

# Checklist for Degree Requirements in the Biomedical Imaging Track

	Quarter Taken	Institution	Units	Grade
<b>Undergraduate Physical Sciences and Engineering Core</b> (must be taken but do not count towards degree requirements)				
Math 21A, B, C, D (Calculus)				
Math 22A, B (Linear Algebra, Diff Eq)				
Biology 1A (Intro)				
Chemistry 2A (Intro)				
<b>Physics 9A, B, C (Intro for Physics Majors)</b>				
Computer Programming ENG 5 or 6				
Circuits ENG 17				
Analog and Digital Devices ENG 100				
<b>Track Specific Undergraduate Core</b> (must be taken but do not count towards graduate degree requirements)				
PHY 9D (Modern Physics)				
EEC 106 Intro to Image Processing or EEC 150B Signals & Systems II				
STA 130A or STA 120 Statistics				
<b>Biomedical Engineering Core</b> (these courses or their equivalent must be taken)				
BIM 204 Physiology for Eng (F)			<b>4</b>	
BIM 202 Cell/Molec Biol for Eng (W)			<b>4</b>	
BIM 281 Acq & Anal of Biomed Signals (S)			<b>4</b>	
BIM 284 Math Methods for Biomed Eng (F) (Required for PhD)			<b>4</b>	
<b>Biomedical Imaging Electives</b> (4 of these courses or their equivalent must be taken)				
BIM 242 Intro to Biomedical Imaging (F)			<b>4</b>	
BIM 252 Image Reconstruction (W)			<b>4</b>	
BIM 251 Medical Image Analysis (N/O)			<b>4</b>	
BIM 287 Molecular Imaging (S)			<b>4</b>	
BIM 243 Radiation Detectors Biomed Appl (W)			<b>4</b>	
BIM 286 Nuclear Imaging Biol Med (S)			<b>4</b>	
BIM 288 Ultrasonic Imaging (F)			<b>4</b>	
BIM 246 Magnetic Resonance Tech (F)			<b>3</b>	
BIM 241 Introduction to MRI (F)			<b>3</b>	
BIM 247 Current Concepts in MRI I (W)			<b>3</b>	

BIM 248 Current Concepts in MRI II (S)			<b>3</b>	
<b>Other Electives</b>				
EEC 260 Random Signals & Noise (W)			<b>4</b>	
EEC 264 Est & Det of Signals in Noise (N/O)			<b>4</b>	
BCM 230 Prac NMR Spec and Imaging (F) +lab			<b>1</b>	
Total Undergraduate Units Taken at UCD (only courses that count towards fulfilling degree requirements)				
Total Graduate Units Taken at UC Davis				
Total Units taken at UC Davis				

(F=fall quarter, W=winter quarter, S=spring quarter, N/O=not offered in 2004-05)

<b>Examinations for PhD Students Only</b>	<b>Date Taken</b>	<b>Result</b>
<b>Exam 1:</b> Written examination that must be passed before the end of the 6 <sup>th</sup> quarter to continue in the PhD program. Offered at least once each year, the examination is based on the 4 core courses and may contain problems based on the content of prerequisite course work. Possible grades are pass, conditional pass, retake (once only), and fail.		
<b>Exam 2:</b> Oral qualifying examination taken within 1 year after passing Exam 1 that must be passed to advance to candidacy. A written dissertation plan in the NIH format is required and is to be submitted to all members of the committee at least 2 weeks prior to the exam. The plan is orally defended before a 5-member committee. See Graduate Students Handbook.		
<b>Exam 3:</b> An oral dissertation defense is taken at least 1 year following Exam 2. The dissertation is defended before a 3-member committee minimum generally constituted with the same members as for Exam 2. This exam must be passed to receive a PhD degree in biomedical engineering.		

Program of Study for \_\_\_\_\_

<b>Course Title and Number</b>	<b>Units</b>
<b>Fall Quarter (Year 1)</b>	
<b>Winter Quarter (Year 1)</b>	
<b>Spring Quarter (Year 1)</b>	
<b>Fall Quarter (Year 2)</b>	
<b>Winter Quarter (Year 2)</b>	
<b>Spring Quarter (Year 2)</b>	

Approved by faculty advisor \_\_\_\_\_ date \_\_\_\_\_

Approved by program advisor \_\_\_\_\_ date \_\_\_\_\_

**Biomedical Imaging Track (Sample Course Schedule)**

(B)/(E) indicate a course satisfies a biological / engineering unit requirement. \* Core course \*\*4 of these courses are Required for Imaging Track.

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Fall I.	(E) Introduction to Biomedical Imaging	BIM 242	(4)**
	(B) Physiology for Engineers	BIM 204	(4)*
	(E) Mathematical Methods for Biomed Eng	BIM 284	(4)*
	(E) Seminar	BIM 290	(1)
Winter I	(B) Cell and Molecular Biology for Eng	BIM 202	(4)*
	(E) Radiat Det for Biomed App	BIM 243	(4)**
	(E) Image Reconstruction	BIM 284	(4)**
	(E) Seminar	BIM 290	(1)
Spring I	(E) Acq and Analysis of Biomedical Signals	BIM 281	(4)*
	(E/B) Molecular Imaging	BIM 287	(4)
	(B) Biological Elective Course		(4)
	(E) Scientific Ethics & Integrity	BIM 289	(1)

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Fall II.	(E) Imaging Elective Course		(4)**
	(E) Imaging Elective Course		(4)**
	(E) Research	BIM 299	(4)
	(E) Seminar	BIM 290	(1)
Winter II	(E) Engineering Elective Course		(4)
	(E) Research	BIM 299	(8)
	(E) Seminar	BIM 290	(1)
Spring II	(B) Biological Elective Course		(4)
	(E) Research	BIM 299	(8)
	(E) Seminar	BIM 290	(1)

	<b>MS Units Min.</b>	<b>Recommended</b>	<b>PhD Units Min.</b>	<b>Recommended</b>
Biological	8	9	12	12
Engineering/Grad	18/12	24/16	32/24	36/36
Totals	32	33	48	48

## Possible Elective Courses

(This list is NOT comprehensive and elective courses should be chosen by discussing with your major professor).

### **Technical electives**

(E) Biochemical Systems Theory (F)	BIM 270	(4)
(E) Gene Circuit Theory (W)	BIM 271	(4)
(E) Introduction to Biomaterials (W)	BIM 210	(4)
(E) Biomedical Fluid Mechanics & Transport (S)	BIM 215	(4)
(E) Skeletal Biomechanics (F)	BIM 228	(4)
(E) Musculoskeletal Biomechanics (S)	BIM 231	(4)
(E) Intro to Methods of Mathematical Physics	PHY 104A,B	(3)
(E) Continuum Mechanics	PHY 105C	(3)
(E) Introduction to Image Processing and Computer Vision	ECE 106	(4)
(E) Image Analysis and Computer Vision	ECE 208	(3)
(E) Electromagnetics	EEC 230	(3)
(E) Design of Microelectromechanical Systems (MEMS)	EEC 244A,B	(3)
(E) Adaptive Systems	EEC 253	(3)
(E) Optical Methods in Biophysics	EAD 271	(3)
(E) Digital Image Processing	ECE 206	(4)
(E) Optics	PHY 108	(3)
(E) Scanning Probe Microscopy	EAD 171	(4)
(E) Theory and Practice of Bioinformatics	ECS 124	(3)

### **Biological electives**

(B) Blood Cell Mechanics (F)	BIM 214	(4)
(B) Neuroscience	NPB 112	(3)
(B) CV, Respiratory & Renal Physiology	NPB 113	(4)
(B) Cellular Basis of Disease	PMI 285	(3)
(B) Genes and Gene Expression	BIS 101	(4)
(B) Structure and Function of Biomolecules	BIS 102	(3)
(B) Regulation of Cell Function	BIS 104	(3)
(B) Molecular Biology of Eukaryotic Cells	MCB 121	(3)
(B) Molecular Genetics	MCB 161	(3)
(B) Human Genetics	MCB 162	(3)
(B) Cell Biology Laboratory	MCB 140L	(4)
(B) Neurobiology	NPB 100	(4)
(B) Comparative Physiology: Circulation	NPB 127	(3)
(B) Human Gross Anatomy	CHA 101	(4)
(B) Human Gross Anatomy Lab	CHA 101L	(4)
(B) Principles of Veterinary Anesthesia	VMD426	(1.7)
(B) Experimental Mouse Biology	PMI 298	(4)