BIOINFORMATICS, PHD

Code	Title	Hours
BMSP 6340	Curr Prob Res App Genes/Genom	2
BIPG 5200	Statistical Methods in Bioinformatics	3
BIPG 5100	Fund Bioinformatics Proteomics	3
INDI 6020	On Being a Scientist	1
BMSP 6390	Mentored Research	1-15
BIPG 6100	Bioinformatic Computation	3
BMSP 6350	Cell Biology & Signaling (either/or)	3
BIPG 6400	Applications of Bioinformatics	3
BRIM 6200	Biomarker Disc,Valid & Impleme	3
BIPG 5400	Biodatabases	1
BIPG 6890	Independent Study in BPG	4
BIPG 5300	Current Topics in BPG	1
BIPG 9990	Dissertation Research in BIPG	1-9
BIPG 6500	Applied Statistics for Bioinformatics	3
BIPG 6200	Advanced Programming in Bioinformatics	3
BIPG 7300	Transcriptomic Data Science	3
BIPG 7350	Algorithms for Bioinformatics	3
BIPG 6300	Clinical Proteomics	2

First Year

First Term		**Hours**
BIPG 5100	Fund Bioinformatics Proteomics	3
BIPG 5200	Statistical Methods in Bioinformatics	3
BMSP 6340	Curr Prob Res App Genes/Genom	2
BMSP 6390	Mentored Research	1
	Hours	**9**
Second Term		
BIPG 6100	Bioinformatic Computation	3
BMSP 6350	Cell Biology & Signaling	3
BIPG 6400	Applications of Bioinformatics	3
Or		
BRIM 6200	Biomarker Disc,Valid & Impleme	
Or		
BIPG 6500	Applied Statistics for Bioinformatics	
	Hours	**9**
Third Term		
BIPG 5400	Biodatabases	1
BIPG 6890	Independent Study in BPG	1
BIPG 7300	Transcriptomic Data Science	3
INDI 6020	On Being a Scientist	1
Students must pass the BIPG 100 Questions preliminary exam before the end of the 1st year.		
	Hours	**6**

Second Year

Fourth Term		
BIPG 5300	Current Topics in BPG	1
BIPG 6890	Independent Study in BPG	3
BIPG 6300	Clinical Proteomics	2
BIPG 6200	Advanced Programming in Bioinformatics	3
PhD Qualifying Examination - successful completion required by end of Fall semester of Year 2		
	Hours	**9**
Fifth Term		
BIPG 9990	Dissertation Research in BIPG	2
BIPG 7350	Algorithms for Bioinformatics	3
BIPG 5300	Current Topics in BPG	1
BIPG 6500	Applied Statistics for Bioinformatics	3
	Hours	**9**
Sixth Term		
BIPG 9990	Dissertation Research in BIPG	6
	Hours	**6**

Third Year

Seventh Term		
BIPG 9990	Dissertation Research in BIPG	8
BIPG 5300	Current Topics in BPG	1
	Hours	**9**
Eighth Term		
BIPG 9990	Dissertation Research in BIPG	8
BIPG 5300	Current Topics in BPG	1
	Hours	**9**
Ninth Term		
BIPG 9990	Dissertation Research in BIPG	1-9
	Hours	**1-9**

Fourth Year

Tenth Term		
BIPG 9990	Dissertation Research in BIPG	1-9
	Hours	**1-9**
Eleventh Term		
BIPG 9990	Dissertation Research in BIPG	1-9

The PhD Qualifying Exam is taken in the Fall semester of the second year. Prior to completing the exam, students should carry out their dissertation research under the course BIPG6890 Independent Study in Bioinformatics. After passing the Qualifying Exam, students conduct their research under the course Dissertation Research (BIPG9990). The minimum number of credits required for PhD is 90, with a minimum of 25 credits of didactic coursework (letter grade), and a minimum of 30 credits of dissertation research. The remaining credits are approved electives and independent study in the Bioinformatics track.

	Hours	**1-9**
	Total Hours	**69-93**

- PLO 1. K1 Describe molecular, biochemical, and cellular mechanisms involved in regulation of cellular processes and development.

- PLO 2. K2 Explain fundamental systems biology technologies, such as proteomics, genomics and transcriptomics, and the bioinformatics tools central to their interpretation.
- PLO 3. K3 Describe algorithmic and statistical methods for analysis of nucleic acid and protein sequences, such as hidden Markov models and Bayesian statistics.
- PLO 4. K4 Explain principles and legal responsibilities that govern responsible conduct of research, and the accurate reporting of research results.
- PLO 5. S1 Execute technical procedures necessary for the completion of the student's doctoral thesis research project(s).
- PLO 6. S2 Design and complete an independent research project.
- PLO 7. S3 Use least two modern computer programming languages, such as PERL and Python, and the UNIX (Linux) operating system.
- PLO 8. S4 Appraise statistical and biological significance of bioinformatic results and patterns.
- PLO 9. S5 Demonstrate database design, management, and/or mining.
- PLO 10. S6 Experiment productively as an individual or member of a research team.
- PLO 11. S7 Critique, organize, and communicate research findings effectively, both orally and in writing.
- PLO 12. S8 Interrogate electronic databases via automated scripting.
- PLO 13. S9 Identify biomedical information for solving problems that are relevant to the appropriate completion of a research project, and the accurate reporting of the results.
- PLO 14. P1 Ethical, responsible, and reliable behavior in all aspects of their professional lives.
- PLO 15. P2 Honesty and integrity in all interactions with colleagues, research subjects, and others with whom students may interact in their professional lives.
- PLO 16. P3 Professionalism in dress and grooming in compliance with health and safety rules applicable to research laboratories and to other institutional and public sites.
- PLO 17. P4 Respect of and adherence to all laws and regulations governing the biomedical research use of animals and patient materials, and for all patient privacy issues.
- PLO 18. P5 Respect of and adherence to all laws and regulations governing ethical use of computers and remote computational facilities.