters</td>
<td>2 semesters</td>
</tr>
<tr>
<td>(TC 601)</td>
<td>(2 credit hours)</td>
<td>(2 credit hours)</td>
</tr>
<tr>
<td>Graduate Coursework</td>
<td>24 credit hours²</td>
<td>24 credit hours²</td>
</tr>
<tr>
<td></td>
<td>(~8 courses)</td>
<td>(~8 courses)</td>
</tr>
<tr>
<td>M.S. Project Work</td>
<td>Thesis and Final Oral Examination</td>
<td>2 semesters of TC 630, independent study</td>
</tr>
<tr>
<td></td>
<td>(6+ credit hours)</td>
<td>(6 credit hours)</td>
</tr>
</tbody>
</table>

**Minimum Committee Structure**

Chair + 2 Members; two must be part of NC State Graduate Faculty outside of TECS core faculty. An optional Co-Chair can be a 4th member

Chair only, selected from TC program graduate faculty

**Total Timeline**

3-4 semesters

2-3 semesters

**Eligibility for Assistantships?**

RA = research assistantship

TA = teaching assistantship

¹ Current non-thesis program is 35 credits, but we are proposing to drop it to 32 credits.
2 Current program requires 5 courses from an approved list (6 courses for non-thesis students), and 3 courses from a supporting area or minor. This approved course list for the current program is given below. The proposed changes provides more flexibility in course selections for the students.

**Approved Course List for TC M.S. Degree Requirements:**

<table>
<thead>
<tr>
<th>Course ID</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC 530</td>
<td>The Chemistry of Textile Auxiliaries</td>
<td>3</td>
</tr>
<tr>
<td>TC (MSE) 561</td>
<td>Organic Chemistry of Polymers</td>
<td>3</td>
</tr>
<tr>
<td>TC 565</td>
<td>Polymer Applications and Technology</td>
<td>3</td>
</tr>
<tr>
<td>TC 589</td>
<td>Special Studies in Textile Engineering Science</td>
<td>3</td>
</tr>
<tr>
<td>TC 704</td>
<td>Fiber Formation—Theory and Practice</td>
<td>3</td>
</tr>
<tr>
<td>TC 705</td>
<td>Theory of Dyeing</td>
<td>3</td>
</tr>
<tr>
<td>TC 706</td>
<td>Color Science</td>
<td>3</td>
</tr>
<tr>
<td>TC 707</td>
<td>Color Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>TC 720</td>
<td>Chemistry of Dyes and Color</td>
<td>3</td>
</tr>
<tr>
<td>TC (CH,MAT) 762</td>
<td>Physical Chemistry of High Polymer – Bulk Properties</td>
<td>3</td>
</tr>
<tr>
<td>CH</td>
<td><em>Any course at the 500 level and above</em></td>
<td>1-4</td>
</tr>
<tr>
<td>TT (NW) 503</td>
<td>Materials, Polymers, and Fibers used in Nonwovens</td>
<td>3</td>
</tr>
<tr>
<td>TE (PY) 570</td>
<td>Polymer Physics</td>
<td>3</td>
</tr>
<tr>
<td>TMS 762</td>
<td>Physical Properties of Fiber Forming Polymers, Fibers &amp; Fibrous Structures</td>
<td>3</td>
</tr>
<tr>
<td>TMS (MSE) 763</td>
<td>Characterization of Structure of Fiber Forming Polymers</td>
<td>3</td>
</tr>
<tr>
<td>FPS 710</td>
<td>Science of Dyeing, Printing, and Finishing</td>
<td>3</td>
</tr>
<tr>
<td>FPS 770</td>
<td>Advances in Polymer Science</td>
<td>3</td>
</tr>
<tr>
<td>BCH 751</td>
<td>Biophysical Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>FB 516</td>
<td>Forest Products Colloids and Surfaces</td>
<td>3</td>
</tr>
<tr>
<td>MSE 565</td>
<td>Introduction to Nanomaterials</td>
<td>3</td>
</tr>
<tr>
<td>MSE (CHE) 761</td>
<td>Polymer Blends and Alloys</td>
<td>3</td>
</tr>
<tr>
<td>MSE 775</td>
<td>Structure of Semicrystalline Polymers</td>
<td>3</td>
</tr>
<tr>
<td>CHE (BEC) 562</td>
<td>Fundamentals of Bio-Nanotechnology</td>
<td>3</td>
</tr>
</tbody>
</table>
# 3+X Program in Textile Chemistry

https://textiles.ncsu.edu/tec/graduate/graduate-resources/tecs-graduate-handbook/#mstc-overview

<table>
<thead>
<tr>
<th>Semester 1: Fall</th>
<th>Semester 2: Spring</th>
<th>Summer</th>
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</thead>
<tbody>
<tr>
<td>GTI 401</td>
<td>TC 601: Seminar 1</td>
<td>Internship or Research</td>
</tr>
<tr>
<td></td>
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<td>(Optional but recommended)</td>
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<tr>
<td><strong>Course 1:</strong> Chemistry$^{a,b,c}$</td>
<td>Course 4$^{a,b,c}$</td>
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<tr>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td><strong>Course 2:</strong> Chemistry$^{a,b,c}$</td>
<td>Course 5$^{a,b,c}$</td>
<td></td>
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<td>3</td>
<td>3</td>
<td></td>
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<tr>
<td><strong>Course 3:</strong> 4$^{a,b,c}$</td>
<td>Course 6$^{a,b,c}$</td>
<td></td>
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<tr>
<td>3</td>
<td>3</td>
<td></td>
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<tr>
<td><strong>Total Credits</strong>$^e$</td>
<td><strong>TC 630: Independent Study</strong>$^d$</td>
<td><strong>Total Credits</strong>$^g$</td>
</tr>
<tr>
<td>12</td>
<td>3</td>
<td>13</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>Semester 3: Fall</th>
<th>Semester 4: Spring</th>
<th>Summer</th>
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</thead>
<tbody>
<tr>
<td>TC 601: Seminar 1</td>
<td>TC 695$^e$</td>
<td>Internship or Research</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Only if needed)</td>
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<tr>
<td><strong>Course 7:</strong> 4$^{a,b,c}$</td>
<td>(Thesis students only, if needed.)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Course 8:</strong> 5$^{a,b,c}$</td>
<td></td>
<td></td>
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<tr>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TC 630 or TC 695</strong>$^d,e$</td>
<td></td>
<td></td>
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<tr>
<td>3</td>
<td></td>
<td></td>
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<tr>
<td><strong>Total Credits</strong>$^f,g$</td>
<td><strong>Total Credits</strong>$^f,g$</td>
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<tr>
<td>10</td>
<td>1-6</td>
<td></td>
</tr>
</tbody>
</table>

Total credits for non-thesis students: **3 + 32**
Total credits for thesis students: **3 + 32**

**NOTES:**

$^a$ 12 credits of letter-graded coursework must be chemistry courses at the 500-level or above. Those credits can be any TC (PCC) or CH course for which you meet the prerequisites; other courses can be approved, in writing, by the TECs Director of Graduate Programs, and a pre-approved list is available on the curriculum website given above.

$^b$ 15 credits of letter-graded coursework must be courses at the 500-level or above that are taught by TECs faculty and for which you meet the prerequisites. Those courses could have the prefix: TE, TMS, TT, TC, FPS, or TTM. (Note that not all courses with these prefixes are taught by TECs faculty; if in doubt, please confirm with the TECs Director of Graduate Programs.) If you plan to continue into the FPS or TTM Ph.D. program, consider taking the core courses as part of your M.S. degree.

$^c$ At least 18 credit hours must be letter graded courses at the 500 level or above; no credits below the 400 level will be counted toward the degree.

$^d$ TC 630 versus TC 695: For non-thesis students, please choose TC 630. For thesis-track students, please register your first 3-6 credits of research as independent study (TC 630) as it will help you obtain structure for your project at the initial stages; in addition, it will also give you flexibility to be able to switch to non-thesis in the future.

$^e$ Thesis students must also produce a Master's thesis and unanimously pass an oral examination of it.

$^f$ The maximum number of credits that can be taken in a semester is 15.

For students on assistantships (TA or RA), the maximum number of credits that can be taken in a semester is 12 (or 13 if one is TE 601); if you are taking at least one 700-level course, we advise limiting credit load to 10.

For students NOT on assistantships, we strongly advise limiting credit load to 12, especially if you are taking at least one 700-level course.

$^g$ The time limit for finishing all Master's degree requirement is 6 years, even if a student received an approved leave of absence. Eligibility for the Graduate Student Support Plan (GSSP) is 4 semesters.

Full-time Non-thesis students (Option B) should aim to finish up by no later than the third semester; ABM students have 12 months after their undergraduate degree is conferred.

Full-time Thesis students should work with their research advisors to determine their completion date. Thesis students should aim to finish up by the fourth semester, but can take up to a fifth semester if your research project necessitates it; ABM students have 18 months after their undergraduate degree is conferred.
Appendix IV
Degree Requirements for Master of Science in Textile Engineering (MS TE)

Master of Science in Textile Engineering (MS TE)
The Master of Science in Textile Engineering degree program offers unique educational and research opportunities within the domain of textile materials, structures, and technologies, as well as process design. The program is interdisciplinary in nature, drawing upon polymer and fiber science, mathematical sciences, other engineering disciplines, and the physical sciences. Current research activities in textile engineering include inventory and supply chain control, molecular modeling, nonwovens, thermal and protection sciences, polymer and fiber science, biomedical applications of textiles, wearable and smart textiles, textile composites, filtration, nanotextiles, and sustainability.

Graduates of Textile Engineering are recruited by a broad range of employers, including traditional textile areas such as performance athletic wear or outdoor apparel and equipment, or even areas outside of textiles, such as hospitals, research laboratories, or banks. Some graduates have also gone onto doctoral programs, particularly in fiber and polymer science (FPS) and textile technology management (TTM).

**TE PROGRAM REQUIREMENTS**
The Textile Engineering M.S. degree program has both a thesis and a non-thesis track, which entail the following:

<table>
<thead>
<tr>
<th></th>
<th>THESIS TRACK</th>
<th>NON-THESIS TRACK</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Minimum Number of Credits:</strong></td>
<td>32+ credit hours</td>
<td>32 credit hours</td>
</tr>
<tr>
<td>Graduate Seminar</td>
<td>2 semesters</td>
<td>2 semesters</td>
</tr>
<tr>
<td>(TE 601)</td>
<td>(2 credit hours)</td>
<td>(2 credit hours)</td>
</tr>
<tr>
<td>Graduate Coursework</td>
<td>24 credit hours</td>
<td>24 credit hours</td>
</tr>
<tr>
<td>(~8 courses)</td>
<td>(~8 courses)</td>
<td></td>
</tr>
<tr>
<td>M.S. Project Work</td>
<td>Thesis and Final Oral Examination</td>
<td>2 semesters of TE 630, independent study</td>
</tr>
<tr>
<td></td>
<td>(6+ credit hours)</td>
<td>(6 credit hours)</td>
</tr>
</tbody>
</table>

**Minimum Committee Structure** Chair + 2 Members; two must be part of (All members must be part of the TC program graduate faculty, one must be NC State Graduate Faculty) outside of TECS core faculty. An optional Co-Chair can be a 4th member

<table>
<thead>
<tr>
<th>Total Timeline</th>
<th>3-4 semesters</th>
<th>2-3 semesters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eligibility for Assistantships?</td>
<td>RA</td>
<td>TA</td>
</tr>
<tr>
<td>RA = research assistantship</td>
<td>TA</td>
<td></td>
</tr>
<tr>
<td>TA = teaching assistantship</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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# 3+X Program in Textile Engineering

https://textiles.ncsu.edu/tecs/graduate/graduate-resources/tecs-graduate-handbook/#mste-overview

## Semester 1: Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GTI 401</td>
<td>3</td>
</tr>
<tr>
<td><strong>Course 1: Engineering</strong>&lt;sup&gt;a&lt;/sup&gt;&lt;sup&gt;b&lt;/sup&gt;&lt;sup&gt;c&lt;/sup&gt;</td>
<td>3</td>
</tr>
<tr>
<td><strong>Course 2: Engineering</strong>&lt;sup&gt;a&lt;/sup&gt;&lt;sup&gt;b&lt;/sup&gt;&lt;sup&gt;c&lt;/sup&gt;</td>
<td>3</td>
</tr>
<tr>
<td><strong>Course 3</strong>&lt;sup&gt;a&lt;/sup&gt;&lt;sup&gt;b&lt;/sup&gt;&lt;sup&gt;c&lt;/sup&gt;</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Credits<sup>d</sup>** | 12      |

## Semester 2: Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>TE 601: Seminar</td>
<td>1</td>
</tr>
<tr>
<td><strong>Course 4</strong>&lt;sup&gt;a&lt;/sup&gt;&lt;sup&gt;b&lt;/sup&gt;&lt;sup&gt;c&lt;/sup&gt;</td>
<td>3</td>
</tr>
<tr>
<td><strong>Course 5</strong>&lt;sup&gt;a&lt;/sup&gt;&lt;sup&gt;b&lt;/sup&gt;&lt;sup&gt;c&lt;/sup&gt;</td>
<td>3</td>
</tr>
<tr>
<td><strong>Course 6</strong>&lt;sup&gt;a&lt;/sup&gt;&lt;sup&gt;b&lt;/sup&gt;&lt;sup&gt;c&lt;/sup&gt;</td>
<td>3</td>
</tr>
<tr>
<td><strong>TE 630: Independent Study</strong>&lt;sup&gt;d&lt;/sup&gt;&lt;sup&gt;e&lt;/sup&gt;</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Credits<sup>f</sup>** | 13      |

## Summer

**Internship or Research**<sup>g</sup>  
(Optional but recommended)

## Semester 3: Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC 601: Seminar</td>
<td>1</td>
</tr>
<tr>
<td><strong>Course 7</strong>&lt;sup&gt;a&lt;/sup&gt;&lt;sup&gt;b&lt;/sup&gt;&lt;sup&gt;c&lt;/sup&gt;</td>
<td>3</td>
</tr>
<tr>
<td><strong>Course 8</strong>&lt;sup&gt;a&lt;/sup&gt;&lt;sup&gt;b&lt;/sup&gt;&lt;sup&gt;c&lt;/sup&gt;</td>
<td>3</td>
</tr>
<tr>
<td><strong>TE 630 or TE 695</strong>&lt;sup&gt;d&lt;/sup&gt;&lt;sup&gt;e&lt;/sup&gt;</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Credits<sup>f</sup><sup>g</sup>** | 10      |

## Semester 4: Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>TE 695&lt;sup&gt;h&lt;/sup&gt;</td>
<td>3+</td>
</tr>
</tbody>
</table>

**(Thesis students only, if needed.)**  
(Only if needed)

**Total Credits<sup>f</sup><sup>g</sup>** | 3+      |

## Summer

**Internship or Research**<sup>g</sup>  
(Only if needed)

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### NOTES:

<sup>a</sup> 12 credits of graded coursework must be engineering courses at the 500-level or above. Those credits can be TE, TMS, or any engineering course for which you meet the prerequisites.

<sup>b</sup> 15 credits of letter-graded coursework must be courses at the 500-level or above that are taught by TECS faculty and for which you meet the prerequisites. Those courses could have the prefix: TE, TMS, TT, TC, FPS, or TTM. If you plan to continue into the FPS or TTM Ph.D. program, consider taking the core courses as part of your M.S. degree.

<sup>c</sup> At least 18 credit hours must be letter graded courses at the 500 level or above; no credits below the 400 level will be counted toward the degree.

<sup>d</sup> **TC 630 versus TE 695:** For non-thesis students, please choose TC 630. For thesis-track students, please register your first 3-6 credits of research as independent study (TC 630) as it will help you obtain structure for your project at the initial stages; in addition, it will also give you flexibility to be able to switch to non-thesis in the future.

<sup>e</sup> **Thesis students** must also produce a Master's thesis and unanimously pass an oral examination of it.

<sup>f</sup> The maximum number of credits that can be taken in a semester is 15. **For students on assistantships (TA or RA),** the maximum number of credits that can be taken in a semester is 12 (or 13 if one is TE 601). **For students taking at least one 700-level course,** we strongly advise limiting credit load to 12 if not on an assistantship, and to 10 for those on assistantships.

<sup>g</sup> **For full-time students:**

- **Non-thesis students (Option B)** should aim to finish up by no later than the third semester; ABM students have 12 months after their undergraduate degree is conferred.

- **Thesis students** should work with their research advisors to determine their completion date. Thesis students should aim to finish up by the fourth semester, but can take up to a fifth semester if your research project necessitates it; ABM students have 18 months after their undergraduate degree is conferred.

**Total credits for non-thesis students:** 3 + 32  
**Total credits for thesis students:** 3 + 32+
North Carolina State University
MOA for 3+X Master's Program with Soochow University

This request has been reviewed and approved by the appropriate campus committees and authorities.

Endorsed By:

Head, Department/Program __________________________ Date ____________

Recommended By:

Chair, College Curriculum Committee __________________________ Date ____________

Endorsed By:

See document signature __________________________ Date ____________

College Dean

Recommended By:

N/A

Vice Provost, DELTA (if DE degree/certificate) __________________________ Date ____________

Recommended By:

N/A

Chair, University Courses & Curricula Committee __________________________ Date ____________

Approved By:

See document signature __________________________ Date ____________

Dean, (DASA or the Graduate School)

Recommended By:

____________________ 1/31/19

Dean's Council

Approved By:

1/31/19

Executive Vice Chancellor and Provost

Approved By:

2/25/19

Chancellor