

## Teacher Education—TE

- 959 Acquisition and Development of Language and Literacy**  
Spring. 3(3-0) Interdepartmental with Counseling, Educational Psychology and Special Education. R: Open only to Ph.D. students in the College of Education.  
Literacy development including oral language base from birth through adulthood. Oral and written language development and learning in and out of school. Sociocultural contexts in relationship to schooling. Cross-cultural and international literacy development. Schooling, global economy, world health, and post-colonialism.
- 960 Language, Literacy, and Educational Policy**  
Fall of odd years. 3(3-0)  
Policy in relation to framing curriculum. The linguistic nature of pupil assessment. Gatekeeping functions of schools.
- 965 The Craft of Policy Analysis in Education**  
Spring of odd years. 3(3-0)  
Framing problems, devising alternative solutions, and predicting impacts.
- 970 Curriculum and Pedagogy in Teacher Education**  
Spring of even years. 3(3-0)  
Teacher learning opportunities at the preservice, induction, and inservice levels. Intended and enacted curriculum, sources of pedagogy, and their impact on teachers' knowledge, skills, and attitudes.
- 971 Teacher Learning in School Settings**  
Fall of odd years. 3(3-0)  
Research about school-based learning by prospective, beginning, and experienced teachers. Observation, conversation, writing, and classroom research as tools for improving teaching.
- 975 Policy Perspectives on Teaching and Teacher Education**  
Fall of even years. 3(3-0)  
Policy issues such as teacher accountability, teacher knowledge, and political influence.
- 982 Seminar in Curriculum, Teaching, and Educational Policy**  
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 10 credits in all enrollments for this course.  
Intensive study in an area of curriculum, teaching, and learning; educational policy and social analysis; or teacher education and teacher learning.
- 990 Independent Study**  
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 10 credits in all enrollments for this course. R: Open only to doctoral students.  
Supervised individual study in an area of curriculum, teaching, and educational policy.
- 991 Special Topics in Curriculum, Teaching, and Educational Policy**  
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 9 credits in all enrollments for this course.

- 991A Special Topics in Science Education**  
Spring of even years. 1 to 6 credits. A student may earn a maximum of 6 credits in all enrollments for this course.  
Special topics in science education.
- 994 Laboratory and Field Experience in Curriculum, Teaching, and Educational Policy**  
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Open only to doctoral students. Approval of department.  
Supervised practica, observations, and internships in an area of educational policy and social analysis, teacher education and teacher learning, and curriculum, teaching and learning.
- 995 Research Practicum in Curriculum, Teaching, and Educational Policy**  
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 3 credits in all enrollments for this course. R: Open only to doctoral students in the College of Education. Approval of department.  
Supervised research practicum. Design, execution, analysis, presentation, critique, and revision of research projects.
- 999 Doctoral Dissertation**  
Fall, Spring, Summer. 1 to 24 credits. A student may earn a maximum of 100 credits in all enrollments for this course. R: Open only to doctoral students in the Department of Teacher Education.  
Doctoral dissertation research.

- 223 Fundamentals of Automation and Controls**  
Fall. 4(3-2) P: (TSM 121) Not open to students with credit in AE 083.  
On-off controllers for electric actuators. Installation according to code. Ladder-logic. Programmable logic controllers. Installation and programming. Interfacing to a computer.
- 224 Digital Systems, Sensors and Measurements**  
Spring. 3(3-3) P: (TSM 121 or PHY 184) Not open to students with credit in ECE 230.  
Electrical components in transient and steady state operation. Thermo-electric, piezoelectric, magnetic, resistive and capacitive sensors. Electro-optical devices. Digital circuits. Data acquisition. Field trip required. Offered first ten weeks of semester.
- 341 Power and Machinery Systems**  
Fall. 3(2-2) P: (PHY 231 and TSM 122 and TSM 223 and TSM 224 and CEM 141) or (BE 456 and TSM 224 and CEM 141) or (LBS 171 and TSM 122 and TSM 223 and TSM 224 and LBS 172) or (BE 456 and TSM 224 and LBS 172)  
Principles, performance, operation, and management of agricultural machine systems and tractors.
- 342 Power and Control Hydraulics**  
Spring. 3(2-2) P: (TSM 341) or (BE 331 and ECE 345) Not open to students with credit in BE 430.  
Properties of hydraulic fluids. Fixed and variable displacement pumps and motors. Control valves and circuitry. Measurement and analysis of hydraulic systems. Component selection.
- 343 Implementation of Precision Agriculture**  
Spring. 3(2-2) P: (TSM 341 and GEO 221)  
Global positioning systems (GPS), yield monitors, computer software. Analysis and interpretation of field maps. Variable-rate application. Economics of precision agriculture.

## TECHNOLOGY SYSTEMS MANAGEMENT TSM

### Department of Biosystems and Agricultural Engineering College of Agriculture and Natural Resources

- 121 Fundamentals of Electricity**  
Fall. 4(3-2) P: (MTH 103 or MTH 116 or MTH 124 or concurrently) Not open to students with credit in AE071.  
Application of Ohm's law. Kirchoff's laws. Series and parallel circuits. Inductive and capacitive reactance. Power factor. Practical single and three-phase electrical systems. Electromagnetic induction. Transformers. Environmental constraints in power use and production.
- 122 Alternating and Direct Current Machines**  
Spring. 3(3-3) P: (TSM 121) Not open to students with credit in AE 084.  
Types and characteristics of electric motors. Connecting, reversing and servicing of AC and DC motors and drives. Stepper motors. Variable frequency drives for induction motors. Offered first ten weeks of semester.
- 351 Information Technology in Agricultural Systems**  
Fall. 3(2-2) P: (CSE101)  
Applications and trends in information systems. Evaluation and use of computer systems, peripherals, networks, presentation systems, and communication systems.
- 481 Technology Systems Management - Capstone I (W)**  
Fall. 3(3-0) P: (TSM 341 and TSM 342 and TSM 343 and TSM 351 and ABM 332) and completion of Tier I writing requirement. R: Open only to seniors.  
Project management. Integration of technology systems concepts. Teamwork and leadership skills. Financial and time constraints. Ethics, safety, and liability. Expectations of society.
- 482 Technology Systems Management - Capstone II**  
Spring. 3(0-6) P: (TSM 481)  
Team project in technology systems management. Field trips required.