

# SEED TECHNOLOGY AND BUSINESS

(Interdepartmental Graduate Major)

The Graduate Program in Seed Technology and Business (STB) offers students advanced study in the seed science and technology and business management appropriate for application in the seed sector.

The STB program is focused on preparing students for seed-related management roles by training the next generation of seed leaders.

The program is offered by departments in the Ivy Colleges of Business and Agriculture and Life Sciences: Accounting, Agronomy, Finance, Horticulture, Agricultural Biosystems Engineering, Management Information Systems, Management, Marketing and Plant Pathology.

This multidisciplinary program offers a focused online curriculum for a Master of Science in Seed Technology and Business, along with Graduate Certificates in Seed Science and Technology and in Seed Business Management.

## Online Graduate Program in Seed Technology & Business

The curriculum offers a set of scientific and technical courses that are focused on seed, with a set of basic management courses, similar to those in the core courses of an MBA program. The business courses will use examples drawn from the seed industry. A creative component is required for the Master of Science degree.

Prerequisite for the program is a bachelor's degree in business, agriculture, other biological discipline, or related degrees. Graduate training in these disciplines will also be considered.

Graduates of the Graduate Program in Seed Technology and Business will be prepared for roles in management and leadership within private and public seed and seed-related organizations.

All of the courses listed below are required for the Master of Science degree. The pace of the course sequence is designed to allow the students with work and other commitments to participate. Students will complete the creative component under the guidance of their Program of Study Committee. In many cases, the creative component topic will be associated with the student's work.

Graduates of the Master of Science curriculum will be prepared for roles in management and leadership within seed related organizations, private and public.

### Master of Science in Seed Technology and Business

STB 501	Strategic Management	2
STB 503	Information Systems	2

STB 504	Marketing and Logistics	3
STB 507	Organizational Behavior	2
STB 508	Accounting and Finance	3
STB 509	International Seed Business Practices, Policies, & Regulation	3
STB 510	Crop Improvement	3
STB 534	Seed and Variety, Testing and Technology	2
STB 535	Introduction to the Seed Industry	1
STB 539	Seed Conditioning and Storage	2
STB 536	Quantitative Methods for Seed	2
STB 543	Seed Physiology	2
STB 547	Seed Production	2
STB 592	Seed Health Management	2
STB 595	Seed Quality, Production, and Research Management	3
STB 599	Creative Component	2-3

*The program also offers two graduate certificates:*

### Graduate certificate in Seed Science and Technology

STB 535	Introduction to the Seed Industry	1
STB/AGRON 536	Quantitative Methods for Seed	2
STB/AGRON 510	Crop Improvement	3
STB/HORT 543	Seed Physiology	2
STB/PL P 592	Seed Health Management	2
STB/AGRON 547	Seed Production	2
STB/AGRON 534	Seed and Variety, Testing and Technology	2
STB/AGRON 539	Seed Conditioning and Storage	2
STB/AGRON 595	Seed Quality, Production, and Research Management	3

### Graduate certificate in Seed Business Management

STB 535	Introduction to the Seed Industry	1
STB/BUSAD 501	Strategic Management	2
STB/BUSAD 503	Information Systems	2
STB/BUSAD 504	Marketing and Logistics	3
STB/BUSAD 507	Organizational Behavior	2
STB/BUSAD 508	Accounting and Finance	3
STB/BUSAD 509	International Seed Business Practices, Policies, & Regulation	3

Graduate certificate courses may be applied to the Master of Science in Seed Technology and Business. Those interested in these graduate certificates should contact the Program for details.

Information on application procedures and specific requirements of the major can be obtained at our website: <http://www.seedgrad.iastate.edu> or by writing to [seedgrad@iastate.edu](mailto:seedgrad@iastate.edu) ([//seedgrad@iastate.edu](mailto://seedgrad@iastate.edu)).

**Courses primarily for graduate students, open to qualified undergraduates:**

**STB 501: Strategic Management**

(Cross-listed with BUSAD). (2-0) Cr. 2.

*Prereq: Admission to the Graduate Program in Seed Technology and Business or approval of instructor must be obtained.*

Critical analysis of current practice and case studies in strategic management with an emphasis on integrative decision making. Strategy formulation and implementation will be investigated in the context of complex business environments.

**STB 503: Information Systems**

(Cross-listed with BUSAD). (2-0) Cr. 2.

*Prereq: Admission to the Graduate Program in Seed Technology and Business or approval of instructor must be obtained.*

Introduction to a broad variety of information systems (IS) topics, including current and emerging developments in information technology (IT), IT strategy in the context of corporate strategy, and IS planning and development of enterprise architectures. Cases, reading, and discussions highlight the techniques and tactics used by managers to cope with strategic issues within an increasingly technical and data-driven competitive environment.

**STB 504: Marketing and Logistics**

(Cross-listed with BUSAD). (3-0) Cr. 3.

*Prereq: Admission to the Graduate Program in Seed Technology and Business or approval of instructor must be obtained.*

Integration of the business functions concerned with the marketing and movement of goods along the supply chain with the primary goal of creating value for the ultimate customer. Coordination of marketing, production, and logistics activities within the firm and with outside suppliers and customers in the supply chain.

**STB 507: Organizational Behavior**

(Cross-listed with BUSAD). (2-0) Cr. 2.

*Prereq: Admission to the Graduate Program in Seed Technology and Business or approval of instructor must be obtained.*

Understanding human behavior in organizations, and the nature of organizations from a managerial perspective. Special emphasis on how individual differences, such as perceptions, personality, and motivation, influence individual and group behavior in organizations and on how behavior can be influenced by job design, leadership, groups, and the structure of organizations.

**STB 508: Accounting and Finance**

(Cross-listed with BUSAD). (3-0) Cr. 3.

*Prereq: Admission to the Graduate Program in Seed Technology and Business or approval of instructor must be obtained.*

Survey of fundamental topics in accounting and finance. Financial statement reporting and analysis for agriculture firms, corporate governance issues related to financial reporting, (e.g., Sarbanes-Oxley). Basic tools and techniques used in financial management, including stock and bond valuation. How to assess and use capital budgeting methods to evaluate proposed firm investments.

**STB 509: International Seed Business Practices, Policies, & Regulation**

(Cross-listed with BUSAD). (3-0) Cr. 3.

*Prereq: Admission to the Graduate Program in Seed Technology and Business or approval of instructor must be obtained.*

Cultural, financial, economic, political, legal/regulatory environments shaping an organization's international business strategy. Topics include entry (and repatriation) of people, firms, goods, services, and capital. Special attention to the institutions of seed regulation and policy. Ethical issues facing managers operating in an international context.

**STB 510: Crop Improvement**

(Cross-listed with AGRON). (3-0) Cr. 3.

*Prereq: Admission to the Graduate Program in Seed Technology and Business or approval of instructor must be obtained.*

A study of agriculture from its origins with the domestication of crop plants through basic genetics, demonstrating the challenges and elements of breeding strategies intended to manage gene x environmental interactions. Elements of biotechnology including use of molecular markers, development of genetically modified cultivars, gene mapping, cloning, and gene editing will be covered. Methods to measure the effectiveness of plant breeding (genetic gain) and the impact of improved agronomic practices contributing to increased agricultural productivity will be covered. Use of intellectual property protection, and the conservation and utilization of exotic genetic resources.

**STB 534: Seed and Variety, Testing and Technology**

(Cross-listed with AGRON). (2-0) Cr. 2.

*Prereq: Admission to the Graduate Program in Seed Technology and Business or approval of instructor must be obtained.*

The components of seed quality and how they are assessed in the laboratory, including traits derived from modern biotechnology. The impact of new technologies on seed quality testing. Variety maintenance procedures and breeder seed. Variety identification: phenotype and grow-out trials, isozyme testing, and DNA marker testing. Procedures for evaluating varieties. The variance tests appropriate for fixed effects analysis of variance. Statistical inference and stratification for yield trials. Use of strip plot testing.

**STB 535: Introduction to the Seed Industry**

Cr. 1.

*Prereq: Admission to the Graduate Program in Seed Technology and Business or approval of instructor must be obtained.*

This introductory course is a quick overview of the academic program and the seed industry. It describes how the STB program components relate to the seed industry scope; the role of the seed industry in global agriculture and society; public and private institutions involved in seed research, development, and regulation; quality management for seed products. Current issues including industry consolidation, ethical and economic issues related to biotechnology, and incorporation of digital technology in the seed business will be discussed by course instructors and guest lecturers from the seed industry.

**STB 536: Quantitative Methods for Seed**

(Cross-listed with AGRON). (2-0) Cr. 2. F.

*Prereq: Admission to the Graduate Program in Seed Technology and Business or approval of instructor must be obtained.*

Quantitative Methods for analyzing and interpreting agronomic and business information for the seed industry. Principles of experimental design and hypothesis testing, regression, correlation, analysis of variance, and graphical representation of data. Use of spreadsheets and statistical software for manipulating, analyzing and presenting data.

**STB 539: Seed Conditioning and Storage**

(Cross-listed with AGRON). (2-0) Cr. 2.

*Prereq: Admission to the Graduate Program in Seed Technology and Business or approval of instructor must be obtained.*

The technical operations which may be carried out on a seed lot from harvest until it is ready for marketing and use. The opportunities for quality improvement and the risks of deterioration which are present during that time. Analysis of the costs of and benefits of operations. Evaluation of equipment based on benefits to the customer and producer. Interpretation of the role of the conditioning plant and store as a focal points within the overall operations of a seed company.

**STB 543: Seed Physiology**

(Cross-listed with HORT). (2-0) Cr. 2. Alt. F., offered even-numbered years.

*Prereq: Admission to the Graduate Program in Seed Technology and Business or approval of instructor must be obtained.*

Brief introduction to plant physiology. Physiological aspects of seed development, maturation, longevity, dormancy and germination. Links between physiology and seed quality.

**STB 547: Seed Production**

(Cross-listed with AGRON). (2-0) Cr. 2.

*Prereq: Admission to the Graduate Program in Seed Technology and Business or approval of instructor must be obtained.*

Survey of crop production; including management of soil fertility, planting dates, populations, weed control, and insect control. Analysis of the principles of seed multiplication and the key practices which are used to ensure high quality in the products. Field inspection procedures and production aspects that differ from other crop production. Foundation seed production. Analysis of the typical organization of field production tasks. Survey of the differences in seed production strategies between crops and the impact of these differences on seed production.

**STB 592: Seed Health Management**

(Cross-listed with PL P). (2-0) Cr. 2. Alt. S., offered even-numbered years.

*Prereq: Admission to the Graduate Program in Seed Technology and Business or approval of instructor must be obtained.*

Occurrence and management of diseases during seed production, harvest, conditioning, storage, and planting. Emphasis on epidemiology, disease management in the field, seed treatment, effects of conditioning on seed health, and seed health testing. Credit may not be obtained for both PI P/STB 592 and PI P 594.

**STB 595: Seed Quality, Production, and Research Management**

(Cross-listed with AGRON). (3-0) Cr. 3.

*Prereq: Admission to the Graduate Program in Seed Technology and Business or approval of instructor must be obtained.*

Advanced survey of the organization, staff capabilities and management characteristics typical in seed production and crop improvement in seed enterprises. Analysis of the use of quality information in the management of seed operations and sales. Process management applications for seed. Production planning for existing capacity. Analysis of the manager's tasks in the annual cycle and how the tasks of these managers relate to the general categories of business management roles. Difference in management strategies used with different situations and groups of employees.

**STB 599: Creative Component**

Cr. 2-3.

*Prereq: Admission to the Graduate Program in Seed Technology and Business or approval of instructor must be obtained.*

A written report based on research, library readings, or topics related to the student's area of specialization and approved by the student's advisory committee.