Class of 2023 Master of Science in Human Genetics and Genomic Data Analytics (MSDGA)

Students in the MSGDA program are required to complete a minimum of **65.5 credits** over the course of two years of study. The coursework is comprised of required courses, elective courses, and a capstone project. Students are required to declare a concentration by May 1 and will begin taking electives in their second year. Students will also complete a summer internship between their first and second year.

**Core Requirements**

| ****1st Year Fall Core Courses**** | ****Credits**** |
| --- | --- |
| **GENE 310** Human Molecular Genetics | 3.0 |
| **GENE 312** Programming for the Biosciences | 3.0 |
| **GENE 340** Genetic Disease Mechanisms | 1.5 |
| **ALS 359** Introduction to Bioscience Industries | 3.0 |
| **ALS 434** Clinical Biostatistics | 3.0 |
| **ALS 481A** Fundamental Papers in Applied Medicine | 1.5 |
| **GENE 348A** Journal Club | **0** |
| **Subtotal** | **15.0** |

| ****1st Year Spring Core Courses**** | ****Credits**** |
| --- | --- |
| **GENE 360** Human Genomics | 3.0 |
| **GENE 362** Human Genomics NGS Lab | 2.0 |
| **GENE 370** Clinical Cancer Genomics | 3.0 |
| **GENE 380** Medical Genetics | 3.0 |
| **GENE 390** Biochemical Genetics | 1.5 |
| **ALS 341** Healthcare and Life Science Industry Ethics | 1.5 |
| **ALS 411** Biomedical Data Systems and Informatics | 1.5 |
| **ALS 436** Clinical Trial Design and Literature Evaluation | 3.0 |
| **GENE 348B** Journal Club | 0 |
| **Subtotal** | **18.5** |

| ****2nd Year Fall Core Courses**** | ****Credits**** |
| --- | --- |
| **GENE 430** DNA Sequencing and Variant Analysis | 3.0 |
| **GENE 440** Functional Genomics | 3.0 |
| **GENE 490** Capstone | 6.0 |
| **GENE 348C** Journal Club | 0.0 |
| **Subtotal** | **12.0** |

| ****2nd Year Spring Core Courses**** | ****Credits**** |
| --- | --- |
| **GENE 435** Genomic Knowledge Translation | 3.0 |
| **GENE 445** Genomic Data Visualization and Management | 3.0 |
| **ALS 407B** Pharmacogenomics and Precision Medicine | 1.5 |
| **ALS 430A** Advanced Pharmaceutical Discovery | 1.5 |
| **GENE 491** Capstone | 6.0 |
| **GENE 348D** Journal Club | 0 |
| **Subtotal** | **15.0** |

**Concentrations**

In addition to the above courses, students will select 6 credits of electives to satisfy their concentration requirement. Up to 3 credits may be counted from courses taken at CGU with permission of the program director.

| Clinical Decision Support | ****Credits**** |
| --- | --- |
| **GENE 320** Human Embryology and Prenatal Diagnosis | 3.0 |
| **GENE 447** Microbiomics and Pathogen Genomics | 1.5 |
| **ALS 402** Molecular Basis of Disease | 1.5 |
| **ALS 408** Advanced In Vitro Diagnostics | 3.0 |
| **ALS 460** Advanced Writing and Editing for Profession Publications | 1.5 |
| **ALS 380** Medical Terminology | 3.0 |
| **ALS 413** Machine Learning in the Life Sciences | 1.5 |
| **ALS 481B** Fundamental Papers in Applied Medicine | 1.5 |

| Clinical Trial Design | ****Credits**** |
| --- | --- |
| **GENE 446** Genetic Engineering | 1.5 |
| **ALS 362** Introduction to US Food and Drug Law | 1.5 |
| **ALS 330** Pharmaceutical Discovery | 1.5 |
| **ALS 333** Pharmaceutical Development | 1.5 |
| **ALS 401** Biotechnology-based Therapeutics  | 3.0 |
| **ALS 409** Technologies for Biomarker and Drug Discovery | 1.5 |
| **ALS 433** Design of Clinical Trials | 1.5 |
| **ALS 413** Machine Learning in the Life Sciences | 1.5 |

| Assay Development | ****Credits**** |
| --- | --- |
| **GENE 446** Genetic Engineering | 1.5 |
| **ALS 300** Fundamentals of Biotechnology | 1.5 |
| **ALS 320** Medical Diagnostics | 3.0 |
| **ALS 362** Introduction to US Food and Drug Law | 1.5 |
| **ALS 408** Advanced In Vitro Diagnostics | 3.0 |
| **ALS 409** Technologies for Biomarker and Drug Discovery | 1.5 |
| **ALS 424** Business Operations | 3.0 |
| **ALS 425** Device and Diagnostic Product Development | 3.0 |
| **ALS 448** Organizational Analytics | 1.5 |
| **ALS 380** Medical Terminology | 3.0 |
| **ALS 413** Machine Learning in the Life Sciences | 1.5 |
| **ALS 481B** Fundamental Papers in Applied Medicine | 1.5 |