

Dual-Listed Courses

Departments must request permission to offer courses at the graduate level in conjunction with 300-400 level undergraduate courses. The request is made to the Graduate Curriculum and Catalog Committee. If the dual-listed courses are also experimental courses (400X/500X), submit the experimental course form to the Scheduling Office, 10 Enrollment Services, AND attach an approved copy of the experimental course form(s) to the dual-listed request.

Dual-listed courses permit undergraduate and graduate students to be in the same class but to receive credit under two different course numbers. Credit in the graduate course is not available to students who have received credit in the corresponding undergraduate course. Both graduates and undergraduates receive the same amount of credit for the course, but additional work is required of all graduate students taking the course under the graduate-level course number. This extra work may take the form of additional reading, projects, examinations, or other assignments as determined by the instructor. The instructor must be a member of the Graduate Faculty or a Graduate Lecturer. Each dual-listed course is designated in the catalog with the phrase "Dual-listed with," although the student's official transcript of credits, both graduate and undergraduate, does not identify dual-listed courses as such. There is a limit to the number of dual-listed course credits that may be used to meet the requirement for an advanced degree. (For information about procedures for requesting permission to offer dual-listed courses, faculty should consult the *Graduate Faculty Handbook*.)

In reviewing proposals for dual-listed courses, this committee needs to understand the department's rationale for offering the course. When a department submits a request, an explanation should be given of the purpose served by the course and the criteria used by the department to determine if the course is suitable for dual-listing. Please submit the proposal in electronic form as a word attachment to grad_college@iastate.edu.

The following information should be included in the proposal:

1. Full catalog information for each course to be dual-listed, including the course numbers (or proposed course numbers), title, credits, semester offering (if applicable), prerequisites, and description. Dual-listed courses bear common numbers, e.g., 580 (480).

TSM 455X. Feed Processing and Technology (dual-listed with TSM 555X). (3-0) Cr. 3. F.
Prereq: TSM 322 or ABE 469 or AN S 320 or permission of instructor. Introduction to formula feed manufacturing and the animal feed industry. Overview of feed ingredients and formulation, understanding and operation of feed production processing equipment including principles of conveying, grinding, mixing, conditioning, pelleting, and other processing techniques, and the formulation of concentrates, premixes, and rations. Students will become knowledgeable about the manufacturing of various animal feed types such as pelleted and

extruded feed, aqua (fish) feed, liquid feeds, poured and pressed blocks, steam flaked feed, and pet food, and their effect on animal performance and health.

TSM 555X. Feed Processing and Technology (dual-listed with TSM 555X). (3-0) Cr. 3. F. Prereq: TSM 322 or ABE 469 or AN S 320 or permission of instructor. Introduction to formula feed manufacturing and the animal feed industry. Overview of feed ingredients and formulation, understanding and operation of feed production processing equipment including principles of conveying, grinding, mixing, conditioning, pelleting, and other processing techniques, and the formulation of concentrates, premixes, and rations. Students will become knowledgeable about the manufacturing of various animal feed types such as pelleted and extruded feed, aqua (fish) feed, liquid feeds, poured and pressed blocks, steam flaked feed, and pet food, and their effect on animal performance and health. Research project required for graduate credit.

2. Graduate faculty status of the proposed instructor.
Dirk Maier, full graduate faculty status
3. Number of the dual-listed course credits the department will permit to be used to meet the requirements for an advanced degree. This limit includes dual-listed courses taken in all departments.

No restriction.

4. The differential expectations for graduate students and undergraduates. What additional work will be required for graduate students enrolled in the course? Please describe this work, not in abstract terms (such as "more in-depth participation") but in terms of concrete measurable outcomes or other tangible evidence. Welcome inclusions: specific examples of the additional assignments with details about paper length; the number of additional readings; the length and frequency of oral presentations; portfolio expectations; indications of how these graduate requirements are weighted in the course grade (ex. 40% of final grade); comparisons with undergraduate expectations.

Individual research project required for graduate credit. Graduate students must receive a C or better in the research project in order to pass the class. Grading:

	TSM 455	TSM 555
Reading quizzes	50	50
Lab exercises	250	250
Exam 1	100	100
Exam 2	100	100
Final exam	100	100
Research project	n/a	100
Total	600	700

5. Reason(s) the course is considered sufficiently rigorous and of such an advanced nature as to challenge graduate students.

For many graduate students, this is a new field. Most will not have had background and will be sufficiently challenged. Additionally, graduate students will be required to complete a research project.

The graduate research project will be a thorough literature review detailing the state-of-the-art (theory and practice) and future challenges in a topic related to the course. Such topics might include: feed process efficiency and energy use, process control, a particular feed manufacturing unit operation, life-cycle analyses of feed manufacturing, feed quality, impact of feed quality and manufacturing practices on animal nutrition, medicated feed manufacturing, feed safety and regulations, traceability, or new feed ingredients. Topics must be approved by the instructor.

This project will challenge graduate students to develop depth in their knowledge of a particular area within feed technology at a level approaching that of a practicing professional. Identifying future challenges will require them to synthesize knowledge gained to create new knowledge.

6. Academic advantages and disadvantages accruing to graduate students taking this course with undergraduates.

Advantages

- ability to offer the course when enrollment for either undergraduate/graduate courses are low.
- Undergraduates gain from working along side graduate students.

Disadvantages:

- Advanced topics are explored by graduate students individually through their research projects rather than by the whole class.

7. The place of the course in a graduate student's program of study and why it is not considered a "remedial" undertaking intended to overcome deficiencies in the student's preparation for graduate work.

Undergraduate programs do not have courses in this relatively new area of study. Graduate students would not have had the opportunity for coursework in this area.

8. The role of the course in an undergraduate's degree program and the academic qualifications undergraduates must have to take this course.

This course will be an elective for undergraduates taking the course. We expect students with majors in agricultural engineering, biological systems engineering, agricultural systems technology, industrial technology, animal science, agricultural business and agricultural

studies. This course will be required for a soon-to-be proposed feed undergraduate technology minor. A prerequisite of junior standing or higher will be enforced.

9. The name of the person writing the proposal.
Tom Brumm, Chair, Agricultural and Biosystems Engineering Technology Curriculum Committee.