

# SYSTEMS (SYGN)

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## **SYGN398. SPECIAL TOPICS. 1-6 Semester Hr.**

(I, II, S) Pilot course or special topics course. Topics chosen from special interests of instructor(s) and student(s). Usually the course is offered only once, but no more than twice for the same course content. Prerequisite: none. Variable credit: 0 to 6 credit hours. Repeatable for credit under different titles.

## **SYGN498. SPECIAL TOPICS. 1-6 Semester Hr.**

(I, II) Pilot course or special topics course. Topics chosen from special interests of instructor(s) and student(s). Usually the course is offered only once. Prerequisite: none. Variable credit; 1 to 6 credit hours. Repeatable for credit under different titles.

## **SYGN498. SPECIAL TOPICS. 1-6 Semester Hr.**

(I, II) Pilot course or special topics course. Topics chosen from special interests of instructor(s) and student(s). Usually the course is offered only once. Prerequisite: none. Variable credit; 1 to 6 credit hours. Repeatable for credit under different titles.

## **SYGN501. RESEARCH SKILLS FOR GRADUATE STUDENTS. 1.0 Semester Hr.**

(I, II) This course consists of class sessions and practical exercises. The content of the course is aimed at helping students acquire the skills needed for a career in research. The class sessions cover topics such as the choice of a research topic, making a work plan and executing that plan effectively, what to do when you are stuck, how to write a publication and choose a journal for publication, how to write proposals, the ethics of research, the academic career versus a career in industry, time-management, and a variety of other topics. The course is open to students with very different backgrounds; this ensures a rich and diverse intellectual environment. Prerequisite: None. 1 hour lecture; 1 semester hour.

### **Course Learning Outcomes**

- n/a

## **SYGN502. INTRODUCTION TO RESEARCH ETHICS. 1.0 Semester Hr.**

A five-week course that introduces students to the various components of responsible and research practices. Topics covered move from issues related to the planning of research through the conducting of research to the dissemination of research results. The course culminates with students writing and defending their ethics statements. 1 hour lecture/lab; 1 semester hour.

## **SYGN503. TOOLS FOR SUCCESS: INTEGRATING INTO THE MINES COMMUNITY. 1.0 Semester Hr.**

(I, II) Designed for both incoming and experienced international graduate students who want to strengthen their professional skills for their degree programs and careers. Through engaging materials and conversation, students learn how to more confidently meet expectations, develop an effective professional relationship with their advisor and others on campus, strengthen communication skills, upgrade the quality and efficiency of their writing and presentations, and resolve conflict. Offers a relaxed, friendly space for students to explore questions regarding the cultural and academic transitions they are making and to share strategies for success. 1 hour lecture; 1 semester hour.

### **Course Learning Outcomes**

- Same

## **SYGN505. WELLNESS PRACTICES FOR GRADUATE STUDENTS. 0.5 Semester Hrs.**

Graduate school is a time of growth and development that is exciting but may come with external and internal pressure and stress. Graduate school is also the time when we develop habits that we take with us in our professional life. This class focuses on practices that improve the wellbeing of graduate students by addressing issues and situations that are relevant for graduate school (e.g., activity management and the guilt trap, working with your advisor), as well mental skills and habits (e.g., emotional management, emotional intelligence, and having difficult conversations) that are relevant in graduate school and beyond. This class supports the development of well-rounded graduate students that thrive in graduate school.

### **Course Learning Outcomes**

## **SYGN550. INTELLIGENT GEOSYSTEMS. 3.0 Semester Hrs.**

Geosystems are natural or engineered earth structures, e.g., earth dam or levee, groundwater system, underground construction site, contaminated aquifer. An intelligent geosystem is one that can sense its environment, diagnose its condition/state, and provide decision support to improve the management, operation or objective of the geosystem. The goal of this course is to offer students background material in this interdisciplinary field. The course will consist of the following five modules: SmartGeo Overview, Sensing, Data Processing, Modeling, and Decision Support. Prerequisite: Graduate standing. 3 hours lecture; 3 semester hours.

## **SYGN555. SMARTGEO SEMINAR. 1.0 Semester Hr.**

Geosystems are natural or engineered earth structures, e.g. earth dams or levees, groundwater systems, underground construction sites, and contaminated aquifers. An intelligent geosystem is one that can sense its environment, diagnose its condition/state, and provide decision support to improve the management, operation, or objective of the geosystem. The goal of this course is to introduce students to topics that are needed for them to be successful working in a multi-disciplinary field. The course will include training in leadership, multidisciplinary teams, policy and ethical issues, and a monthly technical seminar. Prerequisite/Corequisite: SYGN550. 1 hour lecture; 1 semester hour credit.

## **SYGN588. GIS-BASED REAL WORLD LEARNING PROJECT I - FUNDAMENTALS. 1-6 Semester Hr.**

This course requires a GIS-based project and report that demonstrate competence in the application of GIS to real world problems. The project topic and content of the report is determined by the course instructor, in consultation with the student. The format of the report will follow the guidelines for a professional journal paper. Variable credit: 1 to 6 credit hours. Repeatable for credit under different topics/experience and the cumulative maximum is 6 credit hours and 3 repeats total.

## **SYGN590. GIS-BASED REAL WORLD LEARNING PROJECT II - ADVANCED APPLICATIONS. 1-6 Semester Hr.**

This course requires a GIS-based project and report that demonstrate competence in the application of GIS to real world problems. The project topic and content of the report is determined by the course instructor, in consultation with the student. The format of the report will follow the guidelines for a professional journal paper. Variable credit: 1 to 6 credit hours. Repeatable for credit under different topics/experience and the cumulative maximum is 6 credit hours and 3 repeats total.

## **SYGN598. SPECIAL TOPICS. 6.0 Semester Hrs.**

(I, II, S) Pilot course or special topics course. Topics chosen from special interests of instructor(s) and student(s). Usually the course is offered only once, but no more than twice for the same course content. Prerequisite: none. Variable credit: 0 to 6 credit hours. Repeatable for credit under different titles.

**SYGN600. COLLEGE TEACHING. 2.0 Semester Hrs.**

This course is designed for graduate students planning careers in academia and focuses on principles of learning and teaching in a college setting; methods to foster and assess higher order thinking; and effective design, delivery and assessment of college courses. Prerequisite: None. 2 hours lecture; 2 semester hours.

**SYGN683. ORAL COMMUNICATION SKILLS. 1.0 Semester Hr.**

This course is designed for ME, MS and PhD students and focuses on designing and delivering technical presentations. Course assignments will be based on technical and non-technical material relating to earth, energy, and the environment and will include the topics of professionalism, ethics and diversity. Students will work individually and in multicultural teams on assignments. There are no prerequisites for this course, however, proficiency with the English language, both oral and written, is expected prior to enrollment.

**Course Learning Outcomes**

- Identify ethical considerations in technical communication.
- Identify audience considerations in technical communication.
- Prepare and deliver technical presentations.

**SYGN684. WRITING SKILLS. 2.0 Semester Hrs.**

This course is designed for MS and PhD students and will focus on the research process and the technical writing process. Course assignments will be based on technical and non-technical material relating to earth, energy, and the environment and will include the topics of professionalism, ethics and diversity. Students will work individually and in multicultural teams on assignments. There are no prerequisites for SYGN684, however, proficiency with the English language, both oral and written, is expected prior to enrollment.

**Course Learning Outcomes**

- Analyze and critique peer-reviewed journal articles
- Organize information and write technical documents including memos, abstracts, proposals, thesis/dissertations, and formal analytical reports.
- Discuss workplace and societal issues including professionalism, ethics, and diversity.