Any experimental courses offered by GDCB can be found at:
registrar.iastate.edu/faculty-staff/courses/explistings/ (http://
www.registrar.iastate.edu/faculty-staff/courses/explistings/)

Courses primarily for graduate students, open to qualified
undergraduates:

GDCB 510: Transmission Genetics
(3-0) Cr. 3. F.
Prereq: GEN 410 or graduate standing
In-depth investigations of modern research practices of transmission
genetics. Designed for students interested in genetic research. Topics
include: Mendelian genetic analysis, analysis of genetic pathways,
mutational analysis of gene function, chromosomal mechanics, genetic
mapping, epigenetic inheritance, human genetic analysis.

GDCB 511: Advanced Molecular Genetics
(Cross-listed with MCDB). (3-0) Cr. 3. S.
Prereq: BIOL 313 and BBMB 405
Mechanisms of molecular genetic processes in eukaryotes and
prokaryotes, including DNA replication and repair, transcription,
translation and regulation of gene expression. Critical evaluation and
discussion of current primary literature, methodologies and experimental
data.

GDCB 513: Plant Metabolism
(Cross-listed with PLBIO). (2-0) Cr. 2. Alt. F., offered even-numbered years.
Prereq: BIOL 330, PHYS 131, CHEM 331; one semester of biochemistry
recommended
Photosynthesis, respiration, and other aspects of plant metabolism.

GDCB 528: Advances in Molecular Cell Biology
(Cross-listed with MCDB). (3-0) Cr. 3. Alt. F., offered even-numbered years.
Prereq: Courses in general cell biology and biochemistry
Cell biological processes including cell signaling, cell division,
intracellular trafficking, biogenesis of organelles, cell adhesion and
motility.

GDCB 533: Advances in Developmental Biology
(Cross-listed with MCDB). (3-0) Cr. 3. Alt. F., offered odd-numbered years.
Prereq: BIOL 314 or Biol 423
Fundamental principles in multicellular development. Emphasis on
cellular and molecular regulation of developmental processes, and
experimental approaches as illustrated in the current literature.

GDCB 536: Statistical Genetics
(Cross-listed with STAT). (3-0) Cr. 3.
Prereq: STAT 401 or STAT 587; STAT 447 or STAT 588; GEN 320 or BIOL 313
Statistical models and methods for genetics covering models of
population processes: selection, mutation, migration, population
structure, and linkage disequilibrium, and inference techniques: genetic
mapping, linkage analysis, and quantitative trait analysis. Applications
include genetic map construction, gene mapping, genome-wide
association studies (GWAS), inference about population structure,
phylogenetic tree construction, and forensic and paternity identification.

GDCB 542: Introduction to Molecular Biology Techniques
(Cross-listed with B M S, EEOB, FS HN, HORT, NREM, NUTRS, V MPM,
VDPAM). Cr. 1. Repeatable. F.S.SS.
Sessions in basic molecular biology techniques and related procedures.
Offered on a satisfactory-fail basis only.

GDCB 542A: Introduction to Molecular Biology Techniques: DNA
Techniques
(Cross-listed with B M S, BBMB, EEOB, FS HN, HORT, NREM, NUTRS, V
MPM, VDPAM). Cr. 1. Repeatable. F.S.
Includes genetic engineering procedures, sequencing, PCR, and
genotyping. Offered on a satisfactory-fail basis only.

GDCB 542B: Introduction to Molecular Biology Techniques: Protein
Techniques. Includes: fermentation, protein isolation, protein purification,
SDS-PAGE, Western blotting, NMR, confocal microscopy and laser
microdissection, Immunophenotyping, and monoclonal antibody
production. Sessions in basic molecular biology techniques and related
procedures. Offered on a satisfactory-fail basis only.

GDCB 542C: Introduction to Molecular Biology Techniques: Cell
Techniques
(Cross-listed with B M S, BBMB, EEOB, FS HN, HORT, NREM, NUTRS, V
MPM, VDPAM). Cr. 1. Repeatable. S.SS.
Includes: immunophenotyping, ELISA, flow cytometry, microscopic
techniques, image analysis, confocal, multiphoton and laser capture
microdissection. Offered on a satisfactory-fail basis only.

GDCB 542D: Introduction to Molecular Biology Techniques: Plant
Transformation
(Cross-listed with B M S, BBMB, EEOB, FS HN, HORT, NREM, NUTRS, V
MPM, VDPAM). Cr. 1. Repeatable. S.
Includes: Agrobacterium and particle gun-mediated transformation of
tobacco, Arabidopsis, and maize, and analysis of transformands. Offered
on a satisfactory-fail basis only.
GDCB 542E: Introduction to Molecular Biology Techniques: Proteomics  
(Cross-listed with B M S, BBMB, EEOB, FS HN, HORT, NREM, NUTRS, V MPM, VDPAM). Cr. 1. Repeatable. F.  
Includes: two-dimensional electrophoresis, laser scanning, mass spectrometry, and database searching. Offered on a satisfactory-fail basis only.

GDCB 542F: Introduction to Molecular Biology Techniques: Metabolomics  
(Cross-listed with B M S, BBMB, EEOB, FS HN, HORT, NREM, NUTRS, V MPM, VDPAM). Cr. 1. Repeatable. F.  
Includes: metabolomics and the techniques involved in metabolite profiling. For non-chemistry majoring students who are seeking analytical aspects into their biological research projects. Offered on a satisfactory-fail basis only.

GDCB 542G: Introduction to Molecular Biology Techniques: Genomic  
(Cross-listed with B M S, BBMB, EEOB, FS HN, HORT, NREM, NUTRS, V MPM, VDPAM). Cr. 1. Repeatable. S.  
Offered on a satisfactory-fail basis only.

GDCB 544: Fundamentals of Bioinformatics  
(Cross-listed with BCB, COM S, CPR E). (4-0) Cr. 4. Alt. F., offered odd-numbered years.  
Prereq: MATH 165 or STAT 401 or equivalent  
A practical, hands-on overview of how to apply bioinformatics to biological research. Recommended for biologists desiring to gain computational molecular biology skills. Topics include: sequence analysis, genomics, proteomics, phylogenetic analyses, ontology enrichment, systems biology, data visualization and emergent technologies.

GDCB 545: Plant Molecular, Cell and Developmental Biology  
(Cross-listed with MCD, PLBIO). (3-0) Cr. 3. Alt. F., offered odd-numbered years.  
Prereq: BIOL 313, BIOL 314, BIOL 330 or BBMB 405  
Plant nuclear and organelle genomes; regulation of gene expression; hormone signaling; organization, function, and development of plant cells and subcellular structures; regulation of plant growth and development.

GDCB 545: Cellular, Molecular and Developmental Neuroscience  
(Cross-listed with B M S, NEURO). (3-0) Cr. 3. Alt. F., offered odd-numbered years.  
Prereq: BIOL 335 or BIOL 436; physics recommended  
Fundamental principles of neuroscience including cellular and molecular neuroscience, nervous system development, and regulatory systems.

GDCB 556: Rotations in Neuroscience  
(Cross-listed with NEURO). (2-0) Cr. 2. F.S.  
Rotation experiences in various neuroscience research methods and techniques related to our current faculty specialties.

GDCB 557: Statistical Bioinformatics  
(Cross-listed with BCB, COM S, STAT). (3-0) Cr. 3. S.  
Prereq: BCB 567 or (BIOL 315 and one of STAT 430 or STAT 483 or STAT 583), credit or enrollment in GEN 409  
Statistical models for sequence data, including applications in genome annotation, motif discovery, variant discovery, molecular phylogeny, gene expression analysis, and metagenomics. Statistical topics include model building, inference, hypothesis testing, and simple experimental design, including for big data/complex models.

GDCB 558: Systems Biology  
(Cross-listed with BCB, COM S, CPR E, STAT). (3-0) Cr. 3. S.  
Prereq: BCB 567, BBMB 316, GEN 409, STAT 430  

GDCB 568: Fundamentals of Predictive Plant Phenomics  
(Cross-listed with BCB, M E). Cr. 4. F.  
Principles of engineering, data analysis, and plant sciences and their interplay applied to predictive plant phenomics. Transport phenomena, sensor design, image analysis, graph models, network data analysis, fundamentals of genomics and phenomics. Multidisciplinary laboratory exercises.

GDCB 590: Special Topics  
Cr. arr. Repeatable.  
Prereq: Permission of instructor

Courses for graduate students:
GDCB 661: Advanced Topics in Neuroscience
(Cross-listed with BBMB, KIN, NEURO). (3-0) Cr. 3. Repeatable. Alt. S., offered even-numbered years.
Prereq: NEURO 556 (or comparable course) or permission of instructor
Students will present three journal articles and two overview lectures on topics in neuroscience that are related but outside of their own research interest.

GDCB 690: Seminar in GDCB
Cr. 1. Repeatable.
Research seminars by faculty, invited speakers, and graduate students. Offered on a satisfactory-fail basis only.

GDCB 696: Research Seminar
(Cross-listed with AGRON, BBMB, FOR, HORT, PLBIO). Cr. 1. Repeatable.
Research seminars by faculty and graduate students. Offered on a satisfactory-fail basis only.

GDCB 698: Seminar in Molecular, Cellular, and Developmental Biology
(Cross-listed with BBMB, MCDB, MICRO, V MPM). (2-0) Cr. 1-2.
Repeatable. S.
Student and faculty presentations.

GDCB 699: Research
Cr. arr. Repeatable.
Research for thesis or dissertation. Offered on a satisfactory-fail basis only.