BDSI-PhD Curriculum

Area 1 - Biomedical Informatics Foundations and Applications - 15-16 hours					
Research Foundations - Choose 1					
	3	MUSC	DHA 805	Qualitative Methods	
	3	MUSC	HIN 708	Applied Statistical and Research Methods	
	3	CLEM	HLTH 8210	Health Research 1: Design and Measurement	
Biomedical Informatics Foundations - Both					
	3	MUSC	BDSI 701/8010[1]	Intro to Biomedical Informatics	
	3	MUSC	BDSI 702/8020[2]	Biomedical Data Standards and Terminologies	
Track Specific Course - Choose 1					
	3	MUSC	BDSI 711/8110[3]	Precision Medicine Informatics	
	3	MUSC	BDSI 712/8120[4]	Clinical and Translational Informatics	
	3	CLEM	HLTH 8600	Clinical Decision Support Systems	
	3	CLEM	HLTH 8900	Population Health Informatics	
BDSI Electives - Choose 1-2 (minimum 3 hours)					
	2	MUSC	BDSI 731/8310	Microbiome Informatics	
	2	MUSC	BDSI 732	Health Enterprise Analytics	
	3	MUSC	BDSI 775	Systematic and Scoping Reviews	
	2	MUSC	BMTRY 783	Statistical Methods for Bioinformatics	
	3	CLEM	CPSC 8450	Bioinformatics Algorithms	
	3	MUSC	NEW BMI	Panomics	
	2	MUSC	NEW BMI	Consumer and Quantified Self	

Area 2 – Computing, Math, Stats, and Engineering - 18 hours					
Systems and Data Base Management - Choose 2					
	3	CLEM	CPSC 8700	Software Design	Applied Software Engineering
	3	CLEM	CPSC 8710	Foundations of Software Engineering	
	3	CLEM	CPSC 6550	Computational Science: Methods & Software Systems	Computing Environments
	3	CLEM	CPSC 8200	Parallel Architectures	
	3	CLEM	CPSC 8490	Principles of Scientific Computing	
	3	CLEM	ECE 6730	Introduction to Parallel Systems	
	3	CLEM	ECE 6780	General Purpose Computation on GPUs	
	3	CLEM	ECE 8780	High-Performance Computing with GPUs	
	3	CLEM	CPSC 6620	Database Management System	Data Management Tools and Technology
	3	CLEM	CPSC 8470	Introduction to Information Retrieval	
	3	CLEM	CPSC 8620	Database Management System Design	
	3	CLEM	CPSC 6140	Human and Computer Interaction	Human Factors/ HCI/Usability
	3	CLEM	HCC 8310	Fundamentals of Human-Centered Computing	
	3	CLEM	IE 6880	Human Factors Engineering	
	3	CLEM	IE 8000	Human Factors Engineering	

Math - Choose 1					
	4	MUSC	BMTRY 700	Introduction to Clinical Biostatistics	
	3	CLEM	MATH 8050	Applied Statistical Models I	
	3	CLEM	STAT 8010	Statistical Methods	

[1]	MUSC students will register for 701; Clemson students will register for 8010
[2]	MUSC students will register for 702; Clemson students will register for 8020
[3]	MUSC students will register for 711; Clemson students will register for 8110
[4]	MUSC students will register for 712; Clemson students will register for 8120
[5]	MUSC students will register for 721; Clemson students will register for 8210
[6]	MUSC students will register for 700; Clemson students will register for 8000
[7]	MUSC students will register for 720; Clemson students will register for 8880
[8]	Clemson students will register their dissertatin hours under the course prefix of their advisor's home department, with course number 9910

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Area 2 (continued) – Computing, Math, Stats, and Engineering - 18 hours					
Machine Learning/Data Science - Choose 1					
	3	MUSC	BDSI 721/8210	Applied Machine Learning	
	3	CLEM	CPSC 6300	Applied Data Science	
	3	CLEM	CPSC 6420	Artificial Intelligence	
	3	CLEM	CPSC 6430	Machine Learning: Implementation and Evaluation	
	3	CLEM	CPSC 8420	Advanced Machine Learning	
Other - Choose 2					
	3	CLEM	CPSC 8380	Advanced Data Structure	Algorithms and Data Structures
	3	CLEM	CPSC 8400	Design & Analysis of Algorithms	
	4	MUSC	BMTRY 701	Biostatistical Methods II	Biostatistics
	3	CLEM	HLTH 8310	Quantitative Analysis in Health Research I	
	3	CLEM	STAT 6020	Introduction to Statistical Computing	
	3	CLEM	STAT 8190	Biostatistics	
	3	MUSC	BMTRY 719	Bayesian Biostatistics	Data Mining
	3	CLEM	CPSC 8480	Network Science	
	3	CLEM	CPSC 8650	Data Mining	
	3	CLEM	ECE 8560	Pattern Recognition	
	3	CLEM	MATH 8070	Applied Multivariate Statistical Analysis	
	3	CLEM	ECE 6420	Knowledge Engineering	Decision Analysis/ Knowledge Integration/ Modeling
	3	CLEM	IE 8030	Engineering Optimization and Applications	
	3	CLEM	MATH 6410	Introduction to Stochastic Models	
	3	MUSC	DPHS NEW	GIS and Mapping for Public Health	Geospatial Analysis
	3	CLEM	PADM 8420	GIS for Public Administrators	
	3	CLEM	BIOE 6310/11	Medical Imaging	Image and Signal Processing
	3	CLEM	ECE 6310	Introduction to Computer Vision	
	3	CLEM	ECE 6670	Introduction to Digital Signal Processing	
	3	CLEM	ECE 8470	Digital Image Processing	
	3	MUSC	BDSI 722	Clinical Natural Language Processing	Natural Language Processing
	3	CLEM	CPSC 6030	Data Visualization	Visualization and Exploratory Data Analysis
	3	CLEM	CPSC 8030	Scientific Visualization	
	3	CLEM	CPSC 8430	Deep Learning	

Area 3 - Population Health, Health Systems, and Policy - 5-6 hours					
Choose 2 - Course Titles Must Be Different					
	3	MUSC	HAP 735-02	Health Law and Risk Management	Ethical, Legal, and Social Issues; Privacy and Security
	3	MUSC	HIN 716	Ethical, Legal, and Regulatory Issues in Health Informatics	
	3	MUSC	HAP 704-02	Health Policy	Health Policy
	3	CLEM	HLTH 8100	Health Policy	
	3	MUSC	DHA 807	Managing Healthcare Information	Health Systems
	3	CLEM	HLTH 8020	Health Economics	
	3	CLEM	HLTH 8110	Health Care Delivery Systems	
	3	MUSC	BMTRY 736	Foundations of Epidemiology I	Population Health
	3	MUSC	BMTRY 738	Field Epidemiology I	
	3	MUSC	BMTRY 747	Foundations of Epidemiology II	
	3	MUSC	DHA 850	Population Health Management	
	3	CLEM	HLTH 8090	Epidemiology	
	2	CLEM	HLTH 8130	Population Health and Research	
	3	CLEM	HLTH 8600	Clinical Decision Support Systems	
	2	CLEM	HLTH 8140	Health Systems Quality Improvement	Quality and Safety

Area 4 - Domain Biology/Medicine - 3-4 hours					
Choose 1					
	3	CLEM	BCHM 6360	Molecular Biology: Genes to Proteins	Biochemistry and Pathology
	3	CLEM	BCHM 6430	Molecular Basis for Disease	
	3	CLEM	BCHM 8140	Advanced Biochemistry	
	3	CLEM	BIOE 8460	Biomedical Basis for Engineered Replacement	Foundations of Biomedical Science
	3	CLEM	BIOL 8000	Concepts in Evolution, Ecology and Organismal B	
	3	CLEM	BIOL 8010	Concepts in Molecular, Cellular and Dev. Bio	
	2	MUSC	CGS 766	Genes: Inheritance and Expression	
	2	MUSC	CGS 767	Cells: Organization and Communication	
	3	CLEM	GEN 6400	Bioinformatics	
	3	CLEM	MICRO 8130	Practical Bioinformatics for Microbiologists	
	3	CLEM	PHYS 8190	Computational Biophysics	
	3	CLEM	GEN 6050	Molecular Genetics of Eukaryotes	Genetics
	3	CLEM	GEN 6100	Population & Quantitative Genetics	
	3	CLEM	GEN 6200	Molecular Genetics and Gene Regulation	
	3	CLEM	GEN 6700	Human Genetics	
	3	CLEM	GEN 8140	Advanced Genetics	
	3	CLEM	GEN 8500	Introduction to Quantitative Genetics	
	3	CLEM	MATH 9810	Statistical Genetics	
	3	CLEM	BIOL 6030	Introduction to Applied Genomics	Genomics
	3	CLEM	CHE 8450	Systems Biology and Pharmacology	
	3	CLEM	GEN 8060	Molecular Diagnostics and Pathogen Genomics	
	3	CLEM	GEN 8200	Genomics and Proteomics	
	3	CLEM	GEN 8450	Advanced Medical Bioinformatics	
	3	CLEM	GEN 8900	Regulatory Genomics	
	3	CLEM	HCG 9150	Principles of Pharmacogenomics	

Area 5 - Seminars/Lab Rotations/Research Hours - 26 hours				
Seminars BDSI (700) 8000 - 4 hours				
	1	___	BDSI 700/8000[6]	Seminar
	1	___	BDSI 700/8000	Seminar
	1	___	BDSI 700/8000	Seminar
	1	___	BDSI 700/8000	Seminar
Lab Rotations BDSI (720) 8880 - 4 hours				
	1	___	BDSI 720/8880[7]	Lab Rotation
	1	___	BDSI 720/8880	Lab Rotation
	1	___	BDSI 720/8880	Lab Rotation
	1	___	BDSI 720/8880	Lab Rotation
Research Hours - 18 hours				
	3	___	BDSI 970/90[8]	Dissertation Research
	3	___	BDSI 970/90	Dissertation Research
	3	___	BDSI 970/90	Dissertation Research
	3	___	BDSI 970/90	Dissertation Research
	3	___	BDSI 970/90	Dissertation Research
	3	___	BDSI 970/90	Dissertation Research