Baylor College of Medicine

GRADUATE SCHOOL OF BIOMEDICAL SCIENCES

Graduate Student Bulletin 2019-2020

Contents

RESPECT
Integrity
INNOVATION
Teamwork
Excellence

Graduate School of Biomedical Sciences
Baylor College of Medicine
One Baylor Plaza, Suite N204
Houston, TX 77030

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2019-2020 GRADUATE SCHOOL CALENDAR

REGISTRATION 1st Term	July 1-12, 2019
ORIENTATION	July 24, 25 & 26, 2019

FIRST TERM ~ JULY 29 – SEPTEMBER 27, 2019

First Class Day	July 29
Last Day to Drop/Add	August 12
Holiday	September 2 (Labor Day)
Registration Term 2	September 9–20
Last Class Day	September 20
Exams	September 23–27

SECOND TERM ~ OCTOBER 7 – DECEMBER 6, 2019

First Class Day	October 7
Last Day to Drop/Add	October 21
GSBS Student Symposium	November 7
Registration Term 3	November 18 – 29
Holiday	November 28 & 29 (Thanksgiving & FTO)
Last Class Day	November 27
Exams	December 2 -6

THIRD TERM ~ JANUARY 2 – FEBRUARY 28, 2020

Holiday	January 1 (New Year's Day)
First Class Day	January 2
Last Day to Drop/Add	January 16
Holiday	January 20 (Martin Luther King Day)
Holiday	February 17 (President's Day -FTO)
Registration Term 4	February 10–23
Last Class Day	February 21
Exams	February 25–28

FOURTH TERM ~ MARCH 9 – MAY 8, 2020

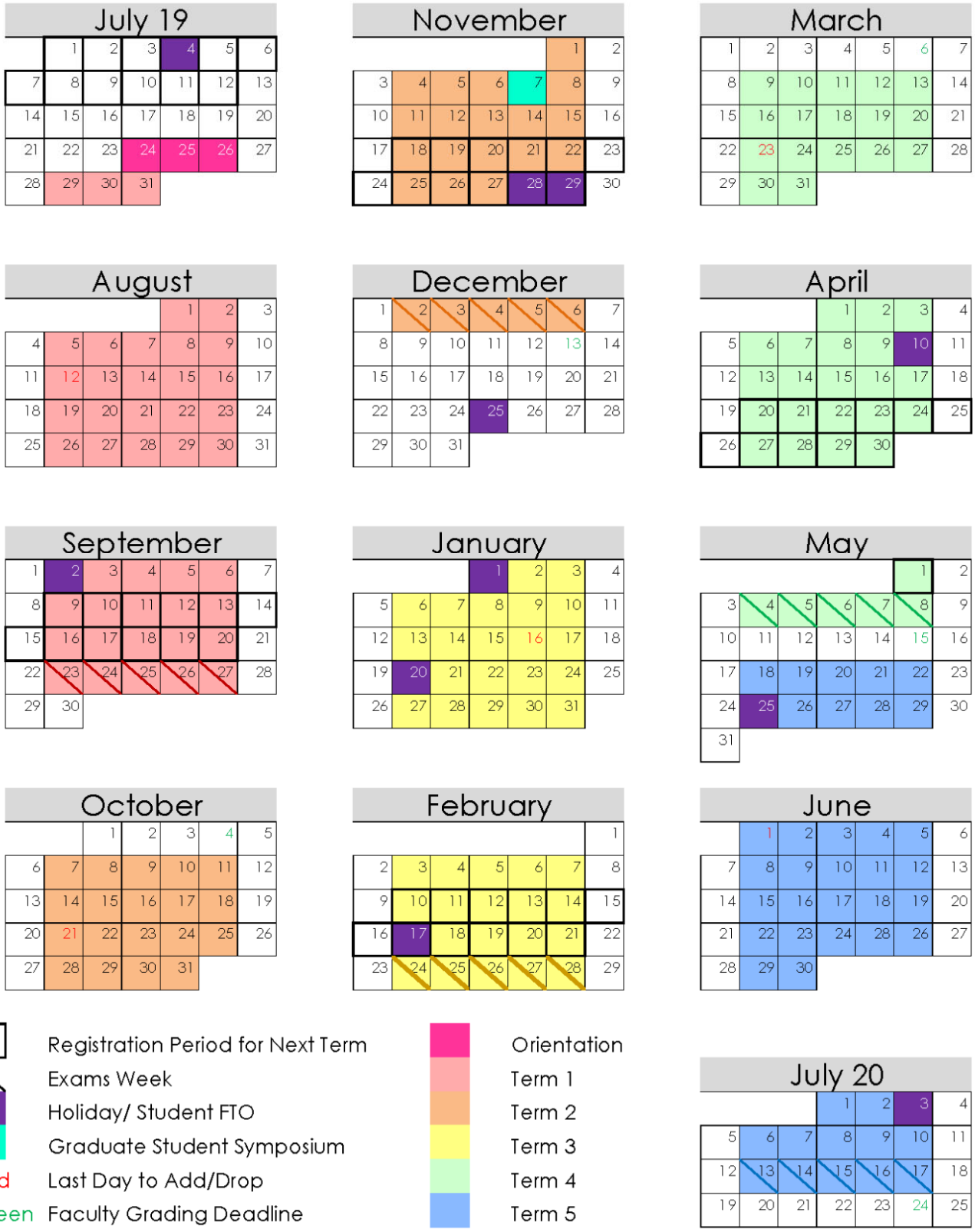
First Class Day	March 9
Last Day to Drop/Add	March 23
Holiday	April 10 (Good Friday - FTO)
Registration Term 5	April 20–May 1
Last Class Day	May 1
Exams	May 4–8

FIFTH TERM ~ MAY 18 – JULY 17, 2020

First Class Day	May 18
Holiday	May 25 (Memorial Day)
Last Day to Drop/Add	June 1
Holiday	July 3 (Independence Day Observed)
Registration Term 1 (2020-21)	June 29–July 10
Last Class Day	July 10
Exams	July 13 - 17

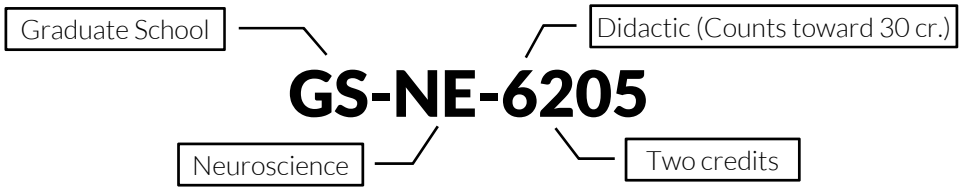
Updated: 07/01/19

2019-20 Graduate School Calendar



General Information & Definitions

- Course Number:
  - The first two letters identify courses in the Graduate School (GS)
  - The second two letters designate the graduate program which offers the course
  - The first digit indicates whether the course counts toward the 30-credit hour requirement for all PhD students
    - 5 = Does not count toward the 30-credit requirement (non-didactic)
    - 6 = Counts toward the 30-credit requirement (didactic)
  - The second digit indicates the number of credits in the course. A zero denotes a course that has a variable number of credits depending on student scheduling needs.
  - The last two digits are an internal identifier of the course.
  - Example:



- ARRA = Schedule to be arranged: Instructional & meeting hours will be scheduled by agreement between the faculty member(s) and the student.
- AY = Academic Year. The academic year starts with Term 1 at the end of July. This is AY19 (2019-20).
- TBA = To Be Announced
- V = Variable credit hours

- Course Notes:
  - P = Partial term course. Class does not meet all 8 weeks of the term. See syllabus.
  - X = Course not offered in the current academic year (also highlighted gray).
  - E = Course offered in even-numbered academic years.
  - O = Course offered in odd-numbered academic years.
  - R = Course is restricted to students in the academic program.

- Days: Days the course meets.
  - M Monday
  - T Tuesday
  - W Wednesday
  - R Thursday
  - F Friday

- Building Abbreviations:
  - A Cullen
  - B Cullen
  - CNRC Children's Nutritional Research Center
  - D Jewish
  - E Anderson
  - M DeBakey
  - N Alkek Tower
  - NRI Neurological Research Institute
  - R Alkek Bldg for Biomedical Research (ABBR)
  - S Smith
  - T Taub
  - TXFC Texas Children's Feigin Center

- Even/Odd Years:
  The 2019-2020 academic year (AY19) is an "odd" year. Some courses are offered either odd or even years.

GRADUATE SCHOOL SERVICE CURRICULUM

COURSE #	COURSE TITLE		DAY	TIME	RM	INSTRUCTOR	NOTES
Terms 1+2 Courses							
GS-GS-6600	Foundations A: Molecules to Systems	Lec:	M W F	1:15-2:15	N315	Sifers	
		Discussion:	W F	2:30-3:30	N311/N315/N317		
GS-GS-6400	Foundations B: Biostatistics	Lecture:	M R	2:30-3:30	N315	Hilsenbeck	
		Labs A-C:	R	12:00-1:30	N304/N311/N317		
		Labs D-F:	R	2:00-3:30	N304/N311/N317		
Term 1 Courses							
GS-GS-5101	Responsible Conduct of Research Year 1		T	9:00-10:00	N315	Smith	
GS-GS-5111	Strategies for Success in Graduate School		T	1:00-2:30	N315	Samuel/Sillitoe	
GS-GS-6203	Data Mining		MTW F	10:00-12:00	N315	Shaulsky	P
GS-GS-6204	Ethics, Conduct and Practical Aspects of Clinical Research		R	2:30-4:30	TBA	Suter	X
Term 2 Courses							
GS-GS-5102	Responsible Conduct of Research Year 2		T	9:00-10:00	N315	Smith	P
GS-GS-5112	Powerful Presentations		T	1:00-2:30	N315	Samuel	
Term 3 Courses							
GS-GS-5103	Responsible Conduct of Research Year 3		T	10:00-11:00	N315	Smith	P
GS-GS-5104	Responsible Conduct of Research Year 4		R	10:00-11:00	N315	Smith	P
GS-GS-5105	Scientific Writing		F	8:30-10:30	N315	Marriott	P
GS-GS-5107	Leadership Skills		M W	12:00-1:00	N317	Fuqua	X
GS-GS-5108	Pharmacoepidemiology & Pharmacogenetics		R	2:00-3:00	N304	Scheurer	E,X
GS-GS-6101	Neuroscience		M W F	12:00-1:00	N311	Ray	P
GS-GS-6201	Cell Division and Cancer		M W F	2:30-3:30	N315	Chang	X
GS-GS-6202	Gene Regulation		M W F	1:15-2:15	N315	Cooper	
GS-GS-6205	Fundamentals of Epidemiology		M	1:00-3:00	N304	Scheurer	
Term 4 Courses							
GS-GS-6102	Principles of Immunology		T R	1:30-2:30	N311	Levitt	P
GS-GS-5113	Effective Project Design and Management		W	2:30-4:00	N315	Samuel/Arur	
GS-GS-5106	Intellectual Property		T R	9:00-10:00	N311	Turley	P

CANCER AND CELL BIOLOGY

COURSE #	COURSE TITLE		DAY	TIME	ROOM	INSTRUCTOR	NOTES
Term 1 Courses							
GS-CC-5100	Student Research Seminar		M	4:00-5:00	N315	Neilson	
GS-CC-5201	NRSA Grant Writing & Project Development 1		T R	10:30-12:00	N302	Pereira/Pangas	X,R
Term 2 Courses							
GS-CC-5100	Student Research Seminar		M	4:00-5:00	N315	Neilson	
GS-CC-5202	NRSA Grant Writing & Project Development 2		T R	10:30-12:00	N302	Pereira/Pangas	X,R
GS-CC-6102	Biology of Aging 1		M	10:00-11:00	N801	Catic/Dang	
GS-CC-6201	Translational Cancer Biology		R	1:00-3:00	N302	Yustein	
GS-CC-6205	Translational Breast Cancer Research		T R	3:00-4:00	N302	Fuqua	
GS-CC-6207	Ethics & Regulatory Prep for Research with Animal Models		T R	9:00-10:30	N302	Pereira	X
Term 3 Courses							
GS-CC-5100	Student Research Seminar		M	4:00-5:00	N315	Neilson	R
GS-CC-6101	Cancer		M F	2:30-3:30	N311	Pangas	P
GS-CC-6202	Explorative Data Analysis		M F	11:00-12:30	M616	Lanz	
GS-CC-6203	Integrated Microscopy	Lecture:	R	1:00-2:00	N304	Mancini/Stossi	
		Labs:	R	2:00-5:00	122A/123A/125A		
GS-CC-6206	Cell Death in Development & Disease		T R	10:00-11:30	N317	Zhou/Bouchier-Hayes	
GS-CC-6208	Cellular Signaling		M W F	10:00-11:00	N311	York	P
Term 4 Courses							
GS-CC-5100	Student Research Seminar		M	4:00-5:00	N315	Neilson	
GS-CC-6204	Regulation of Energy Homeostasis		M W	12:00-1:00	N311	Moses/Moore	
GS-CC-6209	The Clock-Cancer Connection		M W	1:30-2:30	N317	Fu	X
GS-CC-6301	Biology of Aging 2		T R	10:30-12:00	N302	Pereira	
GS-CC-6302	Molecular Carcinogenesis		M W F	11:00-12:00	N317	Li	
GS-CC-6303	Reproductive Biology		M W F	10:00-11:00	N310	Pangas/Richards	

CHEMICAL, PHYSICAL, & STRUCTURAL BIOLOGY

COURSE #	COURSE TITLE	DAY	TIME	ROOM	INSTRUCTOR	NOTES
Term 1+2 Courses						
GS-CP-6601	Molecular Biophysics: Methods & Principles	M W	10:50-11:45	HBH-22 @ Rice	Wensel	
GS-CP-6602	Computational Molecular Biophysics & Structural Biology	T R	1:00-2:15	BRC-286 @ Rice	Ma	
Term 1 Courses						
GS-CP-5100	Student Research Seminar	M	4:00-5:00	301A	Prasad	
GS-CP-5101	Thinking Like a Scientist 1	T	11:00-1:00	350A	Young	R
Term 2 Courses						
GS-CP-5100	Student Research Seminar	M	4:00-5:00	301A	Prasad	
GS-CP-6202	Thinking Like a Scientist 2	T	11:00-1:00	350A	Palzkill	R
Term 3 Courses						
GS-CP-5100	Student Research Seminar	M	4:00-5:00	301A	Prasad	
GS-CP-6203	Thinking Like a Scientist 3	T	11:00-1:00	350A	Zhou	R
GS-CP-6302	Chemical Concepts in Chemical Biology	M W F	11:00-12:00	N317	Young	
GS-CP-6303	Macromolecules: Structure & Interactions	M W F	2:30-3:30	N317	Prasad/Zhou	X
Term 4 Courses						
GS-CP-5100	Student Research Seminar	M	4:00-5:00	301A	Prasad	
GS-CP-6204	Thinking Like a Scientist 4	T	11:00-1:00	350A	Zhou	R
GS-CP-6207	Electron Cryomicroscopy	R	9:00-10:30	N420	Wang	
GS-CP-6301	Advanced X-ray Crystallography	M W F	2:00-4:00	N302	Tsai	E,X
GS-CP-6401	General Pharmacology	T	9:00-11:00	N501	Chan/Palzkill	
		R	10:00-12:00			
Term 5 Courses						
GS-CP-6205	Chemical Biology	R	2:00-4:00	N304	Wang	
GS-CP-6206	Drug Discovery: From Bench to Bedside	T	2:00-4:00	N304	Song/Wang	

CLINICAL SCIENTIST TRAINING PROGRAM

COURSE #	COURSE TITLE	DAY	TIME	ROOM	INSTRUCTOR	NOTES
Term 1 Courses						
GS-CT-5100	Seminar in Clinical Sciences	W	4:00-6:00	2002 CNRC	Balasubramanyam	X
GS-CT-5101	Responsible Conduct of Research for Clinical Investigators	MTWR	5:30-7:30	M112	Gramatges	P
GS-CT-6201	CICS 1: Grant Development for Clinical Investigators	T R	4:00-5:30	N901	Balasubramanyam	R,P
GS-CT-6300	Fundamentals of Clinical Investigation	MTWR	5:30-7:30	M112	Kheradmand	P
Term 2 Courses						
GS-CT-5100	Seminar in Clinical Sciences	W	4:00-6:00	2002 CNRC	Balasubramanyam	X
GS-CT-6302	CICS 2: Clinical Trials for Clinical Investigators	T R	4:00-5:30	N901	Kheradmand	R
Term 3 Courses						
GS-CT-5100	Seminar in Clinical Sciences	W	4:00-6:00	2002 CNRC	Balasubramanyam	X
GS-CT-6303	CICS 3: Translational Research for Clinical Investigators	T R	4:00-5:30	N901	Vallejo	R
Term 4 Courses						
GS-CT-5100	Seminar in Clinical Sciences	W	4:00-6:00	2002 CNRC	Balasubramanyam	X
GS-CT-6105	Development and Commercialization of Biomedical Innovations	W	4:00-5:00	R608	Balasubramanyam	X
GS-CT-6304	CICS 4: Health Services Research for Clinical Investigators	T R	4:00-5:30	N901	Pereira	R
Term 5 Courses						
GS-CT-5100	Seminar in Clinical Sciences	W	4:00-6:00	2002 CNRC	Balasubramanyam	X
GS-CT-6205	CICS 5: Evaluating a Completed Career Development Grant	T R	4:00-5:30	N901	Pereira	R,P

DEVELOPMENT, DISEASE MODELS, AND THERAPEUTICS

COURSE #	COURSE TITLE	DAY	TIME	ROOM	INSTRUCTOR	NOTES
Term 1 Courses						
GS-DD-6204	Cell Physiology	T R	4:00-5:00	N302	Poché	X
GS-DD-6202	Classical Developmental Biology	T R	10:00-11:30	N311	Lewis/Poché	X
Term 2 Courses						
GS-DD-5101	Effectively Writing & Reviewing Proposals	T R	3:30-6:00	N310	Samuel/Arenkiel	R
GS-DD-6201	Development	M W	12:00-1:00	N311	Groves	
GS-DD-6301	Human Physiology 1	M W F	9:00-10:00	N311	Horrigan/Poché	
Term 3 Courses						
GS-DD-5110	DDMT Journal Club	M	4:00-5:00	N317	Gorelick/Lee	R
GS-DD-6207	Advanced Topics in Muscle Physiology	T R	9:30-10:30	N302	Rodney	
GS-DD-6208	Evolutionary Conservation of Developmental Mechanisms	T R	12:30-2:00	N310	Groves	
GS-DD-6210	Cardiovascular Diseases	T R	10:00-11:00	N310	Wehrens	
GS-DD-6302	Human Physiology 2	M W F	9:00-10:00	N311	Horrigan/Poché	
Term 4 Courses						
GS-DD-5110	DDMT Journal Club	M	4:00-5:00	N317	Gorelick/Lee	R
GS-DD-6205	Transmembrane Signaling	M W	1:00-2:00	N310	Beeton	X
GS-DD-6206	Pathophysiology & Mechanisms of Human Disease	T R	11:00-12:00	N304	Lacorazza	
GS-DD-6209	Animal MRI	W	9:00-11:00	N317	Pautler	X
GS-DD-6303	Neural Development	M W F	10:00-11:30	N304	Arenkiel/Sillitoe	
GS-DD-6304	Topics in Development	T R	2:00-3:30	N310	Nakada/Wythe	X
GS-DD-6401	Adv Topics in Cardiovascular Physiology	MTWR	9:00-10:00	N304	Wehrens/Li	
Term 5 Courses						
GS-DD-5110	DDMT Journal Club	M	4:00-5:00	N317	Gorelick/Lee	R
GS-DD-6203	Animal Models of Human Disease	M W F	10:00-11:00	N317	Ward	
GS-DD-6402	Advanced Topics in Cardiovascular Disease Pathogenesis	MTWR	9:00-10:00	N304	Wehrens/Lagor	

GENETICS & GENOMICS

COURSE #	COURSE TITLE	DAY	TIME	ROOM	INSTRUCTOR	NOTES
Term 1 Courses						
GS-GG-5100	Student Research Seminar	W	3:30-5:00	301A	Herman/Dierick	
GS-GG-6101	Clinical Genetics	F	12:00-2:00	R808	Scott	
Term 2 Courses						
GS-GG-5100	Student Research Seminar	W	3:30-5:00	301A	Herman/Dierick	
GS-GG-6201	Model Systems Genetics	M R	10:30-11:30	N315	Herman	
Term 3 Courses						
GS-GG-5100	Student Research Seminar	W	3:30-5:00	301A	Herman/Dierick	
GS-GG-5105	Genetics & Genomics Journal Club	F	3:45-5:00	N311/N317	Jafar-Nejad/Yamamoto	
GS-GG-6202	Mammalian Genetics	T R	10:45-11:45	N311	Jafar-Nejad/Heaney	
GS-GG-6204	Method & Logic in Genetics & Genomics	M W	10:00-12:00	M319.01 M319.02 M319.03	Mardon/Suter	
Term 4 Courses						
GS-GG-5100	Student Research Seminar	W	3:30-5:00	301A	Herman/Dierick	
GS-GG-5105	Genetics & Genomics Journal Club	F	3:45-5:00	N311/N317	Jafar-Nejad/Yamamoto	
GS-GG-6102	Genetic Epidemiology & Population Genetics	R	8:00-9:00	N311	Lupo/Scheurer	
GS-GG-6103	Genetics & Genomics in Vision Research	M W	1:00-2:00	N304	Mardon	E,X
GS-GG-6203	Gene & Cell Therapy	T R	10:30-11:30	N311	Ng	
GS-GG-6301	Bioinformatics & Genomic Analysis	T R F	9:00-10:00 9:00-10:30	N317 N317	Worley	
GS-GG-6302	Human Genetics	M W F	1:00-2:00	N311	Scott/Hanchard	
GS-GG-6303	Medical Genetics	T R	9:30-11:00	N304	Sardiello	
Term 5 Courses						
GS-GG-5105	Genetics & Genomics Journal Club	F	3:45-5:00	N311/N317	Jafar-Nejad/Yamamoto	

IMMUNOLOGY & MICROBIOLOGY

COURSE #	COURSE TITLE	DAY	TIME	ROOM	INSTRUCTOR	NOTES
Term 1+2 Course						
GS-IY-6401	Concepts in Host Immune System-Microbe Interactions (I&M Keystone 1)	T	10:00-12:00	N317	Conner/Javier	
Term 1 Courses						
GS-IY-5105	Seminars in Immunology & Microbiology	T	4:00-5:00	FC01A TXFC	Kimata/Diehl	
GS-IY-5110	Lit. Review in Immunology & Microbiology	T	3:00-4:00	FC01A TXFC	Maresso/Rodriguez	
Term 2 Courses						
GS-IY-5100	Student Research Seminar	M	4:00-5:00	201A	Diehl/Kimata	
GS-IY-5105	Seminars in Immunology & Microbiology	T	4:00-5:00	FC01A TXFC	Kimata/Diehl	
GS-IY-5110	Lit. Review in Immunology & Microbiology	T	3:00-4:00	FC01A TXFC	Maresso/Rodriguez	
Term 3 Courses						
GS-IY-5100	Student Research Seminar	M	4:00-5:00	201A	Diehl/Kimata	
GS-IY-5105	Seminars in Immunology & Microbiology	T	4:00-5:00	M112	Kimata/Diehl	
GS-IY-5110	Lit. Review in Immunology & Microbiology	T	3:00-4:00	M112	Maresso/Rodriguez	
HS-IY-6202	The Microbiome Lecture:	W	9:30-11:00	N317	Samuel/Petrosino	
	Lab:	R	2:30-4:30	N317		
GS-IY-6301	Immunology	M W F	11:00-12:00	N311	Levitt	P
GS-IY-6302	Grand Challenges & Methods in Immunology & Microbiology (I&M Keystone 2)	T F	1:00-2:30	N317	Hyser/Mamonkin	
Term 4 Courses						
GS-IY-5100	Student Research Seminar	M	4:00-5:00	201A	Diehl/Kimata	
GS-IY-5105	Seminars in Immunology & Microbiology	T	4:00-5:00	M112	Kimata/Diehl	
GS-IY-5110	Lit. Review in Immunology & Microbiology	T	3:00-4:00	M112	Maresso/Rodriguez	
GS-IY-6201	Cells, Tissues & Organs Lecture:	R	4:00-5:00	N311	Rowley/Phung	
	Lab:	R	3:00-4:00	213B		
GS-IY-6303	Fundamentals of Effective Grant Writing (I&M Keystone 3)	W	8:30-10:30	M112/N311/N317	Marriott	
		F	8:30-9:30	N302/N304/N311		
GS-IY-6402	Concepts in Microbial Pathogenesis	M F	10:00-12:00	N311	Conner	
Term 5 Courses						
GS-IY-6304	Clinical Aspects of Immunology	T R	10:00–11:30	N310	Levitt	

NEUROSCIENCE

COURSE #	COURSE TITLE	DAY	TIME	ROOM	INSTRUCTOR	NOTES
Term 1+2 Course						
GS-NE-6401	Fundamentals of Human Neuroimaging	T R	10:50-12:05	S104	Ress	
Term 1 Courses						
GS-NE-5111	Neuroscience Lab 1	T	10:00-1:00	S740	Pfaffinger	R
		R	9:00-12:00	S740		
GS-NE-6303	Electrical Signaling in the Brain	M W F	9:00-10:00	S740	Pfaffinger	
GS-NE-6304	Brain Cell Biology & Development	M W F	10:15-11:15	S740	Rasband	
Term 2 Courses						
GS-NE-5100	Seminar Journal Club in Neuroscience	W	12:00-1:00	S740	Medina/Chin	R
GS-NE-5101	Preparing for Your Neuroscience Qual. Exam	TW	4:00-5:00	S740	Jankowsky/Tolias	R
GS-NE-6112	Neuroscience Lab 2	T	9:00-12:00	S740	Ray	
GS-NE-6201	Analyses of Neuronal Function	M W F	9:00-10:00	S740	Xue	
GS-NE-6202	Anatomy of the Nervous System	R	9:00-12:00	414-415SA	Foster	
Term 3 Courses						
GS-NE-5100	Seminar Journal Club in Neuroscience	W	12:00-1:00	S740	Medina/Chin	R
GS-NE-6203	Genetics for Neuroscience	M W F	9:00-10:00	S740	Parchem	
GS-NE-6301	Neural Systems 1	M W F	10:00-11:00	S740	Yau	
Term 4 Courses						
GS-NE-5100	Seminar Journal Club in Neuroscience	W	12:00-1:00	S740	Medina/Chin	R
GS-NE-5201	Advanced Functional MRI Laboratory	T	9:30-12:00	S104	Robinson	X
GS-NE-6101	Core Concepts in Computational Neuroscience	R	10:00-11:00	S740	Patel	
GS-NE-6204	Neurobiology of Disease	T	3:00-5:00	S740	Noebels	
GS-NE-6302	Neural Systems 2	M W F	10:00-11:00	S740	Sillitoe	
GS-NE-6305	Concepts of Learning & Memory	M W F	9:00-10:00	N317/T728/T734	Costa-Mattioli/ Ji	X
GS-NE-6306	Cellular Neurophysiology	WR	3:30-5:00	S740	Wu	
GS-NE-6307	Physiology of the Visual System	WR	3:30-5:00	S740	Wu	

QUANTITATIVE & COMPUTATIONAL BIOSCIENCES

COURSE #	COURSE TITLE		DAY	TIME	ROOM	INSTRUCTOR	NOTES
Term 1 Courses							
GS-QC-5105	Seminar in Quantitative Biosciences		W	12:00-1:00	201A	Lichtarge/Sucgang	
GS-QC-5110	Advanced Topics in QCB		F	12:00-1:00	N302	Milosavljevic	
GS-QC-6301	Practical Introduction to Programming for Scientists		M F	9:00-10:30	N311	Ludtke	
Term 2+3 Course							
GS-QC-6801	Computational Mathematics for Quantitative Biomedicine	Term 2:	T R	10:30-12:30	N310	Liu	
		Term 3:	T R	2:30-4:30	N310		
Term 2 Courses							
GS-QC-5105	Seminar in Quantitative Biosciences		W	12:00-1:00	201A	Lichtarge/Sucgang	
GS-QC-5110	Advanced Topics in QCB		F	12:00-1:00	N302	Milosavljevic	
Term 3 Courses							
GS-QC-5105	Seminar in Quantitative Biosciences		W	12:00-1:00	201A	Lichtarge/Sucgang	
GS-QC-6201	Applications to Biology of Computation		T R	9:00-10:00	N311	Lichtarge	
Term 4 Courses							
GS-QC-5100	Student Research Seminar		F	12:00-1:30	N317	Milosavljevic	
GS-QC-5105	Seminar in Quantitative Biosciences		W	12:00-1:00	201A	Lichtarge/Sucgang	
GS-QC-5301	QCB Research Design		T	12:30-3:30	N304	Prasad/Young	
GS-QC-6302	Computer-Aided Discovery Methods		W F	10:00-12:00	N302	Milosavljevic	

TROPICAL MEDICINE

COURSE #	COURSE TITLE	DAY	TIME	ROOM	INSTRUCTOR	NOTES
Term 2 Courses						
GS-TM-5100	Seminar in Tropical Medicine	R	5:30-7:00	TBA	Hotez	X
Term 4 Courses						
GS-TM-5600	Diploma in Tropical Medicine Module 1		Online		Murray/Woc-Colburn	

LEGACY PROGRAM COURSES

COURSE #	COURSE TITLE	DAY	TIME	ROOM	INSTRUCTOR	TERMS
Term 1 Courses						
GS-CB-466	Seminar in Cell Biology	T R	12:00-1:00	116C	Foulds	R
GS-PY-466	Seminar in Mol. Physiology & Biophysics	T R	12:00-1:00	409B	Wythe/Karch	R
Term 2 Courses						
GS-CB-466	Seminar in Cell Biology	T R	12:00-1:00	116C	Foulds	R
GS-PY-413	Grant Writing Skills	F	10:00-11:00	N304	Larina/Lagor	
GS-DB-466	Seminar in Developmental Biology	M	5:00-6:15	N311	Groves	R
GS-PY-466	Seminar in Mol. Physiology & Biophysics	T R	12:00-1:00	409B	Wythe/Karch	R
GS-TB-467	Seminar in TBMM	T	4:00-5:00	N315	Thevananther	
Term 3 Courses						
GS-DB-466	Seminar in Developmental Biology	M	5:00-6:15	N311	Groves	
GS-PY-466	Seminar in Mol. Physiology & Biophysics	T R	12:00-1:00	409B	Wythe/Karch	R
GS-TB-466	TBMM Bench to Bedside	F	11:00-1:00	N302	Craigen	
GS-TB-467	Seminar in TBMM	T	4:00-5:00	N315	Thevananther	
Term 4 Courses						
GS-DB-466	Seminar in Developmental Biology	M	5:00-6:15	N311	Groves	
GS-PY-466	Seminar in Mol. Physiology & Biophysics	T R	12:00-1:00	409B	Wythe/Karch	R
GS-TB-466	TBMM Bench to Bedside	F	11:00-1:00	N310	Craigen	
GS-TB-467	Seminar in TBMM	T	4:00-5:00	N315	Thevananther	

RESEARCH & SPECIAL COURSES (Current)

COURSE #	COURSE TITLE	CR	TIME	INSTRUCTOR
Cancer & Cell Biology Courses				
GS-CC-5000	Special Topics	V	ARRA	
GS-CC-5010	Readings	V	ARRA	
GS-CC-5030	Research Rotation	V	ARRA	
GS-CC-5040	Special Projects	V	ARRA	
GS-CC-5050	Dissertation	V	ARRA	
Chemical, Physical, & Structural Biology Courses				
GS-CP-5000	Special Topics	V	ARRA	
GS-CP-5010	Readings	V	ARRA	
GS-CP-5030	Research Rotation	V	ARRA	
GS-CP-5040	Special Projects	V	ARRA	
GS-CP-5050	Dissertation	V	ARRA	
Clinical Scientist Training Program				
GS-CT-5010	Readings	V	ARRA	
GS-CT-5030	Research Rotation	V	ARRA	
GS-CT-5040	Special Projects	V	ARRA	
GS-CT-5050	Dissertation	V	ARRA	
Development, Disease Models & Therapeutics Courses				
GS-DD-5000	Special Topics	V	ARRA	
GS-DD-5010	Readings	V	ARRA	
GS-DD-5030	Research Rotation	V	ARRA	
GS-DD-5040	Special Projects	V	ARRA	
GS-DD-5050	Dissertation	V	ARRA	
Genetics & Genomics Courses				
GS-GG-5000	Special Topics	V	ARRA	
GS-GG-5010	Readings	V	ARRA	
GS-GG-5030	Research Rotation	V	ARRA	
GS-GG-5040	Special Projects	V	ARRA	
GS-GG-5050	Dissertation	V	ARRA	
Immunology & Microbiology Courses				
GS-IY-5000	Special Topics	V	ARRA	
GS-IY-5010	Readings	V	ARRA	
GS-IY-5030	Research Rotation	V	ARRA	
GS-IY-5040	Special Projects	V	ARRA	
GS-IY-5050	Dissertation	V	ARRA	
MSTP Course				
GS-GS-5010	MSTP Readings	1.5	ARRA	Plon
Neuroscience Courses				
GS-NE-5000	Special Topics	V	ARRA	
GS-NE-5010	Readings	V	ARRA	
GS-NE-5030	Research Rotation	V	ARRA	
GS-NE-5040	Special Projects	V	ARRA	
GS-NE-5050	Dissertation	V	ARRA	
Quantitative & Computational Biosciences Courses				
GS-QC-5000	Special Topics	V	ARRA	
GS-QC-5010	Readings	V	ARRA	
GS-QC-5030	Research Rotation	V	ARRA	
GS-QC-5040	Special Projects	V	ARRA	
GS-QC-5050	Dissertation	V	ARRA	

RESEARCH & SPECIAL COURSES (Legacy)

COURSE #	COURSE TITLE	CR	TIME
Biochemistry & Molecular Biology Courses			
GS-BC-435	Special Projects	V	ARRA
GS-BC-463	Special Topics	V	ARRA
GS-BC-550	Dissertation	V	ARRA
Cardiovascular Sciences Course			
GS-CS-550	Dissertation	V	ARRA
Developmental Biology Courses			
GS-DB-435	Special Projects	V	ARRA
GS-DB-463	Special Topics	V	ARRA
GS-DB-550	Dissertation	V	ARRA
Immunology Courses			
GS-IM-435	Special Projects	V	ARRA
GS-IM-463	Special Topics	V	ARRA
GS-IM-550	Dissertation	V	ARRA
Integrated Molecular & Biomedical Sciences Courses			
GS-MB-435	Special Projects	V	ARRA
GS-MB-463	Special Topics	V	ARRA
GS-MB-550	Dissertation	V	ARRA
Molecular & Cell Biology Courses			
GS-CB-435	Special Projects	V	ARRA
GS-CB-463	Special Topics	V	ARRA
GS-CB-550	Dissertation	V	ARRA
Molecular Biophysics & Physiology Courses			
GS-PY-435	Special Projects	V	ARRA
GS-PY-463	Special Topics	V	ARRA
GS-PY-550	Dissertation	V	ARRA
Molecular Virology & Microbiology			
GS-MV-435	Special Projects	V	ARRA
GS-MV-463	Special Topics	V	ARRA
GS-MV-550	Dissertation	V	ARRA
Pharmacology Courses			
GS-PG-435	Special Projects	V	ARRA
GS-PG-463	Special Topics	V	ARRA
GS-PG-550	Dissertation	V	ARRA
Translational Biology & Molecular Medicine Courses			
GS-TB-435	Special Projects	V	ARRA
GS-TB-436	Special Projects Clinical	3	ARRA
GS-TB-463	Special Topics	V	ARRA
GS-TB-550	Dissertation	V	ARRA

TERM 1+2 COURSES

COURSE #	COURSE TITLE		DAY	TIME	RM	INSTRUCTOR	NOTES
GS-CP-6601	Molecular Biophysics: Methods & Principles		M W	10:50-11:45	HBH 22 @ Rice	Wensel	
GS-CP-6602	Computational Molecular Biophysics & Structural Biology		T R	1:00-2:15	BRC 286 @ Rice	Ma	
GS-GS-6600	Foundations A: Molecules to Systems	Lec:	M W F	1:15-2:15	N315	Sifers	
		Discussion:	W F	2:30-3:30	N311/N315/N317		
GS-GS-6400	Foundations B: Biostatistics	Lecture:	M R	2:30-3:30	N315	Hilsenbeck/Minard/Wang	
		Labs A-C:	R	12:00-1:30	N304/N311/N317		
		Labs D-F:	R	2:00-3:30	N304/N311/N317		
GS-IY-6401	Concepts in Host Immune System-Microbe Interactions (I&M Keystone 1)		T	10:00-12:00	N317	Conner/Javier	
GS-NE-6401	Fundamentals of Human Neuroimaging		T R	10:50-12:05	S104	Ress	

TERM 1 COURSES

COURSE #	COURSE TITLE	DAY	TIME	RM	INSTRUCTOR	NOTES
GS-CB-466	Seminar in Cell Biology	T R	12:00-1:00	116C	Foulds	R
GS-CC-5100	Student Research Seminar	M	4:00-5:00	N315	Neilson	
GS-CC-5201	NRSA Grant Writing & Project Development 1	T R	10:30-12:00	N302	Pereira/Pangas	X,R
GS-CP-5100	Student Research Seminar	M	4:00-5:00	301A	Prasad	
GS-CP-5101	Thinking Like a Scientist 1	T	11:00-1:00	350A	Young	R
GS-CT-5100	Seminar in Clinical Sciences	W	4:00-6:00	2002 CNRC	Balasubramanyam	X
GS-CT-5101	Responsible Conduct of Research for Clinical Investigators	MTWR	5:30-7:30	M112	Gramatges	P
GS-CT-6201	CICS 1: Grant Development for Clinical Investigators	T R	4:00-5:30	N901	Balasubramanyam	R,P
GS-CT-6300	Fundamentals of Clinical Investigation	MTWR	5:30-7:30	M112	Kheradmand	P
GS-DD-6202	Classical Developmental Biology	T R	10:00-11:30	N311	Lewis/Poché	X
GS-DD-6204	Cell Physiology	T R	4:00-5:00	N302	Poché	X
GS-GG-5100	Student Research Seminar	W	3:30-5:00	301A	Herman/Dierick	
GS-GG-6101	Clinical Genetics	F	12:00-2:00	R808	Scott	
GS-GS-5101	Responsible Conduct of Research Year 1	T	9:00-10:00	N315	Smith	
GS-GS-5111	Strategies for Success in Graduate School	T	1:00-2:30	N315	Samuel/Sillitoe	
GS-GS-6203	Data Mining	MTW F	10:00-12:00	N315	Shaulsky	P
GS-GS-6204	Ethics, Conduct and Practical Aspects of Clinical Research	R	2:30-4:30	N311	Suter	
GS-IY-5105	Seminars in Immunology & Microbiology	T	4:00-5:00	FC01A TXFC	Kimata/Diehl	
GS-IY-5110	Lit. Review in Immunology & Microbiology	T	3:00-4:00	FC01A TXFC	Maresso/Rodriguez	
GS-NE-5111	Neuroscience Lab 1	T	10:00-1:00	S740	Pfaffinger	R
		R	9:00-12:00	S740		
GS-NE-6303	Electrical Signaling in the Brain	M W F	9:00-10:00	S740	Pfaffinger	
GS-NE-6304	Brain Cell Biology & Development	M W F	10:15-11:15	S740	Rasband	
GS-PY-466	Seminar in Mol. Physiology & Biophysics	T R	12:00-1:00	409B	Wythe/Karch	R
GS-QC-5105	Seminar in Quantitative Biosciences	W	12:00-1:00	201A	Lichtarge/Sucgang	
GS-QC-5110	Advanced Topics in QCB	F	12:00-1:00	N302	Milosavljevic	
GS-QC-6301	Practical Introduction to Programming for Scientists	M F	9:00-10:30	N311	Ludtke	

TERM 2+3 COURSE

COURSE #	COURSE TITLE		DAY	TIME	RM	INSTRUCTOR	NOTES
GS-QC-6801	Computational Mathematics for Quantitative Biomedicine	Term 2:	T R	10:30-12:30	N310	Liu	
		Term 3:	T R	2:30-4:30	N310		

TERM 2 COURSES

COURSE #	COURSE TITLE	DAY	TIME	RM	INSTRUCTOR	NOTES
GS-CB-466	Seminar in Cell Biology	T R	12:00-1:00	116C	Foulds	R
GS-CC-5100	Student Research Seminar	M	4:00-5:00	N315	Neilson	
GS-CC-5202	NRSA Grant Writing & Project Development 2	T R	10:30-12:00	N302	Pereira/Pangas	X,R
GS-CC-6102	Biology of Aging 1	M	10:00-11:00	N801	Catic/Dang	
GS-CC-6201	Translational Cancer Biology	R	1:00-3:00	N302	Yustein	
GS-CC-6205	Translational Breast Cancer Research	T R	3:00-4:00	N302	Fuqua	
GS-CC-6207	Ethics & Regulatory Prep for Research with Animal Models	T R	9:00-10:30	N302	Pereira	
GS-CP-5100	Student Research Seminar	M	4:00-5:00	301A	Prasad	
GS-CP-6202	Thinking Like a Scientist 2	T	11:00-1:00	350A	Palzkill	R
GS-CT-5100	Seminar in Clinical Sciences	W	4:00-6:00	2002 CNRC	Balasubramanyam	X
GS-CT-6302	CICS 2: Clinical Trials for Clinical Investigators	T R	4:00-5:30	N901	Kheradmand	R
GS-DB-466	Seminar in Developmental Biology	M	5:00-6:15	N311	Groves	R
GS-DD-5101	Effectively Writing & Reviewing Proposals	T R	4:30-6:00	N302	Samuel/Arenkiel	R
GS-DD-6201	Development	M W	12:00-1:00	N311	Groves	
GS-DD-6301	Human Physiology 1	M W F	9:00-10:00	N311	Horrigan/Poché	
GS-GG-5100	Student Research Seminar	W	3:30-5:00	301A	Herman/Dierick	
GS-GG-6201	Model Systems Genetics	M R	10:30-11:30	N315	Herman	
GS-GS-5102	Responsible Conduct of Research Year 2	T	9:00-10:00	N315	Smith	P
GS-GS-5112	Powerful Presentations	T	1:00-2:30	N315	Samuel	
GS-IY-5100	Student Research Seminar	M	4:00–5:00	201A	Diehl/Kimata	
GS-IY-5105	Seminars in Immunology & Microbiology	T	4:00–5:00	FC01A TXFC	Kimata/Diehl	
GS-IY-5110	Lit. Review in Immunology & Microbiology	T	3:00-4:00	FC01A TXFC	Maresso/Rodriguez	
GS-NE-5100	Seminar Journal Club in Neuroscience	W	12:00-1:00	S740	Medina/Chin	R
GS-NE-5101	Preparing for Your Neuroscience Qual. Exam	TW	4:00–5:00	S740	Jankowsky/Tolias	R
GS-NE-6112	Neuroscience Lab 2	T	9:00-12:00	S740	Ray	
GS-NE-6201	Analyses of Neuronal Function	M W F	9:00-10:00	S740	Xue	
GS-NE-6202	Anatomy of the Nervous System	R	9:00-12:00	414-415SA	Foster	
GS-PY-413	Grant Writing Skills	F	10:00-11:00	N304	Larina/Lagor	
GS-PY-466	Seminar in Mol. Physiology & Biophysics	T R	12:00-1:00	409B	Wythe/Karch	R
GS-QC-5105	Seminar in Quantitative Biosciences	W	12:00-1:00	201A	Lichtarge/Sucgang	
GS-QC-5110	Advanced Topics in QCB	F	12:00-1:00	N302	Milosavljevic	
GS-TB-467	Seminar in TBMM	T	4:00-5:00	N315	Thevananther	
GS-TM-5100	Seminar in Tropical Medicine	R	5:30-7:00	TBA	Hotez	X

TERM 3 COURSES

COURSE #	COURSE TITLE		DAY	TIME	RM	INSTRUCTOR	NOTES
GS-CC-5100	Student Research Seminar		M	4:00-5:00	N315	Neilson	R
GS-CC-6101	Cancer		M F	2:30-3:30	N311	Pangas	P
GS-CC-6202	Explorative Data Analysis		M F	11:00–12:30	M616	Lanz	
GS-CC-6203	Integrated Microscopy	Leture:	R	1:00–2:00	N304	Mancini/Stossi	
		Labs:	R	2:00–5:00	122A/123A/125A		
GS-CC-6206	Cell Death in Development & Disease		T R	10:00-11:30	N317	Zhou/Bouchier-Hayes	
GS-CC-6208	Cellular Signaling		M W F	10:00–11:00	N311	York/Weigel	P
GS-CP-5100	Student Research Seminar		M	4:00-5:00	301A	Prasad	
GS-CP-6203	Thinking Like a Scientist 3		T	11:00-1:00	350A	Zhou	R
GS-CP-6302	Chemical Concepts in Chemical Biology		M W F	11:00–12:00	N317	Young	
GS-CP-6303	Macromolecules: Structure & Interactions		M W F	2:30-3:30	N317	Prasad/Zhou	X
GS-CT-5100	Seminar in Clinical Sciences		W	4:00-6:00	2002 CNRC	Balasubramanyam	X
GS-CT-6303	CICS 3: Translational Research for Clinical Investigators		T R	4:00–5:30	N901	Vallejo	R
GS-DB-466	Seminar in Developmental Biology		M	5:00-6:15	N311	Groves	
GS-DD-5110	DDMT Journal Club		M	4:00-5:00	N317	Gorelick/Lee	R
GS-DD-6207	Advanced Topics in Muscle Physiology		T R	9:30–10:30	N302	Rodney	
GS-DD-6208	Evolutionary Conservation of Developmental Mechanisms		T R	12:30-2:00	N310	Groves	
GS-DD-6210	Cardiovascular Diseases		T R	10:00-11:00	N310	Wehrens	
GS-DD-6302	Human Physiology 2		M W F	9:00-10:00	N311	Horrigan/Poché	
GS-GG-5100	Student Research Seminar		W	3:30-5:00	301A	Herman/Dierick	
GS-GG-5105	Genetics & Genomics Journal Club		F	3:45-5:00	N311/N317	Jafar-Nejad/Yamamoto	
GS-GG-6202	Mammalian Genetics		T R	10:45–11:45	N311	Jafar-Nejad/Heaney	

GS-GG-6204	Method & Logic in Genetics & Genomics	M W	10:00-12:00	M319.01 M319.02 M319.03	Mardon/Suter	
GS-GS-5103	Responsible Conduct of Research Year 3	T	10:00-11:00	N315	Smith	P
GS-GS-5104	Responsible Conduct of Research Year 4	R	10:00-11:00	N315	Smith	P
GS-GS-5105	Scientific Writing	F	8:30-10:30	N315	Marriott	P
GS-GS-5107	Leadership Skills	M W	12:00–1:00	N317	Fuqua	X
GS-GS-5108	Pharmacoepidemiology & Pharmacogenetics	R	2:00–3:00	N304	Scheurer/Bernhardt	E,X
GS-GS-6101	Neuroscience	M W F	12:00-1:00	N311	Ray	P
GS-GS-6201	Cell Division & Cancer	M W F	2:30-3:30	N315	Chang/Ira	X
GS-GS-6202	Gene Regulation	M W F	1:15-2:15	N315	Cooper	
GS-GS-6205	Fundamentals of Epidemiology	M	1:00-3:00	N304	Scheurer	
GS-IY-5100	Student Research Seminar	M	4:00-5:00	201A	Diehl/Kimata	
GS-IY-5105	Seminars in Immunology & Microbiology	T	4:00-5:00	M112	Kimata/Diehl	
GS-IY-5110	Lit. Review in Immunology & Microbiology	T	3:00-4:00	M112	Maresso/Rodriguez	
GS-IY-6202	The Microbiome Lecture: Lab:	W R	9:30-11:00 2:30-4:30	N317 N317	Samuel/Petrosino	
GS-IY-6301	Immunology	M W F	11:00-12:00	N311	Levitt	P
GS-IY-6302	Grand Challenges & Methods in Immunology & Microbiology (I&M Keystone 2)	T F	1:00-2:30	N317	Hyser/Mamonkin	
GS-NE-5100	Seminar Journal Club in Neuroscience	W	12:00-1:00	S740	Medina/Chin	R
GS-NE-6203	Genetics for Neuroscience	M W F	9:00–10:00	S740	Parchem	
GS-NE-6301	Neural Systems 1	M W F	10:00–11:00	S740	Yau	
GS-PY-466	Seminar in Mol. Physiology & Biophysics	T R	12:00-1:00	409B	Wythe/Karch	R
GS-QC-5105	Seminar in Quantitative Biosciences	W	12:00-1:00	201A	Lichtarge/Sucgang	
GS-QC-6201	Applications to Biology of Computation	T R	9:00-10:00	N311	Lichtarge	
GS-TB-467	Seminar in TBMM	T	4:00–5:00	N315	Thevananther	
GS-TB-466	TBMM Bench to Bedside	F	11:00–1:00	N302	Craigen	

TERM 4 COURSES

COURSE #	COURSE TITLE	DAY	TIME	RM	INSTRUCTOR	NOTES
GS-CC-5100	Student Research Seminar	M	4:00-5:00	N315	Neilson	
GS-CC-6204	Regulation of Energy Homeostasis	M W	12:00-1:00	N311	Moses/Moore	
GS-CC-6209	The Clock-Cancer Connection	M W	1:30-2:30	N317	Fu	X
GS-CC-6301	Biology of Aging 2	T R	10:30-12:00	N302	Pereira	
GS-CC-6302	Molecular Carcinogenesis	M W F	11:00-12:00	N317	Li	
GS-CC-6303	Reproductive Biology	M W F	10:00-11:00	N310	Pangas/Richards	
GS-CP-5100	Student Research Seminar	M	4:00-5:00	301A	Prasad	
GS-CP-6204	Thinking Like a Scientist 4	T	11:00-1:00	350A	Zhou	R
GS-CP-6207	Electron Cryomicroscopy	R	9:00-10:30	N420	Wang	O
GS-CP-6301	Advanced X-ray Crystallography	M W F	2:00-4:00	N302	Tsai	E,X
GS-CP-6401	General Pharmacology	T R	9:00-11:00 10:00-12:00	N501	Chan/Palzkill	
GS-CT-5100	Seminar in Clinical Sciences	W	4:00-6:00	2002 CNRC	Balasubramanyam	X
GS-CT-6105	Development & Commercialization of Biomedical Innovations	W	4:00-5:00	N901	Balasubramanyam	X
GS-CT-6304	CICS 4: Health Services Research for Clinical Investigators	T R	4:00–5:30	N901	Pereira	R
GS-DB-466	Seminar in Developmental Biology	M	5:00-6:15	N311	Groves	
GS-DD-5110	DDMT Journal Club	M	4:00-5:00	N317	Gorelick/Lee	R
GS-DD-6205	Transmembrane Signaling	M W	1:00–2:00	N310	Beeton	X
GS-DD-6206	Pathophysiology & Mechanisms of Human Disease	T R	11:00-12:00	N304	Lacorazza	
GS-DD-6209	Animal MRI	W	9:00-11:00	N317	Pautler	X
GS-DD-6303	Neural Development	M W F	10:00-11:30	N304	Arenkiel/Sillitoe	
GS-DD-6304	Topics in Development	T R	2:00-3:30	N310	Nakada/Wythe	X
GS-DD-6401	Adv Topics in Cardiovascular Physiology	MTWR	9:00-10:00	N304	Wehrens/Li	
GS-GG-5100	Student Research Seminar	W	3:30-5:00	301A	Herman/Dierick	
GS-GG-5105	Genetics & Genomics Journal Club	F	3:45-5:00	N311/N317	Jafar-Nejad/Yamamoto	
GS-GG-6102	Genetic Epidemiology & Population Genetics	R	8:00–9:00	N311	Lupo/Scheurer	
GS-GG-6103	Genetics & Genomics in Vision Research	M W	1:00–2:00	N304	Mardon	E,X
GS-GG-6203	Gene & Cell Therapy	T R	10:30–11:30	N311	Ng	
GS-GG-6301	Bioinformatics & Genomic Analysis	T R F	9:00–10:00 9:00-10:30	N317 N317	Worley	
GS-GG-6302	Human Genetics	M W F	1:00–2:00	N311	Scott/Hanchard	
GS-GG-6303	Medical Genetics	T R	9:30-11:00	N304	Sardiello	
GS-GS-5106	Intellectual Property	T R	9:00-10:00	N311	Turley	P
GS-GS-5113	Effective Project Design & Management	W	2:30-4:00	N315	Samuel/Arur	
GS-GS-6102	Principles of Immunology	T R	1:30-2:30	N311	Levitt	P

GS-IY-5100	Student Research Seminar	M	4:00–5:00	201A	Diehl/Kimata	
GS-IY-5105	Seminars in Immunology & Microbiology	T	4:00–5:00	M112	Kimata/Diehl	
GS-IY-5110	Lit. Review in Immunology & Microbiology	T	3:00-4:00	M112	Maresso/Rodriguez	
GS-IY-6201	Cells, Tissues & Organs Lecture:	R	4:00–5:00	N311	Rowley/Phung	
	Lab:	R	3:00-4:00	213B		
GS-IY-6303	Fundamentals of Effective Grant Writing (I&M Keystone 3)	W F	8:30-10:30 8:30-9:30	M112/N311/N317 N302/N304/N311	Marriott	
GS-IY-6402	Concepts in Microbial Pathogenesis	M F	10:00–12:00	N311	Conner	
GS-NE-5100	Seminar Journal Club in Neuroscience	W	12:00-1:00	S740	Medina/Chin	R
GS-NE-5201	Advanced Functional MRI Laboratory	T	9:30-12:00	S104	Robinson	X
GS-NE-6101	Core Concepts in Computational Neuroscience	R	10:00–11:00	S740	Patel	
GS-NE-6204	Neurobiology of Disease	T	3:00–5:00	S740	Noebels	
GS-NE-6302	Neural Systems 2	M W F	10:00–11:00	S740	Sillitoe	
GS-NE-6305	Concepts of Learning & Memory	M W F	9:00–10:00	N317/T728/T734	Costa-Mattioli/ Ji	X
GS-NE-6306	Cellular Neurophysiology	WR	3:30–5:00	S740	Wu	X
GS-NE-6307	Physiology of the Visual System	WR	3:30–5:00	S740	Wu	
GS-PY-466	Seminar in Mol. Physiology & Biophysics	T R	12:00-1:00	409B	Wythe/Karch	R
GS-QC-5100	Student Research Seminar	F	12:00-1:30	N317	Milosavljevic	
GS-QC-5105	Seminar in Quantitative Biosciences	W	12:00-1:00	201A	Lichtarge/Sucgang	
GS-QC-5301	QCB Research Design	T	12:30-3:30	N302	Prasad/Young	
GS-QC-6302	Computer-Aided Discovery Methods	W F	10:00–12:00	N302	Milosavljevic	
GS-TB-466	TBMM Bench to Bedside	F	11:00–1:00	N310	Craigen	
GS-TB-467	Seminar in TBMM	T	4:00–5:00	N315	Thevananther	
GS-TM-5600	Diploma in Tropical Medicine Module 1		Online		Murray/Woc-Colburn	

TERM 5 COURSES

COURSE #	COURSE TITLE	DAY	TIME	RM	INSTRUCTOR	NOTES
GS-CP-6205	Chemical Biology	R	2:00–4:00	N304	Wang	
GS-CP-6206	Drug Discovery: From Bench to Bedside	T	2:00–4:00	N304	Song/Wang	
GS-CT-5100	Seminar in Clinical Sciences	W	4:00-6:00	2002 CNRC	Balasubramanyam	X
GS-CT-6205	CICS 5: Evaluating a Completed Career Development Grant	T R	4:00–5:30	N901	Pereira	R,P
GS-DD-5110	DDMT Journal Club	M	4:00-5:00	N317	Gorelick/Lee	R
GS-DD-6203	Animal Models of Human Disease	M W F	10:00-11:00	N317	Ward	
GS-DD-6402	Advanced Topics in Cardiovascular Disease Pathogenesis	MTWR	9:00-10:00	N304	Wehrens/Lagor	
GS-GG-5105	Genetics & Genomics Journal Club	F	3:45-5:00	N311/N317	Jafar-Nejad/Yamamoto	
GS-IY-6304	Clinical Aspects of Immunology	T R	10:00–11:30	N310	Levitt	

GSBS Course Descriptions

Interpreting Course Numbers: The first digit indicates if the course is counts toward the 30-credit hour requirements for all PhD students. Courses starting with 5 are non-didactic and do not count toward the 30-credit requirement. Courses starting with 6 are didactic and do count toward the 30-credit requirement. The second digit indicates the number of credits in the course. (A zero denotes a course which has a variable number of credits depending on student scheduling needs.) The last two digits are an internal identifier of the course.

Core Service Curriculum (GS-GS)

GS-GS-5010
MSTP Reading MSTP Reading provides MSTP students early in their combined physician-scientist training with in-depth exposure to critical reading of the current biomedical literature in order to improve their ability to identify and design research strategies for solving current biomedical problems.
Credits: 1.5
Term: 1, 2, 3, 4, 5
Director: Dr. Sharon Plon

GS-GS-5101
Responsible Conduct of Research – Year 1 Sessions will involve students in discussion during lectures, as well as in small groups where case studies will be reviewed. Students will be mentored on this scientific process (accessing the scientific literature, thinking with the scientific method). Issues surrounding rigor, reproducibility, research material and its ownership will be presented, as will responsible authorship, plagiarism and copyright. Classes will also be devoted to the practical aspects of being a student scientist such as what to look for in laboratory rotations, selecting mentors, coping with stress and deadlines, what to do when experiments don't work, and how to go about career decision-making as well as professional aspects of being a scientist such as funding and advocacy.
Term: 1
Director: Dr. Carolyn Smith

GS-GS-5102
Responsible Conduct of Research – Year 2 Sessions will involve students in discussion during three lectures, as well as in one small group session where case studies will be reviewed. Students will be mentored on research misconduct, focusing on topics such as falsification, fabrication, and plagiarism. College and federal policies and procedures for handling misconduct allegations will be reviewed. A session with 2nd year students and their mentors will review expectations between mentor and student. Students will receive training on the ethics of biomedical studies with animals, covering topics such as when can animals be used ethically in research, the importance of avoiding unnecessary pain/suffering and euthanasia and animal use approval. The final session, which will be held in a small group discussion format with faculty facilitators, will focus on case studies involving scientific misconduct and experiments with animals.
Term: 2
Director: Dr. Carolyn Smith

GS-GS-5103
Responsible Conduct of Research – Year 3 Sessions will involve students in discussion during four lectures, as well as in one small group session where case studies will be reviewed. Topics covered during this module include authorship and peer review conflicts of interest and their management, and collaboration within academia and with industry. The mentorship lecture will be a meeting with 3rd year students and their mentors. The final large group session will be focused on rigor and reproducibility using interactive case studies, reviewing principles introduced in year 1. Finally, the session conducted in a small group discussion format with faculty facilitator will be utilize case studies to highlight issues relevant to the review of grants and papers, conflicts of interest, and collaboration.
Term: 3
Director: Dr. Carolyn Smith

GS-GS-5104
Responsible Conduct of Research – Year 4 Sessions will involve students in discussion during three lectures, as well as in one small group session where case studies will be reviewed. Topics covered during the lecture on research with human subjects will include defining what constitutes research with human subjects versus experiments with human material, confidentiality of medical data, and informed consent. The mentorship session on will be a meeting with 4th year students and their mentors. The lecture on the scientist as a responsible member of society will address contemporary ethical issues in biomedical research and the environmental and societal impacts of scientific research. Finally, the session conducted in a small group discussion format with faculty facilitator will utilize case studies to highlight issues relevant to research with human subjects and societal impact of research, focused on genetics/genomics, stem cells and neuroethics.
Term: 3
Director: Dr. Carolyn Smith

GS-GS-5105
Scientific Writing This course will increase student knowledge and skills in effective scientific writing. Students will learn basic principles of scientific writing that they can put into practice immediately such as selecting high impact words, building effective sentences and paragraphs, and structuring individual sections of a scientific manuscript. The course, which centers on the concept of writing with clarity and brevity, includes exercises to build skills.
Term: 3
Director: Dr. Susan Marriott

GS-GS-5106
Intellectual Property So you now have a great discovery or idea, how can you protect and market it? In this course we will learn about intellectual property law and technology transfer. We will cover different types of intellectual property, such as patents, trademarks, copyrights, etc., with an emphasis on genetic and biotechnology patents, both in the USA and internationally. We will also discuss copyrights: their nature, acquisition, and how to avoid infringing them, with an emphasis in instructional activity and educational settings.
Term: 4
Director: Dr. Patrick Turley

GS-GS-5107
Leadership Skills The objective of the course is to provide students with knowledge regarding the importance of leadership skills in their training and future career development. While leadership skills are essential components in career development, it is appreciated that leadership skills can't be taught and imparted upon students in a short didactic lecture-based setting. Therefore, the objective of this course is to introduce students to the basic concepts of leadership skills.
Term: 3
Director: Dr. Suzanne Fuqua

GS-GS-5108
Pharmacoepidemiology & Pharmacogenetics The purpose of this course is to outline strategies to avoid serious systemic toxicities from chemotherapy and radiotherapy. This course will review the principles of pharmacogenetics and phamacogenomics, pharmacodynamics and pharmacokinetics, and will outline the impact of genetic polymorphisms in drug metabolism and other pathways on the toxicity of anticancer agents and other therapies. The emphasis is on research concepts and applications and the interdisciplinary nature of the field.
Term: 3 (even year course)
Director: Dr. Michael Scheurer and Dr. Melanie Bernhardt

GS-GS-5111
Strategies for Success in Graduate School This course will prepare incoming students to become scientific and professional leaders by developing skills for a successful gradate career early in their training. The objectives are to understand the expectations of a professional lab environment; take ownership over your training and graduate career, identify your scientific and personal working style and motivations, discuss how to evaluate potential mentors and thesis labs, learn how to successfully

manage the mentor-mentee relationship, discuss scientific and personal support services at BCM, and develop networking skills.
Term: 1
Director: Dr. Melanie Samuel and Dr. Roy Sillitoe

GS-GS-5112
Powerful Presentations The goal of this course is to develop and scientific communication skills to effectively convey your ideas to both experts and nonexperts. Effective presentation is the basis for career advancement at all levels in science. In this class, you will hone these skills through understanding how to develop and deliver longer format talks. Topics we will cover include the fundamentals of effective talk design, how to construct potent slides, how deliver information effectively, and in class presentations. For feedback and presentations, each student will be matched with a faculty mentor in groups of eight to ten students.
Term: 2
Director: Dr. Melanie Samuel

GS-GS-5113
Effective Project Design & Management
The goal of this course is to develop skills in designing and executing your thesis research. The course will discuss the scope of a thesis and what it means to make an original scientific contribution. Students will also be exposed to and practice using effective tools and approaches for managing and developing their thesis projects. Topics covered will include: how to design your own project, the challenges and opportunities of hypothesis driven and hypothesis independent research, and how to turn projects into papers through project management and time management.
Term: 4
Director: Dr. Buck Samuel and Dr. Swathi Arur

GS-GS-6101
Neuroscience This is an introductory course covering fundamental aspects of modern neuroscience. The lecture series begins with a discussion of neural development, evolution and the resulting organization of the mammalian nervous system, then progresses into the molecular and structural specializations that allow neurons to process and transmit information via electrical current. The course next explores how neurons contribute to autonomic functions that keep us alive and higher brain functions such as learning and memory. The course will close on an examination of how neural dysfunction leads to common neurological disorders such as developmental pathophysiologies, autism, and Alzheimer's disease.
Term: 3
Director: Dr. Russell Ray

GS-GS-6102
Principles of Immunology In the field of biology, the immune system is unique in that it crosses all organ boundaries and affects a vast number of processes critical for organismal function and survival. This short course introduces the basic cellular and molecular mechanisms of immunity. These include: the innate immune system (molecular "danger" patterns); the acquired immune system (B and T cell receptor gene rearrangement and their effector functions); the cross-talk between innate and acquired immunity; an overview of the principles of immune tolerance exemplified by mechanisms of transplant rejection and cancer immunity; and a discussion of autoimmune diseases & immunotherapies.
Term: 4
Director: Dr. Jonathan Levitt

GS-GS-6201
Cell Division & Cancer This course examines the fundamental concepts in cell cycle regulation, DNA, telomeres and chromatin duplication, chromosome segregation as well as cytokinesis. The course presents principals of cellular response to DNA damage, telomere dysfunction, perturbation in DNA replication and chromosome segregation. The molecular mechanisms of various DNA repair pathways including recombination and their regulation in cell cycle is discussed. The relevance of cell cycle in growth regulation, development and cancer is presented.
Term: 3
Director: Dr. Grzegorz Ira and Dr. Eric Chang

GS-GS-6202
Gene Regulation This course covers the mechanisms of regulated gene expression with a focus on eukaryotes beginning at the gene and chromatin, processing of pre-RNA and mRNA through protein turnover.
Term: 3
Director: Dr. Thomas Cooper

GS-GS-6203
Data Mining Data mining provides practical approaches and tools that allow biomedical researchers to analyze and understand their data and to craft new hypotheses. The course focuses on data mining essentials and will cover standard approaches to clustering, classification, regression and model selection, along with several domain-oriented techniques such as gene enrichment analysis. We focus on applications of these methods through a visual programming platform that requires no training in programming. We provide a basic introduction to the inner workings and mathematics, helping students to intuitively understand the data analysis algorithms without having to understand deep mathematical concepts.
Term: 1
Director: Dr. Gad Shaulsky

GS-GS-6204
Ethics, Conduct, & Practical Aspects of Clinical Research This course is designed to provide students practical insight into the bioethical conduct, practical aspects, including types and categories of clinical trials and the different phases of translational research, as well as regulatory considerations of clinical and translational research. The course encompasses a series of interactive didactic lectures, homework assignments, and observation of an IRB meeting. The purpose of the course is to provide a broad understanding of bioethical issues within the context of clinical research, as well as an understanding of the complex relationship between investigators, their designees, and research subjects.
Term: 5
Director: Dr. Melissa Suter

GS-GS-6205
Fundamentals of Epidemiology This course introduces the basic principles and methods of epidemiology, with an emphasis on critical thinking, analytic skills, and application to clinical practice and research. Topics include outcome measures, methods of adjustment, surveillance, quantitative study designs, and sources of data. The course is designed for professionals intending to engage in, collaborate in, or interpret the results of epidemiological research as a substantial component of their career.
Term: 3
Director: Dr. Michael Scheurer

GS-GS-6400
Foundations B: Biostatistics This course will introduce biostatistical principles and technology most likely to be useful to laboratory scientists interested in basic and translational research. Topics include ANOVA, linear regression, contingency table analysis, logistic regression, survival analysis, and nonparametric statistics. The course also introduces basic experimental design principles and designs for clinical trials. The R software environment will be introduced and used for statistical analysis of real-life problem sets.
Terms: 1+2
Director: Dr. Susan Hilsenbeck& Dr. Charles Minard

GS-GS-6600
Foundations A: Molecules to Systems
This course provides students with foundational and comprehensive knowledge in several critical areas of biology. Lectures are divided into nine modules that cover essential aspects of biology. Lectures will begin with a description of macromolecules, and then incrementally expand into more complex mechanisms, and finally into the presentation of systems. The diversified format includes a series of lectures, discussion sessions, and TA sessions in which "active learning" techniques and "backwards design" are implemented to promote both knowledge and skill development for learners.
Terms: 1+2
Director: Dr. Richard Sifers

Cancer & Cell Biology (GS-CC)

GS-CC-5000
Special Topics Scholarly study directed by a faculty member. Special topics allows a faculty member to develop individualized courses for students. Special topics cannot be used to satisfy the 30 hr. course requirement.
Credits: Variable
Term: 1, 2, 3, 4, 5

GS-CC-5010
Readings Faculty directed literature projects that survey a specialized topic of interest.
Credits: Variable
Term: 1, 2, 3, 4, 5

GS-CC-5030
Research Rotation Faculty mentored research for students who have not yet selected a faculty advisor.
Credits: Variable
Term: 1, 2, 3, 4, 5

GS-CC-5040
Special Projects Faculty mentored research for students that have selected their thesis advisor but not been admitted to candidacy.
Credits: Variable
Term: 1, 2, 3, 4, 5

GS-CC-5050
Dissertation Thesis research directed by a faculty mentor and advisory committee. Open only to candidates for the Ph.D. or M.S. degree.
Credits: Variable
Term: 1, 2, 3, 4, 5

GS-CC-5100
Student Research Seminar The objective of the course is for students within the Graduate Program to have an opportunity to present their ongoing research to a diverse group of colleagues, and to receive feedback from these colleagues on the quality of their presentation and research.
Term: 1, 2, 3, 4
Director: Dr. Joel Neilson

GS-CC-5201
NRSA Grand Writing & Project Development 1
Term: 1
Director: Dr. Frederick Pereira and Dr. Stephanie Pangas

GS-CC-5202
NRSA Grant Writing & Development 2
Term: 2
Director: Dr. Frederick Pereira & Dr. Stephanie Pangas

GS-CC-6101
Cancer This is a short course on the biology of cancer. The course objective is to introduce students to basic mechanisms that lead to tumor initiation, progression, and metastasis. A history of oncogenes and tumor suppressor genes and their modern definitions are presented. Current concepts of cancer stem cells, tumor microenvironment, mouse models, and cancer therapeutics are discussed. Class includes lecture and group discussion of key recent papers in which students are expected to participate.
Term: 3
Director: Dr. Stephanie Pangas

GS-CC-6102
Biology of Aging 1 This course will familiarize students with the biology of aging, including mechanisms, models, clinical aspects, and the development of novel treatments, and the concepts of gerontobiology and geroscience
Term: 2
Director: Dr. Andre Catic and Dr. Weiwei Dang

GS-CC-6201
Translational Cancer Biology This course integrates the basic science and translational aspects of research with clinical applications, thus enhancing student understanding of current research and clinical correlations in particular cancers. Each week will have a particular cancer focus and the meeting time will include a clinically focused lecture, a basic science focused lecture, and a journal club article presented by students. Students will attend a minimum of two tumor board sessions during the term, which include a patient case presentation followed by discussion detailing the background, treatment, outcomes, and research avenues of the patient's malignancy. These tumor boards can be attended at any time during the course.
Term: 2
Director: Dr. Jason Yustein

GS-CC-6202
Explorative Data Analysis Explorative Data Analysis will teach concepts of statistical learning and of data integration in database systems that together will enable students to explore and learn from large and complex datasets to generate new and unique biological insights. The approach to teaching will emphasize methods of statistical learning and their conceptual underpinnings rather than their mathematical properties, and will use a hands-on approach to progressive 'omics'-data integration and mining by using community-based resources for data analysis rather than on writing codes
Term: 3
Director: Dr. Rainer Lanz

GS-CC-6203
Integrated Microscopy The course is composed of a set of lectures that cover basic and advanced forms of light and electron microscopy, and an accompanying set of practical labs where students receive hands-on training on all the available instruments. The main topics addressed in the class are: basic optics, light- and fluorescence-based microscopy (i.e., brightfield, DIC, phase contrast, deconvolution, confocal, live cell imaging), fluorescence-based molecular tools (i.e., FRET, FRAP, fluorescent proteins), transmission electron microscopy, super-resolution microscopy (i.e., SIM, STORM), and specialized automated high throughput microscopy and image analysis.
Term: 3
Director: Dr. Michael Mancini and Dr. Fabio Stossi

GS-CC-6204
Regulation of Energy Homeostasis
Regulation of Energy Homeostasis addresses the control of metabolism in health and disease, and how energy balance is signaled among organs. Emphasis will be placed on defining regulatory mechanisms and pathways, with particular attention to abnormalities occurring with disease. The approach will be inter-disciplinary, including metabolic, biochemical, genetic and cellular aspects.
Term: 4
Director: Dr. Robb Moses and Dr. David Moore

GS-CC-6205
Translational Breast Cancer Research
This course provides an introduction into current issues in translational breast cancer research. The course encompasses a series of lectures on problems in clinical breast cancer diagnosis and treatment, breast development, and evolution of breast cancer, and approaches to translational breast cancer research. The purpose of the course is to provide a broad understanding of clinical issues and problems in breast cancer, familiarize students with breast cancer from the clinician's standpoint, and with research areas of active development in the field.
Term: 2
Director: Dr. Suzanne A. W. Fuqua

GS-CC-6206
Cell Death in Development & Disease
This course will discuss the most updated molecular mechanisms of different forms of cell deaths (apoptosis, necrosis, and autophagy) identified in invertebrate model organisms and in mammals, and the functions and regulation of cell death in human diseases. It will also cover the history, methods, and logic of cell death studies in model organisms.
Term: 3
Directors: Dr. Zheng Zhou, Dr. Lisa Bouchier-Hayes

GS-CC-6207
Ethics & Regulatory Preparation for Research with Animal Models This course will use lecture-discussion format as well as providing several hands-on sessions to instruct trainees on the regulatory and oversight requirements, guidelines for developing and reporting results, and several sampling and delivery procedures when performing research involving animal models.
Term: 2
Director: Dr. Frederick Pereira

GS-CC-6208
Cellular Signaling Cellular signaling covers major cellular signaling pathways, actions of intracellular kinases and nuclear receptors, and

strategies for regulating cell signaling. The pathways covered include those regulated by GPCR, receptor tyrosine kinases, TGFβ, Notch, Hedgehog, WNT, Hippo and nuclear receptors. In addition, signaling pathways regulated by small molecules including calcium, phospholipids, cAMP, cGMP, and AMP are discussed.
Term: 3
Director: Dr. Brian York and Dr. Nancy Weigel

GS-CC-6209
The Clock-Cancer Connection This course will cover the fundamental principles of the mammalian circadian clock, the mechanism driving chronic circadian disruption, and the role of circadian homeostasis in cancer prevention and treatment. Lecture topics will cover the historical background of the connections between circadian disruption and cancer, the importance of this topic, recent progress and unsolved problems, and the future promise in prevention and treatment.
Term 4
Director: Dr. Loning Fu and Dr. Zhang Sun

GS-CC-6301
Biology of Aging 2 This course provides students and post-docs with the up-to-date information and current understanding of the aging process and age-related human disorders. The course covers molecular aspects of aging research, models and theories of aging, and clinical perspectives of aging processes. This advanced graduate elective course is offered for trainees who will specialize in or have a strong background in the interrelated areas of development, aging and age-related diseases. Students comment that participation in discussions of each topic is a highlight of the course.
Term: 4
Director: Dr. Frederick Pereira

GS-CC-6302
Molecular Carcinogenesis The course explores the fundamental concepts and experiments in tumor biology, cancer virology and oncogenes and growth control. This course provides a broad based introduction to students who have an interest in modern cancer research. Faculty from four departments (Cell Biology, Molecular Virology, Pharmacology and Biochemistry) serve as instructors.
Term: 4
Director: Dr. Yi Li

GS-CC-6303
Reproductive Biology Reproductive Biology covers mammalian reproductive processes at all levels of biological organization (anatomical, physiological, cellular, biochemical and molecular). The course is taught with a comparative approach analyzing findings in different animal model systems and clinical studies to ensure that clinical issues affecting reproductive success are presented, and to also demonstrate how basic science is moving toward understanding the causes and treating reproductive failure and diseases.
Term: 4
Director: Dr. Stephanie Pangas & Dr. JoAnne Richards

Chemical, Physical, & Structural Biology (GS-CP)

GS-CP-5000
Special Topics Scholarly study directed by a faculty member. Special topics allows a faculty member to develop individualized courses for students. Special topics cannot be used to satisfy the 30 hr. course requirement.
Credits: Variable
Term: 1, 2, 3, 4, 5

GS-CP-5010
Readings Faculty directed literature projects that survey a specialized topic of interest.
Credits: Variable
Term: 1, 2, 3, 4, 5

GS-CP-5030
Research Rotation Faculty mentored research for students who have not yet selected a faculty advisor.
Credits: Variable
Term: 1, 2, 3, 4, 5

GS-CP-5040
Special Projects Faculty mentored research for students that have selected their thesis advisor but not been admitted to candidacy.
Credits: Variable
Term: 1, 2, 3, 4, 5

GS-CP-5050
Dissertation Thesis research directed by a faculty mentor and advisory committee. Open only to candidates for the Ph.D. or M.S. degree.
Credits: Variable
Term: 1, 2, 3, 4, 5

GS-CP-5100
Student Research Seminar The Graduate Student Seminar Series gives students the opportunity to present their research formally to an audience of their peers. Students in years 2 through 5 will give different presentations designed to prepare them for different kinds of scientific speaking.
Term: 1, 2, 3, 4
Director: Dr. B.V. Venkatar Prasad

GS-CP-5101
Thinking Like A Scientist 1 This is the first in a series of 4 courses that aim to help first year graduate students develop the critical thinking, speaking and writing skills that are necessary for their professional success in graduate school and beyond. In this term, students set short-term professional goals around courses and laboratory rotations and gain strategies to improve their skills in technical writing and critical evaluation of the literature. Learning is achieved through group-based problem solving.
Term: 1
Director: Dr. Nicolas Young

GS-CP-6202
Thinking Like a Scientist 2 The goal of this term is to develop critical reading skills for evaluating the scientific literature. For a set of assigned papers, student will learn to identify the gap in knowledge and the hypothesis that was tested, and analyze the experimental outcomes in relation to the hypothesis. Students will also develop reasonable future directions in the form of a new set of hypotheses that follow from the results of each paper. Each week one student will present an assigned paper in the style of a journal-club. The other students will write a summary of the same paper, highlighting the logical flow of the paper.
Term: 2
Director: Dr. Timothy Palzkill

GS-CP-6203
Thinking Like a Scientist 3 The goal of this term is to build up on the analytical and presentation skills students develop through critical reading of the literature in Term 2. Students will continue to use the concept of the framing funnel to identify an existing gap in knowledge, and formulate a hypothesis/model that makes specific predictions that can be critically tested experimentally. Each student will write an abstract of a research proposal that will be discussed and revised in response from feedback from students and faculty.
Term: 3
Director: Dr. Ming Zhou

GS-CP-6204
Thinking Like a Scientist 4 The goal of this term is to build upon the activities of Term 3 that culminated in writing a proposal abstract based on a published paper. Students will do additional literature-based research to add both depth and breadth to each component of the abstract using the concept of the framing funnel, and develop one new specific aim building off of published results. By the end of the course, each student will have written a full research proposal, whose specific aims, outline and early drafts will be presented to the class in written and oral form. They will receive feedback from students and faculty in the process of finalizing the proposal. Each student will also present a final presentation on the full proposal in a format similar to that of the qualifying examination.
Term: 4
Director: Dr. Zheng Zhou

GS-CP-6205
Chemical Biology Chemical Biology is a scientific discipline spanning the fields of chemistry, biology, and physics. It involves the application of chemical techniques, tools, and analyses, and often

compounds produced through synthetic chemistry, to the study and manipulation of biological systems. The course teaches topics including an introduction to chemical biology, bio-orthogonal ligand reactions, small molecule inhibitors for protein-protein interactions and epigenetics, chemoproteomics, sensors for living cells, and state-of-the-art imaging techniques. The course content emphasizes applications of chemical tools in solving biological and biomedical problems.
Term: 5
Director: Dr. Jin Wang

GS-CP-6206
Drug Discovery: From Bench to Bedside
The objective of this course is to provide an overview of the making of a small-molecule drug. The topics include the identification of a drug target, bioassay development, structural biology, rational drug design and development, intellectual property protection as well as FDA regulations on new drug clinical trials.
Term: 5
Director: Dr. Yongcheng Song

GS-CP-6207
Electron Cryomicroscopy This course discusses in-depth theoretical and practical techniques in structural biophysics with a particular emphasis on electron imaging and crystallography. The topics include cryo-specimen preparative techniques, electron microscope optics, image contrast theory, specimen radiation damage, single particle image reconstruction, tomographic reconstruction, density based modeling, 3-D visualization, biological knowledge discovery from cryo-electron imaging.
Term: 4
Director: Dr. Zhao Wang

GS-CP-6301
Advanced X-ray Crystallography X-ray crystallography is a powerful technique to determine atomic resolution structures from small, inorganic molecules to large, multi-subunit macromolecular assemblies. This course covers both theory and practical applications starting with crystallization, crystal systems, and data processing to finding a structure solution, model building, and structure refinement/validation. The course will prepare students with diverse scientific backgrounds to expand their research to protein crystallography as an analytical tool to probe the structure-function relationship of proteins and enzymes at the atomic level.
Term: 4 (even year course)
Director: Dr. Francis T.F. Tsai

GS-CP-6302
Chemical Concepts in Chemical Biology
Chemical biology is a relatively modern and highly interdisciplinary paradigm that centers on using small molecules to probe fundamental and disease-associated biological processes. This course will provide students with a firm foundation in synthetic, medicinal, biological, physical and analytical chemistry concepts for conducting chemical biology research. Upon successful completion of CCCB, the student will have an advanced knowledge of the chemical underpinnings of chemical biology research.
Term: 3
Director: Dr. Damian Young

GS-CP-6303
Macromolecules: Structure & Interactions This course will provide fundamental information on macromolecular structures, techniques used in structure determination, principles of thermodynamics and kinetics, and how this information can be leveraged to design/develop lead compounds to modulate disease targets for clinical relevance with the help of novel cell-based screening techniques.
Term: 3
Director: Dr. B.V. Venkatar Prasad and Dr. Ming Zhou

GS-CP-6401
General Pharmacology Basic pharmacological principles as they apply to basic research and to everyday life. The objectives of this course are to present the basic principles of pharmacology. Principles of pharmacodynamics, pharmacokinetics and major classes of therapeutic agents will be discussed.
Term: 4
Director: Dr. Pui-Kwong Chan & Dr. Timothy Palzkill

GS-CP-6601
Molecular Biophysics: Methods & Principles This course presents in lecture format a survey of the major techniques of molecular biophysics, and the underlying physical principles and mathematics on which they are based.
Terms: 1+2
Director: Dr. Theodore Wensel

GS-CP-6602
Computational Molecular Biophysics & Structural Biology This course is designed for students in computationally-oriented theoretical, biophysical, biomedical and bioengineering majors to introduce the principles and methods used for computer simulations and modeling of macromolecules of biological interest. Particular emphasis is also given to the applications of molecular graphics. During the final reading period, each student carries out an original research project that makes use of the techniques and grading is based on the written and oral presentations of the results from the final projects.
Term: 1
Director: Dr. Jianpeng Ma

Clinical Scientist Training Program (GS-CT)

GS-CT-5010
Readings Faculty directed literature projects that survey a specialized topic of interest.
Credits: Variable
Term: 1, 2, 3, 4, 5

GS-CT-5030
Research Rotation Faculty mentored research for students who have not yet selected a faculty advisor.
Credits: Variable
Term: 1, 2, 3, 4, 5

GS-CT-5040
Special Projects Faculty mentored research for students that have selected their thesis advisor but not been admitted to candidacy.
Credits: Variable
Term: 1, 2, 3, 4, 5

GS-CT-5050
Dissertation Thesis research directed by a faculty mentor and advisory committee. Open only to candidates for the Ph.D. or M.S. degree.
Credits: Variable
Term: 1, 2, 3, 4, 5

GS-CT-5100
Seminar in Clinical Sciences The purpose of this course is to provide a forum for students to improve their knowledge and skills in planning, preparing and effectively presenting their research to an inter-disciplinary audience.
Term: 1, 2, 3, 4, 5
Director: Dr. Ashok Balasubramanyam

GS-CT-5101
Responsible Conduct of Research for Clinical Investigators The RCRCI course is designed for the early career scientist/clinical or translational investigator, and will provide students with a fundamental competency and appreciation for the core topics within the ethical dimensions of biomedical research. During this one-week course, students will receive lectures from faculty with expertise in each of these core topics, to be followed by small group case study discussions illustrating ethics topics from the preceding lecture.
Term: 1
Director: Dr. Maria Gramatges

GS-CT-6101
Development and Commercialization of Biomedical Innovations This course provides a general overview of the steps required to move a biomedical innovation into the marketplace. The course begins with an overview of the ecosystem and a framework to assess opportunities for product development and commercialization. Other lectures take the students through the product development process, and provide insights into strategies for funding translational research projects through the "valley of death" gap that exists between basic research funding and commercial funding. Other topics include an introduction to intellectual property basics, and options for commercialization of biomedical assets, licensing and new ventures.
Term: 4
Director: Dr. Ashok Balasubramanyam

GS-CT-6201
CICS 1: Grant Development for Clinical Investigators This course provides students with the skills to develop an important research question, formulate strong hypotheses and specific aims, and begin to draft the components of a career development grant proposal.
Terms: 1
Director: Dr. Ashok Balasubramanyam

GS-CT-6205
CICS 5: Evaluating a Completed Career Development Grant This course provides students with an appreciation of the NIH study section review process and a completed career development award.
Terms: 5
Director: Dr. Frederick Pereira
Prerequisites: GS-CT-6201 and GS-CT-6304

GS-CT-6300
Fundamentals of Clinical Investigation
The objective of this course is to train students to interpret the results of other clinical investigators and to use the knowledge for providing state-of-the-art care for their patients. The course includes three modules reflecting specific areas relevant to a clinical researcher. These modules are: principles of clinical research; statistical methods in clinical research; special topics.
Term: 1
Director: Dr. Farrah Kheradmand

GS-CT-6302
CICS 2: Clinical Trials for Clinical Investigators This course provides students with an understanding of the theory and practice of conducting scientifically rigorous clinical trials. Building on the work of the previous CICS I course and from knowledge gained from the Fundamentals in Clinical Investigation course, students will fully develop the hypothesis, specific aims, and experimental design of their projects.
Terms: 2
Director: Dr. Farrah Kheradmand
Prerequisites: GS-CT-6201 and GS-CT-6300

GS-CT-6303
CICS 3: Translational Research for Clinical Investigators This course provides students with an understanding of the theory and practice of conducting bench-to-bedside translational research. Building on the work of the previous term, students will continue the development of a K-type grant proposal, focusing on the career development plan and mentor's letters.
Terms: 3
Director: Dr. Jesus Vallejo
Prerequisites: GS-CT-6201 and GS-CT-6302

GS-CT-6304
CICS 4: Health Services Research for Clinical Investigators This course provides students with an understanding of the theory and practice of health services research. Building on the work of the previous term, students will continue the development of a K-type grant proposal.
Terms: 4
Director: Dr. Frederick Pereira
Prerequisites: GS-CT-6201 and GS-CT-6303

Development, Disease Models, & Therapeutics (GS-DD)

GS-DD-5000
Special Topics Scholarly study directed by a faculty member. Special topics allows a faculty member to develop individualized courses for students. Special topics cannot be used to satisfy the 30 hr. course requirement.
Credits: Variable
Term: 1, 2, 3, 4, 5

GS-DD-5010
Readings Faculty directed literature projects that survey a specialized topic of interest.
Credits: Variable
Term: 1, 2, 3, 4, 5

GS-DD-5030
Research Rotation Faculty mentored research for students who have not yet selected a faculty advisor.
Credits: Variable
Term: 1, 2, 3, 4, 5

GS-DD-5040
Special Projects Faculty mentored research for students that have selected their thesis advisor but not been admitted to candidacy.
Credits: Variable
Term: 1, 2, 3, 4, 5

GS-DD-5050
Dissertation Thesis research directed by a faculty mentor and advisory committee. Open only to candidates for the Ph.D. or M.S. degree.
Credits: Variable
Term: 1, 2, 3, 4, 5

GS-DD-5101
Effectively Writing & Reviewing Proposals This course will explain the requirements and expectations of the qualifying exam. The course is geared specially towards second year students who have successfully completed their first year coursework and several months' work in their chosen thesis lab. The course will cover the format of the written and oral exams, tips for structuring the aims and scope of the written proposal, and provide students with opportunity to develop and deliver their oral presentation for feedback from the group. The goal of the course is to help students begin thinking about their work independently and to present their research problem and experimental goals clearly. Ultimately, this course is intended to encourage independent NRSA or other fellowship applications from those students who qualify.
Term: 2
Directors: Dr. Melanie Samuel, Dr. Benjamin Arenkiel

GS-DD-5110
DDMT Journal Club This course is required of all first and second year students enrolled in the Development, Disease Models & Therapeutics Graduate Program. The course is conducted as a journal club to study current literature, to practice critical analysis of the literature and to refine presentation techniques. First year students present papers from the current literature, all students join in discussion of the paper presented.
Terms: 3,4,5
Director: Dr. Daniel Gorelick and Dr. Hyun-Kyuong Lee

GS-DD-6201
Development The Development of a mature organism from a single cell is one of the most fascinating problems in biology. Understanding development can shed light on fundamental processes such as gene regulation and control of the cell cycle, and on translational problems such as the origins and progression of cancer and the possibility of tissue engineering and regeneration to treat human disease. This course is designed as an introduction to some of the concepts of modern developmental biology.
Term: 2
Director: Dr. Andrew Groves

GS-DD-6202
Classical Developmental Biology This course provides introductory information related to major questions in developmental biology. It also provides an introduction to classical experimental methods and examples are provided which highlight how developmental principles have been tested. These examples will allow the students to grasp how earlier investigations presaged present areas of inquiry for each organism. The course introduces the anatomy and histology of most organs and cells during development with a particular emphasis on C. elegans, Drosophila, mouse, chick, zebrafish, and Xenopus. The development of each organism is described in lectures and observed by the students in lab settings so that students can readily grasp the complex issues of modern developmental biology and begin to see how questions might be approached.
Term: 1
Directors: Dr. Ross Poché and Dr. Michael Lewis

GS-DD-6203
Animal Models of Human Disease This course is designed to expose students to methodologies employed in generating animal models for human diseases and in analyzing these models. The major emphasis is on mouse models, but other model organisms will be discussed as well.
Term: 5
Director: Dr. Cindy Buckmaster

GS-DD-6204
Cell Physiology This course will introduce students to a variety of topics related to cellular physiology while also providing instruction as to how one critically evaluates primary research literature. The topics covered will include Neurophysiology, Metabolism and Physiology, Cancer Physiology, Cardiovascular Physiology, Muscle Physiology and Biophysics/Bioengineering. The lectures will be general overviews of the stated topics so that students of varying academic backgrounds may become familiar with systems they will encounter in subsequent physiology courses. The course will consist of a 1-hour class that meets twice weekly. The first class will consist of a faculty lecture from an expert in each respective field. The second class will be in the format of a journal club Powerpoint presentation and include an open discussion and critical evaluation of literature pertaining to the previous faculty lecture. The presenting faculty member will choose a single paper to accompany their lecture.
Term: 1
Director: Dr. Ross Poché

GS-DD-6205
Transmembrane Signaling This highly interactive upper level course is designed for students interested in understanding in-depth the important principles of trans-membrane signaling. In addition to introducing the roles of lipids, ion channels, kinases, and second messengers, selected examples of signal transduction pathways underlying muscle physiology and cell survival will be discussed in detail. One half of the course will be lectured by experts from related fields. Each lecture is paired with a group discussion of a relevant article.
Term: 4
Director: Dr. Christine Beeton

GS-DD-6206
Pathophysiology and Mechanisms of Human Disease This course will provide students with an understanding of the basic mechanisms of human disease with a systems biology perspective. Molecular defects at different levels including the gene, RNA, protein, cell, tissue, and organ will be covered. The focus is on helping students develop critical thinking skills that will help them approach complex scientific problems.
Term: 4
Director: Dr. Daniel Lacorazza

GS-DD-6207
Advanced Topics in Muscle Physiology
This course will focus on skeletal muscle and integrate current information on molecular structure of muscle, its function, signaling pathways controlling its development, growth and response to disease. The course consists of lectures by faculty, presentations by students of assigned papers with student participating and a final exam.
Term: 3
Director: Dr. George Rodney

GS-DD-6208
Evolutionary Conservation of Developmental Mechanisms This course focuses on the similarities and differences of developmental mechanisms between vertebrates and invertebrates. Invertebrates, such as Drosophila and C. elegans, have allowed scientists to isolate many genes that are required for proper development through genetic screens. Vertebrate homologs of many of these genes have been identified, and their role is being studied through a variety of approaches, including manipulations in chick and zebrafish as well as through mouse knockouts. The view of vertebrate and invertebrate developmental biologists on a series of topics like segmentation, Hox and Polycomb-group genes, limb development, and cell death is presented in this course. In addition, the lecturers discuss and compare the function of proteins required for specific developmental pathways in invertebrates whose homologs are involved in tumorigenesis in vertebrates. Additional topics include: evolution, evolutionary trees, and the evolution of developmental pathways, as well as how during evolution numerous molecular players are conserved and how they are deployed in various developmental processes in diverse organisms.
Term: 3
Director: Dr. Andrew Groves

GS-DD-6209
Animal MRI This course provides an introduction to the theory and application of small animal MRI which is currently not readily available through other courses.
Term: 3
Director: Dr. Robia Pautler

GS-DD-6210
Cardiovascular Diseases This course provides a general overview of the main common cardiovascular diseases and their causes. Topics covered include atherosclerosis, hypertension, congenital heart disease, ischemic heart disease, cerebral stroke, cardiac arrhythmias, and the effects of aging on the cardiovascular system. The course will be taught by a combination of clinicians, basic scientists, and physician scientists throughout the Texas Medical Center.
Term: 3
Director: Dr. Xander Wehrens

GS-DD-6301
Human Physiology 1 This course will provide students with the basic knowledge of organ systems and integrative physiology in humans upon which the pathophysiology of human diseases can later be expanded. Lectures are intended to educate students about the current research being performed in each field and to elicit ideas about future research and human applications. Topics covered in this course, which is the first of two Human Physiology courses, include: cellular physiology, the nervous system, skeletal muscle, the cardiovascular system, and the respiratory system.
Term: 2
Director: Dr. Frank T. Horrigan and Dr. Ross Poché

GS-DD-6302
Human Physiology 2 This course will provide students with the basic knowledge of organ systems and integrative physiology in humans upon which the pathophysiology of human diseases can later be expanded. Lectures are intended to educate students about the current research being performed in each field and to elicit ideas about future research and human applications. Topics covered in this course, which is the second of two Human Physiology courses include: the immune system, renal physiology, bone, the endocrine system, the reproductive system, the gastrointestinal system and liver.
Term: 3
Director: Dr. Frank T. Horrigan and Dr. Ross Poché

GS-DD-6303
Neural Development This advanced graduate course in developmental neurobiology provides students with a more detailed background of neural development that will serve as conceptual framework for future studies. It particularly focuses on molecular genetic studies that have helped us elucidate the mechanisms underlying the development of the nervous system. This course integrates knowledge about molecular patterning of the nervous system using a cross-species approach that also emphasizes evolutionary relationships. The role of genes and mechanisms that play a role in the selection of neuroblasts and neuronal differentiation, in the specification and function of glial cells, in growth cone guidance and synapse formation are covered in detail.
Term: 4
Directors: Dr. Benjamin Arenkiel and Dr. Roy Sillitoe

GS-DD-6304
Topics in Development The purpose of this course is to introduce the students to some current topics in developmental biology, to improve the students' ability to read and interpret primary literature, and to improve the students' skills in presenting scientific data. A lecturer introduces a topic and then assigns two papers to two students to present in the next lecture. All students are expected to critically evaluate and interpret the assigned papers prior to attending class, and the selected students prepare a 45 min lecture on the assigned topic. Each student presents twice. Topics discussed include sex determination, epithelial morphogenesis and cancer, hematopoietic and cardiac development, stem cell therapy, skin cancer, nuclear hormone receptors, cell motility and invasive behavior (metastasis), and ectoderm-mesoderm interactions.
Term: 4
Director: Dr. Daisuke Nakada and Dr. Joshua Wythe

GS-DD-6401
Advanced Topics in Cardiovascular Physiology Topics covered include cardiac cycle, cardiac contractility, neural, and nonneural control of the circulation, biomedical instrumentation, and physical analytical methods. The various components of the cardiovascular system is integrated to define its basic control functions.
Term: 4
Director: Dr. Xander Wehrens and Dr. Na Li

GS-DD-6402
Advanced Topics in Cardiovascular Disease Pathogenesis This course explores cause and mechanism of cardiovascular disease. Specific topics include mechanistic discussion of atherosclerosis (lipids and lipoproteins, inflammation, oxidatively modified LDL), hypertension (epidemiology, mechanisms, and consequences), hemostasis (thrombosis and bleeding disorders), cerebral stroke, heart failure (systolic and diastolic dysfunction), cardiac arrhythmias, myocardial ischemia (healing and remodeling, cardia fibrosis, myocarditis), laterality in heart disease and aging in the cardiovascular system. This course is taught by a combination of clinicians, basic scientists, and clinician scientists from throughout the Texas Medical Center.
Term: 5
Director: Dr. Xander Wehrens and Dr. William Lagor

Genetics & Genomics (GS-GG)

GS-GG-5000
Special Topics Scholarly study directed by a faculty member. Special topics allows a faculty member to develop individualized courses for students. Special topics cannot be used to satisfy the 30 hr. course requirement.
Credits: Variable
Term: 1, 2, 3, 4, 5

GS-GG-5010
Readings Faculty directed literature projects that survey a specialized topic of interest.
Credits: Variable
Term: 1, 2, 3, 4, 5

GS-GG-5030
Research Rotation Faculty mentored research for students who have not yet selected a faculty advisor.
Credits: Variable
Term: 1, 2, 3, 4, 5

GS-GG-5040
Special Projects Faculty mentored research for students that have selected their thesis advisor but not been admitted to candidacy.
Credits: Variable
Term: 1, 2, 3, 4, 5

GS-GG-5050
Dissertation Thesis research directed by a faculty mentor and advisory committee. Open only to candidates for the Ph.D. or M.S. degree.
Credits: Variable
Term: 1, 2, 3, 4, 5

GS-GG-5100
Student Research Seminar Student Seminar.
Term: 1, 2, 3, 4
Director: Dr. Christophe Herman and Dr. Herman Dierick

GS-GG-5105
Genetics & Genomics Journal Club This course is required of all first and second year students enrolled in the graduate programs in Genetics & Genomics. The course is conducted as a journal club to study current literature, to practice critical analysis of the literature and to refine presentation techniques. First year students present papers from the current literature, all students join in discussion of the paper presented.
Term: 3, 4, 5
Director: Dr. Hamed Jafar-Nejad and Dr. Shinya Yamamoto

GS-GG-6101
Clinical Genetics The course is aimed at training graduate students in the applied aspects of clinical genetics. Students will learn how Human Geneticists address medical genetic problems in the clinic, interact with genetic fellows and learn how to design tests and experiments to address clinical problems.
Term: 1
Director: Dr. Daryl Scott

GS-GG-6102
Genetic Epidemiology and Population Genetics This introductory level course in genetic epidemiology focuses on the design of studies to identify disease-gene associations. The lectures concentrate on the two most common study designs for genetic association studies: case-control studies and case-parent trios, and address disease-gene associations, gene-environment interactions, and maternal genetic effects. Students will learn about study design and data analysis through class lectures, independent readings, completion of problem sets and class discussions.
Term: 4
Director: Dr. Philip Lupo and Dr. Michael Scheurer

GS-GG-6103
Genetics and Genomics in Vision Research This course provides graduate students and postdoctoral fellows with broad exposure to the molecular genetics underlying normal and abnormal visual system development and function. This course offers an in-depth analysis of normal vertebrate and invertebrate development, genetic causes of disease, as well as the use of animal models for genetic analysis of normal and abnormal development and function.
Terms: 4 (even year course)
Director: Dr. Graeme Mardon

GS-GG-6201
Model Systems Genetics This course focuses on introducing genetic approaches offered by different model organisms for solving biological problems, understanding how these models can address problems related to human diseases, and learning technical terms and concepts unique to each system. Yeast genetics will be used to demonstrate how to order genes in a genetic pathway. Classical and modern genetic methods for studying gene function in C. elegans during development will be discussed, as will use of Drosophila genetics to study pattern formation, mutation isolation and mapping and mosaic analysis. Mouse genetics (gene knock-out, generating specific strains by crosses, and the use of transgenic approaches) and human genetics (linkage and pedigree analysis, gene mapping and analysis, and population biology and evolution) will be covered.
Term: 2
Director: Dr. Christophe Herman

GS-GG-6202
Mammalian Genetics This course describes the contribution of mammalian molecular genetics techniques to understanding the function of genes and the impact of genetic and epigenetic factors on human disease. The first half of the course focuses on historical aspects and advanced technologies used in mouse genetics. The second half of the course explores topics such as the human genome project, primate genetics, epigenetics, comparative sequence analysis and RNAi-based screens in the mammalian systems.
Term: 3
Directors: Dr. Hamed Jafar-Nejad and Dr. Jason Heaney

GS-GG-6203
Gene and Cell Therapy This course covers various approaches to somatic and germ cell gene therapy, with emphasis on vector systems and other methods for gene delivery and targeting; model systems for specific applications of gene therapy; and the status of current therapeutic strategies for various inherited and acquired disorders.
Term: 4
Director: Dr. Philip Ng

GS-GG-6204
Method and Logic in Genetics & Genomics This course is intended to train first year graduate students how to read and interpret the primary literature. In particular, we will teach students to discern what conclusions can be drawn from experimental data without over-interpretation. Students will learn what constitutes a well-designed experiment with proper controls. In addition, students will learn the fundamental experimental principles that pervade biological science, such as complementation, assigning function and specificity.
Term: 3
Director: Dr. Graeme Mardon & Dr. Melissa Suter

GS-GG-6301
Bioinformatics and Genomic Analysis
This course is intended to provide a background in the theory and application of standard computational methods for molecular biology research. The topics to be discussed include databases, sequence comparison, phylogeny, pattern inference and matching, RNA secondary structure, and protein structure. The course will also address computational issues for the Human Genome Program in the areas of large-scale DNA sequencing, chromosome mapping, and gene recognition. During the term, a seminar speaker, with expertise in an area relevant to the subject area of the course, is invited as a guest lecturer. Students are required to attend this seminar.
Term: 4
Director: Dr. Kim Worley

GS-GG-6302
Human Genetics The goal of this course is help graduate students learn the fundamental principles of human genetics they will need to be effective contributors to the field of human genetics. By the end of the course, students will have an increased ability to comprehend the human genetics literature, conduct human genetics research, accurately interpret genetic data obtained from human subjects and communicate these findings to other researchers and the general public.
Term: 4
Director: Dr. Daryl Scott and Dr. Neil Hanchard

GS-GG-6303
Medical Genetics This course will provide students insight into the specialty of medical genetics and its place within the practice of medicine in the United States; offer students an opportunity to understand what it is like to be a medical geneticist and work in a diagnostic laboratory; and, inform students about educational and training requirements that lead to eligibility for board certification by the ABMG. The focus of the course will be on laboratory specialties, however, the specialties of Clinical Genetics and Genetic Counseling will also be discussed.
Term: 4
Director: Dr. Marco Sardiello

Immunology & Microbiology (GS-IY)

GS-IY-5000
Special Topics Scholarly study directed by a faculty member. Special topics allows a faculty member to develop individualized courses for students. Special topics cannot be used to satisfy the 30 hr. course requirement.
Credits: Variable
Term: 1, 2, 3, 4, 5

GS-IY-5010
Readings Faculty directed literature projects that survey a specialized topic of interest.
Credits: Variable
Term: 1, 2, 3, 4, 5

GS-IY-5030
Research Rotation Faculty mentored research for students who have not yet selected a faculty advisor.
Credits: Variable
Term: 1, 2, 3, 4, 5

GS-IY-5040
Special Projects Faculty mentored research for students that have selected their thesis advisor but not been admitted to candidacy.
Credits: Variable
Term: 1, 2, 3, 4, 5

GS-IY-5050
Dissertation Thesis research directed by a faculty mentor and advisory committee. Open only to candidates for the Ph.D. or M.S. degree.
Credits: Variable
Term: 1, 2, 3, 4, 5

GS-IY-5100
Student Research Seminar Graduate students will attend and present in a weekly research seminar series with presentations by Immunology & Microbiology Graduate students to discuss new developments and findings in their thesis research and develop networks. Students having passed their Qualification Exam will present their laboratory research once per year. Student evaluators will provide student presenters with constructive feedback on their presentations.
Term: 2, 3, 4
Director: Dr. Gretchen Diehl and Dr. Jason Kimata

GS-IY-5105
Seminars in Immunology & Microbiology Research Graduate students will attend the combined seminar series supported by Immunology/ Immunobiology/Molecular Virology and Microbiology. Presentations will be primarily scientists from other institutions along with BCM faculty and postdocs. Seminar topics or speaker suggested readings will be coordinated with the Literature Review in Immunology & Microbiology and Student Research in Immunology & Microbiology Seminar courses.
Term: 1, 2, 3, 4
Director: Dr. Jason Kimata and Dr. Gretchen Diehl

GS-IY-5110
Literature Review in Immunology & Microbiology Immunology and Microbiology (I&M) graduate students will critically evaluate and present current research articles in areas of immunology, vaccine and immune therapy, microbiology, virology, parasitology and microbiome research. First and second year graduate students will give oral presentations (generally twice a year) of research articles to an audience comprised of fellow graduate students, postdocs, faculty and other scientists. Students will be paired with I&M faculty that will assist in choosing a journal article often related to the Seminars in Immunology and Microbiology faculty presentation(s) of the week that directly follows this course. Presenting students will be evaluated and receive feedback from fellow attendees, including students and faculty.
Term: 1, 2, 3, 4
Director: Dr. Anthony Maresso and Dr. Antony Rodriguez

GS-IY-6201
Cells, Tissues and Organs The Cells, Tissues and Organs course focuses on analysis of structure/function relationships in tissues and organs. This will include correlating tissue histology with organ physiology. Interactive lectures and discussions occur simultaneously with direct observation of human and some animal model tissues by the students through multi-head microscopes with a pathologist. Students participate in weekly essays and presentations.
Term: 4
Director: Dr. David Rowley

GS-IY-6202
The Microbiome This course will facilitate deeper understanding a host-associated community of microbes, termed the 'microbiome'. Through examination of a series of landmark and cutting edge papers, students will learn what constitutes a microbiome both in form and functions it provides to the host, plus the many molecular ways that it can influence health and progression of a wide range of diseases. Students will also learn about the key methodologies used to characterize and quantitatively analyze the microbiome in an associated lab. Together, this class is intended to provide a robust foundation of knowledge and methodological know-how to be able to integrate microbiome studies into any research program.
Term: 3
Director: Dr. Buck Samuel & Dr. Joseph Petrosino

GS-IY-6301
Immunology This is a series of lectures stressing basic concepts in immunology. These include immunoanatomy and cytology, innate immunity, development of the immune system, immunoglobulin structure and genetics, antigen-antibody reactions, the major histocompatibility complex and antigen presentation, T cell receptors (genetics, structure, selection), T cell activation and effector functions, cell trafficking, phagocytic cell functions, immune responses to infections organisms and tumors, autoimmunity, allergies and immunodeficiency. The course includes weekly reviews led by senior graduate students that help to explore and clarify concepts.
Term: 3
Director: Dr. Jonathan Levitt

GS-IY-6302
Grand Challenges and Methods in Immunology & Microbiology This course will utilize primary literature to provide students an understanding of how important challenges in Immunology & Microbiology are addressed with a particular focus on rationale, thoughtful experimental design and rigorous methodologies are leveraged to answer the biggest questions in Immunology and Microbiology. The session topics will be organized around Grand Challenges in the fields of Immunology & Microbiology, such as Vaccines, Antimicrobial Resistance, Autoimmunity, HIV, Cancer Immunotherapy, and the like.
Term: 3
Director: Dr. Joseph Hyser and Dr. Maksim Mamonkin

GS-IY-6303
Fundamentals of Effective Grant Writing
An ability to conceive significant and innovative research questions and to communicate them clearly is essential to achieve grant funding. This course is designed to introduce 1st or 2nd year graduate students to the fundamentals of successful grant writing including grant organization, strategy, and the review process using NIH as the model funding agency. Students will learn to strategically design at least two specific aims and to expand one of those aims into a fully developed research strategy section. During the course, students will present their aims and rationale several times with written and oral feedback from peers and faculty. The course will culminate in an oral presentation with questioning by a select group of upper level graduate students, post-docs, and faculty. All students in the course will observe these oral presentations. This course is intended to develop skills in critical thinking, written presentation of complex scientific information, and oral presentation, as well as preparing students for their qualifying exam, and encouraging independent NRSA or other fellowship applications..
Term: 4
Director: Dr. Susan Marriott

GS-IY-6304
Clinical Aspects of Immunology This course is designed for immunology students to learn more about the roles and importance of immunology in various human diseases and animal models, including cancer immunology, autoimmune diseases, infectious/tropical diseases, allergy and immunodeficiency. The goals of this course are to introduce students to these active research topics, to bridge basic immunology to clinical immunology, and motivate them for the selection of their own research topics related to important human diseases. This course will combine faculty lectures (50%), student presentations of scientific papers and student-designed future directions in the selected topics (50%).
Term: 5
Director: Dr. Jonathan Levitt

GS-IY-6401
Concepts in Host Immune System-Microbiome Interactions This course facilitates an integrated understanding of host immune system-microbe interactions, including how they are established, maintained in health, and altered in disease states. Students will develop a conceptual understanding of the primary components and functions that drive these interactions from both a host and microbial perspective and will apply this understanding to real-world problems using student-centered and team-based learning approaches..
Terms: 1-2
Director: Dr. Margaret Conner and Dr. Ronald Javier

GS-IY-6402
Concepts in Microbial Pathogenesis
Microbial Pathogenesis will provide interested graduate students or postdoctoral fellows with knowledge of the basic and clinical aspects of mechanisms and consequences of microbial (bacterial and viral) pathogenesis. This course will provide students with the knowledge to understand how bacteria and viruses cause disease, insights into research approaches used to answers questions on microbial pathogenesis, and a forum for in depth discussion of data from selected papers and enhance their ability to critically analyze, discuss, and present data.
Term: 4
Director: Dr. Margaret Conner

Neuroscience (GS-NE)

GS-NE-5000
Special Topics Scholarly study directed by a faculty member. Special topics allows a faculty member to develop individualized courses for students. Special topics cannot be used to satisfy the 30 hr. course requirement.
Credits: Variable
Term: 1, 2, 3, 4, 5

GS-NE-5010
Readings Faculty directed literature projects that survey a specialized topic of interest.
Credits: Variable
Term: 1, 2, 3, 4, 5

GS-NE-5030
Research Rotation Faculty mentored research for students who have not yet selected a faculty advisor.
Credits: Variable
Term: 1, 2, 3, 4, 5

GS-NE-5040
Special Projects Faculty mentored research for students that have selected their thesis advisor but not been admitted to candidacy.
Credits: Variable
Term: 1, 2, 3, 4, 5

GS-NE-5050
Dissertation Thesis research directed by a faculty mentor and advisory committee. Open only to candidates for the Ph.D. or M.S. degree.
Credits: Variable
Term: 1, 2, 3, 4, 5

GS-NE-5100
Seminar Journal Club in Neuroscience
This course is required of all first and second year students enrolled in the Neuroscience Graduate Program. The course is conducted as a journal club to study the scientific literature, to practice critical analysis of the literature, and to develop and refine presentation skills. This course is coordinated with the Department of Neuroscience seminar series such that second-year students present papers from the laboratory of the upcoming seminar speaker. All students join in discussion of the paper and evaluation of the journal club presentation.
Terms: 2, 3, 4
Director: Dr. Javier Medina and Dr. Jeannie Chin

GS-NE-5101
Preparing for Your Neuroscience Qualifying Exam This course will explain the requirements and expectations of the qualifying exam in Neuroscience. The course is geared specifically towards second year students who have successfully completed their first year coursework and several months' work in their chosen thesis lab. The course will cover the format of the written and oral exams, tips for structuring the aims and scope of the written proposal, and provide students with opportunity to develop and deliver their oral presentation for feedback from the group. The goal of the course is to help students begin thinking about their work independently and to present their research problem and experimental goals clearly.
Term: 2
Directors: Dr. Joanna Jankowsky and Dr. Kim Tolias

GS-NE-5111
Neuroscience Lab 1 Students will be introduced to basic approaches of molecular and cellular neuroscience including learning how to model biological systems and how to perform basic laboratory techniques. Primary focus will be on understanding how to break complex neuronal systems down to enable useful computational analyses as well as the importance of design and controls in different experimental approaches. Students will be exposed to a combination of problem solving, practical demonstrations, and discussions of pluses and minuses for different approaches.
Term 1
Director: Dr. Paul Pfaffinger

GS-NE-5201
Advanced Functional MRI Laboratory
This laboratory course will teach students to use blood-oxygen level dependent functional magnetic resonance imaging (BOLD fMRI) to explore human brain function. BOLD fMRI is the most popular method for examining the human brain, but poses unique technical, methodological, and data analysis obstacles. Students will learn how to overcome these obstacles by designing experiments and collecting fMRI data using the 3-tesla MRI scanners in BCM's Core for Advanced Magnetic Resonance Imaging (CAMRI).
Term: 4
Director: Meghan Robinson
Prerequisites: GS-NE-6400 and permission from Course Director

GS-NE-6101
Core Concepts in Computational Neuroscience How do brains compute? This course covers the basic concepts underlying neuronal computation, from individual neurons up to networks of neurons in circuits. The focus will be on achieving a computational level understanding: how populations of neurons compute tasks critical for the organism's survival from sensory input. Students will also be exposed to key ideas from the field of Deep Machine Learning wherein artificial neural networks are employed to solve difficult real-world tasks.
Term: 4
Director: Dr. Ankit Patel
Prerequisites: GS-NE-6301. (GS-NE-6302 can be taken concurrently)

GS-NE-6112
Neuroscience Lab 2 This course extends the practical laboratory demonstrations begun in GS-NE-449 with hands-on demonstrations in systems and computational neuroscience. Methods to be covered include classical and modern neuro-anatomical techniques, in vivo pharmaco- and opto-genetics, model systems behavioral assays, fMRI, and computational modeling among others. One hour lecture and 3 hour laboratory demonstration per week.
Term: 2
Director: Dr. Russell Ray

GS-NE-6201
Analyses of Neuronal Function This course will cover the basic concepts of synaptic biology. The topics include the organization of the synapses, neurotransmitter release, neurotransmitter receptors, synaptic plasticity in learning and memory, synaptic organization of microcircuits, and synaptic dysfunction in diseases. Students will learn synaptic biochemistry, cell biology, and physiology and how to study synapses.
Term: 2
Director: Dr. Mingshan Xue

GS-NE-6202
Anatomy of the Nervous System The course will cover the basic concepts in neuroanatomy in a combined lecture, demonstration, and hands-on lab format. The emphasis will be on the structural organization of the nervous system. A large part of the course will consist of lectures that cover a structure or region of the brain augmented by simultaneous hands-on dissection of fixed sheep brain tissue, histological photographs, and representative MRIs. The students will be divided into small teams and will dissect a sheep brain along with the instructor. It is expected that the teams will interact with the instructors as the lecture/demonstration progresses. Additional lectures and demonstrations will be used to compare and contrast mammalian brains with other species' brains commonly used in neuroscience research.
Term: 2
Director: Dr. Brett Foster

GS-NE-6203
Genetics for Neuroscience This course is intended to teach neuroscience students how to tackle neurobiological problems using genetic strategies and tools. Students will be exposed to the basic concepts in genetics and will be taught the advantages and approaches used in invertebrate model organisms, C. elegans and D. melanogaster, focusing on different genetic, cell biological and neurobiological tools available in those organisms. The course will also focus on mouse genetics, highlighting the different techniques and approaches commonly used in the mouse, followed by genetic approaches in humans.
Term: 3
Director: Dr. Ronald Parchem

GS-NE-6204
Neurobiology of Disease This course will cover important and scientifically tractable disorders of nervous system function. The course will expose the students to the incidence, clinical manifestations, pathophysiology and current scientific models of the causes and mechanisms of some of the most common disorders of brain and nervous system function and development throughout the lifespan. This is an advanced course assuming basic knowledge of neuroscience. Completion of an introductory course is required. Students outside the Neuroscience Graduate Program must receive permission from course director to register, as registration is limited to 20 students.
Term: 4
Director: Dr. Jeffrey Noebels

GS-NE-6301
Neural Systems 1 Neural Systems I course covers the mechanisms involved in processing sensory information by the brain. The course will cover the major sensory systems from organizational principles to the transformation of information. This course will cover the key topics in the processing of sensory information by the brain. The course will also introduce students to in depth analysis of important papers in systems neuroscience to better assist their development of critical reading skills. This course will prepare students for Neural Systems 2 which will cover how sensory inputs are transformed into motor actions by the brain. Following completion of this course students will understand the locations, functional organization, and functional significance of the main sensory processing streams in the central nervous system.
Term: 3
Director: Dr. Jeffrey Yau

GS-NE-6302
Neural Systems 2 Neural Systems 2 course covers the mechanisms involved in transforming sensory inputs into motor action and higher brain functions. The course will cover the spinal, cortical, limbic and cerebellar systems involved in motor planning and execution, behavioral control, and learning and memory. This course will cover the key topics in translation of sensory inputs into patterns of motor behavior as well as brain circuits involved in higher cognitive functions. The course will also introduce students to in depth analysis of important papers in systems neuroscience to better assist their development of critical reading skills. Following completion of this course student will understand the locations, functional organization, and functional significance of the main motor pathways as well as key findings linking brain function to complex cognitive behaviors.
Term: 4
Director: Dr. Roy Sillitoe
Prerequisites: GS-NE-6301

GS-NE-6303
Electrical Signaling in the Brain This course covers the basics concepts of electrical signaling from the chemical and physical principles involved, to the biological components involved in generating, modulating and transmitting electrical signals in the brain. Students will learn about the foundations of electrical signaling, how ion channel function and regulation actively regulate membrane potential, how to analyze membrane potential using circuitry methods, and how to understand how electrical signals propagate across long distances. Finally this course will explore some of the new methods to measure and manipulate electrical signaling in awake behaving animals.
Term: 1
Director: Dr. Paul Pfaffinger

GS-NE-6304
Brain Cell Biology & Development This course covers the basic molecular and cellular organization of the Nervous system. The first 2/3 of the course provides an overview and focal lectures on topics of particular importance to understanding molecular and cellular organization of neurons. The last third of the course covers aspects of neural development that integrates principles learned in the first 2/3 of the course.
Term: 1
Director: Dr. Matthew Rasband

GS-NE-6305
Concepts of Learning & Memory This course is designed to introduce graduate students to the field of learning and memory. The course will introduce the student to classical and modern concepts of learning and memory across all levels at which learning and memory is studied, including behavioral, anatomical, cellular, molecular and genetic levels of analysis. The basic concepts of learning and memory will also be related to known diseases of learning and memory.
Term: 4
Directors: Dr. Mauro Costa-Mattioli and Dr. Daoyun Ji

GS-NE-6306
Cellular Neurophysiology This course provides a general background in cellular neurophysiology with an emphasis on an understanding of the properties of excitable nerve membranes and chemical synapses. The first part of the course covers the theory of ions in solutions, ion conduction through membranes, ion transport and distribution, nonlinear properties of neurons, nerve excitation and conduction, and stochastic properties of single ion channels. The second part of the course covers linear cable theory, multiple types of voltage-gated conductances, synaptic transmission including, quantal analysis; the role of calcium and transmitter release, various forms of synaptic plasticity.
Term: 4
Director: Dr. Samuel Wu

GS-NE-6307
Physiology of the Visual System This is an advanced level course on the physiology of the visual system. It covers the biochemistry, physiology and biophysics of phototransduction, synaptic transmission in the retina and functional architecture of the retina and central visual pathways. Additionally, principles of visual information processing in the eye and in the brain, mechanisms controlling eye movement and gaze stabilization are discussed.
Terms: 4
Director: Dr. Samuel Wu

GS-NE-6401
Fundamentals of Human Neuroimaging Neuroimaging has rapidly become one of the most popular and powerful tools for neuroscience. This course surveys a variety of brain imaging modalities, describing what each measures and how the results are used for research. Neuroscience has classically relied on invasive electrode measurements, mostly in animals, to directly map electrical activity in the brain, and modem microelectrode arrays have expanded this method. Two other brain activity measurement schemes, electroencephalography (EEG) and magnetoencephalography (MEG), provide non-invasive measurements with excellent temporal resolution but limited spatial accuracy. Recently, magnetic resonance imaging (MRI) has become tremendously popular because it is non- invasive, involves no ionizing radiation, and offers substantial flexibility. In particular, MRI is used to measure brain structure in a variety of fashions, to measure white-matter connectivity using diffusion-weighted imaging (e.g., DTI), and to measure brain function (e.g., fMRI). Extensive techniques have been developed to localize and probe cortical activity in a variety of specialized areas. Optical imaging techniques have also contributed substantially to our understanding of brain function, mostly as an invasive technique in animal models. Positron-emission tomography (PET) provides additional specialized information about brain function. Students should have introductory physics and calculus capability at the freshman level.
Terms: 1-2
Director: Dr. David Ress

Quantitative and Computational Biosciences (GS-QC)

GS-QC-5000
Special Topics Scholarly study directed by a faculty member. Special topics allows a faculty member to develop individualized courses for students. Special topics cannot be used to satisfy the 30 hr. course requirement.
Credits: Variable
Term: 1, 2, 3, 4, 5

GS-QC-5010
Readings Faculty directed literature projects that survey a specialized topic of interest.
Credits: Variable
Term: 1, 2, 3, 4, 5

GS-QC-5030
Research Rotation Faculty mentored research for students who have not yet selected a faculty advisor.
Credits: Variable
Term: 1, 2, 3, 4, 5

GS-QC-5040
Special Projects Faculty mentored research for students that have selected their thesis advisor but not been admitted to candidacy.
Credits: Variable
Term: 1, 2, 3, 4, 5

GS-QC-5050
Dissertation Thesis research directed by a faculty mentor and advisory committee. Open only to candidates for the Ph.D. or M.S. degree.
Credits: Variable
Term: 1, 2, 3, 4, 5

GS-QC-5100
Student Research Seminar QCB graduate students will attend the course weekly where upper level student who have passed their qualifying exam will present their research. These research presentations will be presented to an audience of 1st year students and a faculty member to help develop their oral communication and research presentation skills. Following each student's presentation, constructive advice from faculty and students will be provided in a survey about improving oral and presentation skills and about producing effective presentation materials.
Term: 4
Director: Dr. Aleksandar Milosavljevic

GS-QC-5105
Seminar in Quantitative Biosciences This course introduces graduate students to the diversity of biological and clinical research problems that benefit from computational approaches. On alternating weeks the students will be exposed to speakers, or they will present a journal club. The speakers are drawn from across BCM, the TMC, Rice University and the greater Houston area and occasionally will include outside seminar speakers. During this one hour, a format of two short talks from two different speakers will discuss some of the most salient current problems studied in their laboratories, often with a significant emphasis on computational aspects. Style and content vary but, generally, the level is introductory and accessible to all members of the audience. Topics range from genomics to clinical text-mining and from bioengineering to public health, representing the rich diversity of computational biology research in the Gulf Coast area. .
Term: 1, 2, 3, 4
Director: Dr. Oliver Lichtarge and Dr. Richard Sucgang

GS-QC-5110
Advanced Topics in QCB QCB 1st year graduate students will attend the course weekly where QCB faculty will present their research. Each presentation will be 15 minutes, plus 5 minutes for discussion, and cover an advanced topic on recent development from the faculty's lab. Following each presentation, the students will discuss with the faculty any potential rotation projects in the lab. The course is aimed to supply the students with the topics for their rotations and research projects.
Term: 1, 2
Director: Dr. Aleksandar Milosavljevic

GS-QC-5301
QCB Research Design This course is designed to guide the student through the process of identifying a research problem, developing specific hypotheses and designing well-controlled experiments to test them. It will be taught in small groups of ~8 students/class. A faculty mentor helps formalize and organize the process, but students will develop their ideas through literature searches and discussion. The terms and discussion will center around the NIH format for grant applications (Specific Aims, Background and Significance, Experimental Design).
Term: 4
Director: Dr. BVVenkatar Prasad, Dr. Nicolas Young

GS-QC-6201
Applications to Biology of Computation The course will offer a broad survey of different topics from a computational perspective: genomics, epigenomics, population genetics, transcriptomics, proteomics, structure-function, systems biology, networks, cellular imaging, phylogenomics, pattern discovery, drug design, medical informatics, the microbiome, the cancer genome and neurosystems. The objectives are to become familiar with basic computational challenges in these fields and with the current algorithmic solutions.
Term: 3
Director: Dr. Olivier Lichtarge

GS-QC-6301
Practical Introduction to Programming for Scientists In this course students will learn Python, one of the most widely used scripting languages in scientific computing. The course is primarily aimed at students with little or no programming background, but those with some programming experience in other languages wishing to learn Python are also welcome. The course covers basic programming concepts and data structures, and students will learn to write simple programs to improve their data processing productivity. We will also cover a number of open source scientific libraries available in Python (Biopython, SciPy, Matplotlib, etc.). Some basic familiarity with using a computer will be expected, and each student must have a laptop computer for use in class by the beginning of the term.
Term: 1
Director: Dr. Steven J. Ludtke

GS-QC-6302
Computer-Aided Discovery Methods The objective of this course is to introduce students to the concepts, methods and tools relevant for computer-aided discovery using data collected using high-throughput technologies. The course will focus on the methods of integration of data, tools, and discovery processes and the methods of computational pattern discovery, hypothesis generation and testing. The students will master advanced applications of computing that enable new methods of discovery in a field of focus, which will initially be cancer biology. The course will not focus exclusively on technical, algorithmic or mathematical aspects nor will it focus on biology alone. Instead, the focus will be on genuine integration of the two fields.
Term: 4
Director: Dr. Aleksandar Milosavljevic

GS-QC-6801
Computational Mathematics for Quantitative Biomedicine This course introduces essential computational, statistical and mathematical concepts to students who are interested in computational biology. It is intended that each of the concepts will be taught in the context of the real biological problems ranging from genomics bioinformatics, structural biophysics, computational neuroscience, systems biology, protein design, drug discovery, and medical bioinformatics
Terms: 2+3
Director: Dr. Zhandong Liu

Tropical Medicine (GS-TM)

GS-TM-5600
Diploma in Tropical Medicine Module 1
This module is a component of the four-module Diplomat in Tropical Medicine program. This module will provide the learners with knowledge and basic understanding of epidemiology, biostatistics, ethics, health economics & public health policies. By the end of the module, learners will be able to explain epi-demicological surveillance of emerging infectious diseases, perform basic biostatistics computation skills, and describe ethics, health economic, policy and other public health topics as they relate globally.
Term: 3
Director: Dr. Kristy Murray and Dr. Laila Woc-Colburn

GS-TM-5100
Seminar in Tropical Medicine - Global Health Policy (GS-TM-5100)
This course consists of a series of weekly lectures on a topic in tropical medicine. Lectures will convey different themes in tropical medicine from one year to the next. The learning themes are global health policy, one health, globalization and the impact on Houston health, tropical medicine abroad, and tropical medicine research.
Term: 3
Director: Dr. Peter Jay Hotez

Legacy Program Courses

Seminar in Cell Biology (GS-CB- 466)
Student Seminar
Credits: 1
Term: 1, 2
Counts for 30 hr. requirement: N
Director: Dr. Charles Foulds

Seminar in Developmental Biology (GS-DB-466) The purpose of this course is to guide the students into learning how to approach scientific literature directly. Students are expected to read the primary literature and lead discussions in a group setting. Students in the Program in Developmental Biology participate in this seminar every term during their first four years at BCM.
Credits: 1
Term: 2, 3, 4
Counts for 30 hr. requirement: N
Director: Dr. Andrew Groves

Grant Writing Skills (GS-PY- 413) The goal of this course is to guide students to write a specific aims page on a specified theme while teaching them about grant structure, grant writing styles, and reinforcing scientific thinking in developing models, hypotheses, and experimental tests through question and answer sessions. The course interleaves lectures with group discussion. In the lectures, the students will be instructed in the overall layout of a grant, the purpose of the various grant sections, and the writing style for grants. Before each discussion, the students will be required to write a section of the specific aims page. In the discussion, the students will question each other's hypotheses, aims and approaches.
Credits: 1
Term: 2
Counts for 30 hr. requirement: N
Director: Dr. Irina Larina and Dr. William Lagor

Seminar in Molecular Physiology & Biophysics (GS-PY- 466)
Student Seminar
Credits: 1
Term: 1, 2, 3, 4, 5
Counts for 30 hr. requirement: N
Director: Dr. Joshua Wythe and Dr. Jason Karch

TBMM: Bench to Bedside (GS-TB-466)
This course is designed to provide a forum for an in-depth discussion of translational research. Each term will cover one subject or a specific aspect of a larger topic to allow for a more detailed review of the biomedical literature. The emphasis is on student participation and the role of the faculty member(s) at any given session is to facilitate the discussion. Students are expected to have reviewed assigned article(s) prior to each session and come prepared with comments, criticisms, questions or points of discussion. The faculty member will typically provide a brief overview of the topic at hand to provide some perspective on the subject, but will not direct the discussion. An outside speaker of national prominence engaged in translational research relevant to the topic will give a school-wide talk and meet with the TBMM students.
Credits: 1
Term: 1, 2, 3, 4
Counts for 30 hr. requirement: N
Director: Dr. William J. Craigen

Seminar in TBMM (GS-TB-467) Students who have been admitted to candidacy (years 3 and above) will be required to present a seminar yearly on the topic of their ongoing thesis research project with emphasis on the translational aspects of their research project. The purpose of this course is to provide a forum for students to improve their knowledge and skills in planning, preparing and effectively presenting their scientific research to an inter-disciplinary audience.
Credits: 1
Term: 2, 3, 4
Counts for 30 hr. requirement: N
Director: Dr. Sundararajah Thevananther

Academic Regulations

(Excerpted from the 2019-20 GSBS Policy Handbook)

All Graduate School of Biomedical Sciences policies are compiled in the GSBS Policy Handbook, updated annually. Below is reprinted from the most recent policy handbook Article VI: Academic Regulations for the ease of access of students who are making their course scheduling decisions. As this is only the section on academic policies, students are encouraged to refer to the full handbook for broader policy issues.

ARTICLE 6. ACADEMIC REGULATIONS

6.1 The Grading System and Assigning *Credit* *(Revised 04/15/98, 04/26/02, 2/29/2011, 08/01/16)*

6.1.1 The Grading System *(Revised 04/15/98, 04/26/02)*

Grade	Description
A	Honors Work
B	Passing Work
P	Passing Work
C	Marginal Work
MP	Marginal Pass-*Research Courses Only*
I	Temporary Incomplete Work
F	Failing Work

A grade of C or F does not confer credit toward Graduate School degree requirements. MP only applies to research related courses (Special Projects, Research Rotation and Dissertation). Incomplete (I) is to be used only to represent incomplete work; no other use of the grade is to be accepted. The grade may be carried no longer than three terms. After the third elapsed term, the I automatically becomes an F. For all courses that are graded without objective examination (e.g., graded on attendance) only grades of P (Pass), F (Fail) or I (incomplete) can be used. These include but are not limited to Readings (courses numbered 548) and Seminar (courses numbered 466). Grades of P (Pass), MP (marginal Pass) or F (Fail) are to be used for Special Projects (courses numbered 435), Research Rotations (courses numbered 549) and Dissertation (courses numbered 550). In all courses (School of Medicine and Graduate School), all students must be graded on the identical criteria. If a Program wishes additional criteria for its students in a required course, such criteria should not be reflected in the recorded grade.

Please refer to the institutional Course Repeat Policy (Section 23.1.09) for criteria for calculating repeats in coursework.

6.1.2 Assigning Academic Credit *(2/29/12, Revised 8/27/15, 8/01/16)*

The academic calendar of the Graduate School is divided into five academic terms. Each term is of 8 weeks duration followed by one week of exams. Terms 1 and 2 are offered in the fall (August-December), terms 3 and 4 occur in the Spring (January-May) and Term 5 occurs in the Summer (May-July). Credits for coursework (term hours) are awarded on the basis of the Carnegie Unit. A term unit of credit is equal to one hour of lecture, seminar or small group discussion time per week or three hours of laboratory research activity per week. One term credit hour is equivalent to 0.5 semester credit hours. If the calculation of credit hours using the convention specified above is a non-integral number, the credit hours will be rounded to the closest integer. Please refer to the institutional Credit Hour Policy (BCM Policy 23.1.11) for additional guidance on how academic credit is awarded and for overall guidance on the number of credits required for each BCM degree.

6.2 Grade Changes *(Revised 08/23/04, 8/27/15, 08/01/16)*

Grades submitted by the faculty become final on the official date that grades are due each term. Grade changes for other than numerical error are discouraged. If an exam is re-evaluated, all students' answers to the affected sections of the exam are subject to review. Grade alterations affecting one student only, must be justified on the basis of a mathematical or related error. Requests to change final grades must be submitted in writing by the course Director, with the approval of the Program director, to the Promotions Committee. The request must specifically state the reason for the change. If student concerns regarding final grade are not resolved through discussion with the course director, students may choose to proceed with a formal grade appeal. Guidance for the appeal process, inclusive of timeline, is outlined in the BCM Student Grievances Policy (Section 23.1.08).

6.3 Student Evaluation (Revised 06/15/06)

Students are encouraged to complete evaluation-of-course/instructor forms at the end of each term, including courses taken at other institutions through inter-institutional agreements (see article 5.11). The Graduate School office shall distribute these forms for each service course to each student engaged in classroom-based course work. Completed forms are to be returned to

the Graduate School, before the end of the subsequent term, where they will be collated and sent to the respective course directors.

6.4 Transcripts

All grades and academic actions will be permanently recorded on the transcript. Students may be provided with unofficial copies of transcripts. Official copies will be released only by written request of the student to the Registrar's office.

6.5 Unsatisfactory Academic Progress *(Revised 04/26/02, 08/23/04, 08/03/09, 07/30/12; 07/29/13, 07/14/14, 08/01/16, 04/06/18)*

Students are considered to be making good academic progress unless they have been placed on Academic Warning, Academic Probation or recommended for dismissal. Graduate students are expected to maintain satisfactory progress toward the degree. One or more credit hours with the grade of C, MP, F, or I makes a student subject to review by the Promotions Committee. The Promotions Committee will take one of the following actions: 1) Place the student on Academic Warning; 2) Place the student on Academic Probation; 3) Recommend the student for dismissal to the Dean; 4) Other action deemed appropriate by the Promotions Committee.

In the case of a grade of MP or F in a research-related course, the student's TAC and Program Director will be notified as soon as possible by the Graduate School. If a TAC has not been established, the Program Director will be notified. The Program Director or designee will meet with the student and mentor. A plan of remediation, signed by student, mentor, program director and TAC (if appropriate) must be submitted to the Graduate School within two (2) weeks of the preceding term's grade submission deadline. Before assigning a grade of F in a research-related course, the mentor must notify the Program director of the reason(s) for the grade, documenting that the student has been given written warning of their unsatisfactory performance and potential remedies.

A student must be making good academic progress when granted permission to write and at graduation for either the MS or PhD degrees.

6.6 Academic Warning *(Revised 04/13/06, 11/08/07, 07/14/14)*

Any student who receives one to three credit hours of C, or one instance of MP (in a research-related course), will be placed on Academic Warning by the Promotions Committee. The Promotions Committee will notify the student, in writing, of its decision. To be removed from Academic Warning, the student must retake the required course within one year and obtain a grade of B (P in a research-related course) or better, and must also complete two terms with no grades lower than B (or P in a research-related course). A student who Fails to comply with the specific conditions of the Academic Warning may be placed on Academic Probation by the Promotions Committee. A student who satisfies the conditions of the Academic Warning will be removed from Academic Warning upon review by the Promotions Committee.

6.7 Academic Probation *(Revised 06/21/02, 04/13/06, 11/02/06, 11/08/07, 07/14/14)*

Any student who accumulates four or more credit hours of C, or receives one or more credit hours of F, or two (cumulative) grades of MP in research-related courses, will be placed on Academic Probation by the Promotions Committee. A student who fails their first attempt at their Qualifying Examination will be placed on Academic Probation. The Promotions Committee will notify the student, in writing, of its decision. When a student is placed on probation or when a student on probation accumulates additional grades of C or lower, a plan of remediation must be submitted to the Promotions Committee by the student's Program. To be removed from Academic Probation the student must: (1) retake required course(s) within one year and obtain a grade of B or better (P in a research-related course), or their second qualifying exam, and (2) complete two terms with no grades lower than B (P in a research-related course).

A student who fails to comply with the specific conditions of his/her probation will be recommended to the Dean for dismissal from the Graduate School. A student who satisfies the conditions of probation will be removed from Academic Probation upon review by the Promotions Committee.

6.8 Dismissal *(Revised 06/23/00, 11/16/01, 04/13/06)*

6.8.1 Dismissal due to poor academic performance *(Revised 11/11/99, 11/16/01, 07/29/13, 07/14/14)*

A student who receives a grade of C or lower in nine or more term hours of courses, three (cumulative) grades of MP in a research-related course or 9 or more hours of a grade of F in a research-related course will be recommended for dismissal from the Graduate School after grade verification by the Promotions Committee and Dean. A student who fails to pass their first qualifying examination may be recommended for dismissal to the Dean by the Promotions Committee (see Section 9.8.1). A student who fails to pass their second qualifying examination will be recommended for dismissal to the Dean by the Promotions Committee (see Section 9.8.1). The Dean will notify the student, in writing, of the decision for dismissal. If the dismissal is upheld on appeal, Dismissal is entered on the permanent transcript, along with the student's academic status at the time of dismissal. Outstanding grades of I at the time of dismissal will remain incomplete.

The student will have the right to appeal the dismissal as outlined in Section 6.10, and must notify the Dean of the intent to appeal, in writing, within one week of receipt of notification of the dismissal action.

6.8.2 Dismissal for nonacademic reasons *(Revised 08/29/97, 11/16/01, 06/14/05, 02/07/08, 07/14/14)*

A student also may be dismissed for non-academic reasons that seriously violate the expectations of professional behavior (Section 6.11). After investigation of any allegations, any finding of non-professional conduct will be forwarded to the Promotions Committee for review and action. After its review, the Promotions Committee may recommend appropriate sanctions or penalties, including a recommendation for dismissal for non-academic reasons to the Dean. The Dean will notify the student, in writing, of the Promotions Committee's recommendation. If the Promotions Committee recommends dismissal, the student will have the right to appeal, the dismissal as outlined in Section 6.10. The request to appeal a dismissal decision must be made in writing to the Dean within one week of receiving notification of the dismissal action.

6.9 Withdrawals

6.9.1 Request to Withdraw *(New 01/16/04, Revised: 06/14/05, 04.13.06, 08/03/09, 07/29/13, 07/14/14)*

A student may withdraw from the Graduate School at any time, but to do so, the student must submit to the Dean a completed "Request to Withdraw/Clearance Form" signed by the program director for approval. The student's academic status at the time of the withdrawal will be reflected on the transcript. If the request to withdraw is approved by the Graduate School after the student has completed all the course requirements, including the final examination if applicable, the transcript will reflect the grade earned. Outstanding grades of I at the time of withdrawal will be changed to WD (Withdrawn).

A student charged in a misconduct issue may withdraw; however, if the allegations are substantiated by an investigation, and the Promotions Committee subsequently recommends dismissal, the transcript shall be amended to show that the student was dismissed for reasons of misconduct.

6.9.2 Administrative Withdrawal *(New 01/20/04, Revised 11/02/06)*

Students who Fail to register during a term without specifically requesting leave or permission to withdraw, shall be withdrawn administratively. Transcripts will bear the notation "Administratively Withdrawn". All payments and benefits, including the tuition waiver, will cease upon administrative withdrawal.

6.10 Appeal of Promotions Committee Decisions *(Revised 11/16/01, 07/14/14)*

A student who disagrees with a Promotions Committee decision may appeal that judgment in writing to the Dean within **one week** of being notified of the decision.

6.10.1 Appeal Process *(Revised 11/16/01; 'Review by the Promotions Committee' removed on 07/14/14; 'Composition of the Appeals Committee' moved to Article 2 on 07/14/14)*

6.10.1.1 Review by the Appeals Committee *(Revised 11/16/01, 07/29/13, 07/14/14)*

A student who disagrees with the Promotions Committee may appeal the decision in writing to the Dean within one week of being notified of the Promotions Committee's decision. The appeal request must state the basis of the appeal (Section 6.10.1.2). The Dean will notify the Appeals Committee of the Graduate School to review the Promotions Committee decision within two weeks of receiving a written request.

6.10.1.2 Appeals Committee Process *(Revised 11/16/01, 07/14/14)*

The Appeals Committee will meet within two weeks of the Dean receiving the written appeal. The student may ask to meet with the Committee and may bring a faculty member of their choice as an advocate. The Appeals Committee may request to speak with persons that may have information pertinent to the appeal.

The Appeals Committee will review the appeal request with regards to: 1) whether Graduate School policies as outlined in this manual were followed, 2) the appropriateness of the evaluation of any information provided by the student, faculty or Program to the Promotions Committee, or 3) any other relevant information that was not available to the Promotions Committee.

Recommendations the Appeals Committee should reflect the decision of the majority of Committee members on the issues above. Based on recommendations of the Appeals Committee, the Dean will make the final decision regarding the appeal. If the recommendation of dismissal or other decision by the Promotion Committee is overturned by the Appeals Committee, the Dean, together with the Appeals Committee, must recommend a remediation plan for the student.

6.10.1.3 Responsibility of the Student's Graduate Program During the Appeals Process

During the appeals process(es), the student will retain his/her financial and research support from the student's Graduate Program, and will maintain academic enrollment.

6.11 Professional Conduct *(New 02/07/08, 8/16/19)*

Students are expected to perform their duties in a professional manner and abide by all the policies of Baylor College of Medicine including the BCM Code of Conduct, the Graduate School, and their Programs. Any conduct not in keeping with the ethical or professional standards of BCM is defined as professional misconduct. This includes, but is not limited to, actions of academic misconduct that occur in the context of meeting academic requirements (courses and Qualifying Examinations), scientific misconduct as defined by the College, violation of College policies, and acts of a criminal nature.

6.11.1 Academic Misconduct *(New 02/07/08, 07/29/13)*

Academic misconduct is defined as dishonesty (cheating, plagiarism, etc.) that occurs in conjunction with academic requirements such as courses or Qualifying Examinations. Allegations of academic misconduct should be made in writing to the Dean. In cases of alleged academic misconduct, the Dean will, within one week, appoint an Investigative Committee consisting of three faculty members and two students to investigate the allegations and report their findings and recommendations to the Promotions Committee (Section 6.8.2). The student has a right to receive a copy of the written allegations of academic misconduct provided to the Investigative Committee and to respond to the Committee orally or in writing concerning any allegations if he or she chooses. The student may bring a faculty member of their choosing to serve as an advocate.

6.11.2 Scientific Misconduct *(New 02/07/08)*

Scientific misconduct is defined as "fabrication, falsification, plagiarism or other acts that deviate from commonly accepted practices within the scientific community for proposing, conducting or reporting research" (US Public Health Service Regulations).

Allegations of scientific misconduct should be reported to the College officer in charge of investigating these allegations using the policies defined by the College. Once the College process has reached a conclusion and any appeals have concluded, any finding of scientific misconduct will be sent to the Promotions Committee for their review and action (section 6.8.2)

6.11.3 Violation of College Policies *(New 02/07/08, Revised 8/27/2015, 08/01/16)*

Graduate Students are expected to abide by all College policies that apply to them, including the policies set by the Graduate School, their Program and the College. The College policies include, but are not limited to, those pertaining to:

Human Resources (BCM Policy Section 02)

Information Technology Acceptable Use Policy (BCM Policy Section 12.02.01)

Use of Copyrighted Material (BCM Policy Section 20.8.03)

Diversity Policy (BCM Policy Section 02.2.40)

Gift Acceptance and Processing Policy (BCM Policy Section 17.02.01)

Environmental Safety:
http://intranet.bcm.tmc.edu/index.cfm?fuseaction=home.showpage&tmp=research/enviro_safety/main

Office of Research (Human and Animal Subject Research): http://intranet.bcm.tmc.edu/apps/research/oor/

Allegations of the violation of College policies by graduate students will be initially dealt with by the normal processes for handing such allegations within the College. When other College entities deal with professional misconduct allegations involving graduate students, the Graduate School Dean should be informed of these allegations if in keeping with confidentiality requirements. Under extraordinary circumstances, where there may be concerns about well-being of the student or others, the Dean may suspend the student while awaiting a final resolution of the allegation by the College.

If an allegation is substantiated, the Dean will inform the student, their Program director, and mentor in writing of the responsibilities of students to follow College and Program Policy and may recommend the matter to the Graduate School Promotions Committee if it is judged to be sufficiently serious to serve as grounds for dismissal (section 6.8.2).

6.11.4 Criminal Acts *(New 02/07/08)*

The Dean may recommend review of the status of a graduate student convicted of a criminal offense. If the criminal act is judged to be of a serious nature, the Dean may forward the case to the Promotions Committee for their review and recommendation concerning dismissal (section 6.8.2).

6.12 Participation in Extracurricular Activities *(New 08/23/04, Revised 08/01/16)*

Student who participate in extracurricular activities sponsored by the College requiring a significant time commitment including mentoring, recruiting, teaching assistantships, externships, etc. must be making good academic progress and have the permission of their mentor and Program director.

6.13 Student Written Grievance Policy *(New 08/15/05, Revised 07/30/12, 01/29/15, 8/27/15, 08/01/16)*

A grievance is a complaint arising out of any alleged unauthorized or unjustified act or decision by a member of the faculty, member of the administration, or member of the staff which in any way adversely affects the status, rights, or privileges of a member of the student body. A complaint is considered a written grievance whether it is filed on paper, online or on the phone. The burden of proof shall rest with the complainant.

Student complaints or grievances should initially be addressed, if possible, by the student discussing the problem with the individual (student, faculty, staff) most closely related to the area of the grievance. Following that, the student should contact the individual's Supervisor, Program Director, Departmental Chair, Associate or Assistant Dean and the Dean in the Graduate School of Biomedical Sciences. If the problem is not resolved, the student may file a formal written grievance with the Dean of the Graduate School of Biomedical Sciences using the Student Grievance form. If the problem is not resolved the student is encouraged to contact the Integrity Hotline (855-764-7292) to file a written grievance with the Office of the Provost. The Integrity Hotline may also be accessed through www.bcm.ethicspoint.com. Additional information is located in the BCM Student Grievances Policy (Section 23.1.08).

6.14 BCM Statement of Student Rights *(New 8/27/15)*

BCM is committed to creating an environment for students that is conducive to academic success and academic freedom commensurate with all applicable laws and regulations. As students are not only members of the Baylor academic community but are also members of society as a whole, Baylor works to ensure that all rights, protections, and guarantees that students are assured as citizens of society are also provided to them within Baylor.

Baylor College of Medicine's Statement of Student Rights aligns with the College's mission as a health sciences university that creates knowledge and applies science and discoveries to further education, healthcare and community service locally and globally. These rights embody our values of respect, integrity, innovation, teamwork, and excellence, our vision to improve health through science, scholarship and innovation and our adherence to the Institutional Code of Conduct.

Students have the right to freedom of expression within an atmosphere of culturally responsive inclusiveness and sensitivity. The free dissemination of ideas is key to promoting the academic, personal, and professional growth of Baylor students.

Students have the right to a safe learning environment that is free of discrimination, violence, and harassment. Baylor seeks to provide a community of respect, open communication, collaboration, and inclusiveness.

Students have the right to due process in incidents of alleged student misconduct, and have the right to appeal decisions in this regard. Baylor strives to guarantee accuracy in academic results and decisions.

Students have the right to confidentiality of education records. Explicit written confidentiality policies and procedures are in place to achieve the protection of all personal information and academic records.

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