

BIOENGINEERING GRADUATE STUDENT HANDBOOK

Version 7 8/10/09 Fall 2009

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A MESSAGE FROM PROF. THOMAS J. ROYSTON, INTERIM HEAD.



Welcome to Bioengineering at the University of Illinois at Chicago. Your admission to our graduate program demonstrates a high level of academic achievement. You will find that the Bioengineering Department's faculty has a broad range of interests with a strong commitment to research and to high quality graduate education. We are committed to helping you achieve your professional goals beginning with the successful completion of your graduate degree.

I hope that you will find this handbook helpful in providing the information necessary for you to plan your graduate degree program. You have been assigned a faculty academic advisor to assist you. Your academic advisor will help you to plan your coursework, identify a research theme and mentor your progress. As you continue in your studies in the department, you must also select a thesis advisor to guide your graduate research. The material in this handbook outlines the graduate degree process in detail.

If you have any other questions not covered in this handbook, please feel free to contact Prof. Michael Cho, Director of Graduate Studies, the departmental office, or myself so that we can be of further assistance.

I wish you the best in your graduate studies in our department.

Thomas J. Royston
Professor and Interim Head

AREAS OF CONCENTRATION

Bioinformatics

This field combines computer science with biomedicine to develop tools for identifying and understanding the genetic blueprint of life. Bioinformatics seeks to improve our understanding of the structure and function of gene products, the regulation of gene expression profile, and the network of molecular interactions that govern cellular metabolism is a task that promises direct impact on our fundamental understanding of living systems.

Biomedical Imaging & Visualization

This area focuses on the study of medical imaging methods (MRI, CT, ultrasound, nuclear medicine) that are the basis of many aspects of clinical diagnosis. Emphasis is upon new “functional” imaging and visualization tools.

Biomechanics

This specialization focuses on the biomechanical structure and function of human musculo-skeletal systems. Theoretical and experimental studies of the human joints for example, can be invaluable in addressing clinical problems associated with loss of muscle function.

Biomolecular Engineering

Biomolecular engineering studies the design, analysis, and optimization of biological and biomedical processes. Research focuses on metabolic reaction networks, molecular transport phenomena, system dynamics and control in relation to molecular properties in biomedical and biochemical systems.

Cell & Tissue Engineering

This discipline allows one to repair or replace the function of natural tissue with bioengineered substitutes. Principles of engineering, chemistry, and biology are combined to create tissue substitutes from living cells and synthetic materials that are the basis of the new medical field of regenerative therapy.

Neural Engineering

This area uses modeling and analysis to understand and control the nervous system. Neural tissue can be viewed as a series of embedded, mathematically describable systems, and can be measured, manipulated, interfaced with or replaced with system components through the advances of neuroscience and microfabrication.

Department of Bioengineering Faculty Areas of Interest

NAME	DEPARTMENT	E-MAIL	PHONE	RESEARCH INTERESTS
<u>Bioinformatics (Chairperson: Liang)</u>				
Zhuming Ai	Biomedical Health Information	zai@uic.edu	996-7337	Virtual Reality, Molecular Modeling, Computer Graphics
Rong Chen	Information and Decision Sciences	RongChen@uic.edu	996-2323	Time Series Analysis, Statistical Computing
Yang Dai	Bioengineering	yangdai@uic.edu	413-1487	Global & Combinatorial Optimization algorithms
Bhaskar DasGupta	Computer Science	dasgupta@cs.uic.edu	355-1319	Bioinformatics, Computational Biology, Neural Networks
Anton Hopfinger	Medicinal Chemistry	Hopfingr@uic.edu	996-4816	Computer-Assisted Molecular Design
Jie Liang	Bioengineering	Jliang@uic.edu	355-1789	Bioinformatics
Hui Lu	Bioengineering	huilu@uic.edu	413-2021	Computational Structural Genomics
Natalia Maltsev	Argonne National Lab	maltsev@mcs.anl.gov	(630) 252-5195	Computational Biology, Genetic Sequence Analysis
John Marko	Physics	JMarko@uic.edu	996-6064	Protein-DNA Interactions & Molecular Dynamics
Charles Rhodes	Physics	Rhodes@uic.edu	996-4868	X-Ray Microimaging and Bioinformatics
Prashant Banerjee	Mechanical and Industrial Engineering	banerjee@uic.edu	996-5599	Virtual manufacturing
Dulal Bhaumik	Epidemiology and Biostatistics	dbhaumik@uic.edu	413-4455	Statistical inferences, design of experiments, multivariate analysis
Anil Gulati	Midwestern University-Pharmacy	gulati@uic.edu	996-0826	Regional & Systemic Hemodynamics and Drug Delivery
Constance Jeffrey	Biological Sciences	cjeffery@uic.edu	996-3168	Protein Structure & Function/X-ray Crystallography/membrane proteins
Michael Johnson	Pharmaceutical Biotechnology	mjohnson@uic.edu	996-9114	Computer-aided therapeutic design and structural bioinformatics
Robert Kenyon	Computer Science	Kenyon@uic.edu	996-3002	Human-computer interaction, computer graphics
Stanley Sclove	Information and Decision Sciences	slsclove@ui.edu	996-2681	Time series segmentation, Markov models for economic And financial time series
Michael Scott	Mechanical and Industrial Engineering	mjscott@uic.edu	996-4354	Design theory and methodology, computer-aided design
S. Jay Olshansky	Epidemiology and Biostatistics	sjavo@uic.edu	996-8860	Estimates of the upper limits to human longevity
<u>Biomedical Imaging and Visualization (Chairperson: Magin)</u>				
Noam Alperin	Radiology	Alperin@uic.edu	996-4620	Magnetic Resonance Imaging
Daniel Fiat	Physiology & Biophysics	fiat@uic.edu	996-7609	MRI & NMR
Ben Gerber	Medicine	Bgerber@uic.edu	996-6068	Computer Applications in Medicine, Medical Informatics
Daniel Hier	Neurology	dhier@uic.edu	996-1757	Neural Networks & Multi-Imaging Modalities
Richard Magin*	Bioengineering	rmagin@uic.edu	996-2335	MRI, Targeted Drug Delivery, Bioelectromagnetics
Walter Panko	Health Information Sciences	wpanko@uic.edu	996-8338	VR in Healthcare Delivery and Education
Dan Pavel	Radiology	danpavel@uic.edu	996-3966	Medical Imaging
Thomas Royston	Mechanical Engineering	Troyston@uic.edu	413-7951	Diagnostics Using Acoustics and Vibration
Robert Kleps	Research Resources Center	kleps@uic.edu	996-8550	NMR
Aiming Lu	Ctr for Magnetic Res. Research	aiminglu@uic.edu	413-3964	MR Physics
Keith Thulborn	MR Research Center	kthulbor@uic.edu	355-3755	MRI
<u>Biomechanics (Chairperson: Natarajan)</u>				
Alexander Aruin	Physical Therapy	Aaruin@uic.edu	355-0902	Motor disorders and rehabilitation, Biomechanics
David Braddock	Human Development	Braddock@uic.edu	413-1647	Devel. Disabilities, Assistive Technologies
Farid Amirouche	Mechanical Engineering	Amirouch@uic.edu	996-3085	Biomechanics
Elisa Budyn	Mechanical and Industrial Engineering	ebudyn@uic.edu	996-9631	Numerical models for fracture mechanics and biomechanics
Carmen DiGiovine	Disability and Human Development	cpdigiov@uic.edu	413-3113	Wheelchair development
Terry Layton	Bioengineering	Tlayton71@aol.com	996-5946	Design and Patenting of Medical Devices to Technology Assessment
Craig Niederberger	Urology	craign@uic.edu	996-2779	Biomechanics and computational modeling
Glenn Hedman	Disability & Human Development	Ghedman@uic.edu	413-1555	Rehabilitation Engineering
Sabri Cetinkunt	Mechanical and Industrial Engineering	scetin@uic.edu	996-9611	Mechatronics, automatic control, robotics, automation, CAD/CAM
Gunnar Anderson	Rush-Orthopedics	ganders@rush.edu	942-4867	Biomechanics
Daniel Corcos	Kinesiology	dcorcos@uic.edu	355-1708	Neural Control of Human Movement
Mark Grabiner	Kinesiology	grabiner@uic.edu	996-2757	Aging, Musculoskeletal Biomechanics
Nadim Hallab	Rush-Orthopedics	nhallab@rush.edu	942-5000 x29720	In Vivo Metallic Implant Degradation
Timothy Koh	Kinesiology	Tjkoh@uic.edu	996-1617	Mechanical load, Muscle Injury, Adaptation

Joaquin Mayoral	Bioengineering	MedRandD1@prodigy.net	996-2335	Artificial Organs
Raghu Natarajan	Rush-Orthopedics	rnataraj@rush.edu	942-5367	Finite Element Modeling in Orthopedics
Clive Y.-C. Pai	Physical Therapy	cpai@uic.edu	996-1507	Neuromuscular Mechanisms, Motion Analysis
Avinash Patwardhan	Hines VA-Rehabilitation	apatwar@aol.com	708-202-5804	Musculo-Skeletal & Biomechanics
James Patton	Bioengineering	pattonj@uic.edu	413-7664	Robotics for therapeutic neuro-rehabilitation; Control of human movement; Haptics; Human-machine interfaces
Rick Sumner	Rush-Orthopedics	rsumner@rush.edu	942-5501	Biomechanics
Linping Zhao	Shriners Hospital	lpzhao99@uic.edu	996-9313	Biomechanics, biomedical image analysis
Karen Troy	Movement Sciences	klreed@uic.edu	413-5495	Fall-related fractures and poor bone quality
Amarjit Virdi	Rush-Anatomy and Cell Biology	avirdi@uic.edu	942-5143	Biomechanics/ Bone Tissue Regeneration
Vincent Wang	Orthopedic/Rush	Vincent_M_Wang@rush.edu	563-3859	Biomechanics
Jamie Williams	Rush-Orthopedics	jryan10@uic.edu	942-2589	Biomechanics
Markus Wimmer	Rush-Orthopedics	Markus_a_wimmer@rush.edu	942-2789	Hip& Knee Joint Prostheses, Biomaterials, Polyethylene, Cartilage, Wear

Biomolecular Engineering (Chairperson: Linninger)

Andreas Linninger		linninge@uic.edu	413-7743	Drug delivery, brain physics, medical imaging of the central Nervous system, biomolecular engineering
Ali Mansoori		mansoori@uic.edu	996-5592	Molecular based study of fluids, solids and phase transitions in macro and nano systems
Christos Takoudis		takoudis@uic.edu	335-0859	Microelectronic materials and processing, Heterogeneous catalysis and surface chemistry

Cell and Tissue Engineering (Chairperson: Cho)

Anjum Ansari	Physics	Ansari@uic.edu	996-8735	Kinetics of Short DNA segments, Protein-DNA Interactions
Boaz Avital	Cardiac Electrophysiology	Bavital@uic.edu	996-9086	Electrophysiology
Alan Boghosian	Northwestern-Dentistry	boghosian@nwu.edu	503-6890	Physical Properties of Polymer Based Dental Materials
David Carley	Respiratory & Critical Care	DWCarley@uic.edu	996-3827	Respiratory & Sleep Neurobiology, Integrative Systems Physiology
Donald Chambers	Biochemistry	donec@uic.edu	996-7670	Bioregulatory Interactions, Mechanisms of Cell Proliferation
Michael Cho	Bioengineering	mcho@uic.edu	413-9424	Regulation of Cell Adhesion and Migration by Cellular Mechanics
Mary Ann Cooper	Emergency Medicine	MACOOPER@uic.edu	413-7489	Electrical Injuries
John Daugirdas	Medicine	JTDaugir@uic.edu	666-6500	Vascular Physiology
Thomas Diekwisch	Orthodontics	tomdkw@uic.edu	413-9683	Gene Function in Tooth Development, Enamel Crystal Growth
James Drummond	Restorative Dentistry	Drummond@uic.edu	413-3790	Dental Materials
Carlotta Evans	Orthodontics	caevans@uic.edu	996-7138	Orthodontic Mechanotherapy
Richard Gemeinhart	Pharmaceutics/Pharmacodynamics	rag@uic.edu	996-2253	Polymer Chemistry for Drug Delivery & Biomaterials
Anne George	Oral Biology	aneg@uic.edu	413-0738	Biomaterialization, Noncollagenous Proteins, Dentin, Gene Cloning
Luke Hanley	Chemistry	lhanley@uic.edu	996-0945	Chemical Modification & Analysis of Biological Surfaces
Ronald Hoffman	Hematology/Oncology	Ronhoff@uic.edu	413-9309	Sickle Cell Anemia and Stem Cell Biology
Lon Kaufman	Biological Sciences	Lkaufman@uic.edu	996-5822	Gene Expression, Genetic Engineering, Molecular Biology
Fei Li	Pediatrics	Fei@uic.edu	355-1533	In vitro Hematopoietic Development of Primate Embryonic Stem Cells
Francis Loth	Mechanical Engineering	Floth@uic.edu	996-3045	Biofluid Dynamics and Numerical Simulations of Hemodynamics
Jeremy Mao	Orthodontics	jmao2@uic.edu	996-7138	Biomaterials, Tissue Engineering of Bone and Cartilage
Arif Masud	Civil & Materials Engineering	amasud@uic.edu	996-4887	Computational Biomechanics and Computational Hemodynamics
Percival McCormack	Bioengineering	pmccorm@uic.edu	413-2015	Biofluid Mechanics & Gene Expression
Susan McCormick	Bioengineering	SMcCorm@uic.edu	355-2148	Biomechanical Forces on Cell-Protein Interactions
Steven Olson	Oral Diseases	Steven.Olson@uic.edu	996-1043	Engineering of Novel Anticoagulant, Antiapoptotic

Hayat Onyuksel	Pharmaceutics	Hayat@uic.edu	996-2097	Controlled Drug Delivery
William Pietrzak	Biomet, Inc.	Bill.Pietrzak@ Biometmail.com	(219) 267-6639	Orthopedic Biomaterials
Brenda Russell	Physiology & Biophysics	Russell@uic.edu	413-0407	Cardiovascular Biophysics, Science and Exercise Physiology
Michael Stroschio	Bioengineering	stroschio@uic.edu	413-5968	Micro/Nanotechnology, Phonon engineering, Laser-Plasma interactions
Donovan Yeates	Respiratory & Critical Care	Yeates-D@uic.edu	996-6464	Pulmonary Physiology & Clearance

Neural Engineering (Chairperson: O'Neill)

Robert Anderson	Rush-OB/GYN	Randerso@rush.edu	942-5442	Biomedical Instrumentation
Christopher Comer	Biological Sciences	Ccomer@uic.edu	996-2992	Neuroethology & Sensorimotor Integration
Kenneth Alexander	Ophthalmology and Visual Sciences	kennalex@uic.edu	996-5825	Neural Engineering
Alan Feinerman	ECE	feinerman@uic.edu	996-2313	Fiber Optic Technology
David Eddington	Neural	dte@uic.edu	355-3278	bioMEMS, Tissue Engineering, and Drug Delivery
Douglas Feinstein	Neural/Anesthesiology	dlfeins@uic.edu	355-1665	Neuroscience
Daniel Graupe	ECE	graupe@uic.edu	996-3085	Med. Signal Image Processing
David Mogul	IIT-Biomedical Engineering	mogul@iit.edu	597-3873	Electrophysiology & electrical dynamics of the brain
John Hetling	Bioengineering	jhetl1@uic.edu	413-8721	Electrophysiology of Vision, Retinal Prosthetics
Terry Layton	Bioengineering	Tlayton71@aol.com	996-2335	Design and Patenting of Medical Devices to Technology Assessment
James Lin	ECE	James.C.Lin@uic.edu	413-1052	Electromagnetics in Biology & Medicine
Hussein Mansy	Rush-Pediatrics	hmansy@rush.edu	942-5000 x21467	Biomedical Instrumentation, Pattern Recognition
Arye Nehorai	ECE	nehorai@uic.edu	996-2778	Biomedical Signal Processing & Biomedical Imaging
William O'Neill	Bioengineering	WONeill@uic.edu	413-2294	Neuroscience & Pupillography
David Pepperberg	Ophthalmology	davipepp@uic.edu	996-4262	Retinal Physiology
Patrick Rousche	Bioengineering	rousche@uic.edu	996-2333	Development and Application of BioMEMS
Mahnaz Shahidi	Ophthalmology	Mahnshah@uic.edu	996-7773	Optical Imaging, Image Processing and Analysis
Scott Shippy	Chemistry	sshippy@uic.edu	355-2426	Chemical Signaling in the Mammalian Brain
David Schneeweis	Bioengineering	schnee@uic.edu	413-7664	Ophthalmology, Bipolar cells in processing visual information
Dan Schonfeld	ECE	dschonen@uic.edu	996-5847	Medical Imaging
Boaz Super	CS	super@uic.edu	413-8719	Vision, Visual Psychophysics, Computer Vision

THE GRADUATE PROGRAM IN BIOENGINEERING

Admission

Admission to the department is granted to well-prepared and highly motivated students, who satisfy the entrance requirements of the Graduate College and Bioengineering Department.

Students with deficiencies in their prior coursework may be admitted on “Limited Standing”. Such students will be required to take additional courses and/or meet specific academic performance goals.

Applicants are considered on an individual basis. In addition to the Graduate College minimum requirements, applicants must meet the following program requirements:

Master of Science

Baccalaureate Field: Physical sciences, engineering, computer science, mathematics, biology, or medicine. Students from other areas are also encouraged to apply if their backgrounds indicate a reasonable chance of success in the program.

Grade Point Average: At least 3.00 (A=4.00) for the final 60 semester (90 quarter) hours of undergraduate study.

Tests Required: GRE general, 1200 total minimum score for verbal and quantitative.

Minimum TOEFL Score: 213 CBT; 80 IBT; 6.5 IELTS

Letters of Recommendation: Three required.

Personal Statement: Required.

Doctor of Philosophy

Baccalaureate Field: Physical sciences, engineering, computer science, mathematics, biology, or medicine. Students from other areas are also encouraged to apply if their backgrounds indicate a reasonable chance of success in the program.

Grade Point Average: At least 3.00 (A=4.00) for the final 60 semester (90 quarter) hours of undergraduate study.

Tests Required: GRE general, 1200 total minimum score for verbal and quantitative.

Minimum TOEFL Score: 213 CBT; 80 IBT; 6.5 IELTS

Letters of Recommendation: Three required.

Personal Statement: Required.

The Combined M.D./Ph.D. Degree

The M.D./Ph.D. in Bioengineering is a joint program of the College of Medicine and the Bioengineering Department. This program is designed to enable students to combine the study of Medicine with graduate research training in Bioengineering. It seeks to produce leaders in medicine uniquely qualified and motivated to address complex issues in medical and bioengineering research. Entrance into the program is determined by the College of Medicine. To receive more information about this program, please contact the M.D./Ph.D. Training Program Coordinator, Roberta Bernstein at (312) 996-7473 or e-mail at roberta@uic.edu. Also see their web page, <http://www.uic.edu/com/mdphd/>

MASTER OF SCIENCE

DEGREE REQUIREMENTS (36 Semester Hours Minimum)

CURRICULUM

The following are minimum requirements to complete a Master's in Bioengineering:

<i>Courses</i>	<i>Semester Hours</i>
500-level courses (excluding BioE 595, 596, 598)	12
400- or 500 level courses	15
BioE 595- Seminar in Bioengineering	1
BioE 598-M.S. Thesis Research	8
Total	36

100, 200, 300, and 600-level courses cannot be counted towards the M.S. degree. Twelve hours of coursework must be Bioengineering courses. The list above shows the minimum of what each M.S. student must take to fulfill the M.S. course requirements. Each student must also successfully write, defend, and submit their thesis for approval to the Graduate College before receiving their graduate degree.

Each student should select an Area of Concentration (please see below). Your 400 and 500 level courses are to be chosen in consultation with your advisor and according to your area of concentration.

CELL AND TISSUE ENGINEERING CURRICULUM

SEMESTER HOURS

<i>Students must take all of the following courses.</i>	<i>16</i>
BioE 430-Bioinstrumentation & Measurements	4
BioE 455-Intro to Cell & Tissue Engineering	4
BioE 460-Materials in Bioengineering	4
BioE 550-Principles of Cell and Tissue Engineering	4
BioE 595-Seminar in Bioengineering	1
BioE 598-M.S. Thesis	8

Students must take at least 11 hours from the following two groups; at least 3 hours from Group I, and at least 6 hours from Group II. At least 8 hours must be at the 500-level.

Group I:

PhyB 585 Cell Biology	4
BioS 524 Molecular Biology I	4

Mim 551 Cellular Immunology	4
BCHE 513 Structure of Biopolymers	3
BCHE 561 Biochemistry of Cell Regulation	3
PhyB 586 Cell Physiology I	4
GCLS 501 Biochemistry	3
GCLS 502 Molecular Biology	3
GCLS 503 Cell Biology and Integrative Physiology	4
GCLS 515 Receptor Pharmacology and Cell Signaling	3
Group II:	
BioE 415-Biomechanics	4
BioE 431-Bioinstrumentation & Measurements Lab	2
BioE 440-Biological Signal Analysis	4
BioE 455-Intro to Cell and Tissue Engineering	4
BioE 456-Cell and Tissue Laboratory	2
BioE 480-Introduction to Bioinformatics	4
BioE 481-Bioinformatics Laboratory	1
BioE 494-Micro/Nanotechnology in Biology	2
BioE 494-Special Topics in Bioengineering	variable
BioE 514 Biotransport	4
BioE 515 Mechanics of the Human Spine	4
BioE 521 Imaging of Biological Tissue	4
BioE 525 Physiological and Cellular Effects of Biomechanical Forces	4
BioE 560 Structural Biomaterials	4
BioE 594-Advanced Special Topics in Bioengineering	variable

TOTAL

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MASTER OF SCIENCE

DEGREE REQUIREMENTS (36 Semester Hours Minimum)

NEURAL ENGINEERING CURRICULUM	SEMESTER HOURS
<i>Students must take all of the following courses</i>	<i>16</i>
BioE 430-Bioinstrumentation & Measurements	4
BioE 472-Models of the Nervous System	4
BioE 475-Neural Engineering I	4
BioE 575-Neural Engineering II	4
BioE 595-Seminar in Bioengineering	<i>1</i>
BioE 598-M.S. Thesis	<i>8</i>

Students must take at least 11 hours from the following two groups, with at least three hours from each group. At least 8 hours must be at the 500 level.

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Group I

PhyB 585-Cell Biology	4
BioS 484-Neuroscience I	3
BioS 485- Neuroscience II	3
BioS 487-Developmental Neurobiology	3
BioS 489-Cellular Neurobiology Laboratory	3
BioS 586-Cell and Molecular Neurobiology	3
BCHE 561-Biochemistry of Cell Regulation	3
PhyB 401-Human Physiology I	5
PhyB 402-Human Physiology II	5
GCLS 501 Biochemistry	3
GCLS 502 Molecular Biology	3
GCLS 503 Cell Biology and Integrative Physiology	4
GCLS 504 Research Methods I	1
GCLS 515 Receptor Pharmacology and Cell Signaling	3

Group II

BioE 407-Pattern Recognition	4
BioE 431-Bioinstrumentation and Measurement Lab	2
BioE 439-Biostatistics	4
BioE 440-Biological Signal Analysis	4
BioE 460-Materials in Bioengineering	4
BioE 470-Bio-Optics	4
BioE 494-Special Topics in Bioengineering	variable
BioE 521-Imaging Systems for Biological Tissues	4
BioE 555-MEMS for Biomedical Engineering	4
BioE 579-Neuromuscular Stimulation	4
BioE 594-Sensory Prostheses	3

BioE 594-Advanced Special Topics in Bioengineering	variable
ECE 400-Introduction to Microelectromechanical Systems	4
ECE 449-Microdevices and Micromachining Technology	5
ECE 452-Robotics: Algorithms and Control	4
ECE 541-Microelectronic Fabrication Techniques	4
ECE 546-Chemical and Biosensors	4
CS 411-Artificial Intelligence I	4
CS 511-Artificial Intelligence II	4
CS 559-Neural Networks	4
CS 522-Human-Computer Interaction	4
ME 410-Automation and Robotics Applications	4
ME 510-Robotic Manipulators	4
ME 512-Automatic Control of Mechanical Systems	4

TOTAL

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MASTER OF SCIENCE

DEGREE REQUIREMENTS (36 Semester Hours Minimum)

BIOMEDICAL IMAGING CURRICULUM	SEMESTER HOURS	
<i>Students must take all of the following courses</i>		<i>12</i>
BioE 420-Introduction to Fields and Waves in Biological Tissues	4	
BioE 430-Bioinstrumentation & Measurements	4	
BioE 521- Imaging Systems for Biological Tissues	4	
BioE 595-Seminar in Bioengineering		1
BioE 598-M.S. Thesis		8

Students must take at least 15 hours from the following two groups, with at least three hours from each group. At least 12 hours must be at the 500 level. *15*

Group I

PhyB 585-Cell Biology	4
BioS 484-Neuroscience I	3
BioS 485 – Neuroscience II	3
BioS 443- Animal Physiological Systems	4
BioS 489-Cellular Neurobiology Laboratory	3
BioS 586-Cell and Molecular Neurobiology	3
BCHE 561-Biochemistry of Cell Regulation	3
PhyB 401-Human Physiology I	5
PhyB 402-Human Physiology II	5
GCLS 501 Biochemistry	3
GCLS 502 Molecular Biology	3
GCLS 503 Cell Biology and Integrative Physiology	4
GCLS 504 Research Methods I	1
GCLS 515 Receptor Pharmacology and Cell Signaling	3

Group II

BioE 407-Pattern Recognition	4
BioE 421- Biomedical Imaging	4
BioE 431-Bioinstrumentation and Measurement Lab	2
BioE 439-Biostatistics or BioE 440 Biological Signal Analysis/ Biomodeling	4
BioE 460-Materials in Bioengineering	4
BioE 470-Bio-Optics	4
BioE 494-Special Topics in Bioengineering	variable
BioE 520- Wave Propagation and Scattering in Biological Tissue	4
BioE 521-Imaging Systems for Biological Tissues	4
BioE 540-Pattern and Image Modeling of Bioengineering Systems	4
BioE 579-Neuromuscular Stimulation	4

BioE 594-Sensory Prostheses	3
BioE 594-Advanced Special Topics in Bioengineering	variable
ECE 415-Image Analysis and Machine Vision	4
ECE 420- Introduction to Microwave Engineering	4
ECE 421- Introduction to Antenna Engineering	4
ECE 541-Microelectronic Fabrication Techniques	4
ECE 546-Chemical and Biosensors	4
CS 411-Artificial Intelligence I	4
CS 511-Artificial Intelligence II	4
CS 559-Neural Networks	4
CS 522-Human-Computer Interaction	4
ME 410-Automation and Robotics Applications	4
ME 510-Robotic Manipulators	4
ME 512-Automatic Control of Mechanical Systems	4

TOTAL

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MASTER OF SCIENCE

DEGREE REQUIREMENTS (36 Semester Hours Minimum)

BIOMECHANICS CURRICULUM	SEMESTER HOURS
<i>Students must take all of the following courses</i>	<i>12</i>
BioE 430-Bioinstrumentation & Measurements	4
BioE 460-Materials in Bioengineering	4
BioE 415-Biomechanics	4
BioE 595-Seminar in Bioengineering	<i>1</i>
BioE 598-M.S. Thesis	<i>8</i>
 <i>Students must take at least 15 hours from the following two groups; at least 3 hours from Group I, and at least 6 hours from Group II. At least 12 hours must be at the 500-level.</i>	 <i>15</i>
<i>Group I</i>	
BioS 484-Neuroscience I	3
BioS 485 – Neuroscience II	3
BioS 443- Animal Physiological Systems	4
BCHE 460-Biochemistry	5
PhyB 585-Cell Biology	4
PhyB 586-Cell Physiology I	4
GCLS 501-Biochemistry	3
GCLS 502-Molecular Biology	3
GCLS 503-Cell Biology and Integrative Physiology	4
<i>Group II</i>	
BioE 431-Bioinstrumentation & Measurements Lab	2
BioE 439-Biostatistics	4
BioE 440-Biological Signal Analysis	4
BioE 455-Intro to Cell and Tissue Engineering	4
BioE 456-Cell and Tissue Laboratory	2
BioE 494-Micro/Nanotechnology in Biology	2
BioE 494-Special Topics in Bioengineering	variable
BioE 514-Biotransport	4
BioE 515-Mechanics of the Human Spine	4
BioE 525-Physiological and Cellular Effects of Biomechanical Forces	4
BioE 550-Principles of Cell and Tissue Engineering	4
BioE 560-Structural Biomaterials	4
BioE 594-Advanced Special Topics in Bioengineering	variable
 <i>TOTAL</i>	 <i>36</i>

MASTER OF SCIENCE

DEGREE REQUIREMENTS (36 Semester Hours Minimum)

Focus: MS course specialization offering advanced engineering science methods in reactions, transport and systems methods to address challenges at the molecular and nano-scale.

BIOMOLECULAR ENGINEERING CURRICULUM HOURS	SEMESTER
Students must take the following courses	12
BioE 405 Atomic and Molecular Nanotechnology	4
BioE 430 Bioinstrumentation	4
BioE 465 Metabolic Engineering	4
BioE 595 Seminar in Bioengineering	1
BioE 599 MS Thesis	8
Students must take at least 15 hours from the following two groups. At least three must be taken from group I and at least 6 from Group II. At least 12 hours must be at the 500 level.	
Group I Electives	
PhysB 585 Cell biology	4
BCHE 561 Biochemistry of Cell Regulation	4
BIOS 452 Biochemistry I	4
BIOS 454 Biochemistry II	4
GCLS 501 Biochemistry	4
GCLS 502 Molecular Biology	4
GCLS 503 Cell Biology	4
Group II Electives	
BioE 431 Bioinstrumentation and Measurements Lab	4
BioE 460 Materials in Bioengineering	4
BioE 494 Special Topics	variable
BioE 522 Principles of Polymeric Science and Engineering	4
BioE 594 Advanced Special Topics in Bioengineering	4
BioE 505 Nano-biotechnology	4
BioE 514 Biotransport	4
ECE 400 Introduction to Microelectromechanical Systems	4
ECE 541 Microelectronic Fabrication Techniques	4
ECE 546 Chemical and Biosensors	4
Total	36

MASTER OF SCIENCE IN BIOINFORMATICS

DEGREE REQUIREMENTS (36 Semester Hours Minimum)

CURRICULUM

The following are minimum requirements to complete a Master's in Bioinformatics:

<i>Courses</i>	<i>Semester Hours</i>
500- Bioinformatics level courses (excluding BioE 595, 598)	12
400- or 500 level courses	15
BioE 595- Seminar in Bioinformatics	1
BioE 598-M.S. Thesis Research	8
Total	36

100, 200, 300, and 600-level courses cannot be counted towards the M.S. degree. The list above shows the minimum of what each M.S. student must take to fulfill the M.S. course requirements. Each student must also successfully write, defend, and submit their thesis for approval to the Graduate College before receiving their graduate degree.

SEMESTER HOURS

Students must take 4 from the following list of courses.

		16
BioE 407-Pattern Recognition I	4	
BioE 480-Introduction to Bioinformatics	4	
BioE 481-Bioinformatics Lab	1	
BioE 482-Introduction to Bioinformatics Methods	4	
BioE 483-Molecular Modeling in Bioinformatics	4	
BioE 580-Principles of Bioinformatics	4	
BioE 582- Design of Computational Methods in Bioinformatics	4	
BioE 594-Monte Carlo Methods in Scientific Computation	4	
BioE 595- Seminar in Bioinformatics		1
BioE 598-M.S. Thesis		8

Students should take three courses from the following two groups of biological and computational courses. At least one should be from each group.

Students should have prereq of BioS 220 or equivalent

BioS 422 Cell and Molecular Biology (prereq BioS 220)	4
BioS 430 Evolution (prereq BioS 220)	4
BioS 452 Biochemistry I (Prereq Chem 234)	4
BioS 454 Biochemistry II (Prereq BioS 452)	4

GCLS501 Biochemistry	3
GCLS502 Molecular biology	3
GCLS503 Cell biology and Integrative physiology	3
GCLS504 Research methods	1
GCLS511 Molecular genetics	3
GCLS510 Integrative biology	3
Bche513 Structures of biopolymers	3

Elective Courses

CS/MCS 401-Computer Algorithm I	4
CS 501-Advanced Algorithms	4
CS 595-Introduction to Computational Biology	4
IDS 464-Statistics: Theory and Applications	4
Stat 401-Introduction to Probability	4
Stat 411-Statistical Theory	4
Stat 461 – Applied Probability Model	4
BStat 471-Linear and Nonlinear Programming	4
MCS 521- Combinatorial Optimization	4

TOTAL 36

*Well prepared students may satisfy these course requirements by taking the equivalent 500-level Bioengineering courses. If a core course is listed under an area of concentration, it may not satisfy a core course requirement and an area of concentration requirement.

Typical Course Schedule for MS Bioinformatics Student:

First Semester

BioS 422 - Cell and Molecular Biology (prereq BioS 220)	4
BioE 480-Introduction to Bioinformatics	4
BioE 482-Introduction to Bioinformatics Methods	4

Second Semester

BioE 483-Molecular Modeling in Bioinformatics	4
CS/MCS401- Introduction to Algorithm	4
BioE 580-Principles of Bioinformatics	4

Third Semester (Choose one)

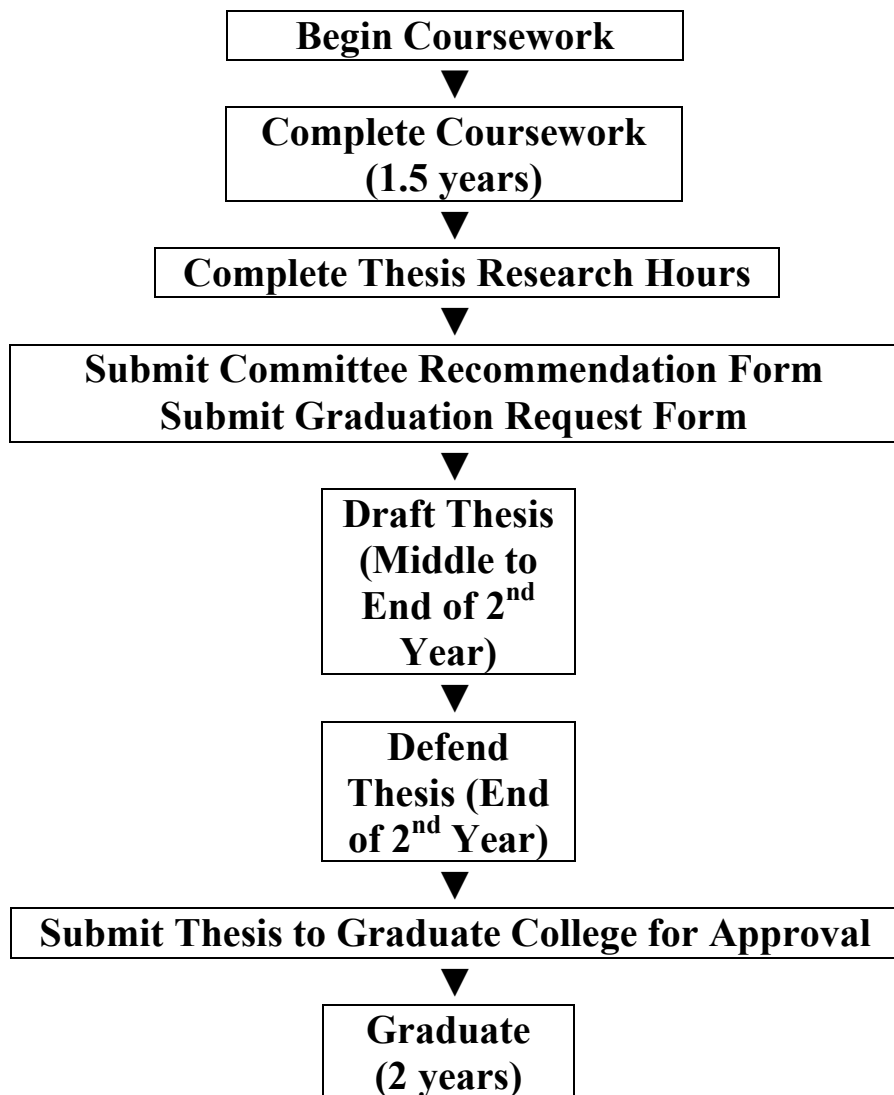
BioE 582 – Design of Computational Biology	4
CS 595-Introduction to Computational Biology	
BioE 594 – Advanced Special Topics	

Fourth Semester

BioE 598 – MS Thesis	8
BioE 595-Seminar in Bioinformatics	1

Total 36 hours

MASTER OF SCIENCE - GRADUATION RECOMMENDED TIMETABLE



Master of Science - Thesis Defense

Provided that the student has completed all graduation requirements and is in good academic standing, he or she is now ready to defend the thesis before a committee. Defense presentations must be limited to one hour. Additional time will be allowed for direct examination by the thesis committee and discussion among the committee members alone.

The defense must be open to the academic community of the university and be publicly announced one week prior to its occurrence. Student must submit a hard copy of his thesis to each member of the thesis defense committee one week prior to the defense date. Each committee member has to confirm receipt of the thesis by sending an email to the Director for Graduate Study prior to the defense date.

The thesis committee must be approved by the Graduate College on the recommendation of the student's department of program. The committee consists of at least three persons, one of whom should be a tenured full member of the UIC graduate faculty. The chair of the committee must be a full member of the UIC graduate faculty. One member of the committee may be from outside the department, academic unit, or outside the university in which case the member must demonstrate equivalent academic standards and his or her curriculum vitae must accompany the **Committee Recommendation Form**.

Please visit: <http://grad.uic.edu/pdfs/ChangeCommittee.pdf> to download a copy of the form. This form must be submitted to the Graduate College three weeks prior to the thesis defense. It must be typed (handwritten versions will not be accepted) and must be signed by your advisor and the department head before it is sent to the Graduate College for approval. The thesis title may not exceed 105 characters, including spaces, and may not include any abbreviations.

The committee must approve the thesis upon the completion of the defense. A candidate cannot be passed if more than one vote of "fail" is reported. See the Thesis Manual regarding current guidelines for the preparation and submission of your thesis. To obtain a copy, please see <http://grad.uic.edu/pdfs/thesismanual.pdf>. Remember to print your Thesis on 20- to 24-pound paper!

The Departmental Approval Form, Examination Report Form, and Red-Border Forms must be completed, signed, and dated by your committee and the department head. These will accompany the two final thesis copies (on watermark paper), which are to be submitted to the Graduate College prior to a specified deadline. The Graduate College and the Graduate Program Coordinator will provide these forms and the deadline date for you prior to your defense.

Time to Degree

The time limit for the Master's Degree is five years. Students failing to meet this limit will be dismissed for failure to progress. A one-time extension of the time limit will be granted automatically by the Graduate College upon the submissions of a petition by the graduate program. The Graduate College, in extraordinary circumstances, may grant a second one-year extension.

Readmission is not guaranteed for students who fail to meet the time to degree requirements.

DOCTOR OF PHILOSOPHY

DEGREE REQUIREMENTS (108 Semester Hours Minimum)

New Curriculum

Coursework

Students admitted with a prior Master's degree in BioE or a related field must complete a minimum of 24 hours of coursework, at least 12 hours of which must be Bioengineering courses. At least 12 hours must be at the 500-level, excluding BioE 595, 596, 599. A maximum of 4 hours of BioE 590 may be applied toward the degree, provided credit for BioE 590 or a similar course was not applied toward the prior MS degree.

Students admitted with a Bachelor's degree in BioE or a related field must complete a minimum of 48 hours of coursework. At least 24 hours must be Bioengineering courses. At least 20 hours must be at the 500-level, excluding BioE 595, 596, 599. A maximum of 4 hours of BioE 590 may be applied toward the degree.

The faculty are reminded of availability of BioE 596. Each Ph.D student can take up to 12 hours of BioE 596. If a student registers BioE 596 under one of the core faculty, no additional steps of forms are required. However, if a student registers BioE 596 under one of the non-core faculty (e.g., BioE Adjunct faculty), we will require the student and sponsoring faculty to submit a written plan to the Director of Graduate Studies that specifies the scope and content of Independent Study. If a letter grade is to be assigned, the mechanisms by which the student will be evaluated must be included. Instead of a typical satisfactory (S) or unsatisfactory (U) grade, written or oral exams, papers, and/or projects can be used to justify for giving letter-grade. Approval from the Director of Graduate Studies is required.

Required Courses

Two hours of BioE 595. Additional required courses vary by area of specialization; contact the department for the specific requirements of each area.

Examinations

Departmental Qualifying Examination: Required

Preliminary Examination: Required

Dissertation

Required. Students must earn at least 60 semester hours in BioE 599.

Other Requirements

Each student is required to present at least two seminars prior to graduation. Students must be registered during the semester of intended graduation.

DOCTOR OF PHILOSOPHY

DEGREE REQUIREMENTS (108 Semester Hours Minimum)

CELL AND TISSUE ENGINEERING CURRICULUM	SEMESTER HOURS
<i>Students must take all of the following courses.</i>	24
BioE 430-Bioinstrumentation & Measurements	4
BioE 439-Biostatistics or BioE 440 Biological Signal Analysis/ Biomodeling	4
BioE 460-Materials in Bioengineering	4
BioE 455-Intro to Cell and Tissue Engineering	4
BioE 550-Principles of Cell and Tissue Engineering	4
BioE 595-Seminar in Bioengineering	2
BioE 599-Ph.D. Thesis	60

Students must take at least 22 hr from the following two groups, with at least 8 hr from each group. At least 16 hours must be at the 500 level.

22

Group I

PhyB 585-Cell Biology	4
BioS 524-Molecular Biology I	4
Mim 551-Cellular Immunology	4
BCHE 460-Biochemistry	5
BCMG 513-Structure of Biopolymers	3
BCHE 561-Biochemistry of Cell Regulation	3
PhyB 586-Cell Physiology I	4
GCLS 501-Biochemistry	3
GCLS 502-Molecular Biology	3
GCLS 503-Cell Biology and Integrative Physiology	4
GCLS 504-Research Methods I	1
GCLS 515-Receptor Pharmacology and Cell Signaling	3

Group II

BioE 415 Biomechanics	4
BioE 431-Bioinstrumentation & Measurements Lab	2
BioE 456-Cell and Tissue Laboratory	2
BioE 480-Introduction to Bioinformatics	4
BioE 481-Bioinformatics Laboratory	1
BioE 494-Special Topics in Bioengineering	variable
BioE 514-Biotransport	4
BioE 515-Mechanics of the Human Spine	4
BioE 521-Imaging of Biological Tissue	4
BioE 522-Micro/Nanotechnology in Biology	2
BioE 525-Physiological and Cellular Effects of Biomechanical Forces	4
BioE 560-Structural Biomaterials	4

BioE 594-Advanced Special Topics in Bioengineering

variable

TOTAL

108

DOCTOR OF PHILOSOPHY

DEGREE REQUIREMENTS (108 Semester Hours Minimum)

NEURAL ENGINEERING CURRICULUM	SEMESTER HOURS
<i>Students must take all of the following courses</i>	28
BioE 430-Bioinstrumentation & Measurements	4
BioE 439-Biostatistics or BioE 440 Biological Signal Analysis/ Biomodeling	4
BioE 460-Materials in Bioengineering	4
BioE 472-Models of the Nervous System	4
BioE 475-Neural Engineering I	4
BioE 575-Neural Engineering II	4
BioE 595-Seminar in Bioengineering	2
BioE 599-Ph.D. Thesis	60
<i>Students must take at least 18 hours from the following two groups, with at least seven hours from each group. At least 16 hours must be at the 500 level.</i>	18
<i>Group I</i>	
PhyB 585-Cell Biology	4
BioS 484- Neuroscience I	3
BioS 485 – Neuroscience II	3
BioS 487-Developmental Neurobiology	3
BioS 489-Cellular Neurobiology Laboratory	3
BioS 586-Cell and Molecular Neurobiology	3
BCHE 561-Biochemistry of Cell Regulation	3
PhyB 301-Human Physiology I	5
PhyB 302-Human Physiology II	5
GCLS 501 Biochemistry	3
GCLS 502 Molecular Biology	3
GCLS 503 Cell Biology and Integrative Physiology	4
GCLS 504 Research Methods I	1
GCLS 515 Receptor Pharmacology and Cell Signaling	3
<i>Group II</i>	
BioE 407-Pattern Recognition	4
BioE 431-Bioinstrumentation and Measurement Lab	2
BioE 460-Materials in Bioengineering	4
BioE 470-Bio-Optics	4
BioE 494-Special Topics in Bioengineering	variable
BioE 521-Imaging Systems for Biological Tissues	4
BioE 555-MEMS for Biomedical Engineering	4

BioE 579-Neuromuscular Stimulation	4
BioE 594-Sensory Prostheses	3
BioE 594-Advanced Special Topics in Bioengineering	variable
ECE 400-Introduction to Microelectromechanical Systems	4
ECE 449-Microdevices and Micromachining Technology	5
ECE 452-Robotics: Algorithms and Control	4
ECE 541-Microelectronic Fabrication Techniques	4
ECE 546-Chemical and Biosensors	4
CS 411-Artificial Intelligence I	4
CS 511-Artificial Intelligence II	4
CS 559-Neural Networks	4
CS 522-Human-Computer Interaction	4
ME 410-Automation and Robotics Applications	4
ME 510-Robotic Manipulators	4
ME 512-Automatic Control of Mechanical Systems	4

TOTAL

108

DOCTOR OF PHILOSOPHY

DEGREE REQUIREMENTS (108 Semester Hours Minimum)

BIOMEDICAL IMAGING CURRICULUM	SEMESTER HOURS
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Students must take all of the following courses 24

BioE 420-Introduction to Fields and Waves in Biological Tissues	4
BioE 430-Bioinstrumentation & Measurements	4
BioE 439-Biostatistics or BioE 440 Biological Signal Analysis/ Biomodeling	4
BioE 460-Materials in Bioengineering	4
BioE 521-Imaging Systems for Biological Tissues	4
BioE 595-Seminar in Bioengineering	2
BioE 599-Ph.D. Thesis	60

Students must take at least 22 hours from the following two groups, with at least seven hours from each group. At least 16 hours must be at the 500 level. 22

Group I

PhyB 585-Cell Biology	4
BioS 484-Neuroscience I	3
BioS 485 – Neuroscience II	3
BioS 487-Developmental Neurobiology	3
BioS 489-Cellular Neurobiology Laboratory	3
BioS 586-Cell and Molecular Neurobiology	3
BCHE 561-Biochemistry of Cell Regulation	3
PhyB 301-Human Physiology I	5
PhyB 302-Human Physiology II	5
GCLS 501 Biochemistry	3
GCLS 502 Molecular Biology	3
GCLS 503 Cell Biology and Integrative Physiology	4
GCLS 504 Research Methods I	1
GCLS 515 Receptor Pharmacology and Cell Signaling	3

Group II

BioE 407-Pattern Recognition	4
BioE 421- Biomedical Imaging	4
BioE 431-Bioinstrumentation and Measurement Lab	2
BioE 460-Materials in Bioengineering	4
BioE 470-Bio-Optics	4
BioE 494-Special Topics in Bioengineering	variable
BioE 521-Imaging Systems for Biological Tissues	4
BioE 555-MEMS for Biomedical Engineering	4

BioE 579-Neuromuscular Stimulation	4
BioE 594-Sensory Prostheses	3
BioE 594-Advanced Special Topics in Bioengineering	variable
ECE 400-Introduction to Microelectromechanical Systems	4
ECE 449-Microdevices and Micromachining Technology	5
ECE 452-Robotics: Algorithms and Control	4
ECE 541-Microelectronic Fabrication Techniques	4
ECE 546-Chemical and Biosensors	4
CS 411-Artificial Intelligence I	4
CS 511-Artificial Intelligence II	4
CS 559-Neural Networks	4
CS 522-Human-Computer Interaction	4
ME 410-Automation and Robotics Applications	4
ME 510-Robotic Manipulators	4
ME 512-Automatic Control of Mechanical Systems	4

TOTAL

108

DOCTOR OF PHILOSOPHY

DEGREE REQUIREMENTS (108 Semester Hours Minimum)

BIOMECHANICS CURRICULUM	SEMESTER HOURS
<i>Students must take all of the following courses</i>	20
BioE 430-Bioinstrumentation & Measurements I	4
BioE 432-Bioinstrumentation & Measurements II	4
BioE 439-Biostatistics or BioE 440 Biological Signal Analysis/ Biomodeling	4
BioE 460-Materials in Bioengineering	4
BioE 415-Biomechanics	4
BioE 595-Seminar in Bioengineering	2
BioE 599-Ph.D. Thesis	60
 <i>Students must take at least 26 hours from the following two groups, with at least seven hours from each group. At least 20 hours must be at the 500 level.</i>	26
Group I	
BioS 484-Neuroscience I	3
BioS 485 – Neuroscience II	3
BioS 443- Animal Physiological Systems	4
BCHE 460-Biochemistry	5
PhyB 585-Cell Biology	4
PhyB 586-Cell Physiology I	4
GCLS 501-Biochemistry	3
GCLS 502-Molecular Biology	3
GCLS 503-Cell Biology and Integrative Physiology	4
 Group II	
BioE 431-Bioinstrumentation & Measurements Lab	2
BioE 455-Intro to Cell and Tissue Engineering	4
BioE 456-Cell and Tissue Laboratory	2
BioE 494-Special Topics in Bioengineering	variable
BioE 514-Biotransport	4
BioE 515-Mechanics of the Human Spine	4
BioE 522-Micro/Nanotechnology in Biology	2
BioE 525-Physiological and Cellular Effects of Biomechanical Forces	4
BioE 550-Principles of Cell and Tissue Engineering	4
BioE 560-Structural Biomaterials	4
BioE 594-Advanced Special Topics in Bioengineering	variable
 TOTAL	 108

DOCTOR OF PHILOSOPHY

DEGREE REQUIREMENTS (108 Semester Hours Minimum)

Focus: PHD course specialization offering advanced engineering science methods in reactions, transport and systems methods to address challenges at the molecular and nano-scale.

BIOMOLECULAR ENGINEERING CURRICULUM HOURS SEMESTER

Students must take the following courses

28		
BioE 405	Atomic and Molecular Nanotechnology	4
BioE 430	Bioinstrumentation I	4
BioE 465	Metabolic Engineering	4
ECE 449	Microfabrication	4
BioE 460	Biomaterials	4
BioE 505	Nano-biotechnology	4
BioE 514	Biotransport	4
BioE 595	Seminar in Bioengineering	2
BioE 599	PhD Thesis	60

Students must take at least 18 hours from the following two groups. Seven must be taken from each group. At least 16 hours must be at the 500 level.

Group I Electives

PhysB 585	Cell biology	4
BCHE 561	Biochemistry of Cell Regulation	4
BIOS 452	Biochemistry I	4
BIOS 454	Biochemistry II	4
GCLS 501	Biochemistry	4
GCLS 502	Molecular Biology	4
GCLS 503	Cell Biology	4
GCLS 511	Molecular Genetics	4

Group II Electives

BioE 431	Bioinstrumentation and Measurements Lab	4
BioE 480	Introduction to Bioinformatics	4
BioE 494	Special Topics	4
BioE 522	Principles of Polymeric Science & Engineering	4
BioE 414	Biomechanics	4
BioE 594	Advanced Special Topics in Bioengineering	variable

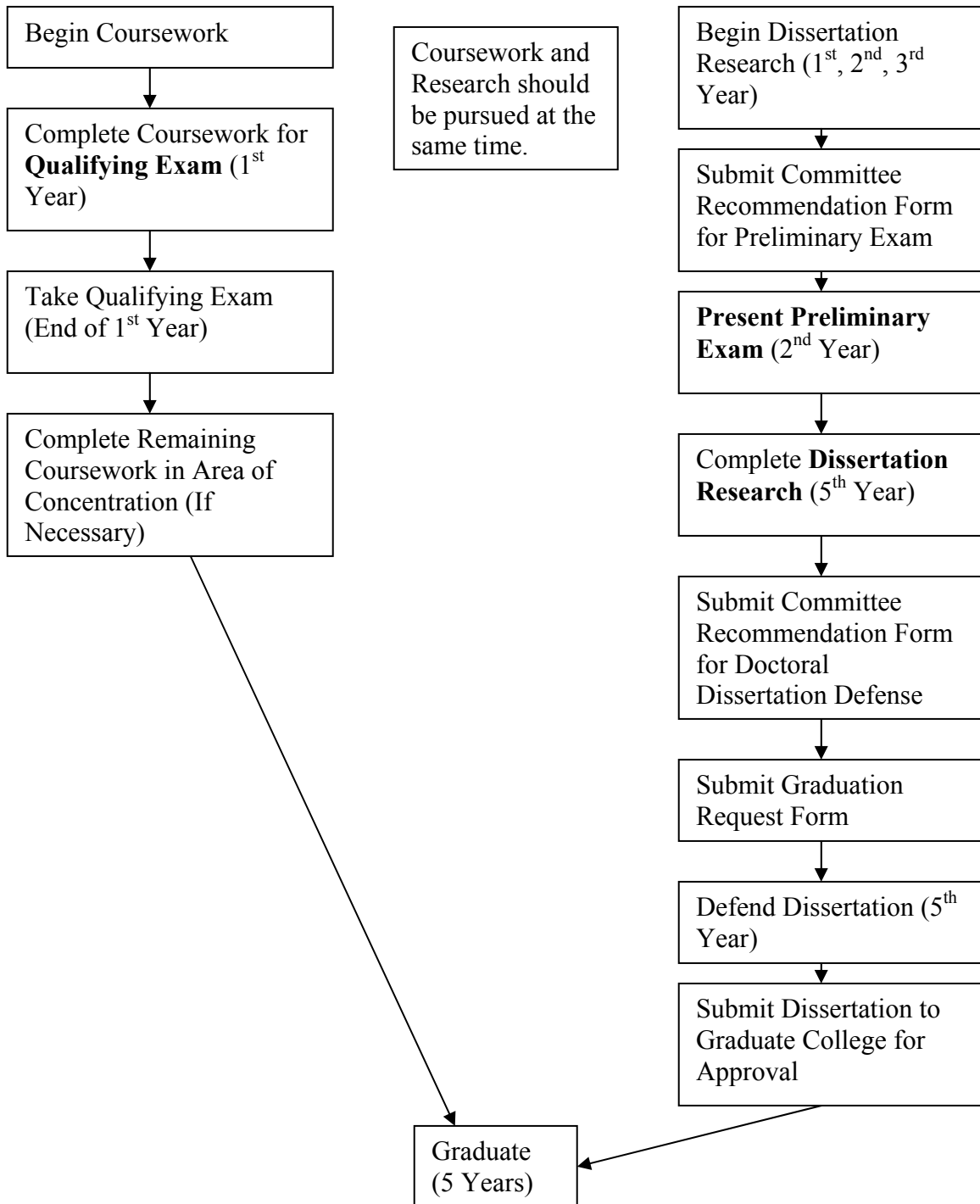
Math 577 Advanced Applied Partial Differential Equations	4
Math 580 Mathematics of Fluid Mechanics	4
CEMM 434 Finite Element Analysis I	4
CEMM 534 Finite Element Analysis II	4
CEMM 554 Nonlinear Finite Element Analysis	4
ME512 Automatic Control of Mechanical Systems	4
ME 417 Intermediate Fluid Mechanics	4
ME 514 Mechanics of Viscous Fluids	4
MCS 571 Numerical Methods for Partial Differential Equations	4
ECE 400 Introduction to Microelectromechanical Systems	4
ECE 541 Microelectronic Fabrication Techniques	4
ECE 546 Chemical and Biosensors	4
Total	108

DOCTOR OF PHILOSOPHY IN BIOINFORMATICS

DEGREE REQUIREMENTS (108 Semester Hours Minimum)

	SEMESTER HOURS	
<i>Students must take all of the following courses</i>		21
BioE 480-Introduction to Bioinformatics	4	
BioE 481-Bioinformatics Lab	2	
BioE 482-Introduction to Bioinformatics Methods	4	
BioE 483-Molecular Modeling in Bioinformatics	4	
BioE 580-Principles of Bioinformatics	4	
BioE 582- Design of Computational Methods in Bioinformatics	4	
BioE 595-Seminar in Bioinformatics		2
BioE 599-Ph.D. Thesis		60
<i>Students must take at least six courses from the following two groups, with at least two courses from each group. At least 16 hours must be at the 500 level .</i>		25
Group I		
BioS 422 Cell and Molecular Biology (prereq BioS 220)	4	
BioS 430 Evolution (prereq BioS 220)	4	
BioS 452 Biochemistry I (Prereq Chem 234)	4	
BioS 454 Biochemistry II (Prereq BioS 452)	4	
GCLS501 Biochemistry	3	
GCLS502 Molecular biology	3	
GCLS503 Cell biology and Integrative physiology	3	
GCLS504 Research methods	1	
GCLS511 Molecular genetics	3	
GCLS510 Integrative biology	3	
Bche513 Structures of biopolymers	3	
Group II		
BioE 407-Pattern Recognition I	4	
BioE 440-Biological Signal Analysis	4	
BioE 594-Monte Carlo Methods in Scientific Computation	4	
CS/MCS 401-Computer Algorithm I	4	
CS 501-Advanced Algorithms	4	
CS 594-Introduction to Computational Biology	4	
IDS 464-Statistics: Theory and Applications	4	
Stat 401-Introduction to Probability	4	
Stat 411-Statistical Theory	4	
Stat 461 – Applied Probability Model	4	
BStat 471-Linear and Nonlinear Programming	4	
MCS 521- Combinatorial Optimization	4	
BioE 594 – Advanced Special Topics in Bioinformatics	4	
TOTAL		108

DOCTOR OF PHILOSOPHY GRADUATION RECOMMENDED TIMETABLE



ADMISSION TO CANDIDACY: THE QUALIFYING AND PRELIMINARY EXAMINATIONS

Qualifying Exam

Qualifying Exam: The Ph.D-seeking student is expected to attempt and pass the written exam (referred to as qual exam) by the end of the first year at UIC.

a) Only Ph.D candidates are allowed to take the qual exam. The student must NOT be on academic probation, AND a letter of intent must be secured from a potential advisor. While this letter does not indicate firm commitment, it is understood that a thesis advisor has been identified and *possibly* financial support may be forthcoming.

b) The format of the qual exam would include 3 problems in instrumentation (BioE 430), modeling (BioE 439 or 440), materials (BioE460), and 1 problem in his/her chosen track of concentration.

*c) For Bioinformatics students only, the Ph.D candidate will have to answer 5 out of 8 problems.

d) The qual exam will be given the first Monday of June each year.

e) Students have two attempts to pass the qualifying exam. Failure to take the qualifying exam after the first year will be counted as the first attempt.

Preliminary Exam

Preliminary Exam: The Ph.D-seeking student is expected to attempt and pass the oral exam (referred to as prelim exam) WITHIN one year (or 2 years for the Bioinformatics students only*) after following successful passing of the qual exam. A typical timeframe envisioned is that the student will become a full Ph.D candidate by the end of the second year (or third year for the Bioinformatics students) at UIC.

a) The prelim exam format will closely follow that of the NIH grant application, including abstract, specific aims, background, preliminary results, research plan, and references, but excludes other portions such as budget, resource statement, and etc. The student is expected to provide some preliminary results and, more importantly, outline his/her research plan. This document is limited to 10 pages (excluding references), and the student must provide the Prelim exam Committee with hard copies of the research proposal at least one week prior to the actual prelim exam. Each committee member has to confirm receipt of the research proposal by sending an email to the Director for Graduate Study prior to the defense date.

b) The prelim exam committee consists of 5 faculty. Specific requirements for the committee include;

- o. at least one core BioE faculty (a list will be posted on our website)
- o. at least one faculty must come from outside of the UIC Bioengineering department
- o. at least one faculty must be tenured
- o. preferably, the prelim exam committee will remain the same and become the final thesis committee

c) The prelim exam must be open to the academic community of the university. The exams will be announced and advertised on the bulletin board and on our website, and mass email will be distributed to the students and faculty on week prior to the presentation date. The first portion of presentation of a prelim exam is open to the general public. The second-half of discussion/questioning/critique is between the student and committee members only.

The prelim committee must be approved by the Graduate College on the recommendation of the student's department or program. The defense committee consists of at least five persons, of whom one must be from outside their program. The chair of the committee must be a full member of the UIC graduate faculty. At least two members of the committee must be tenured faculty at UIC; at least one must be from outside the degree-granting program which may include graduate faculty from other UIC departments or colleges. The outside member can also be from outside the department, academic unit, or outside the university in which case the member must demonstrate equivalent academic standards and his or her curriculum vitae must accompany the Committee Recommendation Form. A Committee Recommendation Form must be submitted to the Graduate College three weeks prior to the defense. Please visit:

<http://www.uic.edu/depts/grad/gcforms/CommRecForm.pdf> to obtain a copy of the form. This form must be submitted to the Graduate College three weeks prior to the thesis defense. It must

be typed (handwritten versions will not be accepted) and must be signed by your advisor and the department head before it is sent to the Graduate College for approval. The thesis title may not exceed 105 characters, including spaces, and may not include any abbreviations. The committee vote is “pass” or “fail.” A candidate cannot be passed if more than one vote of “fail” is reported. See the Thesis Manual for current guidelines for the preparation and submission of your thesis. To obtain a copy of this manual, please see the web site, <http://www.uic.edu/depts/grad/gcforms/thesism.pdf>.

Annual Review

We strongly recommend annual review of research progress by the Committee. In lieu of such annual review, the thesis advisor is asked to provide a description of the student’s research progress to the Director of Graduate Studies.

DOCTORAL DISSERTATION DEFENSE

Provided that the student has completed all graduation requirements and is in good academic standing, he or she is now ready to defend the dissertation before a committee.

All candidates for the Ph.D. degree must have an advisor who is a full member of the UIC graduate faculty. The advisor is considered the primary reader of the dissertation. Defense presentations must be limited to less than one hour. Additional time will be allowed for direct examination by the thesis committee and discussion among the committee members alone.

The defense must be open to the academic community of the university and be publicly announced one week prior to its occurrence. Student must submit a hard copy of his thesis to each member of the thesis defense committee one week prior to the defense date. Each committee member has to confirm receipt of the thesis by sending an email to the Director for Graduate Study prior to the defense date.

The dissertation committee must be approved by the Graduate College on the recommendation of the student’s department or program. The defense committee consists of at least five persons, of whom one must be from outside their program. The chair of the committee must be a full member of the UIC graduate faculty. At least two members of the committee must be tenured faculty at UIC; at least one must be from outside the degree-granting program which may include graduate faculty from other UIC departments or colleges. The outside member can also be from outside the department, academic unit, or outside the university in which case the member must demonstrate equivalent academic standards and his or her curriculum vitae must accompany the Committee Recommendation Form. A Committee Recommendation Form must be submitted to the Graduate College three weeks prior to the defense. Please visit:

<http://www.uic.edu/depts/grad/gcforms/CommRecForm.pdf> to obtain a copy of the form. This form must be submitted to the Graduate College three weeks prior to the thesis defense. It must be typed (handwritten versions will not be accepted) and must be signed by your advisor and the department head before it is sent to the Graduate College for approval. The thesis title may not exceed 105 characters, including spaces, and may not include any abbreviations. The committee vote is “pass” or “fail.” A candidate cannot be passed if more than one vote of “fail” is reported. See the Thesis Manual for current guidelines for the preparation and submission of your thesis. To obtain a copy of this manual, please see the web site, <http://www.uic.edu/depts/grad/gcforms/thesism.pdf>.

TIME TO DEGREE

The time limit for the Ph.D. degree is nine years when the student enters with a baccalaureate degree, but seven years when the student with a master’s degree and 32 hours are awarded toward the Ph.D. Students who are unable to complete their degree within the stated timelines will be dismissed for failure to progress. An automatic one-time extension will be given at the request of the graduate program upon the submission of a petition to the Graduate College. Under extraordinary circumstances, a second year extension will be granted but the student will need to retake and pass the preliminary examination.

Readmission is not guaranteed for students who fail to meet the time to degree requirements.

GRADUATION PROCEDURE

In order to graduate you must view the **Apply to Graduate/Pending Degree List** (formerly called Graduation Request Form) with the Graduate College. Please see <http://grad.uic.edu/cms/?pid=1000030> for complete information. Refer to the Graduate College website for thesis and graduation deadlines.

You must also turn in two copies of your completed and defended thesis or dissertation to the Graduate College for a Master’s degree and three copies for a Doctorate degree. One additional copy of the thesis or dissertation must be delivered to the BioEngineering Department. For further information regarding the submission of your thesis/dissertation to the Graduate College, please visit <http://grad.uic.edu/cms/?pid=1000027>.

PROGRAM TRANSFER

Transfer within the Graduate College:

Students who wish to transfer from their current program to Bioengineering MS or PhD program, must submit the following documents to the BioE Program Coordinator, eight weeks prior to the start of semester that the student is applying for:

1. Personal statement
2. Two letters of recommendation
3. Letter of financial support from a research advisor
4. GRE scores (within 5 years)

Student must initiate the transfer request from his current department by filling out a change of graduate program form and seeking the department's approval.

Students who wish to transfer from MS Bioengineering to PhD Bioengineering program must submit the following:

1. Personal statement
2. Two letters of recommendation
3. Letter of financial support from a research advisor

Admission from Non-degree to the BioE Graduate Program:

Non-degree students wishing to be admitted to the Bioengineering graduate program has to follow the regular graduate application procedures and must follow BioE and Graduate College deadlines which can be found in the BioE website:

http://www.uic.edu/depts/bioe/program_graduate/program_grad.htm. Applications will be evaluated as regular applications.

POSSIBLE CAREERS IN BIOENGINEERING

Some of the careers that are available to bioengineers are:

- Academic positions in research and teaching universities
- Professional and research positions in the bioengineering and biotechnology industry
- Business opportunities in the private sector
- Careers as scientists and professionals in Federal and State government agencies

Here are some ideas that may lead you to a career in one of the above areas:

- Developing medical instruments and devices such as cardiac pacemakers and defibrillators; artificial blood vessels, kidneys, pancreas joints, arms and legs
- Using computers to monitor patients during an operation in intensive care, or to monitor healthy persons in unusual environments such as astronauts in space or divers at great depth. Monitoring includes the sending and processing of information such as the heart's electrical activity and rate, blood pressure, and body temperature
- Design and building noninvasive instruments for monitoring, diagnosis, and rehabilitation, including automated analysis of medical images such as x-ray or magnetic resonance images
- Teaching, managing, or consulting
- Designing clinical laboratories, hospitals and other health care delivery units which emphasize the utmost importance of patient and employee safety
- Using engineering system techniques to aid the study of biology and behavior of man and animals.

The medical device industry is the primary employer of Biomedical Engineers. Below, the main areas are outlined, a brief description of each area is provided, and a list of companies who have hired Biomedical Engineers or provided internships for bioengineering students:

Bioinstrumentation and Biosensors

Companies that make products to measure things such as blood pressure, blood gases, EKG, EEG, electrolytes, and blood glucose.

- LifeScan- <http://www.lifescan.com>
- Instrumentation Metrics- <http://www.instrumentationmetrics.com>
- Electrical Geodesics, Inc.- <http://www.egi.com>

Medical Imaging

Companies that make medical imaging equipment such as MRI, PET, ultrasound, and CAT scanners.

- Parallel Design- <http://www.pardesign.com>

- BrainLab- <http://www.brainlab.com>

Implantable and Invasive Devices

Companies that make products such as pacemakers, cochlear implants, retinal implants, artificial heart valves, stents, grafts, and neurological devices.

- Guidant- <http://www.guidant.com>
- Mircovention- <http://www.microvent.com>
- Thoratec- <http://www.thoratec.com>

Orthopedic

Companies that focus on areas such as artificial joints and limbs, orthopedic braces and rehabilitation, hip replacement, and bone healing.

- Wright Medical- <http://www.wmt.com>
- Smith and Nephew- <http://www.smith-nephew.com>
- OthoLogic- <http://www.orthologic.com>

Tissue and Cellular Engineering

Companies that are using cells for the treatment of disease or creating products to replace and regenerate human tissue.

- LifeCell- <http://www.lifecell.com>
- Aastrom Biosciences- <http://www.aastrom.com>

Diagnostics

Companies that produce products that are used to diagnose a wide variety of medical conditions.

- Diagnostic Products- <http://www.dpcweb.com>
- Abbott Diagnostics- <http://www.abbottdiagnostics.com>

For more career information, please contact the Office of Career Services at (312) 996-2330 or (312) 996-2300 or visit their web site at:

http://www.vcsa.uic.edu/MainSite/departments/career_services/home/ .

The Career Planning Guide is available at <http://uic.placementmanual.com>

Also, the Bioengineering Department receives job information which is posted outside of the main office.

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ANSWERS TO FREQUENTLY ASKED QUESTIONS

Advisors

Who is my advisor?

When you recommended for admission at UIC, an academic advisor will be appointed to you in order to assist you in choosing your first semester classes. As you become better acquainted with the department and its faculty, you may change to a different advisor at any time. The thesis advisor may also serve as the academic advisor, although this is not required. Should you change advisors at anytime during your studies, please notify the Graduate Program Coordinator. Your advisor will provide many types of support, including recommending courses, approving schedules, and providing contacts with other areas of the University. As you choose an academic area of concentration, it may be useful to choose an advisor closely associated with this area. This advisor must be a member of the Graduate College faculty.

Committee

What does my committee do?

If you are a Master's degree student, your committee decides, at your thesis defense, whether you have fulfilled the requirements for the degree. For Ph.D. students, your committee serves this purpose, and in addition, take part in your Preliminary Examination. If you have formed your committee, these members may also serve as valuable resources throughout your research and the writing of your dissertation.

How do I form my thesis committee?

For the requirements for the members of your committee, see the Master's Degree Defense and Doctoral Dissertation Defense.

On the recommendation of the Bioengineering Department, the Graduate College approves the members of your committee. You should meet with your advisor and discuss who should be on your committee. Generally, these will be faculty members with whom you consult during your research. When a list of likely candidates filling the requirements is made, approach each faculty member and ask if he or she would be part of your committee. The Committee Recommendation Form used for requesting committee members is available on-line at <http://grad.uic.edu/pdfs/CommRecForm.pdf>. When the form is completed and signed by your committee chairperson, please return it to the Bioengineering Office. After being reviewed by the Program Coordinator and signed by the Department Head or Director of Graduate Studies, it will be submitted to the Graduate College for final approval.

Registration

What is the Pre-Registration Meeting?

This is a meeting held exclusively for bioengineering students to find out what courses are being offered for the next semester. The meetings are held each semester, a week before registration begins. This event gives students a chance to ask the instructor questions and receive information about the courses that he or she is interested in taking.

What courses are offered during the upcoming semester?

A listing of upcoming Bioengineering courses is available at the Pre-Registration meeting, in the Bioengineering office, or on the Bioengineering web site <http://www.uic.edu/depts/bioe/>.

When do I register?

Before the beginning of each semester, registration letters are sent out to all students by the Department of Registration and Records. These letters contain information about deadlines, registration instructions and the time and a date in which you are able to register after.

Registration times and dates are assigned according to criteria developed by the Office of Admissions and Records.

For your first semester at UIC, you may need to register during the “late registration period,” which extends through the end of the second week of classes in the current semester.

How do I register?

Detailed instructions are given in your registration letter and in the Timetable printed each semester. Students should consult with their advisor in order to choose the appropriate schedule.

The main method to register is through the Student Access System (<http://osssorawebprod2.admin.uillinois.edu/webforstudent/wfs3.asp>). Instructions are available on-line and are also printed in the Timetable.

Courses

How do I select my courses?

Select your courses by referring to the required course list and consulting with your advisor. It is generally advisable to finish most of your coursework in your first years in the program. Also, since most courses are not offered every semester, and many not every year, careful planning is required to insure progress towards your anticipated degree.

What if I don't have a prerequisite for a course but want to take it?

In general, the prerequisites should be taken for every course. However, since many graduate students come from different schools, provisions are made for substituting equivalent courses. Ask your advisor or the course instructor about registered for courses without the UIC prerequisites. If you are not sure whether your background has prepared you sufficiently for a particular course, the best thing to do is to ask the opinion of the instructor. In some cases they may be able to recommend materials to help you overcome deficiencies before the semester begins.

What is the average course load for a bioengineering graduate student?

Full-time students usually enroll for 12 to 16 credit hours each semester. In exceptional cases, the advisor and Director of Graduate Studies may permit a student to enroll for up to 20 hours. Registration for more than 20 hours is not recommended. Full-time load is defined by the University as registration of 12 hours or more even if holding an assistantship.

Fellowship Holders must be registered for at least 12 hours of credit per fall and spring semester and 6 hours of credit per summer semester as long as they hold the award.

Tuition and Service Fee Waiver Holders must register for at least 12 hours of credit per fall and spring semester and 6 hours of credit per summer semester as long as they hold the award.

50% Assistantship Holders must register for at least 8 hours of credit each semester, excluding summer. 25% Assistantship Holders must register for at least 12 hours of credit each semester, excluding summer. Some graduation programs may require registration for more than 8 hours per term and/or summer registration. There are no tuition and service fee waiver benefits for students employed with less than 25% or more than 67% appointment. Assistants who qualify for a Spring tuition and service fee waiver automatically receive a summer waiver if registered in at least 3 hours in summer unless holding they hold a summer appointment above 67%.

International Students: For purposes of enrollment certification to the Immigration and Naturalization Service of the United States Department of Justice, the Graduate College considers foreign students to be pursuing a minimum of full-time program of study if they: (1) enroll for 12 or more hours of credit or (2) hold an appointment as a teaching or research assistant for: (a) one-half time and enroll for at least 8 hours of credit or (b) one-third time and enroll for at least 10 hours of credit.

Students on an F-1 visa may be eligible to register for zero hours if all requirements are complete except for project or thesis, and a petition must be submitted to the Graduate College and approved. The petition must be endorsed by the advisor and the Director of Graduate Studies or the Head of the Program as well as the Office of International Services.

What is zero hour registration?

This is a special circumstance which allows doctoral students to remain enrolled at UIC without an obligation to pay tuition associated with normal registration. It applies only to students who have fulfilled all of their requirements except defending the dissertation, and is contingent upon continued satisfactory progress. A M.S. student does not have to be registered during the semester of the thesis defense or graduation if all other degree requirements have been completed. It is the responsibility of the student to ensure that they have completed all requirements prior to attempting to register for zero hours.

How do I add or drop a course?

Courses may be added to your schedule through the last day of the second week of the Fall or Spring semesters, or the last day of the first week during the Summer session. Courses may be dropped without academic penalty by this same deadline. To initiate an add or drop, visit the departmental office for the course in question and obtain a Registration Revision Form. Adding a course during this time requires the signature of the instructor or other suitable authorization as determined by that department.

If you hold a fellowship, assistantship, tuition and service fee waiver, or student visa, you must maintain the required minimum number of credit hours (12 during the fall and spring) throughout the semester, or you risk losing your assistance and/or visa.

Can I take a course pass/fail?

You have the option to take certain courses on a pass/fail basis. These courses may not be in your immediate area of concentration, may not total more than one sixth of the total credit hours you take at UIC and apply towards your degree, and you must have the approval of the course instructor and the Program Director. Please consult the Timetable for the deadlines for requesting to take a course pass/fail each semester.

How do I audit a course?

Graduate students, as well as persons not registered at the University of Illinois at Chicago, may audit courses with the permission of the instructor and Dean of the college offering the course (not the Graduate College). The privilege of attending class as an auditor (visitor) is granted on or after the first day of instruction and only by the instructor of the class with the approval of the dean of the college concerned. Visitor Permit forms may be obtained from the Office of Registration and Records no later than the tenth day of the semester (fifth day of summer session). Visitors are not permitted in laboratory, military science, or physical education classes nor is a visitor allowed to write an examination (including a proficiency examination) for course credit or to participate in class activities. A \$15 fee is charged for the privilege of visiting/auditing a class. A full-time registered student or a person who is a permanent support staff employee of the University does not pay the visitor fee.

Transferring Credit

Can I transfer credit towards my UIC graduate degree in Bioengineering?

Consideration is given to the transfer of credit in three categories:

- Previous graduate work for which a degree was not awarded.
- Graduate work completed elsewhere after admission to UIC and for which a degree was not awarded. Students considering taking graduate work elsewhere during a leave of absence should consult their advisor and director of graduate studies about such plans and the courses that may be considered for transfer.
- Graduate work completed in the senior year at UIC that was not applied to the baccalaureate.

To be considered for transfer, graduate work must have been completed in an accredited institution approved by one of the regional accreditation associations or by the agencies recognized by the Council on Post-Secondary Education, and must meet the quality and content of courses offered at UIC.

For probation and graduation purposes, transfer credit is not computed in the cumulative grade point average or Graduate Degree GPA unless such credit was earned in courses taken at UIC.

Limits on Transfer Credit

The specific number of credit hours accepted for transfer is determined on an individual basis. No transfer is automatic.

Maximum Allowed Transfer Credit: No more than 25 percent of the hours required for a master's degree requiring 32—47 hours of credit, or more than 50 percent of the hours required for a

master's degree requiring 48 or more hours of credit, can be transferred from another institution or another college at UIC. Doctoral students may transfer in no more than 25 percent of the hours required for the degree. This limit is for courses taken as a student in another college at UIC or another institution, but not coursework taken in a different program within the Graduate College at UIC. Transfer credit is considered only for courses in which the student received a grade of A or B. Credit earned more than six calendar years before admission to the Graduate College is not usually accepted for transfer.

Non-degree Credit: Non-degree students who are admitted as degree candidates may, by petition, transfer up to 12 semester hours of graduate-level courses in which grades of A or B were earned. This does not count towards the limits of transfer credit listed above.

Procedures

A *Graduate Petition for Transfer Credit Toward an Advanced Degree* is required for all transfers of credit except the 32 hours of credit for a prior master's degree (see below). The graduate program evaluates the student's petition and makes a recommendation to the Graduate College. The petition should show the courses recommended for transfer by the graduate program and the number of semester hours of credit received. Students must attach to the petition an original transcript showing grades if courses were not taken at UIC, and a certification from the registrar or college dean of the applicable institution stating that the courses are graduate-level and were not used toward fulfillment of the requirements for a degree if not self-evident from the transcript itself.

Credit for Prior Master's Degree

Doctoral candidates who have previously earned a master's degree or its equivalent approved by one of the regional accreditation associations or by the agencies recognized by the Council on Post Secondary Education may be granted 32 semester hours of credit toward the doctoral degree if approved by the program and the Graduate College at the time of admission. The 32 hours are subtracted from the total hours required from the baccalaureate. The 32 hours are not counted toward the maximum allowed transfer credit limit or computed in the cumulative GPA or Degree GPA. A petition is not required.

Petitions

What are petitions used for?

Students may petition the Dean of the Graduate College for exceptions to certain College regulations, but may do so only after consulting with their advisor and the director of graduate studies, whose recommendations must appear on the petition. Petition forms may be obtained from the Graduate College and from the graduate program office and must be accompanied by a full explanation of the circumstances and any appropriate forms and supporting documents required for processing a requested change. ***Petitions should be filed within 30 days*** from the time an individual knows, or reasonably should have known, that an occurrence has affected his or her status.

The BioE department will severely restrict student petitions. Unless clearly explained by both the student and his/her advisor, the department will not routinely grant petitions. Although there

are some “acceptable” petitions such as one-time zero-hour registration, other petitions including degree transfer and extension of academic probation will no longer be automatically granted.

Grades

What is the minimum GPI I have to maintain in the Bioengineering Department?

The minimum GPI (Graduate Progress Index) required to remain in good standing in the Bioengineering Department is the minimum required by the Graduate College, **3.0/4.0**. Keep in mind that it is only graduate level courses which contribute to this GPI (courses at the 400 or 500 level) which have been taken at UIC or have been properly applied towards your program through an approved transfer of credit petition.

What if I fall below the minimum GPI?

You are sent a letter of warning from the Graduate College and are classified as being on academic probation. You then have two semesters to bring your GPI back up to or above the required 3.0/4.0.

Do I have the option to take courses at a pass/fail option?

Yes, with certain stipulations. The course must not be within your area of concentration, the total courses taken pass/fail must not exceed one sixth of your total coursework for the degree. You must declare your intention to take the course pass/fail at the time of registration (please see the department for the appropriate form), and you must have the approval of your advisor and the Director of Graduate Studies.

What if I receive an “incomplete” for a course?

If you have difficulty completing the requirements for a course, the instructor may give you an “incomplete” (IN) as a grade for the course, which means that he/she recognizes some extenuating circumstances and is giving you a chance to make up missed work. The IN grade must be removed by the end of the next term in which you are registered (including summer), or within one calendar year, whichever ever occurs first. *Course instructors may require earlier deadlines.* If the grade is not removed, it will permanently remain an IN.

If you receive an IN, once all of the coursework is completed, please ask the instructor to fill out a Supplemental Grade Report so that the IN will be replaced with the correct grade.

What if I want to repeat a course?

A student is permitted to repeat a course for credit if it is (1) designated in the Timetable with the phrase “Maybe repeated for credit” or (2) a course in which a grade of C or lower was received. In the latter case, the course may be repeated only once and may be counted only once toward the degree requirements; the original grade continues to be included in the computation of the GPI. The approval of both the instructor who will offer the course and the Director of Graduate Studies is required.

Probation

What does it mean if I am on academic probation?

Academic probation is the Graduate College's mechanism for warning students that their GPI has fallen below the minimum standard of 3.0. If you are placed on probation, you have two terms of enrollment after the term in which your GPI falls below 3.0 to remove yourself from probation. If you fail to raise your average to 3.0 or to otherwise fulfill the terms of your probation within the deadlines you will be dismissed from the University.

Students may not hold graduate appointments such as GA, TA, or RA or receive tuition and service fee waivers if they are currently on academic probation. Since losing this option for financial support may cause a great deal of hardship or high loan amounts, it is very advisable to maintain your GPI well above 3.0/4.0.

Leave of Absence

What if I need to take a leave of absence?

Except for international students whose visas require continuous registration, and doctoral students who have passed their preliminary exams, graduate degree-seeking students may take one semester (fall or spring) plus the summer session off without formal leave approval from the Graduate College. Degree students who desire to take an additional consecutive semester off, for a total maximum of three consecutive terms, must file a *Graduate Petition for Leave of Absence* by the tenth day of the semester for which leave is requested.

International students who hold an F-1, J-1, A-1, A-2, or H-1 visa must register each fall and spring semester due to visa requirements. Such students must file a *Graduate Petition for Leave of Absence* for any fall or spring semester they wish to take off, obtaining written authorization on the petition from the Office of International Services. If remaining in the country, such leaves are rarely granted by that office.

Upon receipt of a leave of absence petition from the department/program, the Graduate College will automatically approve the first leave, up to one year maximum. At least one term as a graduate degree student must be completed before being eligible for a leave. After returning to the program from an approved leave, a second leave is not automatic and will only be granted by the Graduate College for medical or other extraordinary reasons.

Leave will not be granted to doctoral candidates who have passed the preliminary exam, except for students whose programs require a formal off-campus activity (e.g., internship), or for documented medical or other extraordinary reasons. If this situation occurs, a *Graduate Petition for Leave of Absence* must be submitted to the Graduate College, and is not automatic.

Non-degree students are not eligible for a leave of absence.

Time spent on leave approved by the department and the Graduate College does not count towards the time to complete the degree.

Students who have already registered for the term for which leave is requested must complete either a *Cancellation of Registration* before the first day of the term, or a *University Withdrawal*

by the tenth day of the semester (fifth day in summer). Students are responsible for filing the appropriate forms and resultant charges; the leave of absence petition itself does not alter existing registration.

Students who are on an approved leave of absence will not be covered by the health and personal accident insurance plan until they return to active registration.

Petition forms may be obtained from the Graduate College, 606 University Hall, or from the director of graduate studies in the graduate program.

Engineering Student Societies and other organizations

What is the Biomedical Engineering Society?

The University of Illinois sponsors a local chapter of the Biomedical Engineering Society (BMES). Joining the BMES provides a range of benefits. Full student membership in the national organization includes subscriptions to the BMES Bulletin and to the annals of Biomedical Engineering. As a registered student member in the national organization, a discounted annual fee is applicable after graduation for a professional bioengineer. The local chapter elects new officers each spring for the following academic year. BMES hosts trips to local medical facilities, participates in national Engineer's Week, and holds informal gatherings for student faculty. BMES is a strong force in the Bioengineering Department. It serves as a forum for students to discuss suggestions or problems with the curriculum and as a unified group of students, it has altered the curriculum to broaden the course selections available to students. BMES meetings are a good way to make contact with fellow Bioengineers.

What is the Student Departmental Advisory Committee (SDAC)?

This Committee, made up of both Graduate and Undergraduate students, is designed to represent the Bioengineering student body at UIC. Members of this committee meet with the Department Head and discuss issues pertaining to BioE students. Discussion includes: classes, departmental resources, finding speakers, problems/concerns with the curriculum, and improving the BioE experience at UIC.

What other professional societies are available?

If you are interested in a specific area of the bioengineering field, most of the other engineering societies (IEEE, AIChE, and ASME) have special interests groups at a national level which publish journals relevant to bioengineering. These journals are offered at a discount to members of the appropriate organizations. The Professional Engineering Societies Council (PESC) unites the individual engineering societies. Each society has a PESC Representative, who represents the society in PESC meeting and reports back to the society members activities sponsored by PESC and the College of Engineering. Membership in PESC is open to any engineering student.

In addition to the professional societies represented on campus there are a wide range of organizations which support bioengineering on a national level. These specific organizations support bioengineering on a national level. These specific organizations have the advantage of being specific to the narrowest areas of interest. However, membership is usually rather expensive even with student discounts. If you are thinking of joining one of these organizations you might want to talk to a faculty member who is already a member of the society.

Email

How do I establish an email account?

In order to establish an email account, you can go to the Academic Computing and Communications Center (ACCC) in Room 2267 in the Science and Engineering Laboratories (SEL) or visit <http://www.uic.edu/depts/accc/index.html/> and follow the instructions that are given. Once you have established an email address please notify the Bioengineering Office so that you can be put on the mailing list.

International Student Support

If you are an international student and need information, please consult the OIS website at <http://www.ois.uic.edu/>

Financial Support

What types of financial support are available for a bioengineering graduate student?

There are five common types of financial support available for bioengineering graduate students:

- 1) Educational loans, which are applied for through the Office of Student Financial Aid (OSFA) located on the second floor of the Student Services Building (312) 996-3126. These loans are federally guaranteed but based on need. Cost beyond what a student is able to contribute and beyond amounts borrowed under a federally guaranteed loan can often be met with a Supplemental Loan for Students (SLS). For complete details, contact OSFA at the above number (Loans are available for domestic students only).
- 2) Teaching (TA) positions are semesterly appointments funded by the bioengineering faculty. As a TA you assist a particular instructor in some aspect of a course he/she is teaching that semester. This may include grading homework, holding office hours for tutoring students, leading review sessions, and presenting material in lecture. These positions are limited in number and are awarded competitively based on academic record. Because of this, first semester students are not normally awarded a TA position. This position includes a monthly stipend and a tuition and service fee waiver. The student will be required to pay some student fees.
- 3) Research (RA) positions are probably the most common type of support for bioengineering graduate students. This employment entails assisting an investigator with some aspect of his/her research. The appointments are generally 50%, which carries a commitment of 20 hours/week, a stipend, and a tuition and service fee waiver. The student will be required to pay some student fees. Bioengineering students seek RA positions in many departments throughout the university. The goal of most graduate students is to find support in the lab in which he/she wishes to carry out thesis-directed research, and many times a seemingly temporary position can lead to a greater interest.

- 4) Graduate (GA) positions are also available to graduate students. A student will have clerical and other office related duties. This position includes a monthly stipend and a tuition and service fee waiver.
- 5) Tuition and Service Fee Waivers are awarded by the Graduate College. Students recommended for this award are chosen by the Director of Graduate Studies primarily based on the students need and academic performance.

For a 50% appointment (TA, RA, or GA) the student must register for a minimum number of 8 hours during the fall and spring semesters and 3 hours during the summer semester. For 25% appointments, fellowships recipients, and tuition and service fee holders, students must register for a minimum of 12 hours each semester.

Students that hold academic appointments as assistants for the spring semester are entitled to a tuition and service fee waiver for the summer term immediately following, provided that they are registered for at least three hours during the summer term.

If you are on academic probation, you risk losing your graduate appointment. Also, non-degree and limited standing students may not hold assistantships and are not eligible to receive tuition and service fee waivers.

What about fellowships and scholarships?

There are a number of fellowships and scholarships awarded to students at UIC each year. They fall under several titles and are competed for campus-wide. Consult a current edition of the Graduate Catalog or the Graduate College website (www.uic.edu/depts/grad) for more information on University Fellowships, Dean's scholar awards, Abraham Lincoln Graduate Fellowships, etc. The applications for these awards are usually available in January.