

Proposed Graduate Program of

(student name and ID number)

Leading to the Degree of
 ____ M.S. or ____ Ph.D. in **Macromolecular Science and Engineering**
 (check one)

Research Courses:

MACR 7994 Research and Dissertation – minimum 58 hours for Ph.D. candidates

MACR 5994 Research and Thesis – minimum 10 hours for M.S. candidates

Semester	Dept	Course No.	Course Title	Credit Hours
	MACR	5994/7994	Research and Thesis/Dissertation	

MACR Core Curriculum Courses:

Semester	Dept	Course No.	Course Title	Credit Hours
	MACR	5015	Macromolecular Fundamentals with Lab I	3
	MACR	5016	Macromolecular Fundamentals with Lab II	3
	CHEM/CHE/MSE	5014	Technical Oral Communications	1
	MACR	5024	Writing Skills for Macromol. Sci/Engr.	1
	MACR	5004	Graduate Seminar	1
<i>Subtotal</i>				9

MACR Module Courses:

Ph.D. - 9 credit hours from one MACR module, 6 credit hours from the remaining MACR modules

M.S. - 6 credit hours from one MACR module, 4 credit hours from the remaining MACR modules

Semester	Dept	Course No.	Course Title	Credit Hours
<i>Subtotal</i>				

General Elective Courses:

Ph.D. – 9 credit hours

Semester	Dept	Course No.	Course Title	Credit Hours
<i>Subtotal</i>				

Supporting Courses:

Must be taken for credit

Semester	Dept	Course No.	Course Title	Credit Hours
<i>Subtotal</i>				

Total Credit Hours:

Advisory Committee:

Chair: [Type NAME here]

Signature ID Number

Co-Chair (optional): [Type NAME here]

Signature ID Number

Committee Member: [Type NAME here]

Signature ID Number

Committee Member: [Type NAME here]

Signature ID Number

Committee Member: [Type NAME here]

Signature ID Number

Committee Member: [Type NAME here]

Signature ID Number

Department Head: Robert B. Moore

Signature ID Number

Signature of Candidate

Date Submitted

**** For non-Virginia Tech committee members, please submit a Graduate Program Faculty & Additional Committee Member Registration form, found on the Graduate School's website.**

MACR Courses

All students must complete the MACR core curriculum courses. Ph.D. candidates must complete 9 credit hours from one MACR module, 6 credit hours from the remaining MACR modules, and 9 credit hours of general electives. M.S. candidates must complete 6 credit hours from one MACR module and 4 credit hours from the remaining MACR modules.

Research Courses

MACR 7994 Research and Dissertation – minimum 58 hours for Ph.D. candidates

MACR 5994 Research and Thesis – minimum 10 hours for M.S. candidates

Synthesis Module

CHEM	4534	Organic Chemistry of Polymers
CHEM	5704	Synthesis of Macromolecules
CHEM	6564	Current Topics in Polymer Chemistry
CHE	5984	Interfacial Chemistry and Engineering
CHEM	6664	Amorphous and Crystalline State of Polymers
SBIO	5424	Polysaccharide Chemistry

Choice of:

CHEM	5505 or 5506	Advanced Organic Chemistry
CHEM	5535 or 5536	Synthetic Organic Chemistry
CHEM	5524	Molecular Structure Determination

Structure Module

CHEM 6674/PHYS 5564G	Physical Chemistry of Polymers
CHEM/ESM 5174	Polymer Viscoelasticity
CHEM 6664	Amorphous and Crystalline State of Polymers
CHE 5984	Soft Materials and Self-Assembly
CHE 5984	Dynamic Theory of Complex Fluids
MSE 5504	Polymer Deformation and Fracture
PHYS 4564/5564G	Polymer Physics

Processing Module

CHE 4224/MSE 4524	Introduction to Polymer Processing
MSE 5504	Polymer Deformation and Fracture
CHE 5984	Dynamic Theory of Complex Fluids
ESM 5514	Viscous Flow
ESM/CHSE 5564	Non-Newtonian Fluid Mechanics

Mechanics Module

Choice of:

ESM 5734	Introduction to Finite Element Analysis
ESM 4044	Mechanics of Composite Materials
ESM 5014	Introduction to Continuum Mechanics
CHEM/ESM 5174	Polymer Viscoelasticity
ESM/CHE 5564	Non-Newtonian Fluid Mechanics
ESM 5114	Viscous Flow
ESM 6104	Mechanics of Composite Strength and Life
ESM 5074	Mechanics of Laminated Composite Structures
MSE 5504	Polymer Deformation and Fracture

Adhesion and Surface Science Module

CHEM/ESM/MSE 5654	Adhesion Science
CHEM/ESM 5174	Polymer Viscoelasticity
CHEM 5644/CHE 5334G	Colloid and Surface Chemistry
CHEM 7764/PHYS 5564G	Physical Chemistry of Polymers
ESM 5264	Mechanics of Adhesive Bonding
CHEM 5524	Molecular Structure Determination
CHE 5984	Interfacial Chemistry and Engineering
CHEM 6664	Amorphous and Crystalline State of Polymers

Materials in Medicine Module

BCHM	5124	Biochemistry for the Life Sciences
GRAD	5134	Polymers in Medicine and Biology
CHE 5214/BMES 5434		Polymeric Biomaterials
MSE/ESM	4574	Biomaterials
MSE	5584	Biomimetic Material Design
BMES	5984	Fundamentals of Tissue Function, Structure, and Replacement
BMES	5314	Introduction to Regenerative Medicine I
SBIO	5242	Polysaccharide Chemistry

Choice of:

CHEM	4534	Organic Chemistry of Polymers
CHEM	5704	Synthesis of Macromolecules
CHEM	6564	Advanced Macromolecular Chemistry

Composites and Structures Module

Choice of:

ESM	4044	Mechanics of Composite Materials
MSE	4604	Advanced Composite Materials
ESM	5074	Mechanics of Laminated Composite Structures
ESM	6014	Mechanics of Composite Strength and Life
CHEM/ESM	5174	Polymer Viscoelasticity
MSE	5504	Polymer Deformation and Fracture

Micro- and Opto-electronics Module

PHYS	5984	Opto-Electronic Properties of Polymers
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Choice of:

CHEM	4534	Organic Chemistry of Polymers
CHEM 4224/MSE 4524		Introduction to Polymer Processing
MSE	4554	Polymer Engineering

Choice of:

EE	5144	Introduction to Electro-Optics
MSE	5214	Opto-Electronics/Magnetic Applications
PHYS	5614	Introduction to Quantum Electronics