MAS Elective Courses

- At least 17 credits required. Any elective courses selected must differ from those taken to fulfill core course requirements.
- Only 6 credit hours of 400 level courses are allowed. Cross-listed Animal Science 400 level courses are not allowed.
- Piggybacked 400 level courses that are taken as an undergraduate cannot be taken as a 500 level course.
- Additional elective courses not on the general elective course list may be included in a MAS degree plan of work with mentor’s permission and DGP approval.
- 900 level Vet School courses are not considered graduate courses and will not count towards a MS, MAS or PhD degree. MS or MAS students who get accepted to Vet School before they receive their Masters will not be able to transfer 900 level courses from the Vet Curriculum into their Graduate Plan of Work. There will be no exceptions to this rule.

General Departmental Listings for MAS Graduate Program Elective Courses:

*Agriculture and Extension Education*

AEE 426 - Methods of Teaching Agriculture  
AEE 470 - Agricultural Communications  
AEE 478 - Extension as Non-Formal Education  
AEE 500 - Agricultural Education, Schools and Society  
AEE 501 - Foundations of Agricultural and Extension Education  
AEE 503 - Youth Program Management  
AEE 505 - Trends and Issues in Agricultural and Extension Education  
AEE 507 - Comparative Agricultural and Extension Education  
AEE 521 - Program Planning in Agricultural and Extension Education  
AEE 522 - Occupational Experience in Agriculture  
AEE 523 - Adult Education in Agriculture  
AEE 524 – Coordinating the High School Agricultural Education Program  
AEE 526 - Information Technologies in Agricultural and Extension Education  
AEE 528 - Instructional Design in Agricultural and Extension Education  
AEE 529 - Curriculum Development in Agricultural and Extension Education  
AEE 530 - Priority Management in Agricultural and Extension Education  
AEE 533 – Leadership and Management of Volunteers in Agricultural and Extension Education  
AEE 535 - Teaching Agriculture in Secondary Schools  
AEE 560 - Organizational and Administrative Leadership in Agricultural and Extension Education  
AEE 577 - Evaluation in Agricultural and Extension Education  
AEE 578 - Scientific Inquiry in Agricultural and Extension Education  
AEE 735 - Effective Teaching in Agriculture and Life Sciences  
AEE 740 - Extension in Developing Countries
Animal Science

ANS 530 - Advanced Applied Animal Reproduction
ANS 531 - Advanced Applied Animal Reproduction Lab
ANS 540 - Selection of Domestic Animals
ANS 550 - Applied Ruminant Nutrition
ANS 552 - Advanced Reproductive Physiology & Biotechnology
ANS 553 - Growth and Development of Domestic Animals
ANS 554 - Lactation, Milk, and Nutrition
ANS 561 - Equine Nutrition
ANS 571 - Regulation of Metabolism
ANS 575 - Current Topics in Genomics and Proteomics in Animal Science
ANS 601 – Animal Science Seminar
ANS 602 - Seminar In Biology of Reproduction
ANS 603 - Reproductive Physiology Seminar
ANS 604 - Animal Breeding and Genetics Seminar
ANS 610 - Topical Problems in Animal Science
ANS 685 - Master's Supervised Teaching
ANS 701 - Protein and Amino Acid Metabolism
ANS 702 - Reproductive Physiology of Mammals
ANS 706 - Mammalian Embryo Manipulation
ANS 708 - Genetics of Animal Improvement
ANS 709 - Energy Metabolism
ANS 713 - Quantitative Genetics and Breeding
ANS 726 – Advanced Topics in Quantative Genetics and Breeding
ANS 764 - Advances in Gastrointestinal Pathophysiology
ANS 775 - Mineral Metabolism
ANS 780 - Mammalian Endocrinology
ANS 785 - Digestion and Metabolism in Ruminants

Agricultural Resource Economics

ARE 404 – Advanced Agribusiness Management
ARE 412 – Advanced Agribusiness Marketing
ARE 413 – Applied Agribusiness Marketing
ARE 433 - U.S. Agricultural Policy
ARE 436 - Environmental Economics

Biology

BIO 402 - Invertebrate Zoology
BIO 405 - Functional Histology
BIO 410 - Introduction to Animal Behavior
BIO 413 - Cell Biology
BIO 421 - Advanced Human Anatomy & Physiology Lab
BIO 422 - Biological Clocks
BIO 424 - Endocrinology
BIO 425 - General Entomology
**BIO 430** - Fisheries and Wildlife Administration  
**BIO 460** – Field Ecology and Methods  
**BIO 434** – Hormones and Behavior  
**BIO 449** - Principles of Biological Oceanography  
**BIO 488** - Neurobiology

**Biological and Agricultural Engineering**

**BAE 435** - Precision Agriculture Technology  
**BAE 442** - Systems Approach to Agricultural and Environmental Issues  
**BAE 472** - Irrigation and Drainage  
**BAE 501** - Instrumentation for Biological Systems  
**BAE 535** - Precision Agriculture Technology  
**BAE 572** - Irrigation and Drainage  
**BAE 573** - Introduction to Surface Hydrologic/Water Quality Modeling  
**BAE 576** - Watershed Monitoring and Assessment  
**BAE 578** - Agricultural Waste Management  
**BAE 771** - Theory of Drainage – Saturated Flow  
**BAE 785** - Food Rheology

**Business Administration**

**MBA 514** - Technology, Law, and the Internet  
**MBA 515** – Enterprise Systems  
**MBA 520** – Managerial Finance  
**MBA 554** - Project Management  
**MBA 570** - Managing the Growth Venture  
**MBA 576** - Technology Evaluation and Commercialization Concepts  
**MBA 577** - Technology Evaluation and Strategy  
**MBA 580** - Global Strategy  
**MBA 585** - Current Topics in BioSciences Management  
**MBA 586** - Legal and Marketing Dynamics in Pharmaceutical and Biotechnology

**Business Management**

**BUS 590** – Special Topics in Business Management

**Molecular and Structural Biochemistry**

**BCH 451** - Principles of Biochemistry  
**BCH 452** - Introductory Biochemistry Laboratory  
**BCH 453** - Biochemistry of Gene Expression  
**BCH 454** - Advanced Biochemistry Laboratory  
**BCH 455** - Proteins and Molecular Mechanisms  
**BCH 552** - Experimental Biochemistry  
**BCH 553** - Biochemistry of Gene Expression  
**BCH 555** - Proteins and Molecular Mechanisms  
**BCH 571** - Regulation of Metabolism
BCH 703 - Macromolecular Synthesis and Regulation
BCH 705 – Biological Scanning Electron Microscopy
BCH 751 - Biophysical Chemistry
BCH 761 - Advanced Molecular Biology of the Cell
BCH 763 - Biochemistry of Hormone Action
BCH 768 - Nucleic Acids: Structure and Function

Biotechnology

BIT 410 - Manipulation of Recombinant DNA
BIT 462 - Gene Expression Analysis: Microarrays
BIT 464 - Protein Purification
BIT 465 - Real-time PCR Techniques
BIT 466 - Animal Cell Culture Techniques
BIT 467 - PCR and DNA Fingerprinting
BIT 468 - Genome Mapping
BIT 501 - Ethical Issues in Biotechnology
BIT 510 - Core Technologies in Molecular and Cellular Biology
BIT 562 - Gene Expression: Microarrays
BIT 564 - Protein Purification
BIT 565 - Real-time PCR Techniques
BIT 566 - Animal Cell Culture Techniques
BIT 568 - Genome Mapping
BIT 569 - RNA Purification and Analysis

Comparative Biomedical Sciences

CBS 662 - Professional Conduct in Biomedical Research
CBS 730 - Veterinary Histology
CBS 731 - Applied Veterinary Anatomy I
CBS 732 - Biological Light and Electron Microscopy: Principles and Practice
CBS 754 - Principles Of Analytical Epidemiology
CBS 755 - Immunoparasitology
CBS 760 - Molecular Technologies for Epidemiologic Investigation
CBS 762 - Principles of Pharmacology
CBS 770 - Cell Biology
CBS 771 - Cancer Biology
CBS 773 - Advanced Developmental Biology
CBS 774 - Epidemiology Of Infectious Diseases Of International Importance
CBS 780 - Veterinary Production Epidemiology
CBS 782 - Marine Mammal Medicine
CBS 783 - Advanced Immunology
CBS 785 - Advanced and Molecular Pharmacology
CBS 787 - Pharmacokinetics
Crop Science

**CS 411** - Crop Ecology
**CS 414** - Weed Science
**CS 415** - Integrated Pest Management
**CS 430** - Advanced Agroecology
**CS 462** - Soil-Crop Management Systems
**CS 717** - Weed Management Systems

Economics

**EC 404** - Money, Financial Markets, and the Economy
**EC 410** - Public Finance
**EC 413** - Competition, Monopoly and Public Policy
**EC 431** - Labor Economics
**EC 436** - Environmental Economics
**EC 437** - Health Economics
**EC 448** - International Trade
**EC 449** - International Finance
**EC 451** - Introduction to Econometrics
**EC 471** - Evolution of the American Economy
**EC 474** - Economics of Financial Institutions and Markets

Economics-Graduate

**ECG 505** - Applied Microeconomic Analysis
**ECG 506** - Applied Macroeconomic Analysis
**ECG 512** - Law and Economics
**ECG 515** - Environmental and Resource Policy
**ECG 537** - Health Economics
**ECG 540** - Economic Development
**ECG 700** - Fundamentals of Microeconomics
**ECG 703** - Fundamentals of Macroeconomics
**ECG 706** - Industrial Organization
**ECG 715** - Environmental and Resource Economics
**ECG 730** - Labor Economics
**ECG 741** - Agricultural Production and Supply
**ECG 742** - Consumption, Demand and Market Interdependency
**ECG 748** - Theory of International Trade
**ECG 749** - Monetary Aspects of International Trade

Entomology

**ENT 425** - General Entomology
**ENT 503** - Insect Morphology and Physiology
**ENT 550** - Fundamentals of Arthropod Management
**ENT 582** - Medical and Veterinary Entomology
**ENT 726** - Biological Control of Insects and Weeds
ENT 762 - Insect Pest Management In Agricultural Crops

**Food Science**

FS 402 - Chemistry of Food and Bioprocessed Materials  
FS 403 - Analytical Techniques in Food & Bioprocessing Science  
FS 405 - Food Microbiology  
FS 406 - Food Microbiology Lab  
FS 407 - Risk Analysis and Hazard Analysis in Food Safety  
FS 416 - Quality Control in Food and Bioprocessing  
FS 421 - Food Preservation  
FS 453 - Food Laws and Regulations  
FS 462 - Postharvest Physiology  
FS 520 - Pre-Harvest Food Safety  
FS 530 - Post-Harvest Food Safety  
FS 540 - Food Safety and Public Health  
FS 553 - Food Laws and Regulations  
FS 554 - Lactation, Milk, and Nutrition  
FS 555 - Exercise Nutrition  
FS 562 - Post-harvest Physiology  
FS 567 - Sensory Analysis of Foods  
FS 580 - Professional Development and Ethics in Food Safety  
FS 706 - Vitamin Metabolism  
FS 725 - Fermentation Microbiology  
FS 730 - Human Nutrition

**Fisheries and Wildlife Sciences**

FW 453 - Principles of Wildlife Science  
FW 515 - Fish Physiology  
FW 553 - Principles of Wildlife Science  
FW 560 - International Wildlife Management and Conservation  
FW 586 - Aquaculture I

**Genetics**

GN 513 - Advanced Genetics  
GN 701 - Molecular Genetics  
GN 702 - Cellular and Developmental Genetics  
GN 703 - Population and Quantitative Genetics  
GN 708 - Genetics of Animal Improvement  
GN 713 - Quantitative Genetics and Breeding  
GN 721 - Genetic Data Analysis  
GN 735 - Functional Genomics  
GN 740 - Evolutionary Genetics  
GN 750 - Developmental Genetics  
GN 755 - Population Genetics  
GN 757 - Statistics for Molecular Quantitative Genetics
GN 761 - Advanced Molecular Biology of the Cell
GN 768 - Nucleic Acids: Structure and Function

**Immunology**

IMM 705 - Immunotoxicology
IMM 751 - Immunology
IMM 755 - Immunoparasitology
IMM 783 - Advanced Immunology

**Microbiology**

MB 405 - Food Microbiology
MB 406 - Food Microbiology Lab
MB 411 - Medical Microbiology
MB 412 - Medical Microbiology Laboratory
MB 414 - Microbial Metabolic Regulation
MB 441 - Immunology
MB 451 - Microbial Diversity
MB 455 - Microbial Biotechnology
MB 461 - Introduction to Molecular Virology
MB 714 - Microbial Metabolic Regulation
MB 718 - Introductory Virology
MB 725 - Fermentation Microbiology
MB 751 - Immunology
MB 758 - Prokaryotic Molecular Genetics
MB 771 - Molecular Virology of Animal Viruses
MB 783 - Advanced Immunology

**Nutrition**

NTR 420 - Community Nutrition
NTR 500 - Principles of Human Nutrition
NTR 550 - Applied Ruminant Nutrition
NTR 554 - Lactation, Milk, and Nutrition
NTR 555 - Exercise Nutrition
NTR 701 - Protein and Amino Acid Metabolism
NTR 706 - Vitamin Metabolism
NTR 708 - Energy Metabolism
NTR 730 - Human Nutrition
NTR 764 - Advances in Gastrointestinal Pathophysiology
NTR 775 - Mineral Metabolism
NTR 785 - Digestion and Metabolism in Ruminants

**Philosophy**

PHI 420 - Global Justice
PHI 425 - Introduction to Cognitive Science
PHI 440 - The Scientific Method
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<tr>
<th>Course Code</th>
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<tr>
<td>PHI 475</td>
<td>Ethical Theory</td>
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<td>PHI 520</td>
<td>Global Justice</td>
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<td>PHI 540</td>
<td>The Scientific Method</td>
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<td>PHI 545</td>
<td>Philosophy of Biology</td>
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<tr>
<td>PHI 575</td>
<td>Ethical Theory</td>
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**Physiology**

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<td>General Physiology II</td>
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<td>PHY 524</td>
<td>Comparative Endocrinology</td>
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<tr>
<td>PHY 552</td>
<td>Advanced Reproductive Physiology &amp; Biotechnology</td>
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<td>PHY 702</td>
<td>Reproductive Physiology of Mammals</td>
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<tr>
<td>PHY 764</td>
<td>Advances in Gastrointestinal Pathophysiology</td>
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<td>PHY 780</td>
<td>Mammalian Endocrinology</td>
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**Poultry Science**

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<tr>
<td>PO 410</td>
<td>Production and Management of Game Birds in Confinement</td>
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<td>PO 421</td>
<td>Commercial Egg Production</td>
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<td>PO 422</td>
<td>Incubation and Hatchery Management</td>
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<td>PO 424</td>
<td>Poultry Meat Production</td>
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<td>PO 435</td>
<td>Poultry Incubation &amp; Breeding</td>
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<td>PO 524</td>
<td>Comparative Endocrinology</td>
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<td>PO 566</td>
<td>Animal Cell Culture Techniques</td>
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<td>PO 757</td>
<td>Comparative Immunology</td>
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<td>PO 775</td>
<td>Mineral Metabolism</td>
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**Plant Pathology**

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<tr>
<td>PP 530</td>
<td>Agriculture, Ethics and the Environment</td>
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**Soil Science**

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<th>Course Code</th>
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<tr>
<td>SSC 440</td>
<td>Geographic Information Systems (GIS) in Soil Science &amp; Agriculture</td>
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<td>SSC 452</td>
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<td>SSC 461</td>
<td>Soil Physical Properties and Plant Growth</td>
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<td>SSC 462</td>
<td>Soil-Crop Management Systems</td>
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<td>SSC 470</td>
<td>Wetland Soils</td>
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<td>SSC 532</td>
<td>Soil Microbiology</td>
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<td>SSC 541</td>
<td>Soil Fertility</td>
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<td>SSC 545</td>
<td>Remote Sensing Applications in Soil Science and Agriculture</td>
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<td>SSC 551</td>
<td>Soil Morphology, Genesis and Classification</td>
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<td>SSC 562</td>
<td>Environmental Applications of Soil Science</td>
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<td>SSC 570</td>
<td>Wetland Soils</td>
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<tr>
<td>SSC 701</td>
<td>Tropical Soils: Characteristics and Management</td>
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### Statistics
- **ST 430** - Introduction to Regression Analysis
- **ST 431** - Introduction to Experimental Design
- **ST 432** - Introduction to Survey Sampling
- **ST 435** - Statistical Methods for Quality and Productivity Improvement
- **ST 445** - Introduction to Statistical Computing and Data Management
- **ST 505** - Applied Nonparametric Statistics
- **ST 506** - Sampling Animal Populations
- **ST 511** - Experimental Statistics for Biological Sciences I
- **ST 512** - Experimental Statistics for Biological Sciences II
- **ST 520** - Statistical Principles of Clinical Trials and Epidemiology
- **ST 524** - Statistics in Plant Science
- **ST 546** - Probability and Stochastic Processes I
- **ST 708** - Applied Least Squares
- **ST 711** - Design Of Experiments
- **ST 715** - Theory Of Sampling Applied To Survey Design
- **ST 721** - Genetic Data Analysis
- **ST 730** - Applied Time Series Analysis
- **ST 731** - Applied Multivariate Statistical Analysis
- **ST 732** - Applied Longitudinal Data Analysis
- **ST 733** - Applied Spatial Statistics
- **ST 747** - Probability and Stochastic Processes II
- **ST 748** - Stochastic Differential Equations
- **ST 757** - Statistics for Molecular Quantitative Genetics
- **ST 771** - Biomathematics I
- **ST 772** - Biomathematics II

### Toxicology
- **TOX 401** - Principles of Toxicology
- **TOX 415** - Environmental Toxicology and Chemistry
- **TOX 501** - Principles of Toxicology
- **TOX 701** – Fundamentals of Toxicology
- **TOX 704** - Chemical Risk Assessment
- **TOX 705** - Immunotoxicology
- **TOX 710** – Molecular and Biochemical Toxicology
- **TOX 715** - Environmental Toxicology
- **TOX 727** - Pesticide Behavior and Fate in the Environment
- **TOX 771** - Cancer Biology

### Zoology
- **ZO 503** - General Physiology I
- **ZO 504** - General Physiology II
- **ZO 512** - Animal Symbiosis
- **ZO 513** - Comparative Physiology
ZO 522 - Biological Clocks
ZO 524 - Comparative Endocrinology
ZO 544 - Mammology
ZO 553 - Principles of Wildlife Science
ZO 582 - Medical and Veterinary Entomology
ZO 588 - Neurobiology
ZO 718 - Community Ecology
ZO 756 - Ecology of Fishes
ZO 791 - Topics in Animal Behavior